

A Paradigm of Pipes in a Society of Slums: Techno-political regime dynamics in Kenya's water sector.

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ABSTRACT

An estimated 150 million urban inhabitants lack adequate water and sanitation services in Africa, where more than 70% of all townspeople live in informal and unplanned urban settlements, or so called slums. Africa south of the Sahara is indisputably poor and several countries are water scarce. However, in this paper I argue that the main problem has less to do with resource-scarcity and more with governance, ill-devised technological systems and history. By tracing the current institutional framework and organisation of service provision in Kenya back to early colonial eras, I identify important continuities over time that continue to hamper and discourage public service provision for all citizens. A paradigm of large-scale piped technology still persists in cities where the growing informal urban settlements are constantly circumvented by water infrastructure and consequently left to their own devices. Over time, a particular combination of politics, institutional framework and technological norms have evolved in Kenya's water sector and formed a stable 'techno-political regime', building on elitism and exclusion. Through this regime, public service systems are captured by influential groups while poor people have been left to informal private service providers where they are paying up to ten times more for these services than the rich. This paper goes on to look at the sector reforms currently implemented by governments in East Africa. I demonstrate that these reforms seem not to have made the techno-political regime significantly more responsive to the needs of the poor, as the 60-70% of the population that is currently underserved gets around 3% of the public investment. Finally, I argue why sector reforms of infrastructure and public services must not be left to engineers and economists alone, but need to also involve 'the enlightened historian'.

Modern apartheid: the city south of the Sahara

If you travel to Kisumu, Kenya's third largest city, you may decide to take a walk in the lush and quiet up-market neighbourhood of Milimani. Strolling along on the tarmac past the large villas on those green spacious plots, you will eventually come to the Ring Road. A few more steps will take you across to the informal settlement of Nyalenda. A few steps away, yet worlds apart. This so called 'slum area' holds an estimated 100,000 people but is practically void of public services. Housing is simple, the access roads are small bumpy tracks, drainage is poor and solid waste is dumped willy-nilly. Over the years, more and more people have spilled into Kisumu, settling in unplanned areas like Nyalenda (Nilsson & Kaijser 2009). Public water services, on the other hand, have never spilled over across the Ring Road, which acts like the colonial-era 'cordon sanitaire'. Ironically, along the Ring Road runs one of the main trunk lines for the water supply of Kisumu. Moreover, Kisumu is sitting right on the shore of the Lake Victoria, the second largest freshwater lake in the world! Obviously, it is not for lack of water that Nyalenda has been excluded from public water supply. Like in so many other informal settlements in Africa, the Nyalenda residents have to buy water in jerry cans from water vendors, thus paying up to 250 Kenya shillings per cubic meter, eight times what their rich neighbours in Milimani pay (Owour & Foeken 2009). Hence, the argument that the poor cannot afford to pay for services does not seem to hold true either. Some of these problems are being addressed by ongoing reforms of the water sector in Kenya, as elsewhere in Africa. Or at least, so it is claimed. I will argue in the following that the reforms have not sufficiently acknowledged the past and that the history of the water sector in Kenya still defines and circumscribes the possible development paths. Certain barriers for providing service to poor people have emerged through Kenyan history, barriers that the current reform seems to have failed to overcome.

This paper is about change and continuity of public service systems in developing countries with a colonial past. More specifically, the objective of this paper is to present a history-based critique of the evolution of social and technical systems for urban water provision in Kenya from the end of the 19th century and up until today. I wish to examine to what extent there has been continuity in the public water provision systems and to what extent these systems have been transformed to respond to new conditions in society brought about in the post-colonial period. The scope of this study is geographically delimited to Kenya, but it is possible to argue that many of the findings can be translated to other British ex-colonies in Africa. I will also here concentrate on water supply in urban areas, as this is where the systemic shortcomings and discrimination against the poor is most starkly visible and where relevant data is more accessible. This said, I admit that rural water supply, sanitation and many other public service functions are grossly neglected and would clearly merit more attention.

The remainder of the paper consists of five sections. First I give an overview of water and sanitation services and the urbanisation process in Africa in general and Kenya in particular, and I also discuss some key theoretical concepts. In the next section I summarize the history of modern water and sanitation services provision in Kenya. Thereafter, I discuss the large-scale piped paradigm and the barriers for service provision to informal settlements that are inherent in this technology. After that, focus turns to the ongoing sector reform and to what extent it provides incentives for change. Finally, I present some conclusions regarding the development of the Kenyan water sector, but also

relating to the importance of science and particularly the history subject, when engaging in socio-technical change processes such as a water sector reform.

The failed promise: urban water services in Africa

The societies in sub-Saharan Africa are highly dynamic and undergo social transformation at an unprecedented rate. This combined with a high population growth rate of around 2.4% per annum lead to a quickly increasing population in the urban areas. The urban growth rate in Africa south of Sahara is now higher than in any other part of the world, and stands at around 3.7% per year (UN 2007). Therefore, also the demand for public services, and hence the pressure on infrastructure in cities, is increasing. The rapid growth of population in cities since the 1950s and up until today, have in most countries in Africa not been met with sufficient planning measures and adequate expansion of infrastructure. This has resulted in proliferation of unplanned and informal settlements in and around the urban centres, such as the Nyalenda settlement in Kisumu. Many of these settlements also face problems of legal type, such as formal lack of recognition, and insecure land tenure. Approximately 70% of urban dwellers in Africa currently live in unplanned settlements most of whom – approximately 150 million people - do not have access to safe water (UN 2003a, b).

By 1990 on average 48 % of the sub-Saharan African population had access to an improved water supply (generally regarded as a proxy for 'safe' water) while 32% had access to improved sanitation services (UN 2006). The United Nations' Millennium Development Goals (MDG), adopted by the world's leaders in the year 2000, aims to reduce by half the proportion of people without access to safe water and sanitation by 2015. The MDGs took their point of departure in this baseline data of 1990. Indeed, some countries in Africa have made substantial progress since 1990 and a few countries, such as Namibia, Botswana and Uganda, are likely to meet the MDG target on water. However, most of countries will not. Moreover, almost none of all the sub-Saharan countries will achieve the target on sanitation (UN 2009). The implications of these figures are that millions of poor women, men, girls and boys lack these basic services, keeping them in poverty as they are facing serious health stress, as well as the economic burden involved. The cost incurred by society for water-related health problems is also substantial (UN 2003b, UN 2006).

Not only have the Millenium Goals become an overpowering challenge, but just to monitor progress toward their realisation and the status of WSS services soon turned out to be close to impossible (Satterthwaite 2003). The Kenyan situation is very illustrative on how difficult it is to monitor and manage sector performance. The 1990 MDG baseline for water supply in urban areas in Kenya was given as 91% (World Bank 2006). But six years after pegging the MDG baseline on this figure, the Government of Kenya estimated the actual urban coverage to be only 60% (Republic of Kenya 2007). To make matters worse, recent findings show even lower coverage ratios. The Water and Sanitation Regulatory Board (WASREB) in Kenyan reported in 2009 that the coverage for water supply in Kenya in areas under formal public water supply was as low as 37%, most of this relating to urban areas (WASREB 2009). While the Kenyan government and international donors struggle to meet the MDGs and implement a reform intended to increase water supply coverage, the actual figures reported keeps on going down (see fig. 1).

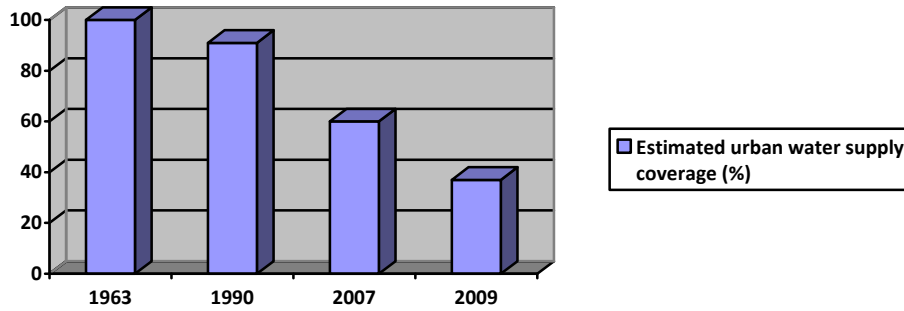


Figure 1. The official figures of urban water coverage in Kenya, as reported through history. The figure reported 1963 was for the same year, the 1990 figure is the MDG baseline, while both the 2007 and 2009 figures relate to the situation in 2006. (source: WHO 1963, WB2006, Kenya 2007, WASREB 2009)

Part of this can be explained by improved data collection; the deplorable situation emerging is more true than previous figures. Moreover, there is currently no agreed upon definition of 'access' in the Kenyan water sector (Seur, pers comm. 2010). Although there is an ambition to have a definition of 'access' capturing aspects of cost, quality, distance and waiting time, the poor state of knowledge about the actual situation has been of concern to sector actors for some time (WASREB 2009, Tufvesson, pers comm. 2010). As the saying goes: what you cannot measure you cannot control. The situation raises some difficult questions around reliability of data, and also about how data is used for the construction of narratives around processes such as a reform, which will be discussed towards the end of this paper.

In absence of reliable coverage data, empirical evidence tend to become anecdotic. An anecdotic approach need to be balanced by a more solid analysis of processes over time as well as models of how provision models and technologies relate to society, and nature, in which they are embedded. Society and technology constantly and mutually defines and redefines each other to the extent that each one can never be regarded as entirely autonomous: they combine into a socio-technical system (Summerton 1994, Kaijser 2003). The implication of this, when studying the development of a socio-technical system such as urban water services over a long period of time, is that processes and structures in society outside the engineering realm must also be given due attention. Below, I will introduce two theoretical concepts which may add value in an analysis of this kind.

The concept of 'paradigms', developed by Thomas Kuhn (1970), has had tremendous impact on theories about how science and knowledge is constructed and reproduced. Kuhn developed his theory around how knowledge and science emerge as a set of agreed positions in the scientific community, which will persist until too many inconsistencies prompts the replacement of the paradigm through a 'paradigm shift'. Knowledge is hence collectively constructed through a consensus process, within the scientific community and in its larger social context (Brante 1976). The paradigm concept is today often used in a wider meaning to include practical applications, such as engineering practices in a 'technological paradigm'. For example, Braadbart (2009) talks about how the 'piped paradigm' as an engineering practise arose in the western world for providing water and sanitation services in the second half of the 19th century. I will also use the technological paradigm

concept in this wider meaning, including engineering 'best practice', technical standards and norms in addition to the scientific underpinning of technology.

However, technology and technological systems also embody structures of control and power. If we agree that technology is socially constructed, then it is also safe to assume that power structures in society will be manifested in technology, especially when dealing with technology for public service systems and infrastructure (Winner 1980, Hughes 1983). As demonstrated by Gabrielle Hecht (1998), large-scale technological systems can have a great deal of politics built into them. The process of putting in place key infrastructure systems such as water supply is in fact a very physical articulation of politics and power. As will be argued here, water supply technology in Kenya has always been centred on large-scale technology, and therefore a study of the 'large-scale piped paradigm' in Kenya needs to thoroughly analyse dimensions of power and politics in the society surrounding technology and science. The paradigm theory has its limitations for this wider analysis of politics and power structures.

Here, I think it will be useful to bring in regime theory. A 'technological regime' can be defined in many ways, but generally encompasses a set of rules and norms for technology, manifested both in theory and in practice. These rules or principles are structured hierarchically from a visionary/political level, via design requirements and tools, to artefacts and operations (Ertsen 2005). The 'regime' concept thus provides an outer layer of power and politics surrounding the scientific and technological norms that make up the paradigm. I intend to use the term 'techno-political regime' to stress this power dimension, and use it to describe the combination of a political framework / power structure with a technological paradigm. I also use the term to capture less physical manifestations of power, such as development ideals and political objectives, which are inherent in ideas, visions and policies that have guided the sector over the past century. To put it short: while a paradigm defines what scientists and engineers agree on as the best way to solve a problem; the techno-political regime defines the problem.

Having presented my key approaches for gaining improved understanding of such complex processes, it is now time to turn our focus to the Kenyan water sector, and to that arena of processes, events and interpretation known as history...

(Re-)Constructing the Kenyan water regime

Any description of the modern history of Africa would be incomplete without reference to its history of colonization. By this token, the Berlin conference in 1884 - 1885 provides a relevant starting point. At this conference, most European states agreed on a master plan for the colonization of Africa by defining the rules of colonial conquest and partitioning the African continent into 'spheres of influence'. Thereby, Britain acquired supremacy over British East Africa and Somaliland (Pakenham 1991: 239ff). However, the principles applied in the Berlin conference agreement allowed for a lot of interpretation. In a bid to wrestle the control of the Nile River out of the hands of Britain, an expedition force was sent by France from their holdings in West Africa to claim the region of the upper Nile. This adventure prompted the famous standoff in 1898 between UK and France at Fashoda, in today's Sudan (Wesseling 1992:274ff). Although the Fashoda incident ended in Britain's

favour, the race for the Nile had made it evident for Britain that she must effectively control the 'source of the Nile'. The key to doing so was to control Uganda. Being far from the coast, an effective colonization and military control of Uganda presumed modern transport technology: a railway had to be built from the coast. This 'Lunatic Express' was built in only 6 years from Mombasa at the coast, to the Lake Victoria in Uganda (Miller 1971).

The advent of the railway from Mombasa to Port Florence (Kisumu) in 1901 would come to influence the development of Kenya in a massive way. Although the Uganda Railway was originally associated with geo-politics and international waters, it would soon be more closely related to local colonization and the development of local water resources. Along the almost 1100 km of tracks would begin to mushroom trading posts and urban settlements. The railway stations provided natural points for trading but also for settlement. Nairobi was established in 1899 as a mid-way station and key railway depot but quickly turned into a bustling pioneer-town. Soon, the British administration moved its headquarters from Mombasa to Nairobi. A number of other small towns also developed around railway stations such as Voi, Naivasha and Nakuru (Miller 1971, Obudho & Obudho 1992). These urban settlements all needed to be supplied with water, both for the railway operations and for their fast growing populations. The Uganda Railways would hence become the main urban water supplier for the first 20 years of the British East Africa Protectorate, later the Kenya Colony. The Uganda Railways developed freshwater sources such as springs and streams, provided rudimentary treatment and also managed the piped distribution systems in these railway towns. Provision was first made through standpipes but gradually, in-house piped water and metering was introduced. Naturally, the British engineers used imported technologies from Europe, and in setting standards for design and planning of infrastructure, reference was commonly made to European standards and practices (Nilsson & Nyangeri 2008). Kenya was not unique in this respect, also when introducing piped water supplies in Kampala in the late 1920s European standards and technologies were used (Nilsson 2006a). As discussed by Braadbart (2009), the 'piped paradigm' was thus transferred from the West to the colonies in the South.

During the 1920s and early 1930s, there was a gradual but decisive shift in terms of ownership and responsibility of water provision and water management in Kenya. The Colonial administration put in place new legislation that ensured state supremacy over water: the Water Ordinance of 1929, in force from 1935. The central administration, through its Public Works Department, took over the responsibility for water supplies from the Uganda Railways in the 1920s while some urban water supplies were being handed over to local authorities. For example, the municipality of Nairobi took over the water supplies from the railway in 1922 (Nilsson & Nyangeri 2008, 2009). This emergence of state responsibility in Kenya did not take place in isolation. In Europe as well as the US, the state had been taking on more responsibility for water and sanitation since the end of the 19th century (see e.g. Juuti & Katko 2005, Braadbart 2009). The new and enlarged role of the state was translated to the British colonies as well. In the 'sister' protectorate of Uganda, the administration built new, large-scale water supplies for Jinja in 1928 and Kampala in 1930 (Nilsson 2006a). The Tanganyika territory, under British administration on a League of Nations mandate since 1919, got its first water legislation in 1923 (Carlsson 2003). In Kenya, the state also started investing in new and expanded water supplies in urban areas during this period. Hence, the state took on a larger burden for providing water services and regulation in Kenya in the period between the two World Wars. However, this responsibility was clearly focusing on the more affluent part of the population. This

'non-native' bias manifested itself through the application of European design standards and, as a direct consequence, services too costly for the vast majority of the African population (Nilsson 2006b, Nilsson & Nyangeri 2008).

Due to the world recession in the early 1930s, investment in the colonies also waned only to resume again after the Second World War. The colonial administration in Kenya in 1946 launched a revitalisation programme under the Development and Reconstruction Authority, with development funds from the UK government. Throughout the post-war period up until political independence in 1963, the colonial administration would continue to invest in water supplies and water resources management. This expansion was done through central government and its Public Works Department as well as through municipal governments of the major cities. Thus, the number of towns with a public water supply increased from 13 in 1931 to 85 in 1958 (Nilsson & Nyangeri 2008).

Independence from Britain in 1963 did not lead to any marked change in the Kenyan water sector. There was initially an increased decentralisation of responsibility for water supplies to local authorities, while operational responsibility of small towns and rural water supplies was transferred from the Public Works Department to the Ministry of Natural Resources. This was, however, based on a proposal made back in 1957 under the colonial government. On the whole, there was considerable continuity from the colonial to post-independence water policy. The sector structure was left more or less intact and design standards and technologies were not replaced to better reflect a new social and political reality (Nilsson & Nyangeri 2008, 2009). This would have serious implications when the post-independence governments started investing heavily in the water sector in the 1970s in order to reach the government's goal of 'Water for All by the Year 2000'.

It is often claimed that the 'social policies' of the Kenyatta era promoted that water should be free of charge (see e.g. Orgut 2010). However, for urban water supplies the policy of full cost recovery that had been applied during the colonial period was never officially discontinued. The land-mark government manifesto 'African Socialism and its application in Kenya' from 1965 did not promote water as a service that should be subsidised (Nilsson & Nyangeri 2008). In sub-sequent Development Plans, the government would typically declare that water services should be provided on cost-recovery basis, such as in the 1974-78 Development Plan:

"It is intended that systems for urban supply and sewage disposal become self-supporting financially as rapidly as possible. Rates will be established, therefore, on the basis of a full recovery of capital, operating and maintenance costs of all schemes taken together in the long run" (RoK 1974: 328).

However, in practice the principles of cost recovery were slowly but steadily being eroded. In 1986, the municipalities recovered no more than a third of the cost for water supplies, and in fact, real water tariffs decreased by 75% from 1971 to 1989 (Hukka, Katko & Seppälä 1992). Without even rudimentary cost recovery the water sector ended up in a severe crisis where over 90% of the funds went to staff costs while operation and maintenance were neglected (Hifab 1988). Consequently, the 1980s and 1990s saw the water services deteriorating seriously in Kenya, generally with longer waiting times and lower quality of services. Similar development was noted in Uganda and Tanzania (Thompson et al 2001). So while the government had tried to implement its goal of 'water for all by the year 2000' by simply increasing the supply, they had not sufficiently considered the cost

implications. They had been using a socio-technical system that was put in place by the colonial administration in order to serve a wealthy few, but used it to try to achieve an objective for which it was not designed: universal access.

The techno-politics of the large-scale piped paradigm in Kenya

“Nairobi as a largely European city situated close to the Equator is almost unique among the cities of the world.[...] Considering the advances made in sanitary science, [...] it would be deplorable if all possible advantage were not taken of modern science to render Nairobi at a comparatively insignificant expense, a model of a sanitary tropical city.”

Nairobi Sanitary Commission 1913.

Now, almost a century after the publication of the report of the 1913 Nairobi Sanitary Commission, it is easy to muse about the contradictions in the above quote, and the startling contrast with the Nairobi of the present time. Today, this city of 3 to 5 million people (no one really knows) is still close to the Equator, but has no aspirations of calling itself a European town, and is definitely not a model of a sanitary tropical city. Unfortunately, this quote is more than a hilarious and anecdotic fragment of a long gone past. In fact it points to the real problem; that Nairobi and its infrastructure – like in many other post-colonial mega-cities – were not designed for millions of low-income people, but for a small group of relatively wealthy people living a European lifestyle on the Equator. In 1912 the Europeans made up around 6% of the population then estimated to be close to 20,000 (ibid, p56). Yet, the Commission supported previous proposals made in 1907 to expand the piped water supply in order to bring it closer to European standards, and also to prepare the ground for the imminent introduction of water borne sewage, since: “...the water closet system in a town of any size is the best, most economical and the healthiest.” (British East Africa Protectorate 1907). Nairobi was not an exceptional case. The introduction of piped water and sewerage in Kampala banked on the same ideas, where European technology was introduced to mainly serve a European minority. Embedded in this approach was also a strong sense of bringing ‘modernity’ to African towns (Nilsson 2006a). However, the modern lifestyle and European-style public service were mainly meant for the colonizers. Similar segregated modernisation patterns in colonial times have been described also for Ghana (Bohman 2010) and Senegal (Ngalamulume2005)

The fact that colonial administrations from Europe gave priority to serving its European settlers and administrators is not surprising, perhaps not even problematic. What is problematic is the fact that these elitist systems for water and sanitation service provision developed in the colonial period have been changed so little, close to half a century after de-colonisation. The design norms for urban water supplies that developed in the colonial period revolved around large-scale infrastructure and in-house connections. Throughout the post-colonial period, high per capita demand figures persisted combined with an official policy of providing metered in-house connections. There thus evolved a technological paradigm for urban water supply: large-scale and capital-intensive systems for piped in-house water.

During the 1980s and 1990s there was a strong push for alternative or so called 'appropriate technology' in the field of development aid (Therkildsen 1988, Vaa 1993). However, simpler technologies have been part of the water sector in Kenya even longer. In the beginning of the 20th century the piped systems in towns like Nairobi and Kisumu used public standpipes as well as yard-taps. Innovative technologies to provide water to low-income areas such as water vending machines featured in Kenya in the 1960s (Nilsson & Nyangeri 2008). Water kiosks for resale to low-income dwellers in informal areas has for long been an acknowledged – although not always formal or legal - part of the provisions structure in Nairobi and Kisumu (Katui-Katua & Mcgranahan 2002, Castro 2009, Owour & Foeken 2009). Although these alternative and less costly technologies were available, the large-scale paradigm was never challenged in the post-colonial period (Nilsson & Nyangeri 2008). In a society where a majority of the urban inhabitants live in informal and unplanned areas – such as in Nairobi -the persistence of this large-scale piped paradigm becomes a major problem, for reasons I will discuss below.

Large-scale water infrastructure is very useful to provide water of a controlled quality to large numbers of users. However, it is a capital-intensive technology, and it presupposes certain characteristics of the geographical and social setting. These characteristics include a planned and predictable spatial distribution of consumers and stable property rights for land and infrastructure. In informal settlements, neither of these two conditions is generally met. In informal settlements, large-scale piped technology therefore faces two critical barriers for service provision: that of transaction costs for securing property rights; and that of transaction costs for receiving payment for services. Protecting property against vandalism, theft or expropriation will be a key consideration for the water provider. Furthermore, a lack of secure tenure for the residents and due to lack of physical planning and low housing standards, in-house and metered connections are virtually impossible, which calls for other – and often more costly - ways of receiving payment from the consumers (Nilsson & Kaijser 2009). In addition, the expansion of large-scale networks to low-income consumers on the periphery is generally of less commercial interest for the utility, whether the service provided is gas, water or electricity (Modig 1984, Kaijser 1986, Tarr 1988). However, this should not be confused with the argument that 'the poor cannot pay'. In fact, low-income populations in most informal areas in Africa are already up to ten times for water from informal providers than the rich are paying (UN 2003, Kjellen 2006). The problem is not that the poor cannot afford the services offered. The problem is that the large-scale piped systems as a socio-technical system is not compatible with the geo-spatial and social setting in which it is supposed to provide services, leading to the systemic barriers described above. This in turn has led to under-provision of public services in informal areas.

Why then, has this paradigm persisted if it is not able to provide an acceptable solution to the problem faced in today's Kenya? Here we need to recall my earlier proposition that it is within the techno-political regime that the problem itself is defined, not within the technological paradigm. The Kenyan political system, which is prone to favouritism and clientelism, has tended to reinforce the elitistic model for public service that was embedded in the colonial system. Kenyan politics is not so much built on development ideas or civil rights, but on patronage, ethnicism and kinship (Barkan & Chege 1989, Southall & Wood 1996, Bratten & Kimenyi 2008). Poor citizens trying to pursue issue-based activism such as demanding their rights for public service, is therefore an uphill battle. The neo-patrimonial political system that has been the hallmark of Kenya since independence militates

against any reform that would reduce the privileges of the powerful, for the benefit of the common man (Cohen 1993, Kjaer 2004). Furthermore, political imperatives have eroded the previously strong technocratic influence in the water sector over time, with detrimental effects on cost-recovery (Nilsson & Nyangeri 2008). On the whole, the way that politics and technology were combined into a techno-political regime in Kenya effectively precluded an expansion of services to the poor.

Although water does not have to be delivered for free, it is easy to argue that public service provision must be non-discriminatory and respond to the needs of all citizens, or at least the vast majority (Nilsson 2005). In its larger political setting, and in the light of the evolving discourse on water as a human right, the problem of urban water supplies turns into a greater challenge. The greater challenge now amounts to reforming the combined political power structures and technological paradigm that have - over time - forged a techno-political regime which preserves old patterns of service segregation. To shift or to modify the paradigm, there must first be a re-interpretation of the problem within the techno-political regime. In the following, I shall review whether the last ten years of reform in Kenya faces up to this challenge.

The Water Sector Reform in Kenya: a troll in the sun?

In the early 1980s, Kenya picked up the path to Structural Adjustment to do away with a bloated and inefficient state machinery. The formation of the National Water Conservation and Pipeline Corporation as a State Corporation in 1988 could be seen as a bid to introduce a commercial approach to larger state-operated water projects, such as dams and transfer schemes (Republic of Kenya 2008). In the 1990s, a series of studies on how to re-structure and reform the sector was carried out by the government, assisted by donor countries like Germany, Japan, and Sweden and by the World Bank. This decade of preparations culminated in the adoption of a new Water Policy in 1999. The Water Policy was supposed to accomplish three things: to give overall guidance for the water sector; outline institutional reforms that separate water resources management from water services provision; and provide a blueprint for the separation of the different functions of policy-making, regulation and actual service provision. On the whole, the Water Policy sought to guide the sector towards improved efficiency, cost recovery and sustainable financing of the sector (Nilsson & Nyangeri 2009).

In order to carry out the institutional changes embodied in the Water Policy, new legislation was soon enacted through the Water Act of 2002. It stipulates the division of roles between policy-making (the ministry), regulation (a new regulatory body; WASREB) and the institutional service providers (eight regional Water Service Boards, WSBs). It furthermore separates water resources management from water service provision, with the former being vested in a new authority (WRMA). The Service Boards are not to provide service directly, but they should deliver services through licensed Water Service Providers (WSPs). In order to create sustainability, the Act stipulates that WSPs are to operate on commercial basis and tariffs should therefore be on cost recovery basis. To cater for the low-income populations, the Water Act also creates the Water and Sanitation Trust Fund as a mechanism to provide a financing mechanism specifically for pro-poor investments (Republic of Kenya 2002).

Improved cost recovery, finances and efficiency are key for sector sustainability. However, in what sense will this mean something for the low-income population? Has the reform dismantled the old techno-political regime and attempted to rebuild it in a way that benefits all citizens?

To probe into these questions I will quickly recap my arguments for why the old regime did not succeed in bringing service to poor urban areas. Firstly, because formal water providers subscribed to the ideal of the large-scale piped paradigm, using capital-intensive technology and large networks as the main mode of provision. Secondly, because using these networks to extend services to poor areas in the periphery generally will yield lower marginal returns. Thirdly, because of the 'informal' character of these areas significantly increases the service provision transaction costs relating to property rights and payments. And fourthly, because the political system in Kenya does not provide any incentive to change national systems in favour of poor and marginalised people. Below, I will briefly discuss how the reform deals with each one of these problems.

1. Alternative technologies

Finding a new direction for technology, one that is better suited for the developing countries' low-income populations, is not a new idea. As described earlier, simple and 'appropriate technology' for water supply and sanitation has co-existed in the sector for a long time, but they have never moved to scale to challenge or replace the large-scale paradigm. Under the new sector structure the ministry has less power to influence choice of technology than before. The utilities (WSBs and WSPs) decide themselves what technology to use based on minimum standards set by the regulators WASREB. Although WASREB may give direction through issuing guidelines, so far they have not issued any guideline on pro-poor water infrastructure (WASREB 2009). Hence, initiating a change towards more 'appropriate technology' using command structures does not seem to be the way to go. Creating incentives for using alternative technology is another possible strategy, which will be further discussed later in this section.

2. Finances and profitability

The low profitability and high marginal cost for providing services in the periphery of a large-scale network is often held out by sector actors as a key constraint; one which produces a finance gap. Therefore, the Water Act 2002 created the Water Services Trust Fund (WSTF), and where it is stated that "The object of the Fund is to assist in financing the provision of water services to areas of Kenya which are without adequate water services." (Republic of Kenya 2002). The Water Services Trust Fund is today the main financing mechanism for improving services in rural areas and urban poor areas. The WSTF only provides funds and does not provide any guidance on technology choices; this is entirely up to the service providers to design. Studying the operations of the WSTF will therefore not say much about whether it has an impact on changing the techno-political regime. It is nevertheless interesting to see what priority the newly reformed sector gives to this pro-poor funding mechanism. Over the period 2005 to 2009, the total monetary allocation to the WSTF was only 3% of the total sector budget, and most of that allocation came from international donors (Republic of Kenya 2010). Considering that a majority of urban dwellers live in these under-served areas, clearly the reform is not making any real headway in terms of bridging the financing gap for the poor on the periphery.

3. Informal areas and transaction cost

The large-scale piped paradigm is associated with high capital costs. Asset holders need to secure their assets against vandalism or theft and recuperate capital costs through user charges. These operations bring – as discussed earlier in this paper - additional transaction costs that create barriers to service provision in informal areas. However, there exist models that can overcome these barriers, which build on a ‘nested-systems approach’ to use a term coined by Elinor Ostrom (1990). Interestingly, in recent years such models have been successfully tried in informal urban settlements in Kenya. In the Nyalenda informal settlement in Kisumu, which was bypassed by the main water supply for so many years, there is now a small but formalised provision system extending into the settlement. Through delegating management to local actors, and by providing rudimentary but metered connection points, the formal Water Service Provider Kiwasco is now selling bulk water to local operators who provide to the end consumers (World Bank 2009, Nilsson & Kaijser 2009). Such successful examples could easily be replicated in other urban areas all over Kenya. However, the Kisumu project was initiated and funded by donors. Inasmuch the Kisumu case can provide a good model, who will initiate a similar project in Nakuru, Kakamega or Nairobi? What incentives are there for the other providers to venture into this new area and change their modus operandi?

4. Incentive structure within the techno-political regime

We must now return to the issue of incentive structures, first at the level of the Water Service Provider. The WASREB monitors the performance of all WSPs and ranks them. The ranking of WSPs is based on 9 indicators: water coverage, sanitation coverage, unaccounted for water, water quality, hours of supply, metering ratio, revenue collection efficiency, O&M Cost coverage, and staff levels (WASREB 2009). It can thus be noted that the efforts of WSPs to provide services to poor people is not monitored by WASREB at all. Hence, only if a new modus operandi can have an impact on any of the mentioned indicators, will there be an incentive for this provider to apply the Delegated Management Model from Kisumu, or any other pro-poor model. The question of changing the technological paradigm becomes a purely internal and corporate decision: should the company go for conventional technologies of the large-scale type or should it try new and more pro-poor models, in order to improve on some of the indicators? What essentially is a question of great public concern thus becomes a matter to be decided on in the boardrooms of a Water Service Provider.

Another tool at the disposal of the policy-makers and regulators is to follow up on and enforce the WSBs duty to provide services to the poor, since they have responsibility to provide services to all citizens within their area of jurisdiction. This is done on an annual basis, as part of the WASREB’s monitoring and ranking of WSBs. But although WSBs are obliged to report on what they do to improve service to poor customers, most WSBs do not report, or have not documented their efforts. Even if they would, the maximum scoring for the indicator “Pro-poor strategies available” is only 3 points out of a total of 120 (WASREB 2009). Understandably, the WSB does not feel a very strong incentive to take pro-poor service provision seriously, including investing in alternative technologies, if this complicated area of operations will earn them less than 3% of the total marks from their “supervisor”.

Once again, therefore, the analysis comes back to the political system and the history of Kenya. Putting in place reforms by enacting legislation is one thing, but really spearheading, driving and

wanting these reforms to succeed is another thing. The government carried out a series of reforms and re-structuring of the water sector in the period from independence to 1990. However, these previous reforms did not change much apart from moving around the same actors in the sector (Nilsson & Nyangeri 2008, 2009). Experience from many similar reform processes in Africa points to the necessity of having a strong commitment from the top leadership in government (GTZ 2008). In the current reform in Kenya, the government has instead tried to stall the reform, or at least implement it in a highly selective manner. This has been done, for example, by only funding certain sector institutions, while leaving others like the WSTF and the Water Resources Management Authority virtually without funding (Orgut 2010). Unless the government really wants to see change in the formal water provision sector, it will not happen. It appears that the government has not been very keen on changing the techno-political regime, and perhaps there are no incentives for them to do so. Ministers normally don't live in slums.

In summary, from the account given in the foregoing the reform seems to make very little progress on redefining the problem within the techno-political regime or otherwise creating incentives for changing or modifying the paradigm in a way that will make it more responsive to a majority of citizens. The government and the donors appears to be more inclined to hide the real problems embedded in the old techno-political regime behind the new slogan "All for Water – Water for All" and behind narratives of success that have emerged around the reform.¹ These narratives include claims of a ten-fold increase of sector investments since 2002, greatly improved cost recovery and an additional 1 million urban dwellers and 2.17 million rural people served with safe water since the onset of reforms (Republic of Kenya 2010). Unfortunately, these narratives of success crumble under a closer scrutiny, like trolls in the sun. Investment per capita is down since the 1970s (Orgut 2010). Furthermore, if you use 1996/97 as base year and take inflation into account the increase in sector investment is very modest, if any at all.² Cost recovery has improved, but still only one out of four WSPs breaks even on O&M costs (WASREB 2009). With regards to the over 3 million newly served with water, no one seems to know where this figure comes from. Official ministry reports use this figure – and so do donors - with reference to data from the Water and Sanitation Trust Fund (WSTF). However, when faced with this statement WSTF itself disowns the figure. Most likely, the figures in circulation refer to the target population of planned or ongoing interventions that are being funded by WSTF (Macharia pers. comm. 2010). The 3 million claimed to be already provided with water are therefore nothing but projections of what may be in the future.

¹ "All for water – Water for All" is the new motto for the sector, brandished by the Minister for Water in the new Water Sector Strategic Plan.

² Using data from JICA 1998, for development expenditure in Ministry of Water and WSS-related in Ministry of Local Government, and using CPI deflators from KNBS, 2010.

Conclusions: Reforming with history

In the following I will discuss some conclusions on two levels. First, regarding the evolution of urban water services in Kenya, and secondly a discussion regarding how reforming socio-technical systems play out in a setting of 'la longue duree'; the long and slow processes of change sometimes called history.

In Kenya, a paradigm for urban water services based on large-scale piped technology was established in the colonial period based on European models. An important carrier for this technology was the establishment of the Uganda Railway, which paved way for urban colonization. The socio-technical system for urban water supply which were transferred from Europe and implanted in Nairobi, Nakuru and other places, was already from the outset meant to be a service system for the European elite, spearheaded by ideas of development and modernisation while providing services to the European population. With the rise of state responsibility for water in the 1920s, the technological paradigm would fuse with the elitist political system to form a techno-political regime for urban water.

At independence, the political objectives changed, at least the officially stated objectives under the motto of Water for All by the Year 2000. However, the provision systems inherited from the colonial past was not well suited to the socio-economic conditions of a majority of Kenyans, and especially not for providing services in informal urban areas. Thus, the large-scale piped paradigm proved incapable of accomplishing the government's official objective. The political climate also led to an abandonment of cost-recovery mechanisms which resulted in a dysfunctional sector in the 1980s and 1990s. Seen over the period from the rise of state responsibility until the 1990s the techno-political regime for urban water supply remained more or less intact, save for a disregard of cost recovery objectives in the 1970s and 1980s.

In the 1990s important steps were taken towards reforming the water sector in Kenya, a reform that is still ongoing. However, the large-scale piped paradigm still dominates. The effect for poor people in informal areas is that they are continuously discriminated against, since large-scale piped systems are not easily extended to informal areas. Incentives for overcoming the barriers of provision in informal areas are largely lacking under the new sector structure. Provision of public water services to poor and marginalised citizens seem to suffer from a 'three-percent-syndrome'. Three percent is what is offered in dedicated funding to pro-poor investments through the WSTF, and three percent is the weight the regulator attaches to this issue in its overall monitoring of performance of the institutional service providers (the Service Boards). Yet, 63% of the population in areas with reliable data (mostly urban) do not have access to a public water supply. Although somewhat simplified, this figure on the whole corresponds to those people living in informal settlements.

It is hence reasonable to talk about a stable techno-political regime in the Kenyan water sector. This regime has changed very little over the last century up until today, from the viewpoint of the urban poor. Politics, policies, legislation, incentives, norms and technology all form a techno-political regime that continues to exclude the poorest and most marginalised citizens, even when they make up a majority of the population. The colonial dispensation of public services seems to have perpetuated itself.

The recent reform in Kenya has - just like in the reforms in the 1960s and 70s – shuffled actors around and put new labels to them. In addition, it has introduced improved management principles at the micro level, and created better incentives for efficiency and cost recovery but it has so far failed to change the incentive structure with regards to equality in service provision. Improved cost recovery is in itself an important achievement. However, without incentives for improving services for poor people, improved cost recovery only serves to reproduce an elitist service provision system that discriminates a majority of citizens. Neither has the reform done much to move away from or modify the large-scale piped paradigm. The new sector structure and division of responsibilities gives the ministry and the regulator some new powers. It would be possible to create stronger incentives for changing the technological paradigm and to give priority to the low-income population, through regulation and through decisively putting more emphasis on financing services for the poor beyond the meagre 3 per cent. However, these regulatory powers are not used. The government is not asking for it from the regulator and therefore the regulator is not putting pressure on the providers. The budget for WSTF or other means of financing pro-poor investments could easily be expanded, but only at the expense of other sector institutions. Increasing the funding to the poor therefore requires political will and for the government to decisively do away with the path dependent mentality in the sector. It can be done. The vehicle is there, but it is not moving.

Finally, I will turn to my discussion on the level of reform processes. Sector reforms are not good or bad per se, they do have objectives. These objectives need to come out clearly; for what purpose will reforms be made and who should benefit? What is ‘the problem’ as defined in the broader techno-political regime? In the case of Kenyan water sector, the key objectives of the reform for Kenya as a nation, as a people and particularly for the underserved that make up the majority of the population, are still obscure.

Barriers to achieving sector-level objectives can have historic roots, which cannot be identified and challenged without a historic perspective. This is particularly obvious when reforming socio-technical systems, which tend to develop slowly and with a significant inbuilt resistance, or inertia. Just because of this inertia, a long time perspective must be applied in analysis of the shortcomings of socio-technical systems and in setting the direction of reforms. Reforms that try to take off from the point of the present, without first mapping the trajectory and the long-term historical baggage of the socio-technical system at hand, are likely to have lower chances of reaching their objectives.

If a reform means changing direction of a socio-technical system, this not only requires political will and the engaging in a political process between a set of actors. It also requires a scientific approach, and a meaningful method for establishing self-evaluation and methods for learning within the process. All too easily can reforms end up in political posturing and the trading of accusations or success-stories, using quasi-scientific narratives. Scientists from many fields must be involved to critically question narratives constructed by policy-makers and actors that are inclined to make superficial analyses and present findings that are politically expedient. A scientific approach is a key also for systematic learning and for bringing out past experience. Historians with an interest of contemporary development processes, and who can offer constructive criticism and a deeper understanding of the mutual interdependence of society and technological systems; come ye forth! There’s work to do.

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