

Chapter 2

Meeting Social Challenges in Developing Sustainable Environmental Infrastructures in East African Cities

Peter Oosterveer and Gert Spaargaren

Abstract The slum population in sub-Saharan Africa is expected to grow from 101 million in 1990 to 313 million in 2015. Modernizing sanitation therefore has to adapt to the context of cities with high densities of poor people under the conditions of absent or fragmented environmental infrastructures and services. Addressing this problem requires an integrated approach that deviates both from the Western large-scale, high-technological, and grid-based systems, as well as from the small-scale, low-tech, decentralized alternative options. A Modernized Mixtures approach should be developed that combines the strong elements from these opposing alternatives. This chapter presents the Modernized Mixtures approach and its contribution to sustainability. It discusses the contribution this approach can make to improving accessibility of urban infrastructures for the poor, while strengthening flexibility and resilience. It is argued that the successful introduction of a Modernized Mixtures approach to urban environmental infrastructures in East African cities requires the careful consideration of social and political factors next to technological innovation.

2.1 Introduction

Africa is going through a process of rapid urbanization. Whereas in the early 1900s, 95% of Africa's population was rural, by 2010 at least 43% of the population will be urbanized (Boadi et al. 2005). The large majority of these new urbanites lives in unplanned, or informal, settlements and therefore the slum population of sub-Saharan Africa is expected to grow from 101 million in 1990 to 313 million in 2015 (Kombe 2005; UNDP 2005). These rapid changes in housing practices signify serious challenges for these people themselves as well as for municipal authorities.

Municipal authorities are faced with the task to provide the expanding populations with adequate infrastructures and services for water, sanitation and solid waste.

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Assuring these facilities is particularly difficult because they target predominantly low-income settlements with high population densities and high illiteracy rates, under very low living and livelihood security standards, where formal property rights and land titles are absent and existing infrastructures and access to other social services are rather poor. Currently most people in the larger African cities are forced to assure their access to environmental facilities themselves, often against high costs. The resulting poor and inadequate water provision, failing solid waste management and incomplete sanitation facilities result in health hazards and waste materials polluting water, soil, and air. Well-managed systems for piped water, sanitation, drainage, and garbage removal would greatly diminish the health hazards to which city residents are currently exposed and reduce their poverty, even without increasing their income (Satterthwaite 2004). Creating reliable urban environmental infrastructures and services is therefore recognized as of key importance by the African governments and within international development cooperation as expressed in the seventh Millennium Development Goal (MDG) (UN-Habitat 2006). Realizing this shared objective in a sustainable manner is however complicated. The absence of formal governmental interference and the unplanned nature of many neighborhoods, necessitates radical adaptations in technologies, socio-economic management arrangements, and governmental policies. This chapter elaborates on the challenges and opportunities to provide sustainable sanitation and solid waste services in informal settlements under these conditions and thereby makes use of recent research in Africa, particular in urban centres of East Africa (Kenya, Tanzania and Uganda). This is done from a social science perspective. First, we discuss in some more detail the problem of urban environmental infrastructure provision under situations of low living and livelihood standards. We argue for the need to develop an approach to infrastructure provision which better fits the local conditions in both social and technological respects. This so-called Modernized Mixtures approach is illustrated with some examples taken from an ongoing research project on environmental infrastructures in East Africa.¹ Particular attention is paid to the political (planning) aspects of Modernized Mixtures at different levels of scale. We conclude by discussing the potentials of the suggested Modernized Mixtures approach for research and policy making on environmental infrastructures.

2.2 Two Opposing Views on Urban Environmental Infrastructures

Over time, particularly since the nineteenth century Industrial Revolution, many European and other Western countries have successfully established reliable urban environmental infrastructures through installing large centralized systems (Guy

¹This research is undertaken within the framework of the PROVIDE project. Funded by Wageningen University, PROVIDE focuses on and contributes to the improvement of sanitation and solid waste management in East Africa (Kenya, Uganda and Tanzania) with an emphasis on the Lake Victoria Region. See: www.provideafrica.org

and Marvin 1996). Most towns and villages in OECD countries currently have a well-developed sewage system as a central grid connecting most houses to a waste water treatment plant for processing and discharging waste. All connected households have to pay substantial fees to contribute to the development and maintenance of these systems, while keeping up the quality standards and provisions which are laid down in governmental laws and urban by laws. Solid waste collection and treatment systems follow a similar logic of centralized organization and treatment, mostly ending in sanitary landfills or large incineration plants.

Despite their intention to copy this example, most cities in developing countries have not achieved such a modernization of their facilities. Urbanization under conditions of poverty has given rise to peculiar urban land development patterns, that is informal settlements, that are defying spatial planning theories used to applying master and structure plans (Kombe 2005). Such informal settlements are the result of a dynamic, largely self-managed land development process based on social trust and support mechanisms from social actors at the grass roots. Urban authorities have been far less successful in implementing large infrastructural systems than in OECD countries as they face a number of pertinent and persistent problems, in particular the lack of adequate material and human resources but also specific ecological, institutional, political and cultural challenges (see Box 2.1). Though some cities possess a central sewerage system

Box 2.1 The history of sanitary infrastructure in Uganda

The British completed the first central sewerage system in Kampala by 1939, which included 35 miles of sewers and 27 miles of storm water drains (Nilsson 2006). Development of piped water supply also started during the colonial period in the 1940s. The majority of the systems were constructed from 1950 to 1965, mainly to serve the workers and the small commercial communities. In Uganda in the 1960s sanitation and environmental health were well supported and latrine coverage was high (90–96%). At the time the urban population was much smaller than today. In the 1970s and early 1980s the political turmoil and breakdown of law and order reduced latrine coverage to 30% in 1983. No new schemes were constructed between 1965 and 1990. Only maintenance of the existing schemes was done, but even this was poor. By 1990 virtually the whole urban water infrastructure was run down and serving less than 10% of the population in the large towns.

In the late 1980s a fresh effort was made to accelerate the promotion of sanitation from new projects. The National Water and Sewerage Corporation was established as a government parastatal with a mandate to operate and provide water and sewerage services in areas entrusted to it on a sound commercial and viable basis. The rest of the water supplies were operated by the Directorate of Water Development. By 1990, there were only 37 urban water systems including those under the NWSC (Mubeezi 2007).

dating from the colonial era, which mostly only covers the central business district and some richer areas, even maintaining these often overburdened systems constitutes a challenge. Paying for the necessary investment and operational costs of such infrastructures bleeds money out of the social system and runs counter to catering for other local needs.

In response to these limitations in government-managed systems, alternative approaches are suggested and particularly privatization is repeatedly considered a solution, as private companies are expected to be more efficient and more responsive to client demands. However, the pressure to introduce (full) cost recovery for collection and processing and for managing sanitary infrastructures forces private companies to seek rents from serving (only) the higher income areas or fully paid services, leaving poor and marginal areas under the responsibility of under-resourced local authorities and Community Based Organizations (CBOs). However, whether publicly or privately managed, many of the large scale infrastructural systems in developing countries prove to be limitedly resistant against the political, economic, ecological and social instabilities they face, leading to poor environmental performances and perpetual breakdowns, due to lack of proper maintenance or timely investments.

In response to these problems with large centralized environmental infrastructures, alternative solutions, particularly small-scale and decentralized systems (Schumacher 1973), are proposed. Decentralized sanitation and reuse (DeSaR) systems were developed partly in opposition to centralized ones (Mels et al. 2005) and claim to be more robust, cheaper and better able to deal effectively with environmental challenges like high levels of water consumption and indiscriminate discharge of potentially valuable substances (Lens et al. 2001, 2003; Otterpohl et al. 1997).² Improved pit latrines, small-scale household composting and other decentralized systems for reuse of solid waste are widely considered a potential solution for developing countries. While this appropriate technology (AT-)paradigm has certainly booked major results, it remained being considered a simple, second-best technology paradigm, useful in situations where the finances, technological capabilities and organizational capacities were severely limited. Where introduced, these technologies offer solutions for individual households but they do not solve the massive challenges of addressing the sanitation challenges of large cities in developing countries. Both users and local authorities consider such technologies 'low quality'. In practice, these first generation decentralized, 'appropriate' technologies are being replaced with more advanced systems as soon as the social, economic and technological conditions allow for it. Large cities in developing regions such as East Africa are therefore faced with the dilemma of which path to choose for improving their sanitation and solid waste infrastructures as both large-scale centralized systems and small-scale decentralized systems each show serious weaknesses.

²See also Hukka and Katko (2003), Mistra (2002), Seppälä et al. (2004), Van Vliet (2006) and Hegger (2007) for attempts to apply DeSaR technologies in urban settings.

2.3 Modernized Mixtures for Improving Urban Environmental Infrastructures

Providing sanitation and solid waste services, if this is to contribute to improving daily lives of the urban poor in East Africa, has to be adapted to the context of cities with high population densities, with people living in informal communities where environmental infrastructures are fragmented or completely absent.

For this, the first generation of decentralized systems (appropriate technologies) has to be replaced with a second generation that offers more sustainable alternatives both from technical and from social points of view. We suggest the concept of Modernized Mixtures (Spaargaren et al. 2006) referring to the development of systems which ‘build upon’ decentralized units of the DeSaR-type but which try to create solutions at a larger scale and take into account the specific local conditions of developing countries. Applying such a Modernized Mixtures (MM) approach to sustainable urban development means the introduction of an ‘organized eclecticism’ by combining various levels of scale, strategies, technologies, payment systems and decision-making structures, to create a better fit with the physical and human systems for which they are designed. This approach is referred to as ‘mixture’ because it takes the best features out of both (modern) decentralized and centralized systems, and combines them into hybrid solutions which better fit the local situation.

When working with MM, one leaves behind the (essentially) false dichotomy dividing centralized, large-scale, high-tech solutions from decentralized, appropriate, small scale and low-cost technology solutions. Instead, the best of both paradigms has to be combined into configurations that represent the low cost, accessible and robust performance of decentralized systems while at the same time realizing the economies of scales and high urban density-capacity characterizing centralized systems. DeSaR-like systems have turned out to be performing best in close relationship with or even in certain dependency from (elements of) conventional large scale socio-technical systems (Lens et al. 2001, 2003; Van Vliet 2006).

Figures 2.1 and 2.2 together illustrate the basic notions of the MM approach, bringing together elements from both paradigms in a number of options and strategies, adapted to the particular infrastructural, institutional, economic and ecological contexts. Figure 2.1 represents the relevant dimensions that have to be taken into account when developing urban environmental infrastructures for water and waste(water) services, while Fig. 2.2 illustrates some possible ways in which these dimensions can be combined into specific Modernized Mixtures.

By moving towards the upper-right corner in the model, infrastructures tend to resemble the large scale publicly-managed, central grid-based systems in industrialized, developed countries. Moving to the bottom-left corner in this model visualizes the decentralized, small-scale systems (like EcoSan) developed in the past for developing countries as well as particular DeSaR-solutions for industrialized countries. The third example shows different Modernized Mixtures, adapted to the specific local contexts and requirements. Integrating knowledge with respect to all relevant dimensions is needed to optimize the chances for socio-technical systems to fit into the specific local social and technical conditions.

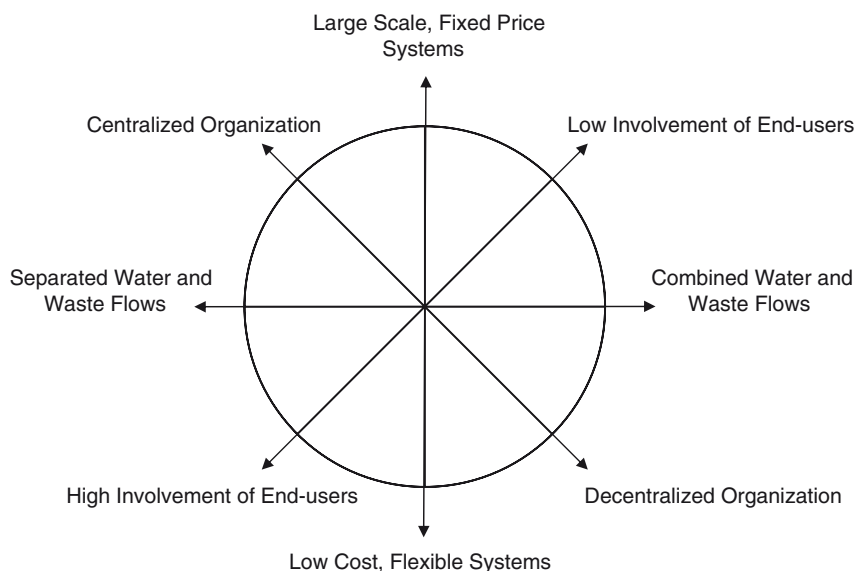


Fig. 2.1 Dimensions of environmental infrastructures (Spaargaren et al. 2006)

This new, hybrid paradigm can be characterized by its multidimensional character in technological (scale, process and combination of water and waste flows) and management/governance respects (involvement of end-users, financial arrangements and organizational set-up). In addition, MM opts for an integrated approach, including all steps in the urban solid waste and the sanitation chains, combining multiple scales in organization, management and governance, and requiring the inclusion of technical as well as social scientific knowledge. The objective of introducing MM is to create a 'fit' between different infrastructural options and the prevailing socio-economic, ecological, technological, and political conditions. For realizing this objective one has to develop and built upon a profound understanding of the specific (urban or semi-urban) settings in which these infrastructures are to be realized. This understanding will allow the involved stakeholders to answer the question, which technological options (and combinations) are realistically possible in the context of their particular cities. This means that each city, or even each neighborhood, will require a specific mixture of technologies and institutional arrangements. Hence, promoting MM means promoting a modular approach to urban environmental facilities and not a one-size-fits-all solution.

In order to provide adequate solutions, MM approaches should be ecologically and institutionally sustainable, accessible (particularly for the poor), and institutionally and technically flexible, resilient and robust. These criteria are all relevant but their exact meaning in the context of particular cities and their relative weight cannot be determined beforehand. Nevertheless some further thought on their connotation can be helpful here. Accessibility reflects the extent to which specific groups within the urban population, such as women, poor or elderly, are included

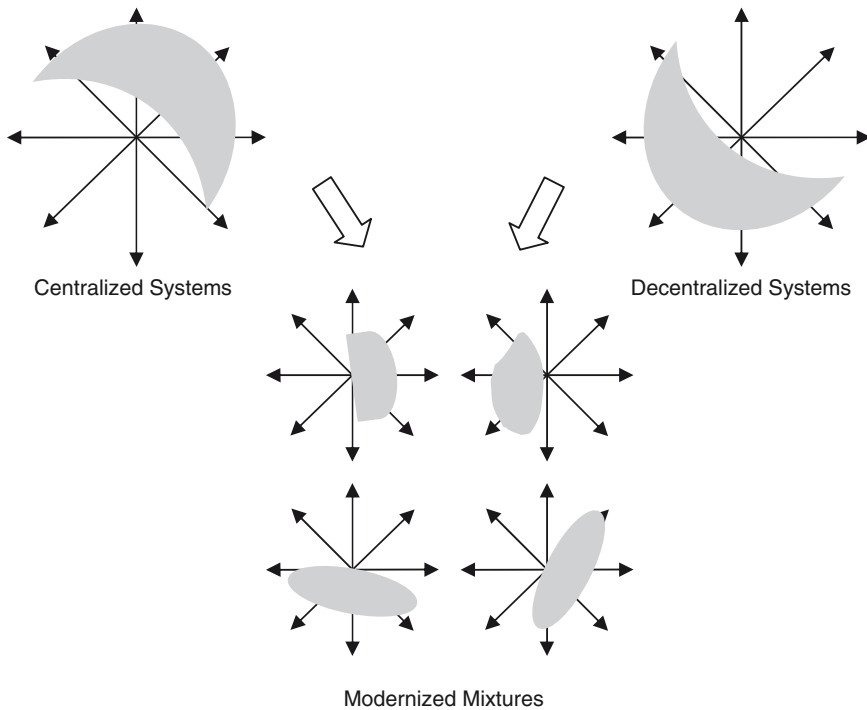


Fig. 2.2 Modernized mixtures (MM) as alternative to centralized and de-centralized systems (Spaargaren et al. 2006)

or excluded from receiving sanitary infrastructures and services due to financial, physical, or cultural reasons. The flexibility criterion points at the way a sanitation system might fit into more encompassing systems to be developed in the future, while also describing how the systems behave in times of instability of climatic, political, or economic nature. The sustainability requirement can be distinguished in institutional and ecological sustainability. Institutional sustainability concerns the extent to which a new system becomes embedded in existing socio-political and cultural systems at the local and national level, while improving their performance. Ecological sustainability refers to the achievements in waste prevention (reducing the need for final disposal of the waste) and reducing the demand for inputs, in particular water and energy. The criteria should be further developed through stakeholder workshops to elaborate the particular connotation in the specific context and their relative importance enabling a comparison between different options (See Van Buuren and Hendriksen in [Chapter 6](#) of this volume). This way a matrix can be developed, where criteria are set and indicators for measurement applied.

Introducing MM may be complicated as existing systems and practices are stabilized through multiple levels of scale and numerous social actors, thereby creating various ‘lock-in’ effects (cf. Geels 2004, 2005, 2006; Geels et al. 2004).

Socio-technical systems such as urban environmental infrastructures also involve larger regimes, that is shared routines or rules that co-ordinate activities. Such regimes may, for example, include technical standards and governmental rules that favor particular technologies, policies, or cultures. Resource management institutions are not just formalized, visible entities but also manifestations of negotiated social practices, located both locally and in wider contexts of history and economy. In addition, people differ in their capacity to shape collective institutions; some command more authoritative resources and are better placed to negotiate rules than others. Regimes may change through different trajectories, carried and enacted by different social groups. Radical innovations may have survived as niches and only become mainstream as a result of mal-adjustments and tensions in the dominant regimes (Walker 2000). Innovations may also be enforced by one or more actors within the dominant regime, such as governments and private companies. The absence of 'conventional' large-scale systems in most East African cities gives alternative, decentralized technologies for sanitation and solid waste management a fair chance of developing into a wider regime for the sustainable provision of environmental services, as pressure on authorities to solve these urgent matters is growing (Geels 2005; Kemp et al. 1998). Alternatively, the limitations in locally available material and financial resources in combination with a high dependency from international donor funds may restrain these perspectives.

When suggesting MM-solutions, specific attention needs to be given to the importance of combining technical and social elements in identifying the correct mixture of options. Urban environmental infrastructures and services are particular because they involve different dimensions and different levels of scale. Environmental infrastructures obviously have a technological dimension, but they need to be implemented and managed in order to fulfill their task. At the same time they also need to accommodate the (sometimes widely diverging) local cultural practices and perform in a sustainable manner to prevent negative environmental impacts. Furthermore, managing these infrastructures effectively also requires some form of coordination between institutions and actors at multiple scales: neighborhood, city, national-level, and sometimes even the global level. The environmental flows approach (Mol and Spaargaren 2006) suggests a way to integrate these different dimensions when addressing urban environmental infrastructures. This approach studies the material flows, such as waste or water, and their interaction with the relevant socio-cultural, institutional and ecological environment starting from their generation, via their collection, treatment, eventual reuse, up to their final discharge. These material flows are channeled through networks and scapes together with non-material flows of money, information and people. Both material and non-material flows are constitutive for the environmental infrastructures.

When applying such an (environmental) flows perspective to urban infrastructure provision it is important to note that the networks and scapes organizing the different flows are not homogeneous in character. In the context of solid waste and (waste) water chains the distinction between up-stream and down-stream actors, processes and relationships is of particular importance. Material flows should be approached in an integrated way, taking into account the process from generation

to final disposal of (solid) wastes. While traveling through (sanitary) chains and networks however, these flows connect fundamentally different social practices (Giddens 1984). Social actors and institutions involved in the generation and primary collection of sanitation and solid waste (down-stream) differ in some essential ways from those involved in practices of secondary collection, treatment and disposal (up-stream). While the first, down-stream phase is dominated by domestic rationalities and household practices, the second, up-stream phase is primarily characterized by system rationalities of technological and economic nature. Acknowledging the existence of these different rationalities makes the point or location where both rationalities meet of particular importance from a theoretical and policy perspective.³ At this location, the different practices and their associated rationalities have to become mutually adjusted and accommodated in order to make possible a more effective, integrated operation and management of infrastructural systems and their environmental flows.

In East Africa, the MM approach may originate from already existing local solutions which then will have to be considered as potential building blocks for larger systems and dealt with within the frame of the complete waste-water-chain, from the local up to the regional and international levels. These considerations may serve as guidance for assessing the feasibility of Modernized Mixtures.

2.4 Perspectives for a Modernized Mixture-Approach in Urban Centres in East Africa

The absence of large sewerage systems, the unsustainability of most existing decentralized installations in combination with the rapid population growth make the task of improving urban sanitary infrastructures in East Africa a pressing need. Under these conditions, the Modernized Mixtures perspective (MM) may serve as a useful guide. In this section we further concretize the MM perspective by discussing some findings both from the literature on environmental infrastructures and from different case-studies in East Africa.⁴

When compared to the situation in many OECD countries, the existing environmental infrastructures in East African urban centres do not contain many lock-in effects for alternative approaches. The most widely used sanitary facilities in poor neighborhoods are pit latrines and they are occasionally supplemented with flushing toilets and septic tanks (Sano 2007). Such conventional pit latrines constitute a traditional and cheap way to handle human waste and require little maintenance. However, they do not provide much comfort, attract flies and can be a source of

³Examples of such a location – referred to in the literature as consumption junction (Schwartz-Cowan 1987) – are toilets in general or skips, or containers, used in many African cities as collection points for domestic solid wastes.

⁴The case-studies were performed in the context of the PROVIDE project. See footnote 1.

various diseases, so users will not necessarily hang on to them. On the other hand, the automatic flushing toilets connected to septic tanks which constitute the preferred system for most citizens as this option offers comfort comparable with Western cities, are faced with problems as well. Septic tanks are expensive and therefore not affordable for the majority of the urban population and they cease to work properly when they are old and over-utilized, potentially causing serious environmental and public health problems. As for the management of urban solid wastes, the situation is not very different: separate waste collection schemes are almost absent, waste littering is omnipresent, and infrastructures for channeling the waste flows are fragmented and underdeveloped. Since the currently applied technologies face serious challenges, there is room for introducing novel options.

Appreciating these novel options requires an integrated flows perspective from waste generation to discharge, combining social and technological dimensions and accommodating different levels of scale. Our intention here is not to present one fixed and fully elaborated alternative model, but to present experiences and views that may provide a basis for introducing varied sanitary systems and services that are flexible, accessible, and sustainable. As for example Kyessi (2005) has illustrated for the case of water provision, it is important that technological options should not be developed as part of fixed models, but with a special eye on the poor, as an important element in creating different, flexible models with enough room for progressive improvements. In what follows we present experiences and views concerning the development of sanitary systems at four levels: household, community, city and national level. For all these we focus in particular on the socio-cultural and political dimensions of the MM's to be developed in East Africa.

2.4.1 Households and Their Socio-Cultural Norms

The main end-users of sanitation facilities and services are located in households where people live and sometimes also work together. Understanding household dynamics and their interaction with the other elements in the waste and sanitation systems is therefore essential. Targeting the urban poor requires understanding their way of life, including their particular culture, household-composition and dynamics, food-security and income-generating strategies in combination with the relevant formal and informal institutional settings. Among these household dynamics we find tenure arrangements and cultural dynamics as particularly relevant, as will be further elaborated below.

Informal or irregular settlements comprise between 30% and 70% of the population in the large cities of the developing world and up to 85% of the new housing stock is produced in an extra-legal manner. The present statutory and customary tenure systems fail to meet the needs of the lower-income groups so traditional practices of land delivery persist and an organic process of human settlement evolution continues. In most African countries, the currently existing institutions of land management were inherited from the colonial era and have, for various reasons, undergone little modification to reflect changing circumstances. As a result, they have been described

Box 2.2 Access to land for housing in Kampala, Uganda

In Kampala, access to land has predominantly relied on the initiative of the households concerned, often undertaken outside the minimally enforced state regulator framework. These households have to some extent used the niches created by the complexity of tenure rules in the city and by administrative turmoil, in order to informally access land for shelter. Most households do not have official titles because processing a title is a lengthy, cumbersome and expensive venture. Moreover, most families in informal neighborhoods settle on marginal land, which is legally inalienable for development and cannot be titled at all. Furthermore, most landholdings in these informal settlements are too small according to the legal standards. Kampala City Council requires that plots be surveyed only in blocks, to allow some planning of the neighborhood. However, given the nature of sub-divisions in these informal settlements this is hardly possible. In addition, for those who buy land from occupants (as opposed to registered owners), a second payment would have to be made to the titleholder before the latter could sign the transfer form necessary for processing the title. This is, in essence, paying for the land twice and thus a disincentive to land registration (Nkurunziza 2007).

by many as inappropriate, alien, expensive and cumbersome. Formal regulations have not been effective in replacing customary ways of accessing land and housing. So, in reality formal and informal institutions exist next to each other; poor households borrow from or utilize state rules where appropriate and circumvent them when they consider them unaffordable or retrogressive. See Box 2.2 for an exemplary case on Kampala, illustrating the complexities surrounding access to land.

When it comes to developing sanitation infrastructures, particular cultural dynamics tend to be ignored, although they turn out to be highly relevant for the acceptance and ways of use by households. For instance, Scheelbeek (2006) found that the numerous Muslim families in Mwanza (Tanzania) make particular demands on the design of sanitary facilities. According to their norms and believes these facilities should meet several prerequisites:

- The toilet should not face the eastern direction (or kibra).
- There should always be water available for cleaning body parts in close vicinity of the toilet itself.
- Flush toilets should be provided with a lid to avoid water splashing out of the toilet; if a person gets in contact with splashed water, the whole body has to be washed to consider it again as holy.
- The toilet should be separated from the bathroom; this implies a double drainage pipe for both toilet and bathroom.

Designers and developers of sanitation systems cannot ignore these and other cultural prescriptions which orient household members in the way they assess and

make use of these systems. This example and many other experiences also make clear that cultural beliefs and practices are very much ingrained in the everyday lives of people and cannot simply be adapted to technological requirements through information campaigns or awareness raising. For this reason, designers and managers should involve the community in their decision-making process, while acknowledging the existing differences within communities between men and women, between different cultural and ethnic groups and between children, adults and the elderly.

Existing social practices, norms and values of end-users should be taken into account, as particular interventions may be unacceptable and need to be adapted, or replaced and complemented by other measures or techniques. For example, urine separation by the implementation of sitting-down toilets will not be supported within Muslim communities. In a case study on solid waste, the importance and variability of on-site storage was underlined. Households in Dar es Salaam (Tanzania) have no access to standard domestic storage facilities and therefore they make their own selection, whereby most households resort to used plastic bags. This choice makes regular collection necessary as their limited size means they are rapidly filled up; the absence of lids increases health risks; and possibilities for waste separation are severely limited.

Cultural values and social norms turn out to be constraining factors in the contribution and use of sanitary technologies. They can, however, also be enabling, for example when existing traditions facilitate self-organization and voluntary contributions through self-reliance in the introduction of particular technological options. In general, technological improvements in sanitary facilities require horizontal and vertical linkages and lines of communication between the different social actors involved. Particular technological options should, in general, be assessed on user-acceptance, including comfort considerations, otherwise they will not provide a solution which is sustainable in the longer term. This short discussion on the relevance of householders' cultural and social norms for constructing sanitary infrastructure does not aim to convey the message that cultures and habits are fixed for all times and excluding or constraining technological innovations in urban infrastructures. What we do want to argue is that social and cultural norms are as relevant as technical prerequisites but less malleable than technical factors.

2.4.2 Neighborhoods, Local Communities and Their CBO and NGO Actors

Faced with the challenge of providing sanitation for the urban poor in East Africa many (national as well as local) authorities have considered either large-scale centralized systems or individual household-based solutions. Options at the intermediate level of the neighborhood have hardly been contemplated while they may fit the gap between pit latrines and central sewerage and allow for improvements at the neighborhood scale (Mara and Alabaster 2008). There is a need for the elaboration of concrete technical and managerial options for such alternative communal systems.

It is particularly at the neighborhood level that NGOs and CBOs can become involved in developing and managing urban environmental infrastructures. Since the 1980s, civil organizations have entered the limelight as governments throughout Africa retreated in many areas of social service delivery (Bratton 1989). The groups to be distinguished are community-based organizations (CBOs, which are small membership associations relying on limited amounts of primarily local resources), national non-governmental organizations (NGOs with small professional staffs which provide support to communities), and international non-governmental organizations (INGOs; relief and development agencies with large professional staffs and budgets and field offices in many countries). NGOs and CBOs have received increasing amounts of financial support from private and official donors. International donors have started working more via NGOs, especially since the 1980s (Fritz and Menocal 2006). The proportion of total bilateral aid channeled through (I)NGOs is increasing and individual NGOs are becoming more dependent on official development aid. Many donors and academic observers consider NGOs as more reliable channels to support community development in comparison with the official government (see Box 2.3).

NGOs are generally considered flexible and innovative, disposing of dedicated and professional staff and more willing to fulfill the obligations included in detailed project descriptions. An additional characteristic attributed to NGOs and CBOs is their essential contribution in the establishment of a thriving civil society, prepared to challenge the governmental authority when necessary. However, NGOs are not automatically more cost-effective than other sectors and the sustainability in the long run of large-scale service provision by NGOs has been questioned.⁵ In case of a CBO operating as a service provider contracted by foreign donors, the relation-

Box 2.3 Kisutu Women Development Trust Fund (KIWODET)

KIWODET is formed by a group of women living in a low income area in Kinondoni municipality in Dar es Salaam. The group was formed in 1998 by a group of 20 members to collect solid waste; each member contributed 100Tshs to purchase waste bags which they distributed freely among their neighbors while offering free collection. In 1999, the Dar es Salaam city council gave KIWODET a contract to collect solid waste and the organization now serves 8,331 households. Later on they also acquired a municipal contract for street sweeping. Supported and trained by the ILO, KIWODET put in place an integrated solid waste collection and recycling system, providing employment opportunities for many young men and women.

⁵ Another challenge for NGOs concerns participation and democratization, because they often fail to install such mechanisms internally while the increasing dependence on official donor funding aid may erode their legitimacy within the communities where they operate (Edwards and Hume 1996).

ship with its target groups might change into a provider-client relationship, still remaining different however from the formal relationship usually established between governments and citizens.

2.4.3 City Level Planning, Decentralization and PPP

The recently introduced *decentralization policy* in the countries of East Africa allows local populations to promote solutions that are better adapted to their problems. Decentralization has been hailed as the most appropriate vehicle for achieving good governance invoking as essential political accountability, freedom of association and participation, a reliable and equitable legal framework, bureaucratic transparency, availability of valid information and effective and efficient public sector management (Onyach-Olaa 2003). In this way, sub-national governments are better positioned vis-à-vis the local population to identify local preferences for infrastructure technologies or service quality, and facilitate local decision-making. More room may be opened up for cities to create their own solutions for sanitary infrastructures, to be better adapted to the specific local conditions and demands. The decentralization process going on in the three countries concerned here – Kenya, Tanzania and Uganda – is however not identical and varies in some important respects.

All three East African countries show some form of decentralization: political decentralization through the devolution of power to sub-national units and administrative decentralization through the creation of offices and the deployment of staff to lower levels, while fiscal decentralization is evident in the reallocation of resources. In Uganda decentralization is entrenched in the legislation and has been put into practice, but in Tanzania much of the policy reforms and the very detailed enabling legislation has as yet remained paper work primarily. In Kenya, however, decentralization is practiced to a certain extent, but has not been supported by legislation or political declarations.

In Uganda and Tanzania, staff for key social service delivery sectors (in particular primary education and health) has been transferred from central to Local Governments (LGs). The increase in numbers is very substantial; in Uganda from 65% in 1998 to 73% of total staff numbers in 2002; in Tanzania from 57% to 63%, while a further increase is foreseen for the future (Steffensen and Tidemand 2004). In Kenya, the situation differs substantially, with an increase from 12% in 1998 to only 14% in 2002 (ibid), as the LGs have a much more marginal role in service delivery. LGs (except a few of the larger municipalities) are not responsible for the key sector areas – health and education – and thus many of the functions within these sectors are carried out by agencies other than the LGs (like Ministries, Water Boards, etc.).

Public-Private Partnerships (PPPs) have been heralded in the 1990s as an attractive instrument for public policy implementation. Bringing together the best from the public and the private sector, they should facilitate the creation of cost-efficient and effective delivery services, including sanitation. Although understandings of

the concept and its implementation in practice vary widely, in general governments are involved through the development, implementation and enforcement of regulation, while the private sector assumes particular responsibilities for the collection, transport and disposal of sanitary and solid waste flows. Private sector involvement may range from contracting out services to large private firms, via concessions to local entrepreneurs, to franchises to CBOs, and combinations of these.

For example, since Kenya's transfer into a multi-party system of governance in the early 1990s, the Local Government Act allows local authorities to contract out certain services to the private sector. Currently, different forms of arrangements are in place ranging from franchisees to concessions. An example is Kisumu Water and Sewerage Company (KIWASCO) managing water and sewerage in Kisumu, which is run as a private company and owned by Kisumu City Council.

Realizing the potential merits of this model in the context of Africa proved however more challenging than initially expected. In particular, the absence of a well-developed private sector, the persistent poverty among the urban poor, the lack of transparency in the operation of urban governmental institutions, and the fragmented institutional framework prevented many PPPs from becoming successful overnight.

2.4.4 National Level Policies and a Network Approach to Governance

National governmental authorities remain important as they should offer the necessary strategic guidance and holistic perspective to ensure consistency across the sanitation flow. They are under continuous pressure to deliver public services but have been unable so far to secure them. Despite good intentions at the moment of independence, most African states proved unable to fulfil their developmental role. Relevant environmental policy and legal frameworks for promoting sustainable sanitation do exist, the efforts and measures to develop concrete infrastructures and systems however often remain well-intended but hardly effectively implemented. Explanations for these 'policy gaps', as well as the concomitant recipes to address them, have changed over time.

Government failures in Africa in the 1950s were explained as the result of poverty and conceptualized as the lagging behind of economic and technological development caused by a lack of savings. Later, in the 1960s (neo-) colonialism and dependency from the 'capitalist West', were considered the main causes, but since the 1980s the attention has shifted to the quality of social institutions. The unresponsiveness of administrative systems and weak institutions in general are considered the central causes for lack of development in Africa (Kumssa and Mbeche 2004). Until the early 1990s many African countries opted, in response, for a strategy to expand and modernize the public sector to support social and economic development. Government expenditures increased from about 15% in 1960 to about 28% in 1990 of GDP (World Bank 1997). Despite this trend, most governments remained weak and did not have sufficient capacity to enforce laws and

policies, even if they were enshrined in government documents. A growing number of experts pointed at the lack of attention to the role of institutions and the importance of ‘good governance’. They claimed that development involves more than just adapting macro-economic policies and trimming the state bureaucracy as was promoted by the Structural Adjustment Programs (SAP) of the IMF (Kumssa and Mbeche 2004).

The discourse on ‘good governance’ emerged in the 1990s when donors witnessed democracies outperforming their authoritarian counterparts in economic and social development (Alence 2004; Doornbos 2001). Economic reforms were considered more likely to be sustainable and effective, if the governments imposing the transitory pain of adjustment were viewed as legitimate by the members of society. Democratic governments are better qualified to consult major social and interest groups and to involve them in the design of policies. They could – along with independent media and policy centres – do a better job in educating the public about the need for reform (Mkandawire 2006). The ‘good governance’ – discourse contributed to a shift from externally oriented to internally oriented conditionalities in international developmental aid as it concerned the structuring and operation of recipient countries’ institutions (Doornbos 2001).⁶ However, rather quickly the concept began to lose its popularity, as several countries were able to circumvent some of its prescriptive, particularly political, elements. In addition, the application of universal standards in a variety of different contexts proved complicated.⁷

Minimising the state, promoting good governance and attributing more tasks to markets and private companies did not produce the expected results either, as became clear in the early 2000s. As a consequence the role of the African state in providing urban environmental services is object of renewed discussion. Two competing views can be identified in this debate, on the one hand the neo-developmental state and on the other the network governance approach. According to the proponents of the neo-developmental state, the resources of the governmental agencies at the different levels should be strengthened and in particular their capacities to plan, implement and secure effective urban environmental infrastructure management. A network approach to governance, on the other hand, focuses on the engagement of governmental actors at different levels and of private actors (companies, NGOs, CBOs and communities) in designing and implementing urban environmental infrastructures and services.

Both views have their strong points as well as several weaknesses. Regarding the neo-developmental approach it is argued that the state in Africa has so far not been able to fulfil its responsibility as promoter of development and it is therefore extremely unlikely that this situation will fundamentally change in the near future,

⁶Although the ‘good governance’ concept and the related political and scientific debates cannot be elaborated extensively here, it is essential to note that it refers to two different aspects: the performance aspect of governance and its representational aspect (Harpham and Boateng 1997).

⁷“Introducing conditionalities often meant inserting new, specific elements into highly complex processes and situations, leading up to new complexities for which donors and recipients would henceforth bear joint responsibility” (Doornbos 2001: 102).

for example when trying to secure solid waste and sanitation services. The limited capacity, continued corruption and politicisation of the bureaucracy and the lack of adequate resources will persist and thus hamper effective interventions. According to the perspective of network governance (urban) governmental authorities are no longer pivotal in securing urban environmental infrastructures and services. This approach creates room for the effective participation of stakeholders and allows local communities to develop their own preferred approach while harmonizing their efforts with other stakeholders and with other levels of governance. Network approaches to urban environmental governance become particularly interesting when the notion of centralized infrastructures is substituted with the idea of smaller communal (infra)structures, such as those described by Mara and Alabaster (2008) and Mara et al. (2007), because they facilitate coproduction of solutions which better fit local conditions (Ostrom 1996). Network-based approaches are criticized for the lack of legitimacy, because unlike state-based regulators, whose actions are legitimized via formal democratic procedures and supported by law, non-state actors cannot rely on legal authority, nor derive legitimacy from their position in a wider legal order. For networks, legitimacy is rooted in the acceptance of their role by other stakeholders and in the multiple narratives that can be constructed in the context of multiple accountability relationships meeting divergent legitimacy claims. Community-based environmental service arrangements are not just visible entities but also manifestations of negotiated social practices, located in wider historical, economic and social contexts. Their flexibility makes such network approaches more suitable to respond to specific local conditions and public demands, allowing a better fit between technological options, their management and the prevailing societal circumstances.

2.5 Conclusions

The absence of large-scale environmental infrastructures in many East African cities, the fast growing urban populations and the growing concerns about environmental and health impacts resulting from the use of traditional pit-latrines create fertile conditions for introducing innovative solutions. The Modernized Mixtures approach can provide a coherent perspective for transition processes towards establishing more sustainable sanitary systems and services that are also accessible for the poor. This approach does not signify the identification of one ultimate solution for sanitary problems but is aimed at the identification of multiple pathways towards the creation of improved sanitary infrastructures in the different cities in East Africa and beyond.

The Modernized Mixtures approach presents an integrative perspective on sanitation in informal settlements in the cities of East Africa. It stands for combining technological and social dimensions, integrating the management of sanitation and waste flows from generation to final discharge, and linking the different technological

and social levels of scale involved in the provision of environmental infrastructures and services. This chapter has further elaborated the MM-approach by pointing in particular to the social, cultural and political dimensions of the design, management and use of urban environmental infrastructures at household, community, city and national levels. The different options at the distinguished levels of scale allow a modular approach to the choices of technology and management systems. Nevertheless several key challenges remain to be addressed.

Introducing the Modernized Mixtures approach is new, uncharted territory in infrastructure development and therefore involves some risk-taking and requires long-term commitment from relevant actors, including foreign donors. Consistent political engagement is required to develop innovative technologies which consider sanitation and waste as an integrated material flow and promote prevention, reuse and recycling options instead of simply discharging. Long term commitment is however not assured in a simple manner as political priorities may change while the continuing dependency on external donors in financing infrastructures makes consistent policies also dependent on their shifting priorities. Strengthening the social, scientific and governance networks that are engaged with the design, development, maintenance and use of environmental infrastructures at different levels of scale seems to be the best feasible way forward.

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