

**WHERE COMMUNITY MANAGEMENT WORKS: THE EVOLUTION  
AND PROFESSIONAL MANAGEMENT OF PIPED WATER SUPPLIES IN  
RURAL KENYA**

**By**

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# Abstract

By adopting process tracing in case study research, this research examines how seven rural piped water schemes in Embu and Tharaka Nithi counties in Kenya were constructed and successfully (or not) adopted professional management of their water supplies leading to sustainable services. The schemes have existed in some capacity for the past 30+ years. This research is in consideration that rural water supplies in Sub-Saharan Africa are often characterized by management challenges and evidence from the region indicates that about a third of rural water systems are non-functional at any given time.

An intricate interaction between resolution of collective action problems, social capital, and specialization is seen to influence the ability of schemes to evolve into professionally managed organizations. This argument is premised on how the schemes were able to i) draw from the ideals of self-help under Kenya's Harambee movement to ensure construction of their water schemes, ii) appropriate experiences from coffee cooperative societies to management of their water schemes, and iii) hire trained personnel to perform varied operations and management functions within their schemes. Further, the research shows that there is clear added value for having institutional and organizational arrangements that support the emergence and operation of professionally managed community water schemes. The research argues that by appropriating an institutional template from the coffee cooperative societies, successful schemes were able to

develop a more nuanced chain of actor relationships within their operations than is often associated with community management of rural water supplies in Sub-Saharan Africa. Specifically, successful schemes demonstrate a clear separation of oversight by an elected water management committee and day-to-day operations by an employed staff. This separation is accompanied by defined incentives and accountability frameworks between the water users, the water management committees, and the scheme staff. The experiences of the schemes, however, also demonstrate that external oversight mechanisms are needed to enforce these incentive and accountability frameworks.

**Primary Reader and Advisor:** Winston Yu

**Second Reader:** Brian Levy

**Third Reader:** John Butterworth

# Preface

It all started in 2013. The NGO I worked with wanted to put up new photos to decorate the office, and the pictures of choice included those of children collecting water from a newly installed Afridev pump. The kids were all smiles – you could see their joy. All the necessary release signatures had been signed. These were the perfect pictures to demonstrate our ‘impact’ on the ground.

I was strongly against the idea. Angry. I got visibly emotional when I tried to explain why putting up these pictures was not a good idea. I doubt I communicated my reservations effectively. I was grateful, though, that the pictures were never put up. At least not while I was there.

But why was I so angry? Perhaps it’s because the 10-year-old girl within me could empathize with those kids. That little girl understood what it means to balance a ‘*mtungi*’, a 20-liter jerry can, on her back while carrying an additional 5-liter jerry can in her hand. She had done this on countless occasions when she visited her grandmother during the school holidays. But she was lucky to do this during the school holidays only. Her cousins – the closest people she had to brothers and sisters – did it daily.

How, then, could it be that our ambition for other 10-year-old girls and boys in rural Africa was to get water ‘closer’ to their homes? To limit their collection time to not more than 30 minutes for a roundtrip including queuing. Yes, that is a good thing. But the kids still have to balance the *mtungi* on their backs to carry the water home. Why weren’t discussions on how to eventually pipe water to their households commonplace? Why was piped water supply to households treated like a preserve for urban areas? And ironically, how effective was our training on hygiene practices including the 5 critical times for handwashing? My 10-year-old self knew not to pour the clean water she had just carried home to the ground – if she had to wash her hands, she looked for a *karai*, a wash basin, with previously used water.

The conversation needed to change!

The conversation in 2022 reflects change. I hope that this thesis will contribute to the ongoing change.

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Thank you to all my interview respondents. Thank you for welcoming me to the water schemes, and for your time. This work would have been impossible without the information shared.

Thank you, mom, for your prayers and for always believing in me. Thank you also to my entire support system (with mention of Jacque and the babies, and Grace) for your encouragement.

Thank you to my husband, Peter Kamicha, for your immense love, support, and prayers throughout this process. Thank you for untiringly being my sounding board.

Finally, Thank you God! To His glory and honor.

# Dedication

In celebration of my grandmother, Cucu Naidah (in loving memory). A woman born before her time. The embodiment of grit, resolve and resilience. A true matriarch.

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# **Part I – Introduction, Background and Data Collection**

## **Chapter 1. Introduction**

### **1.1 Water supply for all – A forty-year challenge**

The challenge of providing everyone with reliable and safe drinking water has influenced global water policy goals for over four decades and has been especially pronounced for rural Sub-Saharan Africa. The current policy is marked by Sustainable Development Goal (SDG) 6 which is about achieving clean water and sanitation for all. Target 6.1 is specific to drinking water and aims for universal access to safe and affordable drinking water. Its indicator evaluates the proportion of population using safely managed drinking water services. The interpretation of this indicator marks the lofty nature of the SDG 6.1 ambition. According to the WHO/UNICEF Joint Monitoring Program (JMP), which reports on SDGs for drinking water supply, sanitation, and hygiene (SDG 6.1 and 6.2), the normative interpretation of safely managed drinking water is that which is

accessible on premises, available when needed and free of faecal and priority chemical contamination<sup>1</sup>.

While running tap water in-house is a common phenomenon in developed economies and most urban areas globally, it has remained elusive for most rural communities, especially those in Sub-Saharan Africa. Only an estimated 13.3% of the rural population in Sub-Saharan Africa has access to safely managed drinking water compared to an estimated 74% of the global population with this same level of access (JMP 2021). Further, half of the 771 million people that still lack even a basic drinking water service<sup>2</sup> globally live in Sub-Saharan Africa.

The SGD 6.1 ambition is, arguably, loftier within the Sub-Saharan Africa context because the current water access situation is not due to lack of effort. As Hope et al. (2020) puts it, “decades of effort and billions of dollars of investment have yielded modest gains, with high but avoidable health and economic costs borne by over 300 [million] people lacking basic water access [in rural Africa]”. Indeed, the current global water policy goals are preceded by two other sets of goals. The International Drinking Water Decade (1981 – 1990), now referred to as the First Water Decade, was declared during the 1977 United Nations Water Conference with the aim to “provide all people with water of safe quality in adequate quantity and basic sanitation facilities by 1990” (O’Rourke 1992). While decadal efforts brought water to over 1.348 billion people globally, progress in rural Africa was significantly slow (62 million people) especially when contrasted with rural Asia and the Pacific (896 million). By 1990, the decade’s goal was far from being attained (United National Economic and Social Council 1990).

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<sup>1</sup> Priority chemicals can vary by country, but at a global level priority is placed on arsenic and fluoride.

<sup>2</sup> Basic services refer to access to drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing. Improved drinking water sources are those which, by nature of their design and construction, have the potential to deliver safe water.

The second decade for water, officially referred to as the International Decade for Action ‘WATER FOR LIFE’ was declared for the period 2005 – 2015 with the goal of promoting water and water-related commitments under the Millennium Development Goals (MDGs)<sup>3</sup>. With an estimated 2.6 billion people gaining access to improved drinking water sources between 1990 and 2015 – 1.9 billion of whom used a piped drinking water supply on premises – the drinking water component of target 7C of the MDGs was considered to have been met (United Nations 2015). As with the previous decade, this achievement was driven mostly by gains made in Asia and Latin America and the Caribbean. Sub-Saharan Africa fell short of its 75% target under the MDGs with 68% of the population using an improved drinking water source in 2015, most of which was use of improved point sources (e.g., protected handpumps) rather than piped drinking water supply (United Nations 2015).

These past experiences underscore the loftiness of the SDG 6.1 ambition within the Sub-Saharan Africa context – while most of global progress in drinking water supply between 1990 and 2015 was marked by access to piped drinking water supply on premises, progress within Sub-Saharan Africa was mostly in terms of access to improved point sources. Given these grim statistics, ensuring universal and equitable access to safe and affordable drinking water on premises as envisioned under SDG 6.1 is an uphill task for rural Sub-Saharan Africa, where this level of access stood at 13.3% in 2020.

The magnitude of the challenge in realizing SDG 6.1 is not lost among practitioners engaged in advancing water supply. The JMP (2021) notes that achieving universal access to safely managed services by 2030 will require a quadrupling of current rates of progress (10x in least developed

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<sup>3</sup> The target aimed to halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation.

countries and 23x in fragile contexts). A significant consideration in this undertaking is the cost of delivering safely managed drinking water. The capital investments required globally to achieve this water supply goal by 2030 are estimated at US \$37.6 billion annually of which US\$ 5 billion per year is estimated for rural areas in Sub-Saharan Africa (Hutton and Varughese 2016). This amounts to about three times the investment levels in 2016.

Further, sustained universal coverage requires more than capital investments. Strong financial and institutional frameworks are needed to ensure proper operations and maintenance of water supply infrastructure for continued service delivery. Hutton and Varughese (2016) note that while capital costs reflect the immediate financing needs and are an urgent priority, the costs of operating the new infrastructure will exceed annual capital cost requirements to meet those remaining unserved as we near 2030. As such, necessary institutional measures need to be put in place concurrently with capital investments to ensure long term service delivery. Key to these is strengthening of tariff policies. Ideally, revenues from tariffs should be sufficient to ensure continued operation and maintenance of new infrastructure. This would allow limited government finance to stay focused on capital investments rather than subsidizing operations. Affordability, however, becomes a critical consideration for low-income settings, a lot of which rural Sub-Saharan Africa falls in.

Despite the low-income setting, socio-economic changes in the region are leading to changes in lifestyle and expectations (Moriarty et al. 2013) . The poverty headcount ratio at \$1.90 a day (2011 PPP) as a percentage of population in Sub-Saharan Africa has dropped from a peak of 60.8% in 1994 to 40.4% in 2018 (World Bank Data)<sup>4</sup>. This reduction in poverty is accompanied by improvements in other development indicators such as access to education and information. Mobile subscriptions for instance have grown from 1% in 1999 to 87% in 2019 for Sub-Saharan

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<sup>4</sup> The COVID-19 Pandemic is likely to have increased the proportion of population falling back to poverty

Africa (World Bank Data). It is now not surprisingly to see women carrying jerrycans of water on their backs while speaking on their mobile phones, and if you are in Kenya where electricity access rates have increased from about 15% in 2000 to over 70% in 2020, their paths back home are lined with electricity transmission lines. These changes in lifestyle are increasingly being reflected in rural water supply – water users are increasingly demanding higher levels of services with this continued improvements in socio-economic indicators (Moriarty et al. 2013).

Additionally, research has shown that piped water systems start to be put in place from basic coverage levels of about 50%. With higher basic coverage levels of over 70%, progress relies increasingly on higher levels of service provided by piped systems into homes rather than point systems (Smits and Moriarty 2013). It is therefore likely that as many countries are reaching coverage rates of about 70% of first-time access (basic services) in rural water supplies, there will be an increased shift in demand for piped supplies at the premises. As such, water policy makers as well as development partners in the region need to find solutions to challenges that have impeded development in Sub-Saharan Africa's rural water supplies despite decades of effort in order to be responsive to these changes in lifestyle and expectations as well as make progress towards global policy goals.

## **1.2 Thesis contribution to literature**

This thesis takes its departure from the recognition that community management has been the accepted and dominant institutional arrangement for rural water supplies in many low and middle income countries over the past four decades (Hope 2014; Hope et al. 2020; Hutchings et al. 2017; 2015; Harvey and Reed 2007; Moriarty et al. 2013). The management approach – explored in more detail in Chapter 2 – involves high levels of voluntary participation from the community, with community organizations being responsible for operations and management (O&M) and service



provision from their water facility. The model is premised on the assumptions that communities wish to manage their water supplies and they can do so effectively and equitably (Hope and Ballon 2019; Harvey and Reed 2007). While the world has made great strides in advancing some level of first-time access to improved water supply services for previously unserved persons by adopting this model over the past 40 years, there have been increasing concerns over its effectiveness and sustainability. Existing literature draws these concerns from evidence from across Sub-Saharan Africa as well as India indicating that about a third of rural water systems are non-functional (Hope et al. 2020; Harvey and Reed 2007; Mekala et al., n.d.; Moriarty et al. 2013). Consequently, a rethinking of rural water services, especially in rural Sub-Saharan Africa which has been the recipient of extensive support with marginal gains, is crucial – and is happening – with the hope of making significant progress towards SDG 6.1 by 2030.

This research hopes to contribute to current understanding of community management of rural water supplies in rural Sub-Saharan Africa and to contribute to the discourse on viability of piped rural water supply services in the region. Drawing on experiences of seven community-managed piped rural water schemes in Embu and Tharaka Nithi Counties in Kenya, this research applies analytic narratives in case study research to understand how the schemes were able to successfully (or not) adopt professional management of their operations, and consequently manage to self-finance their O&M and service delivery. All seven case studies have existed in some capacity for 30+ years and demonstrate varied levels of success in their operations.

Additionally, the research discusses how the schemes' have navigated sectoral reforms introduced by Water Act 2002 and Water Act 2016 in recognition of Kenya's ambitions to bring rural water supplies under regulation. To this end, this research asks: *How have select rural communities in Kenya adopted professional management of their water services?*

An intricate interaction between resolution of collective action problems, social capital, and specialization is seen to influence the ability of schemes to evolve into professionally managed organizations. This argument is premised on how the schemes were able to i) draw from the ideals of self-help under Kenya's Harambee movement to ensure construction of their water schemes, ii) appropriate experiences from coffee cooperative societies to management of their water schemes, and iii) hire trained personnel to perform varied O&M functions within their schemes. Further, the research shows that there is a clear case for having institutional and organizational arrangements that support the emergence and operation of professionally managed community schemes. The research argues that by appropriating an institutional template from the coffee cooperative societies, successful schemes were able to develop a more nuanced chain of actor relationships within their operations than is often associated with community management of rural water supplies. Specifically, successful schemes demonstrate a clear separation of oversight by an elected water management committee and day-to-day operations by an employed staff.

In the absence of effective external oversight within the case studies, clear incentives and accountability frameworks were needed within the chain of relationships between water users, water management committees and scheme staff to ensure successful operations. This observation forces a revisit of the conceptualization of community management of rural water supplies, which was done by adapting the Framework for Accountability Relationships from the 2004 World Development Report (World Bank 2003) to localized contexts. It is observed that community management as often applied in Sub-Saharan Africa has a misalignment of incentives between water users and water management committee members as representatives elected to oversee O&M. Drawing from successful schemes under this research, it is argued that

successful schemes were able to govern within an organizational structure that ensures water users are able to elect their water management committees and participate in planning and budgeting within their water schemes (i.e., have voice) and the employed staff have direct accountability to consumers where their salaries are paid from collected revenues.

The observations from the seven case studies are contextualized within Kenya's policy, institutional and regulatory (PIR) framework to draw policy considerations for the way forward. It is observed that while community management of rural water supplies characterized by high levels of voluntary participation has been the de facto approach in Kenya for 30+ years, there has been a persistent policy hesitation to adopt it as a de jure approach. Recognizing that the legal framework acknowledges the significant role played by communities in managing rural water supplies, the thesis draws on strengths and weaknesses of the approach arising from the analytic narratives to propose policy considerations towards its de jure application.

### **1.3 Thesis outline**

This thesis is structured into eight chapters divided into three parts. Part I helps to frame the research starting with the introduction provided in this Chapter. In the next chapter (Chapter 2), a historical evaluation of Kenya's PIR framework regarding rural water supplies is conducted to understand how this has shaped access to services over the years, and to contextualize the case studies. As part of this evaluation, the influence of global policies on the national PIR framework is considered. Chapter 3 details the research approach including selection of case studies and data collection methods to address the research question.

Chapters 4-6 form Part II of the thesis and detail the analytic narratives. Chapter 4 evaluates how target communities navigated a state of institutional uncertainty, especially regarding resource allocation for rural water supplies, to construct their water supply systems. It is observed that by

tapping into the ideals of the Harambee movement in Kenya, communities that did not benefit from government constructed piped rural water supplies were able to self-organize and initiate construction of their piped water schemes. Even then, external resources were critical to the successful construction of the schemes as the cost of initial capital expenditure exceeded feasible member contributions. External resources were either donor funding or government allocations. On the latter, a case for clientelism in allocation of government resources in funding rural water supplies is made by evaluating the evolving role of Harambee as a self-help concept.

With schemes constructed, Chapter 5 argues that successful water schemes are those that were able to establish and govern along institutional structures appropriated from coffee cooperative societies. All seven schemes are located within Kenya's central highlands, and coffee growing is a significant economic activity within their supply area. This chapter starts out with an overview of the history of coffee cooperative societies in the region to make a case for farmer awareness of their institutional framework. This is followed by an evaluation of parallels between institutional frameworks of the coffee cooperative societies and the water schemes to make an argument for appropriation. Beyond the appropriation, exogenous influences such as trainings on O&M best practices and hiring competent personnel are seen to influence overall success.

Chapter 6 contends that community management at five of the seven schemes studied evolved into an organizational arrangement that is distinct from community management characterized by high levels of volunteerism as often applied in rural Sub-Saharan Africa. This was depicted by a nuanced chain of actor relationships established and governed along the institutional template appropriated from the coffee cooperative societies. This organizational arrangement is evaluated against an adaptation of the Framework for Accountability Relationships from the 2004 World Development Report to identify factors that lead to differentiated performance across the schemes.

Part III of the this focuses on governance of rural water supply in recognition of Kenya's ambition to formalize and regulate the sub-sector. Chapter 7 evaluates how and why some of the schemes evaluated under this research came to report their performance data to the Water Services Regulatory Board (WASREB), a proxy indicator for regulation of the water schemes under this research. A critical reflection of Kenya's evolving PIR framework under Water Act 2002 and Water Act 2016 is conducted in consideration of the needs of rural water services arising from Chapters 4-6. Chapter 8 provides policy considerations for governance of this sub-sector going forward.

# Chapter 2. Management of Rural Water Supply in Kenya

*“You can’t really know where you are going until you know where you have been”*

*Maya Angelou*

## 2.1 Introduction

Every Kenyan has a right to clean and safe water in adequate quantities as provided for in the Kenya Constitution of 2010. Realizing this right is, however, a work in progress as 62% of the population<sup>5</sup> rely on improved sources of drinking water according to the 2019 census data.

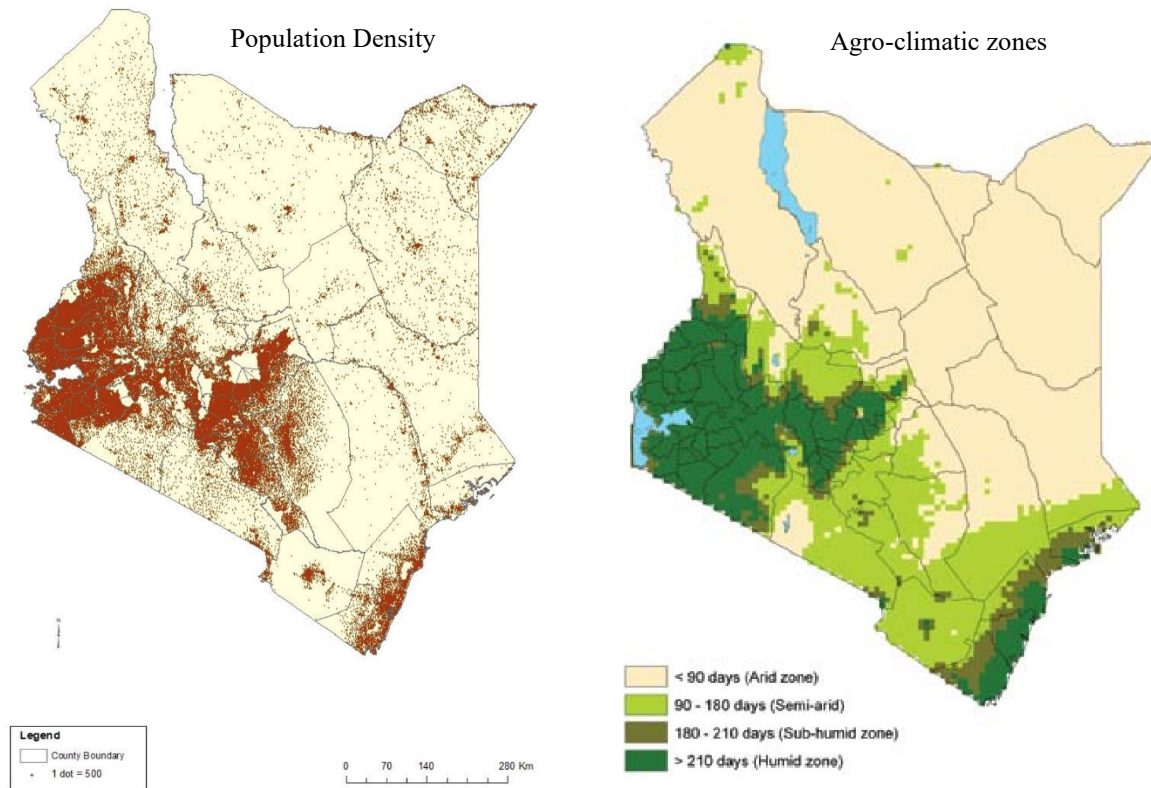
Access rates in rural areas (which account for 72% of total population) are at 55.6% while at 72.2% for urban households. With respect to global water access policy goals as presented under the SDGs, and specifically the ambition for water sources located on premises, only 24.2% of Kenyan households have access to water piped into their dwelling or yard/plot. The disparity between rural and urban areas is significant for this categorization at 12.9% and 42% respectively. A caveat here is necessary – the proportion of households with water access located

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<sup>5</sup> Calculated based on 2019 census data and consistent with sources identified as improved by the JMP (i.e., a sum of households using either a protected spring, protected well, borehole/tube well, water piped into dwelling, water piped into yard/plot, public tap/standpipe, and rain harvested water).

on premises is likely higher than that of households with piped water access into their dwelling or yard/plot due to self-supply through improved sources located within premises.

The implications of these statistics with respect to rural areas in Kenya varies with the lens of interpretation – ‘glass half full’ or ‘glass half empty’. On the one hand, the statistics show that rural areas in Kenya lag significantly in access to improved water source. On the other hand, one may argue that Kenya has made notable progress considering that concerted efforts have only been seen over the last five to six decades. Further, Kenya is a water scarce country with most of her population found in the water ‘rich’ regions. 89% of the country’s land mass is considered as either arid or semi-arid lands (ASAL). A majority of her population, however, lives in the non-ASAL areas where an estimated 62% of Kenya’s population lives on 11% of the country’s land mass (State Department of Arid and Semi-Arid Lands n.d.). Figure 1 shows this distribution. Considering that 72% of Kenya’s total population lives in rural areas (World Bank Data 2020), it may be deduced that rural areas in Kenya’s non-ASAL regions are mostly densely populated. These varied settlement patterns across Kenya’s rural areas (i.e., rural dense in non-ASAL areas and rural remote in ASAL areas) call for different strategies to rural water supplies in order to attain both national and global policy goals. This research hopes to inform strategies for non-ASAL rural areas, though with broader applications for rural contexts.



**Figure 1: Map of Kenya's population density – 2019 (left) and agro-climate zones (right)**  
 Source: Kenya National Bureau of Statistics; (Herrero et al. 2010)

With the benefit of hindsight, this chapter discusses policy decisions in Kenya regarding rural water supplies, and how these have contributed to the current sector landscape. Given the breadth of the subject, emphasis is laid on policy actions that are considered as pivotal to rural water supplies with the ultimate objective of setting the context for this research's question and case analysis. Specifically, the chapter evaluates the path dependent way in which rural water supplies have evolved. First, colonization is seen to have set a foundation for marginalization of rural areas in access to piped water supplies. Second, while an independent Kenya started off with ambitious plans for water supply comparable to the ambitions of the SDG 6.1, economic crisis of the 1980s set off a path dependence on voluntary community management of rural water supplies. This resulted in a state of institutional limbo for rural communities that has persisted to date and limited progress.



The Chapter is organized into historical periods with distinct policy actions, starting with an overview of i) water services in pre-independence Kenya (pre- 1963), ii) water services in newly independent Kenya (1963 – 1974); and iii) water services under the Ministry of Water Development (1974 – 1999). Recognizing that community management evolved to become the accepted and dominant institutional arrangement for rural water supplies (RWS) in many low- and middle-income countries during the 1980s-90s, the chapter goes into considerable detail to discuss global policies under this period. This is because observations from tests conducted in Kenya in the 1980s shaped community management as often practiced in Sub-Saharan Africa today to significant extents. For the analysis, reforms under the Water Act 2002 (1999 – 2013) are introduced in this chapter, but covered in more detail, along with reforms under Water Act 2016 (2013 – Present), in Chapter 7 as part of reflections on how to govern rural water supplies.

## **2.2 Rural water services in pre-independent Kenya**

### **2.2.1 *Pre-colonial Kenya (pre-1885)***

As recent as 1885, Kenya as we know it today did not exist and the area it occupies was home to distinct communities without shared political boundaries or administration. As Nyanchaga (2016) observes, the area's inhabitants settled near water sources and forests from where they practiced their main source of sustenance be it farming or hunting and gathering. In the drier parts of today's Kenya, nomadic lifestyle was practiced, and migration was influenced by water availability.

Intercommunal access to water resources in this pre-colonial period was secured through complex institutional arrangements based on geographical territories, social-political age grade systems and kinship (Nyanchaga 2016). Intra-communal water access on the other hand was

usually embedded in traditional culture and Meinzen-Dick and Nkonya (2007) have identified a number of general features associated with African customary water law. Among these are, first, that water as a resource tended to be commonly held by the community with all members allowed access for primary uses – these often-included basic domestic water needs and water for animals. Beyond domestic use, specific use rights could be allocated to groups or individuals through a social negotiation process where allocations depended on changing local circumstances (e.g., limited allocations in times of drought). Third is that control rights of management and exclusion to a water resource were often held by the local chiefs and/or groups or individuals that developed the source. To this third point, (Nyanchaga 2016) points out that control rights increased with the group's/individual's input of labour and capital to the development of the resource and consequently, while access to water for primary uses was allowed, supplies that required human input were often not open access systems. Finally, it is observed that most customary water laws did not grant any alienation rights so that more people could be allowed in but there was no profit in giving up individual rights to water.

### ***2.2.2 Colonial Kenya (1885 – 1963)***

The Berlin Conference of 1885 marks the beginning of Kenya's colonial history with the partitioning of Africa among European powers. Construction of the Uganda Railway, who's works started soon after Kenya became a British protectorate in 1895, marked a pivotal shift in development of water supplies in Kenya (Nyanchaga 2016). Uganda Railways pioneered the development of piped water supplies in the country with establishment of the first piped water supply schemes along the railway line stations to serve both the steam engines and the railway employees. Formation of the protectorate introduced new legislation towards water supplies that rendered the traditional unwritten institutional structures insignificant from the Crown's

perspective (Nyanchaga 2016). The Crown Lands Ordinance of 1902 contained the first water legislation enactment and only covered the issuance of water permits.

Nyanchaga (2016) has documented the history of water developments in Kenya starting in the 1890's to impressive detail. From this account, key shifts that shaped water supplies in rural areas during the colonial period, and arguably set the foundation for systemic marginalization of rural areas in access to piped water supplies, may be deduced. First was an introduction of new practices towards water access in what Nyanchaga describes as a transition from 'people going for water' to 'water going to the people'. He points out that pre-colonial Kenya marks a period before any piped water supplies. Development of piped water schemes by Uganda Railways, (e.g., the construction of a dam on Njoro River in Nakuru to supply the Nakuru railway station in 1901) introduced new concepts to the local population. However, because this practice was concentrated within stations and often constructed with imported inputs and knowledge, its diffusion beyond the stations was highly limited.

Second, establishment of towns during the colonial period led to the reorganization of social and economic life. Prior to colonial administration, there were no towns – as recognized in European nations – in interior Kenya. Morgan (1969) argues that there was no economic basis for urban settlements because the prevailing subsistence agriculture and stock herding did not give rise to any permanent trading centers. Nyanchaga (2016) observes that all major towns in interior Kenya (Nairobi, Naivasha, Nakuru, Kisumu, Eldoret and Kitale) have their origins from rail stations. The first piped water supplies in these towns were developed and managed by Uganda Railways to serve the stations.

Further, the rail stations provided convenient locations for operations of the colonial government which introduced administration based on provinces and districts (Morgan 1969). Beyond the

rail line stations, the settlements hosting provincial, or district commissioners were usually entirely new creations though in some cases the residence of collaborating prominent chiefs (e.g., Mumias) or important marketplaces (e.g., Ngong) would have some influence. These colonial settlements tended to include residences of the provincial or district commissioner and his staff, offices, law courts, police headquarters, perhaps an army detachment, a post office, and if there was a Christian mission center nearby, a school and a hospital. Many of these settlements grew to become key urban centers in Kenya today, and as Nyanchaga (2016) documents, piped water supplies in these urban centers have their roots in providing water to the colonial settlers.

Provision of water services evolved with increasing European populations, economic growth especially along colonial settlements, population growth in urban centres, and as the colonial government established governance systems. Expectedly, this evolution was aided by a policy environment that mostly favored the colonial settlers. For instance, the first rural water supplies project (Rongai pipeline) was started in 1948 with the aim of opening agriculture in the mainly European settled areas (scheduled areas). Eight such rural pipelines had been developed in the scheduled areas by 1959 (included Rongai, Vissoi, Olabanaita, Westacre, Elburgon, Enarosura, Kinja and Kinangop ring main). While some piped schemes were developed in the African areas (non-scheduled areas), Nyanchaga (2016) notes that these were often designed to protect important water catchment areas by conveying water to grazing areas sufficiently remote from the water source.

The Swynnerton Plan of 1954 under the Ministry of Agriculture is described as a “dramatic break from earlier colonial policies” (Saeteurn 2014) and marks a shift in policy in its attempt to extend piped water supplies to African communities. The Plan was aimed at intensifying African agriculture through mixed farming featuring improved cattle for dairying and increased

cultivation of cash crops. A significant amount of water development activities was built into the plan (Nyanchaga 2016; Thurston 1987). Designed as a government initiative under the district commissioners and implemented by the African District Councils (ADC), water developments under the plan included construction of large and small dams, hand-rig boreholes, wells fitted with handpumps, capped springs with associated piping, and installation of piped water supplies to both farmers and locational centers. Initial costs of water developments were to be covered by a loan channeled through the African Land Development (ALDEV)<sup>6</sup> to the ADCs, and water rates were to be levied to cover maintenance and loan repayment. Among the districts that benefitted the most from the Plan was Nandi District, who's commissioner was also president of the Swynnerton Plan. The district demonstrates some of the earliest efforts to connect rural Kenyans with piped water supply and the ensuing challenges to such operations (Nyanchaga 2016).

Nandi District was observed to have innumerable springs and streams of permanent nature, an indication of adequate water that could be harnessed for optimum use – the question was how to get it to individual farmers, which was the plan's ultimate objective. In 1956, it was decided to refocus available funding towards piped water schemes rather than other plan activities such as large dams. The water works became very popular so that by 1958, half of the district's plot holdings had a permanent water supply. In this time, the emphasis on wells (which had been the focus for experimentation on handpumps and windmills) declined with increased preference for piped water schemes by farmers. The cost of individual wells, along with the time and effort of constructing one, were seen to be disproportionate to that of constructing water schemes. As

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<sup>6</sup> African land development (ALDEV) was formed in 1946 under the Ministry of Agriculture to develop water resources for agriculture especially in the rural area and rangeland management.

demand for connection to the piped networks outgrew the capacity of the district to connect farmers, farmer groupings formed to purchase piping to link to existing supplies. Unfortunately, progress in making piped connections to farmers started to slow in 1959 due to financial challenges. Among the challenges were: the ADC could not service its loan prompting a reconsideration of financing the water schemes; while there was an authorized water rate, revenue was not collected on time; and farmers struggled to meet their share of cost in laying required pipelines from the main water supply tanks to their plot holdings (Nyanchaga 2016). By 1960, it was decided that the ADC would not seek further loans from ALDEV and any augmentation would be covered by payments for water supply. This significantly slowed down any new investments.

### **2.3 Rural water services in newly-independent Kenya (1963 – 1974)**

D. K. Sambu and Tarhule (2013) argue that water reforms immediately post Kenya's independence were influenced by an urgent need to correct colonial injustices as well as global commitments of the International Hydrological Decade (1965-74). Regarding the former, the new government sought to move away from what was perceived to be a narrow, capitalistic, top-down development approach based on cash crop production. Instead, African Socialism was adopted as an economic, political and development philosophy (D. K. Sambu and Tarhule 2013; D. Sambu 2011). Economically, African Socialism entailed the nationalization of key corporations and sectors (including those in agriculture and water resources management) with the goal of accelerating equity, where more than 80% of the population resided in rural areas at the time. The concept of self-help, termed as 'Harambee', presented the main vehicle for implementation of African socialism (D. K. Sambu and Tarhule 2013). Kenya's First

Development Plan (1964 -70) observed that Harambee “as a general awakening of interest in self-improvement [would] put all the people behind the government’s efforts to develop Kenya” (D. K. Sambu and Tarhule 2013). With respect to rural water services, the Plan recognized that “provision of rural water supplies is a fundamental condition for rural development”. It thus called for the provision of free or subsidized water services and promoted self-help water projects in rural areas.

Many rural communities organized themselves with the goal of making labor and financial contributions towards their water supplies. More than 3,400 schemes (2000 springs, 800 wells, 400 dams and 230 piped water supply projects) were built in rural areas between 1964 and 1968 (D. K. Sambu and Tarhule 2013). Communities had to raise a certain amount of money to unlock a matching grant from the government towards their water supplies (Thomas 1987). Kenya’s Development Plans for the period 1970 – 1993 indicate that government had a budget line towards supporting self-help water projects and Table 1 provides a breakdown of government expenditure in water supplies versus harambee investments in the years soon after independence (Mbithi and Rasmusson 1977). With time, however, the structure and format of harambee projects changed and this is explored in Chapter 4 with reference to this research’s case studies.

**Table 1: Comparative government development expenditure on water supplies vs. Harambee investments, '000 £K (1965 – 72)**

<b>Financial Year</b>	<b>Government</b>	<b>Harambee</b>	<b>Ratio Hrb/Govt (%)</b>
1965/66	507	-	-
1966/67	593	76.7	13%
1967/68	825	124	15%
1968/69	654	104	16%
1969/70	854	135.4	16%
1970/71	778	233.1	30%
1971/72	1,308	204.5	16%

With regard to global influences, UNICEF and WHO played a pivotal role in shaping rural water supplies in Kenya post-independence. The two organizations started to fund development of rural water supply in Kenya in 1960 through the Ministry of Health. Having recognized the health problems created by poor quality water, WHO and UNICEF launched the Environmental Sanitation Programme which sought to demonstrate the benefits of rural water supplies and hopefully trigger interest among rural populations (Nyanchaga 2016). The water supplies developed were either mechanical pumps, handpumps, hydrams or gravity schemes. The programme also included improved methods of waste disposal in schools, health centers, markets, and public meeting places. Between 1960 and 1973, about 560 rural water supplies had been implemented through what was expected to be a 60/40 contribution between UNICEF/WHO and the communities - UNICEF providing assistance in the form of necessary equipment for works, mechanical water pumps and diesel engines to power them, hydrams, handpumps, and piping materials; WHO providing the engineers and health inspectors to provide technical oversight; communities providing labor, local materials and some money (Nyanchaga 2016).

In this same time, institutional changes happened to reflect independence. The Water Development Department was formed under the Ministry of Agriculture (replacing ALDEV) in 1964 and mandated with water supply in rural areas and small towns. Further, water supply in rural areas was taken as a social good so that services were not to be paid for. Newly constructed rural systems (such as those supported by UNICEF/WHO) were handed over to the water development departments of the county councils (formerly Africa District Councils) for management. The county councils also managed rural water supplies left behind by the colonial settlers following independence. This structuring led to multiple challenges as identified by a



sectorial study for community and rural water supply carried out by WHO in 1971 and an evaluation of the UNICEF/WHO programme in 1974. Most of these challenges were associated with finance, man-power and administrative procedures. For instance, the operation and maintenance of water supplies was found to be poor due to lack of funds for spare parts, fuel for the diesel pumps, and employment of pump attendants. Further, the stretched capacity of the county councils coupled with large distances between rural water supplies presented challenges for regular maintenance of the systems (Nyanchaga 2016).

To help address challenges facing the water sector, rural water supplies included, the WHO recommended upgrading of the Water Development Department under the ministry of Agriculture to a stand-alone ministry mandated with development and maintenance of water resources. This was effected in 1974, a reorganization that was accompanied by Kenya's first National Water Master Plan (1974) with a goal of ensuring access to potable water at a reasonable distance (within 1km in high and medium potential land areas and 5km in low potential areas) to all Kenyans by the year 2000 (D. K. Sambu and Tarhule 2013; D. Sambu 2011; Nyanchaga 2016; Ministry of Water Resources 1999; Republic of Kenya 1984).

## **2.4 Rural water services under the Ministry of Water Development (1974 – 1999)**

The years between 1974 – 1999 were marked by complex developments affecting rural water supplies in Kenya. First, Kenya experienced multiple shifts in policy and strategies influenced by its broader economic landscape. Second, global commitments under the International Drinking Water Supply and Sanitation Decade (1980-90) led to a shift in the general approach to rural water services in developing countries. Part of this global shift was trialed in Kenya.

### ***2.4.1 National policies on rural water supply in the 1970s-80s***

The newly formed ministry of water development (MOWD) embarked on an ambitious plan for development of water supplies from the 1970s – 90s. Specific to rural areas, the Rural Water Supply Programme marked Kenya’s main programmatic approach to rural water supplies. The programme was implemented with the aims to i) break water related development bottlenecks in the high potential areas, and ii) to provide potable water in areas of chronic drought (Nyanchaga 2016; D. Sambu 2011; D. K. Sambu and Tarhule 2013). Discussions for this programme date to as early as 1970 when the first agreement for support was signed between the Governments of Kenya and Sweden. Nyanchaga (2016) details how rural water development received substantial government resource allocations between 1968 and 1976, most of which was enabled by donor funding, and largely based on investments being a productive input into the agricultural sector. The Development Plan for 1984-88 recognizes the Rural Water Supply Programme as “one of the most important activities of the Ministry during the Plan Period”. The 1989-93 Plan records that by 1987, there were 277 operational water supplies, 350 under implementation and 200 at the planning stage. By the year 2000, there were about 570 rural water supply schemes under the management of various government entities (D. Sambu 2011).

While the Rural Water Supply Programme seemed promising, progress in advancing rural water access in the country was hampered in the 1980s due to budgetary constraints. On the one hand, there were concerns by the early 1980s that rural water schemes were performing at a sub-optimal level so that many schemes were failing to provide dependable services to a majority of the population within the supply area. Further, MOWD had concerns over rising costs of operations and maintenance of the schemes, where the policy of the day perceived water access as a social good and water provision was free (Ministry of Water Development 1988a). While

investments had been predicated on agricultural performance, revenue performance indicated that without reform, government's financial obligation was greater than in the previously optimistic revenue forecast (D. K. Sambu and Tarhule 2013; Nyanchaga 2016; Ministry of Water Development 1988a).

The years leading up to the 1980s were also marked by multiple financial challenges that led to a debt crisis in the 1980s. On the domestic front, droughts in 1979/80 as well as the infamous 1984 severe drought affected coffee and tea exports, Kenya's main export earners, which severely curtailed government's revenues and its ability to fund development projects (Republic of Kenya 1989; D. K. Sambu and Tarhule 2013). On the global scale, Kenya, like many other developing countries, had borrowed significantly from the International Monetary Fund (IMF) and the World Bank in the 1970s and was severely affected by the global economic crisis of the early 1980s (Republic of Kenya 1989). Structural Adjustment Programs (SAPs) introduced by the IMF and the World Bank in response to the country's debt crisis in the 1980s required that government reduce its spending in public sectors, remove subsidies in various sectors, and constrained government's ability to provide varied free public services (D. K. Sambu and Tarhule 2013; Nyanchaga 2016). Combined, these challenges significantly limited the government's ability to invest in new infrastructure, including piped rural water supplies.

The combination of these endogenous and exogenous factors, arguably, lay the foundation for a shift in policies and strategies for rural water supplies. A study conducted in 1982/83 and financed by SIDA proposed management reforms aiming at a higher degree of self-financing within the water sector, improved social effectiveness, and improved operational performance (Ministry of Water Development 1988a). Ultimately, the 1984 – 88 Development Plan

demonstrates this shift in policy with the following being some of the strategies and action programs for rural water supply:

- “Provide water facilities within reasonable distance [...]. Those that will require connections to private homesteads will meet the cost of such connections.
- “The provision, operation and maintenance of water supply facilities will be undertaken primarily through joint efforts between the government and the beneficiaries. This will require the communities to contribute significantly towards the construction and maintenance of facilities.
- “The current design standards for both urban and rural water supplies appear to be too high in relation to the needs and the costs. The government will undertake to review these standards aiming at cost-effectiveness and large coverage with the available resources.
- “Cost recovery will be an essential element in the water supply programs. [...]. In the rural areas generally, water rates should cover at least the direct operation and maintenance costs of the water supply”.

To test the applicability of proposed reforms, a water use test project (WUTP) was jointly financed by SIDA and the Ministry starting in 1987 to test the extent to which i) the rural water supply sector could become self-financing primarily in the operations and maintenance field, ii) decentralization of Operations and Maintenance (O&M) function would contribute to improved operational performance, iii) water consumers could assume the responsibility for the management, operations and maintenance of rural water supply, and iv) it is socially and financially viable to provide the majority of the population the scheme areas with improved water (Ministry of Water Development 1988a). Coincidentally, one of the schemes studied under this research, Ngagaka Water, was one of the schemes selected for the WUTP. The WUTP was,

however, abruptly discontinued in 1991, due to what were described as ‘management problems’ (Business and Economics Research Company 1993).

Beyond the water sector, the 1980s also marked a time of decentralization of government functions under the District Focus for Rural Development. This strategy, first introduced in 1983, shifted the responsibility for planning and implementing rural development from the ministry headquarters to the districts. It hoped to optimize on the complementary relationship between the Ministries’ sectoral approach to development and the districts’ integrated approach to addressing local problems (Republic of Kenya 1987). The strategy was expected to “encourage local initiative in order to improve problem identification, resource mobilization, and project design and implementation”. Among other things, the strategy mandated the District Water Offices (DWO) with all aspects of rural water services, including small towns whose mandates were not under local government authorities.<sup>7,8,9</sup>

The DWO received financial allocations from the national treasury, channeled through the district treasury, to cater for both recurrent and development expenditure (Republic of Kenya 1987; Ministry of Water Development 1988b). Financial allocations were based on budget estimates and funding ceilings. As such, prioritization of self-help projects seeking to receive government funding favored projects approved at the district level. Revenue collection by the DWOs on the other hand was described as generally weak<sup>10</sup>. It involved i) distribution of water bills by water scheme operators, ii) consumers were responsible for payments of their water bills

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<sup>7</sup> Most former colonial centers that came to mark market centers and small towns had some form of water supply, and these were often small pumping schemes

<sup>8</sup> A District could have multiple water schemes, and each scheme had its operational staff. All schemes within a district were under the overall oversight of the DWO headed by the District Water Engineer/Officer.

<sup>9</sup> Eng. Ephantus Mugeru (retired District Water Officer) in discussion with the author, November 2021.

<sup>10</sup> Eng. Ephantus Mugeru (retired District Water Officer) in discussion with the author, November 2021.

at the Divisional clerk's office<sup>11</sup>; and iii) the Divisional clerks consolidated all the revenues for remittance to the District Accountant, and eventually to the District Treasury. This structure had no direct connection between water services delivery and payment for services, a key weakness as identified by Eng. Ephantus Mugeru (former District Water Engineer interviewed during this research). Eng. Mugeru observed that consumers received water services whether they paid their bills or not, and workers were paid whether services were delivered or not. The government attempted measures to improve revenue collection such as reduced financial allocations compared to requested budget amounts to incentive revenue collection to meet the deficit as seen with the 1988/89 allocations (Ministry of Water Development 1988b). This general structure was however retained until after reforms introduced by Water Act 2002.

#### ***2.4.2 Global policies on rural water supply in the 1970s-90s***

The shifts in Kenya's policies for rural water supply in the 1980s reflect the global discourse on the subject at the time. As presented in the Introduction, the International Drinking Water Decade (1981 – 1990) was declared during the 1977 United Nations Water Conference with the aim to 'provide all people with water of safe quality in adequate quantity and basic sanitation facilities' by 1990. Among the most radical approaches promoted towards solving the water access challenge in this Decade was community participation, and over time, aspects of participation evolved to what is now commonly considered of community management of rural water schemes (O'Rourke 1992; Harvey and Reed 2007; Hutchings et al. 2017). While the initial WHO (1981) document summarizing the Decade approach acknowledged that community participation in water supply and sanitation were not a new idea, it noted that the decade would

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<sup>11</sup> Each District was divided into smaller administrative units called Divisions. Bills would be settled at the Divisional clerk's office by consumers from all water schemes within the division.

“generate greater political will to make it work”, and “all the other elements of the decade approach [would], as a matter of policy and strategy, emphasize community participation” (World Health Organization 1981). This WHO (1981) statement summarized the decade approach as follows:

“The Decade must contribute to implementing primary health care; water supply and sanitation development should be complementary and they should be jointly associated with other health development; policies and programmes should be focused on rural and urban under-served populations; full coverage should be achieved through reproducible, self-reliant and self-sustaining programmes; the people for whom the services are intended should be associated with all stages of programme and project development; the Decade should be a matter of collaboration between all contributing sectors. It is evident, too, that if they are to be self-reliant and self-sustaining, programmes will require a new approach to the role of community-based manpower; community workers must be provided with information and logistic and operational support from the appropriate government service”.

O’Rourke (1992) argues that community participation was proposed as an alternative to the centralized government approach to water and sanitation services. Prior to the 1980’s, extension of water services was largely supply driven with gradual decentralization of structures and resources from capital cities to medium sized towns and eventually – hopefully – to rural areas (O’Rourke 1992; Harvey and Reed 2007). Demands from constant rehabilitation and improvement needs of existing systems, however, meant that significant resources went towards giving better service to those already served rather than extending services to the poor and unserved. Community participation was therefore seen as an equitable solution where communities could identify their specific needs in water and sanitation and take the necessary steps to address the needs using locally appropriate solutions. Among activities to promote community participation would be involvement of communities in decisions, costs, and actions including helping to plan, select sites, construct, operate and maintain safe water supplies (World Health Organization 1981; O’Rourke 1992).

Unfortunately, as the decade wore on, implementation focused on some aspects of the Decade's approach more than others. Among these aspects was the emphasis on self-reliant and self-sustaining programmes. With the obvious challenge of the cost of providing water supply, there was a call for adoption of appropriate technologies which favored low-cost technologies purposefully designed to require minimal external inputs (Hutchings et al. 2017). This manifested itself the most under the VLOM approach (village-level operation and maintenance) which in many ways revolutionized rural water supply in rural Sub-Saharan Africa and continues to impact the sector to date. The approach advocated for communities taking full responsibility for operation and maintenance of basic technologies and systems (O'Rourke 1992; Colin and Cotton 1999; Hutchings et al. 2017; Black 1998). The VLOM approach was born out of observations from the Handpumps Project, a UNDP and the World Bank initiated global and interregional project launched in 1981 and formally referred to as Laboratory and Field Testing and Technological Development of Community Water Supply (Black 1998).

The first of the impacts of the Handpumps Project was the definition of appropriate handpumps. Basic technologies for water supply under VLOM were perceived as communal handpumps that were i) easily maintained by a village caretaker, requiring minimal skills and a few tools; ii) manufactured in-country, primarily to ensure the availability of spare parts; iii) robust and reliable under field conditions; and iv) cost effective (Colin and Cotton 1999; Black 1998). This was in contrast to the UNICEF developed India Mark II handpump which, though it accounted for significant progress in water supply for rural communities between 1980 – 1990 and especially in India, it required specialized skills for repair and maintenance (Rural Water Supply Network 2013; Black 1998). As with conventional piped water systems, maintenance and repair of this handpump almost always relied on centralized government action straining limited



government resources. The Afridev, which was developed in Kenya for deep well environments with the support of the Handpumps Project, met the requirements of the VL0M approach. Among other things, its maintenance was simple enough so that villagers could carry out routine maintenance after a few hours of training. Consequently, the Afridev has become the most commonly used handpump under community management (Rural Water Supply Network 2013), and it continues to contribute significantly to progress in access to water services from improved point sources in rural sub-Saharan Africa.

While the Handpumps Project was mostly technical in its orientation, it is argued to have contributed to a major conceptual leap in the understanding of user participation in water supply by linking technology and community management, an idea that “subsequently invaded thinking about water resources in general” as posited by Black (1998). The linkage was made following a field test of the Afridev handpump in Kwale District, Kenya, where about 300 pumps were installed in partnership with UNDP and a Kenyan NGO (Kenyan Water and Health Organization) (Rural Water Supply Network 2013; Black 1998). It was observed that if a community was to be primarily responsible for maintaining and operating handpumps, it would have to want to have a hand-pump in the first place, be willing to choose pump caretakers from its members, organize itself so as to collect money for any repairs and pump replacement, know who to hire for hand-pump work, and where to buy spare parts among other maintenance needs. The field test in Kwale was argued to have proved that community management of water supplies did work, especially where women were involved. To quote Black (1998), “The project was rapidly expanded to the rest of Kwale District. Things did not always go smoothly. But in time, a ground-breaking system of community organization was in place – 125 Water committees were established, all selected women as treasurers, and all collected water levies. By

1988, 70% had opened bank accounts. Pumps were functioning and being routinely mended with the use of the funds”.

The outcomes of the Handpump Project and the VLOM concept as observed in Kwale became key to the discourse of management of rural water services in Sub-Saharan Africa. By requiring that not only the technology be appropriate to communities but also the service model surrounding it, VLOM required a new balance of responsibilities between public authorities and rural communities (Black 1998). It demonstrated that rural water supply could be dissociated from government dependence in both financial terms and technical support so that communities could control their water supply affairs. To this end, the experience in Kwale formed the template for application of community management where beneficiary communities would establish a water committee with key officials; communities were encouraged to appoint women as treasurers; and there was an emphasis on the need for local area mechanics and easy access to spare parts. Informed by the VLOM approach, the World Bank championed the Demand-Responsive Approach (DRA) in the 1990s in continued effort to address the challenge of rural water supplies. The DRA was rooted in neo-liberal thinking, and was meant to ensure that communities achieved the services for which they could demonstrate effective (economic) demand so that they were able to support their services (Moriarty et al. 2013; Hutchings et al. 2017). It involved notions of informed involvement in technology choice, community contribution to the investment costs, and assumption of responsibility for future operations and management (O&M) costs.

These VLOM observations were also of significant consequence in shaping rural water supply in low-income countries in the 1990s. The New Delhi Global Consultation on Safe Water and Sanitation for the 1990s identified community management as one of its four guiding principles

noting that “community management goes beyond simple participation. It aims to empower and equip communities to own and control their own systems” (UNDP 1990). Community management was seen as key to sustaining rural water services and governments were called upon to support community management through legislation and giving it priority in national strategies for the 1990s. With this, rural communities were expected have prominent roles in planning and resource mobilization as well as all subsequent aspects of development (UNDP 1990).

The second guiding principle from the New Delhi consultations was on people and institutions, and it acknowledged that strong institutions are essential for sustainable development. However, it envisioned a changing role for government from that of service provider to one of promoter and facilitator. Consequently, the statement called for the acknowledgement and strengthening of the special role played by non-governmental organizations (NGOs) and volunteers in development, observing that NGOs are “flexible, credible, ready and able to experiment with innovative approaches”. Governments were expected to support NGOs in replicating approaches and include them as partners in projects wherever appropriate (UNDP 1990).

These two principles from the New Delhi consultations, arguably, characterize most rural water supply projects implemented in Sub-Saharan Africa since, and more so under the MDGs era. Further, the development of the Afridev handpump provided a low-cost (initial capital expenditure) solution to providing water services to (often poor) rural communities in Sub-Saharan Africa. Combined, these two factors have allowed for significant progress in providing some level of first-time access to improved water supply services for previously unserved persons. They also, however, had had the unfortunate effect of significantly slowing down large-scale investments – such as those that would advance piped water supply – as intentions to

bridge low-cost services with large-scale investments receded with the shift in global policy (Black 1998).

### ***2.4.3 Challenges with community management of rural water supply***

The principles and intentions behind community participation and management in water service delivery were conceptualized in a rather technocratic manner with an emphasis on sharing project costs and increasing efficiency and effectiveness (Hutchings et al. 2017). Unfortunately, this idea of community management (especially as envisioned in the New Delhi Consultations) was quite removed from the reality of many developing countries. Colin and Cotton (1999) and Hutchings et al. (2017) arguing that, in practice, communities were not prepared to take full responsibility of the water systems as envisioned under VLOM. Further, with the example of Kenya, governments were not ready to relinquish these responsibilities to communities. In Kenya, the District Water Offices (DWO) had the mandate for rural water supply and received direct budgetary transfers to perform their functions; DWO retained this function until 2003 when the Water Act 2002 became effective.

Without real commitment to community participation / management from national governments, O'Rourke (1992) observes that there was a shift to NGOs in the 1990s for support in delivering global water policy goals. Black (1998) confirms this in noting that by the early 1990s, international donors (including the four main players at the time – World Bank, UNICEF, UNDP and WHO) had begun to “accord new respect to the experiences and capabilities of NGOs and the role they could play”. This was especially in acknowledgement that the top-down hierarchical nature of most governments was inhibiting community engagement thus compromising results. Within these circumstances, community management of RWS showed to be suitable to the project approach adopted by many development partners (NGOs and donors).

It allowed them to work directly with communities and grassroots organizations. This, however, had the unfortunate consequence of bypassing government structures which in turn meant that after these projects ended and the development partners left the communities, communities were left to manage systems on their own (Harvey and Reed 2007). Given the limited capacity of most governments along with their limited engagement in project implementation, if any, this approach created an ongoing dependence on NGOs for water supply extension and large capital maintenance.

Beyond government engagement, there exists an expansive literature on challenges in the capacity of communities to manage their rural water schemes (Mesa et al. 2014; Harvey and Reed 2007; Doe 2004; Etongo et al. 2018; Hutchings et al. 2015; Harvey and Kayaga 2003). Most of these challenges stem from the concept of shifting O&M responsibility to communities which can be argued to have been borne out of a ‘cultural idealization’ of rural communities depicted in an idealized generalization of i) communities’ sense of cooperation and therefore ability to form institutions and volunteer time to manage water supply systems, and ii) sense of ownership as a meaningful proxy for legal ownership that translates into a sense of responsibility (Harvey and Reed 2007; Hutchings et al. 2017; O’Rourke 1992).

On the sense of cooperation, Harvey and Reed (2007) highlight the most cited threats to the management capacity of communities from a study of several hundred community schemes. These include reliance on voluntary inputs from community management yet there are often no longer-term incentives for services provided; there are often no mechanisms to replace key individuals in the water committee with trained persons in the event of a vacancy; disillusionment among committee members that may lead them to abandon their roles (e.g., due to factors such as community failure to contribute towards maintenance or general lack of

community cohesion); a loss of trust and respect for the committee management by the general public which is often associated with a lack of transparency and accountability; and some communities lack the resources to replace major capital items in the event of breakdown leading to long term non-functionality.

On the conceptualization and expectations of community ownership, it is observed that fostering a sense of ownership was one of the main goals for community participation through community expression of demand for services and user contributions towards capital costs among other activities. This sense of ownership was expected to translate to a commitment to ensuring ongoing operations and use (Hutchings et al. 2017; Harvey and Reed 2007; O'Rourke 1992). Harvey and Reed (2007), however, note that there is no automatic relationship between these two – because a community owns a facility does not necessarily mean that they will acquire a sense of responsibility to manage it, nor does it guarantee their willingness to contribute towards its maintenance. While links may exist in some cases, ownership in itself is not a key to sustainability. O'Rourke (1992), unfortunately, observes that this ideation of ownership fostered through community participation was based “on the assumption that communities are homogenous, harmonious units eager to work together in the pursuit and satisfaction of their communally felt needs”, an assumption that does not always hold. Ultimately then, it could be more effective to abandon the need to develop a sense of community ownership and instead focus on developing a sense of responsibility towards maintaining the water system. Community education geared towards helping users understand the need to pay for water presents a more direct way to addressing operations and maintenance.

With these challenges, there were global concerns about the sustainability of communal systems by the early 1990s, concerns that carried on into the 2010s. Harvey and Reed (2007) are very

blunt on their observation of the limitation of community management in noting that “despite the blanket application of community management of rural water supplies in sub-Saharan Africa, the sustainability of such interventions remains woefully inadequate”. This reality is substantiated by data. Hope and Ballon (2019) report that an average of one in four rural water systems in sub-Saharan Africa are dysfunctional at any given time and it takes between 13 and 214 days for repairs to be done. A compilation of data by Rural Water Supply Network (RWSN) showed that 30-40% of handpumps in Africa were not working at any given time (Rural Water Supply Network 2010). Concerns of the high degree of operational failure has led to a consensus that non-functionality of RWS is a problem. Moriarty et al. (2013), however, provide the caveat that there is evidence of islands of well performing systems. This caveat is explored in a follow-up section on traits of successful RWS under community management.

#### ***2.4.4 Impact of global policies on Kenya’s rural water supply in the 1990s-2010s***

As previously mentioned, the District Water Offices in Kenya were mandated with the responsibility for rural water supply under the District Focus for Rural Development. DWOs maintained this mandate, though with significant operational weaknesses, until water sector reforms were introduced under the Water Act of 2002. Arguably, there was an obvious hesitation for a policy shift to community management as envisioned under the New Delhi Global Consultations within the Kenyan water sector. It wasn’t until 1997 that the Kenyan government published guidelines on handing over rural water supplies to communities. This is despite Kenya’s history of developing water projects under self-help and conducting both the Water Use Test Project trialing community management of rural piped schemes and the Handpumps Project in Kwale that influenced the VLOM approach in the late 1980s. Even then, the 1997 guidelines

did not relinquish asset ownership to communities and noted that “... at the moment, the ministry is only transferring the management of the water supply schemes. The communities will act as custodians of the water supply schemes, including the assets, when they take over the responsibility for operating and maintaining them” (Mumma 2007). Further, the guideline required that water supplies would be handed over to communities with the ability and willingness to form a community-based group with legal status. This requirement excluded many rural communities which were often registered as self-help groups, a registration considered merely administrative as its not supported by any statutory law and therefore does not create legal entities. By 2002, only ten schemes from more than 550 rural water supplies under the District Water Offices had been handed over to community groups (Mumma 2007; D. K. Sambu and Tarhule 2013).

Community management of rural water supplies, however, became the de facto institutional approach in managing new rural water installations in the 1990s. For a sub-sector driven mostly by donor funding, a lot of service extension efforts were channeled through NGOs during this decade. This was consistent with guidelines from the New Delhi Global Consultation on Safe Water and Sanitation. As will be seen with the case of Muthambi 4K under this research, NGOs worked directly with the communities, handing over the responsibility for operation and maintenance to an elected water management committee at the end of project construction. NGO interaction with the DWOs was very minimal during this decade, if any<sup>12</sup>.

Sessional Paper No. 1 of 1999 on the National Policy on Water Resources Management and Development paved the way for community water management of rural water supplies as the de

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<sup>12</sup> Technical Manager, Catholic Diocese of Meru Water and Sanitation Services in conversations with author, November 2021.



jure approach. The policy's provisions for rural water supplies echoed global rhetoric including outcomes of the New Delhi Global Consultation, the Dublin Principles adopted in 1992 at the International Conference on Water and the Environment, and Agenda 21 from the 1992 UN Conference on Environment and Development. Of relevance to this research, the policy noted that "the government would endeavor to hand over [...] rural water supplies to communities. In this regard, the communities [...] will be assessed on their abilities and preparedness to manage a scheme. If found wanting, they will be trained adequately so that they can manage them" (Ministry of Water Resources 1999). The National Policy called for revision of the Water Act, Chapter 372 (1972) which was realized by Water Act 2002.

Unfortunately, while the Water Act of 2002 and its associated rules and regulations have been lauded for introducing comprehensive – and in many instances radical – reforms to the legal framework for management of the water sector in Kenya (Mumma 2007), provisions for rural water supplies were limited. The most striking of these limitations are gaps in the transfer of rural water supplies, of which there were at least 550 in the year 2000 (D. Sambu 2011; Nyanchaga 2016), from the district water offices to communities, and the consequent transition in management. The policy had, accurately, identified the need for institutional steps to facilitate and support community involvement in water supply. Indeed, such support was needed to form community organizations, train committees on the operations and maintenance of water supplies, provide technical support on complex O&M needs, and oversee committee performance until at such a time when other institutions created under the Water Act 2002 were established and able to take up their respective functions.

The policy's proposal for provision of this support was the establishment of support units for water supply and sanitation at the district level. Such provisions were, however, never realized.

This may, arguably, be attributed to at least three factors. First is that a combination of factors including institutional inefficiencies within the water sector, austerity measures introduced by the SAPs in the 1980s-90s, and the sectoral approach where development agencies and NGOs preferred to work directly with communities had yielded a weakened institutional framework for management of rural water supplies at the district level. Consequently, the districts had limited capacity to provide the envisioned support. Second, the Water (Plan of Transfer of Water Services) Rules, 2005 provided that newly formed Water Service Boards (WSBs) would take over all the relevant seconded staff from the previous institutional structure for monitoring. Previously, the ministry's organizational structure included water services sections at the Ministry's provincial and district offices and at the numerous scheme offices (Kenya 2002). Consequently, the districts were left without capacity for rural water supplies, while seconded staff had the competing responsibilities of establishing new institutions (i.e., WSBs). Finally, given the hesitancy for reform that was previously argued, it is likely that both the writers of the policy documents and the district water officers were not fully supportive of community management of rural water supplies and did not adequately consider the reforms and structures required to enable the approach. According to Eng. Mugeru, "there were many doubting Thomas', especially former DWO officers" who did not believe that the communities could manage water schemes, and therefore expected reforms to fail.

Ultimately, from the example of Ngandori-Nginda and Gatua-Karimba schemes that are studied under this research, the district water offices coordinated the formation of community groups/organizations and appointment of voluntary committees in the wake of Water Act 2002. Responsibilities for O&M for rural supplies were handed over to these entities with little follow-up if any. Schemes that had previously been under community management as a de facto

institutional arrangement continued to operate under this arrangement. It is estimated that there are about 1,200 small piped water systems under voluntary community management (i.e., self-help groups) that provide water to over 3.7 million rural Kenyans today; including community managed hand-pumps drives the total to over 2000 (WASREB 2019b). While the performance of these schemes is largely unclear due to limited data, WASREB observed that most small scale water supply projects are usually abandoned when they break down, with communities approaching NGOs or donors for rehabilitation support or new schemes (WASREB 2019b).

#### ***2.4.5 Traits of successful RWS under community management***

The challenges observed globally, and in Kenya specifically, are not to say that community management of rural water supplies does not work at all. Communities have shown that they can deal with many aspects of basic supplies – the struggle is with issues related to longer-term sustainability and meeting the inevitable asset replacement needs. Indeed, Harvey and Reed (2007) have observed that most problems with community management do not occur immediately after commissioning of water supply, but rather, within 1-3 years after commissioning. Mesa et al. (2014), Mekala et al. (n.d.), Moriarty et al. (2013), Hutchings et al. (2015b) and Hutchings (2016) doctoral thesis, along with the IRC International Water and Sanitation Center and Cranfield University are among those who have conducted extensive studies of community management of water services to identify success factors. Consistent across these studies is the premise that sustainability and scalability of community managed RWS require appropriate levels of institutional support to sustain water supply.

Mesa et al. (2014) and Hutchings et al. (2015b) have documented the outcomes of a systematic review of the development pattern of 174 successful community management case studies over 30 years for what they term as ‘plus’ factors associated with success. A key outcome of this

process was the identification of broad typologies of community management of rural water supplies that are useful in understanding the level of institutional support needed per approach (Hutchings et al. 2015; 2017). These typologies include:

- i) Direct provision with community involvement (DPCI) which is often observed in communities with limited socio-economic capacity and in more difficult-to-serve areas. The community receives direct support on finance, materials, and technical issues from an external agency and under that agency's control, the community is partially involved in O&M. Examples of external agencies include the local government, a centralized public body, or an NGO.
- ii) Community Management plus (CM+) may be considered the 'classic' form of community management with high levels of voluntary participation from the community and the community institution being responsible for O&M and service provision. This approach is particularly common with systems at the simpler end of the technical spectrum, such as borehole handpump schemes, simple gravity flow and powered pump systems without a distribution network. Majority of high performing cases under community management have a 'plus' factor in the form of long-term external support involving a combination of financial support, technical advice, and managerial advice.
- iii) Professional community-based management (PCBM) is characterized by a departure from the volunteerism seen in CM+ and engages paid-for staff for a "more professional, competent and effective management of rural water services working to agreed standards and with greater transparency and accountability" (Hutchings et al. 2017). PCBM needs are more related to the existence of an enabling environment such as regulatory frameworks and access to capital (e.g., loans).

Generally higher scores for success are observed with the CM+ and the PCBM management models, and even then, the PCBM typology registers the highest instance of success, even for systems older than five years.

Beyond the categorization of community management, a host of external ‘plus’ factors have been identified for successful community systems. Financial support and provision of materials along with capacity building on management are seen as equally important for both young and older systems. Younger systems are, however, seen to have a higher need for access to advice on technical issues, access to advice on management and finance, access to loan and microfinance, and access to supply chain of spare parts and services. Systems older than 5-years on the other hand are more likely to need a decentralized system/regulatory framework which includes monitoring and evaluation suggesting water sector policies are instrumental for sustaining community schemes over the longer term. Ultimately, Hutchings et al. (2015b) observe that while technical and managerial support are important, over 90% of all high-performing cases involve financial support to the community, despite the age of the system. This indicates that external financial support is critical to success.

Another critical observation from Hutchings et al. systematic review (2015b) and doctoral thesis (2016) on a synthesis of successful rural water services programmes in India is that collective initiative, strong leadership and institutional transparency are the most common internal ‘plus’ factors associated with successful cases. Collective initiative speaks directly to the theory of social capital and ability to cooperate in collective action dilemmas. The higher the social capital (which may be seen in a variety of communal factors such as the communal ethos of self-help and responsibility, equitable participation in decision making etc.), the higher the probability of success. Strong leadership is often evidenced by the presence of exceptional

individuals or groups that can not only mobilize the community but also take up the role of strategic decision making towards the supervision, monitoring and evaluation of the water system. Transparency speaks to the accountability mechanisms in place for both disclosure of financial and performance data as well as the democratic appointment of leaders. Interestingly, while collective initiative is key for 0-5 years of operation, a balance of all three factors is needed for systems to last more than five years. Also, while community initiative is key for the CM+ model, strong leadership and transparency are needed for it to transition to the PCBM. Transparency on the other hand is critical for the DPCI due to its reporting needs to its external agency.

Mesa et al. (2014) and Hutchings et al. (2015b) also identify an indicative relationship between socio-economic indicators (specifically GDP per capita) and the success of reviewed case studies. From their analysis, the authors make the assertion that for all other regions but Sub-Saharan Africa, the wealthier the state the higher the likelihood for success of community systems. This is because of the availability of both internal and external resources that help with improving cost recovery. Additionally, they argue that the PCBM model, which has the highest instance of success for community schemes, becomes more common and effective as broader trends in social development occur. In Africa, however, the authors identify no discernible relationship between socio-economic indicators and success of case studies, even for projects older than 5 years. Considering that the region was the more likely to report an absence of internal financial resources, challenges with tariff setting, and limited government financial sources, external support from beyond government support (e.g., NGOs and donors) is seen as a highly probable and plausible reason as to why the region does not follow the economic trends observed in other regions.

The review of the relationship between the various factors affecting the success of community schemes may, crudely, then be summarized by three observations: The lower the levels of ‘internal plus’ factors, the higher the degree of ‘external plus’ factors required for success; the higher the levels of ‘internal plus’ factors, the lower the dependence on ‘external plus’ factors though these are never completely invalidated; the levels of both internal and external ‘plus’ factors are directly related to the prevailing socio-economic wealth in the economy. The question that then arises is, what are the implication of Mesa et al. (2014) and Hutchings et al. (2015b) observations on advancing water access in rural Sub-Saharan Africa, a region that has lagged globally in meeting water policy goals but that is steadily registering improvements in its socio-economic indicators.

## **2.5 Chapter summary and contribution thesis**

Targeted efforts to provide rural Kenyans with piped water supplies date to as recently as the 1940s. Even then, these efforts often favored the colonial administrators. While concerted and ambitious efforts for rural water supply were designed following independence, their implementation was soon hampered by a combination of exogenous and endogenous financial challenges. Among these were concerns within government on the rising cost of operations and maintenance for water supplies amidst the economic crisis in the early 1980s. These challenges led to a strategic shift to involve rural communities in developing, operating, and maintaining their water supplies. This shift became characterized by community management of water supplies under self-help projects. The shift was aligned to global rhetoric under the first water decade, and community management became the de facto institutional arrangement for rural water supplies. A hesitancy to adopt community management as a de jure approach for rural water supplies is, however, observed within the Kenyan policy framework under Water Act

2002. Consequently, the widespread yet de facto application of voluntary community management has perpetuated a state of institutional ambiguity for rural water supplies in Kenya.

Despite the challenges associated with community managed schemes, some rural water schemes in Kenya have managed to evolve into successful community organizations that demonstrate traits of PCBM as defined by Mesa et al. (2014) and Hutchings et al. (2015b). This research selects some of these communities for an evaluation of how they managed to establish and govern their organizations in a manner that enabled adoption of professional management despite national institutional weaknesses. This evaluation informs lessons for broader institutional support that is required to sustain rural water supplies.



## Chapter 3. Research Approach

This research sought to understand how select piped rural water supplies in Kenya have adopted professional management of their water supplies. The research is designed as case study research and the case selection, data collection process and analysis informed by writings on process tracing (Bennett and Checkel 2014; Joachim Blatter and Haverland 2012; Skarbek 2020; Trampusch and Palier 2016; Collier 2011; George and Bennett 2005).

There is no standard definition of process tracing with Trampusch and Palier (2016) counting 18 different definitions. With that caveat, two definitions are highlighted. Collier (2011) describes process tracing as “an analytic tool for drawing descriptive and causal inferences from diagnostic pieces of evidence often understood as part of a temporal sequence of events or phenomena”. Bennett and Checkel (2014) describe the approach as an examination of “intermediate steps in a process to make inferences about hypotheses on how that process took place and whether and how it generated the outcome of interest”. Process tracing is thus considered appropriate for this research because of its usability in developing explanations for specific outcomes of interest within selected case studies. Further, the approach has an appreciation of time as an organizing framework for key events. This is significant as the research seeks to understand the chain of events within the case studies that have led to professional management (or lack of) at the rural water schemes within Kenya’s ambiguous institutional framework as introduced in Chapter 2.

### 3.1 Case study selection

Process tracing requires close engagement with cases to acquire the type of fine-grained case knowledge that is central to a robust analysis (Collier 2011). A critical consideration for case selection was thus accessibility of the case studies. Kenya was considered as the country case study for this research. Being Kenyan and having worked in the Kenya water sector for about five years, the country was a natural choice for this research. Not only do I have some level of contextual understanding of the water sector from years of conducting research studies as a consultant, but I would also leverage my network as a starting point for field data collection. There was also the added benefit of cultural familiarity, including fluency in Kiswahili and Kikuyu – the two other languages that data collection was conducted in besides English.

Process tracing provides a tool for “systematic examination of diagnostic evidence selected and analysed in light of research questions [...] posed by the investigator” (Collier 2011). This raises the need for a well-defined research question. The research question under study is: ‘How have select rural communities in Kenya adopted professional management of their water services?’ With this question, four traits were considered in the selection criteria for the case studies. First, and most important, was the definition of professional management of rural water schemes under community management. The definition adopted for the selection process sought to move beyond that provided by Hutchings et al. (2017) as presented in Chapter 2<sup>13</sup> to consider regulation by Kenya’s Water Services Regulatory Board (WASREB). This was done in acknowledgement of Kenya’s goal to formalize rural water supplies by bringing them under regulation. To this end, consistent ranking of a rural water supply scheme in WASREB’s Impact

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<sup>13</sup> Departure from the volunteerism to engage paid-for staff for a more professional, competent, and effective management of rural water services working to agreed standards and with greater transparency and accountability

Report – performance report published annually by the regulator – for the past five years was considered a proxy indicator for regulation. Performance ranking is a relevant proxy in consideration of the key performance indicators (KPIs) monitored by the regulator as summarized in Table 2 (WASREB 2021). The five-year timeline was used to ensure relevance of the proxy under current water scheme operations.

**Table 2: WSP Key performance indicators as defined by WASREB**

#	Indicator	Definition
1.	Water coverage	Number of people served with drinking water expressed as a percentage of the total population within the service area of a utility
2.	Hours of supply (hours/day)	The average number of hours per day that a utility provides water to its customers
3.	Non-revenue water	The difference between the amount of water put into the distribution system and the amount of water billed and unbilled as authorized consumption
4.	Drinking Water quality	Measures the potability of the water supplied by a utility
5.	Metering ratio	The number of connections with functional meters expressed as a percentage of the total number of active water connections
6.	Revenue collection efficiency	The total amount of money collected by a utility expressed as a percentage of the total amount billed over the same period
7.	O&M cost coverage	Extent to which internally generated funds cover the cost of running a utility
8.	Staff productivity	The number of staff in employment for every 1,000 connections
9.	Personnel expenditure as % of O+M Costs	Measures whether personnel related expenses are proportionate to overall O+M costs as defined by the respective sector benchmarks

Qualifying schemes were identified by cross referencing a list of formal rural water supplies published by WASREB (WASREB, n.d.) with ranking data from Impact Reports for the financial years 2015/16 to 2019/20. Nine water schemes out of a list of 38 formal rural water supplies met this first criterion as shown in

Table 3.

**Table 3: List of formal rural water supplies that report to WASREB**

#	Name	County	Overall Ranking				
			2019/20	2018/19	2017/18	2016/17	2015/16
			x / 88	x/82	x/86	x/83	x/83
1	Ngandori-Nginda Water Consumers Association	Embu	10	10	8	7	14
2	Rukanga water and sanitation company	Kirinyaga	11	11	4	16	27
3	Ngagaka Water Consumers Association	Embu	13	13	12	5	13
4	Tachasis Water Supply	Nandi	14	12	14	21	23
5	Muthambi 4K Water Association	Tharaka Nithi	14	19	20	19	20
6	Nyasare Water Supply Association	Migori	19	56	28	69	41
7	Murungi Mugumango Water Society	Tharaka Nithi	21	26	22	28	28
8	Ndaragwa Water Project	Nyandarua	45	67	44	42	71
9	Tuuru Water Association	Meru	47	73	72	62	72

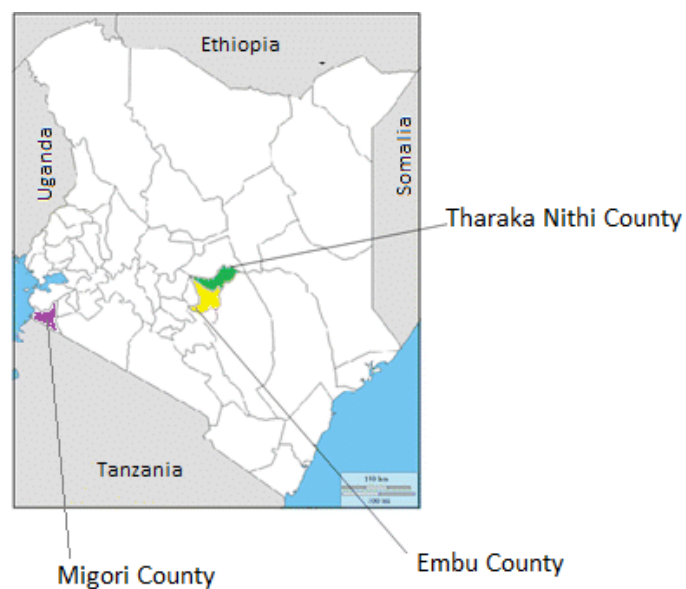
Second, the 9 schemes were evaluated against whether the supplies have their foundations and/or management under rural communities for a significant portion of the scheme's history. Desk review indicated that Ngandori-Nginda, Ngagaka, Muthambi 4K, Nyasare, and Murugi Mugumango water supplies all met this criterion. While there is some level of community engagement with Tuuru Water, a lot of the management throughout the life of the scheme is credited to the Catholic Diocese of Meru thus disqualifying the scheme. The desk review was inconclusive with respect to the role of community management in Rukanga, Tachasis, and Ndaragwa.

The third criteria considered the existence of the water supplies for at least 30 years. As earlier mentioned, one of the goals of this research is to establish how community managed schemes have navigated institutional changes in Kenya over the years. As such, it was important to ensure

that case studies have existed for the past three decades at the least. As with the previous consideration, the desk review was inconclusive with respect to Rukanga, Tachasis, and Ndaragwa. Attempts to contact the schemes for clarification were also unsuccessful. These uncertainties were considered a high risk and the three schemes were dropped from the selection.

The final consideration was the accessibility of selected cases. Ngandori-Nginda, Ngagaka, Muthambi 4K, and Murugi Mugumango are all located within Central Kenya in bordering Embu and Tharaka Nithi counties (see

Figure 2). Nyasare on the other hand is in Migori County which is to the West of Kenya along the border with Tanzania. Being from Central Kenya myself, the four schemes within the region were more accessible in terms of cultural familiarity. The distance to Migori was also a limiting factor and Nyasare was eventually dropped



**Figure 2: Location of select case studies**

during the actual field data collection. Ngandori-Nginda, Ngagaka, Muthambi 4K, and Murugi Mugumango are the four water supply schemes that were selected for research during the desk review process. Table 4 summarizes their KPIs as reported in the 2019/20 WASREB Impact report.

**Table 4: Summary of Key Performance Indicators (KPIs) for selected case studies for the 2019/20 reporting period**

<b>WSP</b>	<b>DWQ (%)</b>	<b>Non-Revenue Water (%)</b>	<b>Water Coverage (%)</b>	<b>Hours of Supply (hrs./d)</b>	<b>Staff Productivity (no. staff / 1000)</b>	<b>Revenue Collection Efficiency (%)</b>	<b>Personnel expenditures as % of total O+M</b>	<b>O+M Cost Coverage (%)</b>	<b>Metering Ratio (%)</b>	<b>Total score</b>
Ngandori Nginda	93	34	92	24	4	93	42	89	100	128
Ngagaka	40	41	93	19	4	99	53	124	100	119
Muthambi 4K	0	28	56	21	7	100	47	145	100	117
Murugi Mugumango	0	21	48	16	6	116	65	82	100	98
<i>For Reference</i>										
<i>Best performer: Nyeri</i>	<i>100</i>	<i>15</i>	<i>73</i>	<i>24</i>	<i>5</i>	<i>97</i>	<i>48</i>	<i>143</i>	<i>100</i>	<i>169</i>
<i>Worst performer: Homabay</i>	<i>79</i>	<i>52</i>	<i>42</i>	<i>7</i>	<i>18</i>	<i>78</i>	<i>38</i>	<i>84</i>	<i>100</i>	<i>20</i>

Based on the selection criteria described above, selection was obviously based on positive cases on the outcome of interest. It was considered necessary to also include ‘negative but possible’ cases to enrich the research<sup>14</sup>. For accessibility, the additional schemes were selected from Tharaka Nithi county. These schemes were also selected to meet criteria 2 (community management) and 3 (scheme existed in some form for at least 30 years). Identification of the schemes was by recommendation and final selection was based on schemes that agreed to at least one in-depth interview. Out of five schemes recommended and contacted, three additional

<sup>14</sup> J. Blatter and Haverland (2012) observe that selecting on the positive outcome methodologically acceptable in process tracing as any causal inferences to be drawn are based on the “epistemology and techniques of causal-process tracing and not on comparing cases and accounting for the co-variation of variables between cases”. That said, one of the major arguments against selecting based on the dependent variable and selecting only positive cases is the problem of generalization. While Blatter and Haverland (2012) counter this argument with the method’s search for ‘individually necessary and jointly sufficient’ conditions for an outcome rather than generalizable conclusions on the effect of a specific cause within a population of specific cases, they also acknowledge that this type of study may be considered an initial study to identify specific causal configurations that yield the outcome of interest. A potential second step in the research process could be a follow-up small-N study focusing on ‘negative but possible’ cases. Blatter and Haverland (2012) argue that this could be appropriate when trying to determine whether it is really the combination of causal factors that make the outcome possible. With these considerations, this research considered it beneficial to include ‘negative but possible’ cases to enrich the research.

schemes were added to the case studies, and these are Mwonge Range Water Association, Kamwene Water Project, and Gatua-Karimba Water Project.

## **3.2 Data collection methods**

Collier (2011) observes that careful description is a foundation of process tracing where the approach focuses on the unfolding of events or situations over time. He highlights the importance of taking “good snapshots [of the process] at a series of specific moments” so as to characterize key steps in the process and perform good analysis of change and sequence.

Similarly, Skarbek (2020) highlights the need for a careful description of the process, with an emphasis on identifying and closely tracing change and causation within the case. This requires the collection of evidence, referred to as causal process observations (CPO) and defined as “an insight or piece of data that provides information about context, process, or mechanism, and that contributes distinctive leverage in causal inference” (Skarbek 2020; Trampusch and Palier 2016). CPOs can come from both qualitative and quantitative sources.

Qualitative information from interviews and document review for both qualitative and quantitative data are the two approaches used to collect evidence under this research. The goal of the data collection process was to establish a historical account of the selected schemes, specifically on how and why management evolved as it did, in as much detail as possible.

### **3.2.1 *Scheme-level interviews***

In-depth (narrative) interviews were a key data collection approach, especially in understanding the order of events, and the motivations behind key actions. Fortunately, for 5 of the 7 schemes, either the water management committee chairman, project manager or both had been with the scheme since inception and were available for interview. Except for Gatua-Karimba, narrative

interviews were held with at least two people per scheme to help check for consistency of information shared. Follow-up meetings or phone calls were had to clarify information as necessary. The duration of the interviews varied with respondents from a single session of 1.5 hours to three sessions totalling about 6 hours. Table 5 describes respondents per water scheme.

**Table 5: List of Respondents**

<b>Water Scheme</b>	<b>Respondent's Position</b>	<b>Respondent's Experience with Scheme</b>
Murugi Mugumango	Project Manager	Joined the scheme in 1984 and has held a leadership position since
	Deputy Project Manager	Has been with the scheme since 2008.
	ICT Officer	Has been with the scheme for about 5 years and is trying to document its history
Muthambi 4K	Committee Chairman	Committee chairman since 1991
	Project Manager	Joined scheme in 1994 as its first employee
Ngandori-Nginda	General Manager	First general manager (2004-05), and current manager (2018 – Present)
	Former General Manager	General manager (2005 – 2018); Previously served as District Water Officer across Kenya until retirement in 2003
	Revenue Officer	Joined the Association in 2004 as a revenue clerk
Ngagaka	General Manager	Joined the water company as its first General Manager in 2011
	Former Inspector	Seconded by the District Water office to Ngagaka in 1991 during transition in management to community management. Later served as District Water Engineer across Kenya, including in Embu District
Mwonge Range	Committee Treasurer	Only member of current committee that was a member of the founding committee in 2001
	Field Supervisor	Joined the scheme in 2009 as a field supervisor
	Project Manager	Joined the scheme as its first project manager and has held the position since.
Kamwene	Committee Chairman	Was a member of founding group members in 1991 and has been committee chairman since scheme revival in 2006
	Project Manager	Joined the project in 2014 s its first employee
Gatua-Karimba	Committee Chairman	Current committee chairman, having been elected in 2020



Key informant interviews were held with persons representing organizations that have influenced the evolution of management and operations of specific schemes where this was deemed necessary, and respondents were available. Table 6 lists these respondents. These interviews lasted between 30 minutes – 1 hour.

**Table 6: List of key informants relevant to scheme operations**

<b>Organization</b>	<b>Position</b>	<b>Relevance</b>
Diocese of Meru Water and Sanitation Services	Technical Manager	The Diocese of Meru has supported operations at Muthambi 4K since 1994
Tana Water Works Development Agency (formerly, Tana Water Services Board)	Manager, Technical Service Asset Management Liaison	The Board provided technical support to water service providers in its jurisdiction (including Ngagaka, Muthambi 4K, Murugi Mugumango, and Ngandori-Nginda) under Water Act 2002
County Government of Embu	County Director – Water and Irrigation	With water being a devolved function under Water Act 2016, the county government of Embu is serves as the service authority overseeing operations at Ngagaka and Ngandori-Nginda
County Government of Tharaka Nithi	County Engineer – Water	With water being a devolved function under Water Act 2016, the county government of Tharaka Nithi serves as the service authority overseeing operations at Muthambi 4K, Murugi Mugumango, Mwonge Range, Kamwene, and Gatua-Karimba.

### **3.2.2 Document review**

Extensive document review was carried out, specifically for Muthambi 4K, Murugi Mugumango, Ngagaka and Ngandori-Nginda which report their performance data to WASREB. Part of the goal for the desk review was to find written records to validate information from the narrative interviews. A starting point with the review process was to request for access to meeting minutes for annual general meetings (AGMs) and water management committee meetings, annual financial audit reports, and operations records. The extent of the document review varied with each scheme depending on their filing system, what information was available, and the level

of access granted. Figure 3, a picture of part of the files at Ngandori-Nginda, demonstrates challenges encountered with respect to filing systems in place. The scheme had moved offices and all files were piled in a storeroom awaiting review to either be refiled or discarded (Picture A). The data collection process involved going through the pile to identify files of interest before actual document review commenced (Picture B shows some of the files of interest following the sorting process).



**Figure 3: Documents search at Ngandori-Nginda**

In Ngagaka Water, records prior to transition of the scheme from community management to a Water Company in 2011 could not be availed at the scheme offices. These documents were, however, critical to understanding the scheme’s organization under community management which was influenced by the Water Use Test Project<sup>15</sup>. Fortunately, access to an archive room at a government complex in Embu town (International Fund for Agricultural Development (IFAD) office) was granted following recommendation by one of the respondents. The archive houses a cabinet-full of reports and records from 1987 – 1993.

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<sup>15</sup> This was a pilot test project jointly financed by SIDA and the Ministry starting in 1987 to test the extent to which rural communities could self-finance and be responsible for the operations and management of their water supplies.

Muthambi 4K and Murugi Mugumamgo have extensive filing systems. However, the level of access was limited mostly to documents from their founding years. While this was restrictive with respect to understanding current operations, documents availed were key to understanding the schemes' pivotal years when a lot of their current operational systems were put in place.

### 3.2.3 *Expert interviews*

Expert interviews were held beyond the case study evaluations towards a better understanding of community management of rural water supplies as well as the regulatory landscape in Kenya's rural water supply. Table 7 is a list of the expert interviews.

**Table 7: List of Expert Interviews**

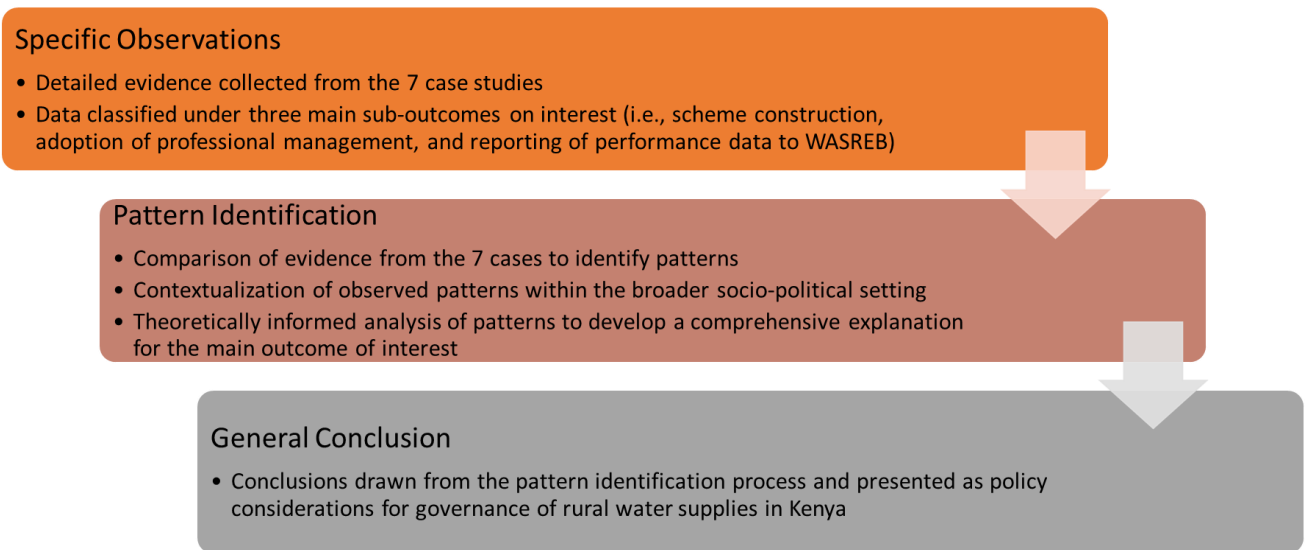
<b>Name</b>	<b>Organization</b>	<b>Relevance</b>
Robert Gakubia	WASREB	Former CEO, WASREB - WASREB made significant steps towards regularizing rural water supplies under Eng. Gakubia's leadership
Richard Cheruiyot	WASREB	Director, Monitoring & Enforcement - Closely involved in development and enforcement of regulations at WASREB
Francis Kimani	Frame Consultants	Consultant - Closely involved with water sector reforms under Water Act 2002 at the Ministry level
Paul Hutchings	University of Leeds	Lecturer in Water, Sanitation & Health - Doctoral studies focused on community management of rural water supplies, and he has multiple publications on the subject.
Stef Smits	IRC WASH	Head of IRC Consult - Has led multiple assignments research on management of rural water supplies in Africa, Asia and Latin America.

### 3.3 **Data analysis**

Data analysis in process tracing is characterized by inductive and/or deductive reasoning with the weight of application of either approach varying among researchers and depending on the research question as well as the researcher's epistemological and ontological view of social reality (Trampusch and Palier 2016). Inductive reasoning is aimed at theory building, (i.e., uncovering and specifying causal mechanisms), while deductive reasoning is aimed at theory

testing and/or refining (i.e., evaluating whether theoretically elaborated causal mechanisms indeed explain the connection between X and Y in specific cases) (Trampusch and Palier 2016; Skarbek 2020). This research leans towards the inductive form of process tracing to deliver a historic explanation of the outcome of interest (i.e., adoption of professional management at selected case studies). To this end, the analysis looks at the observations and historical context of each case study to explore causal explanations for adoption (or lack of) of professional management. Evidence from within and beyond communities is evaluated towards piecing together an analytic narrative of factors that influenced adoption of professional management.

The induction process under this research is summarized in Figure 4. Time is considered to play a key role in the causal explanation of events at the water schemes and forms a framework for organizing the analysis. Time in this case is marked by the duration between a sequence of key processes (marked by sub-outcomes) that lead to the main outcome of interest. Three sub-outcomes are identified and include i) construction of the water schemes, ii) adoption of professional management (as marked by a departure from volunteering in day-to-day O&M functions to engage employed staff), and iii) regulation of the water scheme (marked by reporting performance data to WASREB). The development of the analytic narrative seeks to present a theoretically informed analysis of this chain of processes. As such, relevant theoretical frameworks are called upon to inform the development of explanations for the sub-outcome of interest.



**Figure 4: Summary of the data analysis process**

# Part II – Case Analysis

## Overview of the case analysis

Having detailed the background and data collection process to this research, Part II of this thesis provides an analysis of how the select communities in Embu and Tharaka Nithi counties achieved professional management of their water services. To this end, analysis of the schemes' narratives – stories and contexts – is performed to understand key events in their history.

The structuring of the case analysis follows the development process of the schemes. First and perhaps obvious is the construction of the main water distribution network. Chapter 4 demonstrates how evolving ideals of self-help under Kenya's Harambee movement influenced the successful construction of schemes. Ostrom's Design Principles for common pool resources provide a framework for evaluating how communities self-organized towards construction of their schemes. Beyond community contributions, external support characterized by financial resources from government and/or donor entities and technical support are seen as critical to the construction process. The focus of discussions under this chapter is Kamwene, Muthambi 4K, Murugi Mugumango, Mwonge Range which were all community initiated. Ngagaka is also included - though construction of the main network was government funded, network densification (i.e., connections to individual households) was driven by community initiative.

Once constructed, communities took over management of their schemes in line with the de facto adoption of community management of rural water supplies prior to Water Act 2002. In the case of Ngandori Nginda and Gatua-Karimba, the schemes were transitioned to community management in the wake of Water Act 2002. Chapter 5 argues that five of the seven schemes (Kamwene, Muthambi 4K, Murugi Mugumango, Mwonge Ridge and Ngandori Nginda) appropriated an institutional structure from the coffee cooperative societies to management of their water supplies. This enabled them to adopt professional management of their operations, though to varied effectiveness. Professional management was marked by i) a departure from volunteerism to engage paid-for staff, and ii) a clear separation between oversight by an elected water management committee and day-to-day operations by an employed staff.

Chapter 6 contends that the five schemes that borrowed the institutional template applied at the coffee cooperative societies evolved into an organizational arrangement that is distinct from what is often associated with voluntary community management in Sub-Saharan Africa. This organizational arrangement is characterized by division of roles and responsibilities accompanied by clear incentives and accountability frameworks between the water users, the management committees, and the employed staff. These relationships are evaluated against the Framework of Accountability Relationships presented in the 2004 World Development Report (World Bank 2003) to understand differentiated performance across the seven schemes.

## **Summary description of the case studies**

The seven schemes studied under this research are gravity flow water supply systems. Water is abstracted from rivers, with the intake points located upstream within the Mt. Kenya Forest Reserve. As such, water is generally cool and of low turbidity. Except for Gatua-Karimba, the schemes reported chlorinating water supplied within their systems with Muthambi 4K also

noting that they operate a sedimentation tank while Ngandori-Nginda has a partial water treatment works. The main water distribution networks include a series of break pressure tanks and storage tanks with water connections to households, institutions (e.g., schools) and commercial entities (e.g., coffee factories). Apart from Mwonge Range, the water schemes do not operate communal water collection points. Mwonge Range reported operating four water kiosks within market centers in its supply area. The water kiosks have, however, been leased out to individuals to manage day-to-day operations and are billed based on a metered connection. Kamwene reported having two water kiosks, but these are non-functional due to lack of demand. With the lowest water consumption band for metered connections ranging between 0-10m<sup>3</sup> and 0-50m<sup>3</sup>, domestic water use allows for some productive use including livestock and gardens. Table 8 and Figure 5 summarize this set up. Table 9 and Table 10 provide summary details of the case studies that are referenced in the analysis.

**Table 8: Summary of scheme operational details**

#	Scheme Name	Est. No. of active connections	Coverage (sq. km)	Coverage (administrative units)	Water Coverage (%) <sup>16</sup>	# of intake points
1.	Gatua-Karimba	300		Part of Mitheru Ward including Gatua and Karimba sublocations		1
2.	Kamwene	1,500		All of Mitheru Ward which includes Ruguta, Gatua, Ndumbeni, Karimba, and Mikuu sub-locations		1
3.	Muthambi 4K	2,200		Gitije, Muthambi and Kandungu locations	56	3
4.	Murugi Mugumango	4,600	90		48	2
5.	Mwonge Range	2,200		Mwonge, Rubati, Kabuboni and Gitareni locations		1
6.	Ngandori Nginda	13,000	132	Embu North Constituency (Nginda, Ngandori Ruguru, Kirimari, Mbeti North, Gaturi South Wards and a small part of Kithimu ward)	92	1
7.	Ngagaka	8,200	120		93	1

<sup>16</sup> As reported in WASREB's 13<sup>th</sup> Impact Report (2021); Water Coverage refers to the number of people served with drinking water expressed as a percentage of the total population within the service area of a utility.



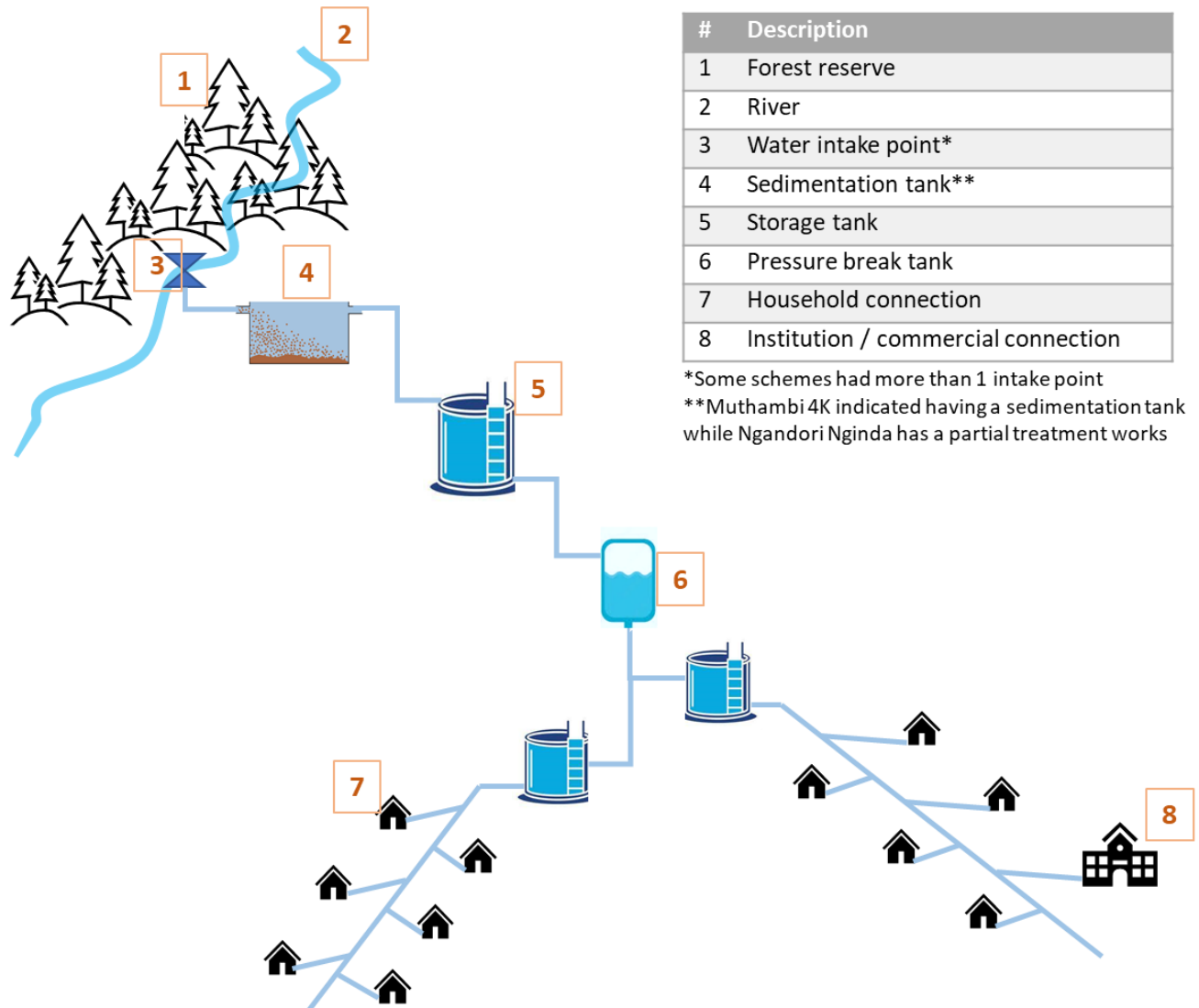


Figure 5: Generalized schematic of the water supply systems

**Table 9: Summary description of selected cases**

#	Scheme	Summary Description
1.	Gatua-Karimba Water Project	Scheme started as government funded project in the 1970's. It was under the management of the District Water Office (DWO) until its transition to community management under Water Act 2002. DWO facilitated the registration of a community self-help group that took over management in 2003.
2.	Kamwene Water Users Association	Project started in 1991 as an initiative of a closed self-help group formed with the primary goal of financial savings. The group members decided to start a water project later in 1991. Group membership was opened to interested community members to help raise funds (i.e., community contributions) towards construction. Construction efforts, however, stalled after construction of the intake and 2.5kms of pipeline due to financial constraints. Efforts were revived in 2006 following access to government resources. Since then, the scheme has received funding through varied government entities including Tana Water Services Board and the Water Sector Trust Fund towards water supply extension. The scheme has been under community management throughout its life and registered as a society in 2008.
3.	Muthambi 4K Water Association	Scheme started in 1984 following the merger of 4 small community self-help projects to form a location wide project. A financial grant from SIDA in 1994 enabled construction of the scheme's primary distribution network. The grant was administered by the Catholic Diocese of Meru (DOM) leading to a relationship that stands to date. Network augmentation over the years has been enabled by a combination of internal revenues and grants accessed with the support of DOM. The scheme has been under community management throughout its life, but with consistent technical support from DOM. The project registered as a self-help group in 1995 and as a Society in 1999.
4.	Murugi Mugumango Water Society	Scheme was born out of an amalgamation of five smaller self-help water projects that had been formed between 1975-78. A series of mergers between the projects resulted in registration of Murugi Mugumango as a self-help group in 1983, and a society in 1984. Scheme construction and extension was enabled by community funds and a major grant from the Canadian Hunger Foundation in 1984. Part of CHF support included establishing operations and maintenance systems. Network augmentation has been enabled by internal revenues and donor/government resources. The scheme has remained under community management throughout its operations.
5.	Mwonge Range Water Association	Scheme was initiated in 2001 to revive water services within the supply area. The area was initially served by Karingani Water Project, a government funded project from the 1970's that was managed by DWO. Supply was, however, discontinued in the 1990s in favor of a neighboring urban center. Resource mobilization efforts for Mwonge Range included community contributions and government resources. Construction of a new intake and required pipeline to connect the intake to pre-existing pipelines was conducted between 2001-06 and water flow was restored in 2006. The scheme is registered as a society and has been under community management.
6.	Ngagaka Water and Sanitation Company	The scheme was commissioned as a government funded project in the early 1980s. It was managed by DWO until 1991 when it transitioned to community management. The scheme was among schemes selected for the Water Use Test Project (1987-91) which sought to trial proposed reforms towards community management of water supplies. The test's report notes that Ngagaka experienced far reaching administrative and organizational changes, much more than any other scheme under the WUTP. Part of the test activities included rehabilitation of the network infrastructure. Following transition under the WUTP, the scheme remained under community management as a Society until 2011 when it transitioned to a public limited liability company following government concerns over financial mismanagement.
7.	Ngandori Nginda Water Users Association	Scheme was commissioned as government funded project in early 1980s. The scheme was managed by District Water Office until 1988 when its management was transitioned to a newly formed National Water Conservation and Pipeline Corporation (NWCPC). NWCPC was expected to run schemes placed under its care on a commercial basis with the objectives to improve performance and efficiency of water schemes and reduce scheme dependency on public funding. The scheme remained under NWCPC until effectiveness of Water Act 2002 when it was transitioned to community management. A water society was registered to take over management.

**Table 10: Summary of scheme management details**

#	Scheme Name	Project initiation	Year of Project initiation	Source of funding for primary distribution network	Management Structure	Registration Status	Asset Holders	Reporting performance data to WASREB?	Billing based on metered connections	Revenue collection efficiency % (2020) <sup>17</sup>	Annual financial auditing conducted?	No. of staff
1.	Gatua-Karimba	Government	Est. late 1970s	-Government	-DWO (until 2002) -Community management (2002 – to date)	-Self-help project – 2004	Government	No	No		No	0
2.	Kamwene	Community	1991	-Community contributions - Harambee (fundraising) -Government	-Community management (1991 – to date)	-Self-help project – 1991 -Society - 2008		No	Partial		Yes	7
3.	Muthambi 4K	Community	1984	-Donor Grant – SIDA, 1994	-Community management (1991 – to date)	-Self-help group – 1995 -Society - 1999	Catholic Diocese of Meru	Yes	Yes	100	Yes	12
4.	Murugi Mugumango	Community	1984	-Community contributions -Donor Grant – CHF, 1984	-Community management (1984 – to date)	-Self-help group – 1983 -Society - 1984	Local chiefs appointed as trustees of the scheme	Yes	Yes	116	Yes	24
5.	Mwonge Range	Community	2001	-Community contributions -Harambee (fundraising) -Government	-Community management (2001 – to date)	-Society - 2001	Local chiefs appointed as trustees of the scheme	No	Partial		Yes	
6.	Ngandori Nginda	Government	Est. late 1970s	-Government	-DWO (until 1988) -NWCPC (1988 – 2002) -Community management (2002 – to date)	-Society - 2004	Government	Yes	Yes	93	Yes	69
7.	Ngagaka	Government	Est. late 1970s	-Government	-DWO (1991) -Community management (1991 – 2011) -Public Company (2011 – to date)	-Society - 1991 -Company - 2011	Government	Yes	Yes	99	Yes	23

<sup>17</sup> As reported in WASREB’s 13<sup>th</sup> Impact Report (2021)

# **Chapter 4. Construction of rural water supply networks**

Consistent with national development plans developed between 1974 and 1993, water supplies evaluated under this study were initiated either as government projects under the Rural Water Supply Programme or as self-help water projects. Given this research's focus on community initiative towards their water schemes, this chapter starts by providing a short overview of construction of the main water distribution network for schemes under government programs to help understand how these came to be before going into a detailed discussion on construction in the community-initiated schemes.

## **4.1 Construction under government programs**

Ngagaka, Ngandori-Nginda, Gatua-Karimba and Karingani Water Project (part of which covered the supply area under Mwonge Range) were constructed under the Rural Water Supply (RWS) Programme, a government initiative from the 1970s-80. Kenya established a fully-fledged ministry in charge of water affairs in November 1974, a year after recommendation by the World Health Organization. The formation of this ministry was in line with global rhetoric on increasing awareness that water supply and environmental sanitation were the biggest contributors to acceptable health standards (Nyanchaga 2016). Within the first decade of creation of this ministry, a programmatic approach characterized by major development programmes was

adopted to provide improved water supplies to rural communities as well as improvement and extension of services within urban areas. The RWS Programme was one of these programmatic approaches. It was implemented under multiple phases of donor driven investments in rural water infrastructure and led by the Ministry. The RWS programme had two major aims: the first was to break water related development bottlenecks in high potential areas (which mostly corresponded with non-ASAL regions of Kenya) and the second to provide portable water in areas of chronic drought (Nyanchaga 2016). Schemes under this study were constructed under the former.

In giving the example of Ngagaka, one of the IDI respondents (a resident of the area and a retired District Water Engineer having joined the ministry in the early 1970s) noted that the ministry had a 'Direct Labour' department which would mobilize a team with the relevant equipment to set up camp at approved scheme sites and construct the main water distribution network. Once constructed, schemes would be handed over to the District Water Office for management, operation and maintenance, and network densification through household connections. In this way, community members were minimally involved in scheme construction, unless in the provision of direct labour towards construction.

## **4.2 Construction under self-help**

Muthambi 4K, Murugi Mugumango, Kamwene, and Mwonge Range schemes were all initiated and constructed through community initiative. While Ngagaka was constructed under a government programme, network densification was driven by community initiative.

Those familiar with Kenya's development post-independence acknowledge the importance played by the Harambee system. Works by Barkan and Holmquist 1986; Ngau 1987; Mbithi and Rasmusson 1977; Thomas 1987; Wilson 1992; Holmquist 1984; Reynolds and Wallis 1976;

Winans and Haugerud 1977 and the references therein provide extensive information on the background and structure of the system, especially for the three decades post-independence when it was key to rural development. For this analysis, a short overview of the system will suffice.

Harambee as a concept meaning collective effort, “pull together”, embodies the ideas of mutual assistance, joint effort, mutual social responsibility, and community self-reliance (Mbithi and Rasmusson 1977). The concept is grounded in the indigenous culture of most communities in Kenya as evidenced by the existence of a term for the concept in various languages – the Luhya call it *Obwasio*, the Luo *Konyir rende*, the Kamba *Mwethia*, the Maasai *Ematonyok*, and the Kikuyu *Ngwatio*. It was demonstrated in such ways as collective neighborhood house-building, bush clearing, harvesting, among other activities (Mbithi and Rasmusson 1977; Ngau 1987).

While the term Harambee was synonymous with self-help in the early years post-independence (Holmquist 1984), years of subtle yet complex changes have led to a divergence of meaning. Today, ‘self-help’ still embodies a lot of the same concepts as in the 1960s, but ‘Harambee’ is now associated with the event of community fund-raising towards a specific cause (e.g., medical bill for a community member or to build a church). For the purposes of this research, reference to the fund-raising event is italicized (i.e., *Harambee*) while reference to the concept is not (i.e., Harambee)

Mbithi and Rasmusson (1977) argue that while Harambee was “a grass-roots form of social exchange of labor and other forms of mutual assistance” before independence, the concept came to represent a distinct development effort post-independence used to denote “collective effort, community self-reliance, cooperative enterprises and all forms of collective self-reliance”. It became a national slogan, a motto on the national coat of arms, and a rally call on Madaraka Day

on 1<sup>st</sup> June 1963 – the day Kenya attained internal self-rule – when Kenyatta declared (quoted in Wilson 1992):

But you must know that Kenyatta alone cannot give you everything. All things we must do together to develop our country, to get education for our children, to have doctors, to build roads, to improve or provide day-to-day essentials. I give you the call: Harambee!

Broadly speaking, Harambee projects post-independence were classified into two main types: social development and economic development projects. The former included projects in education, health, social welfare and recreation, and domestic projects. Economic development projects on the other hand included projects in transport and communication facilities, agricultural ventures, and construction of roads and bridges (Mbithi and Rasmusson 1977; Winans and Haugerud 1977). Piped water supplies were considered an input to agricultural productivity thus classified under economic development. It is estimated that the total nominal valuation of Harambee projects between 1965 and 1984 came to KES 3.2 billion, with Harambee projects contributing significantly to the overall national development expenditure in certain sectors (61% in education; 19% in construction; 18% in water supplies; 13% in health; and 14% in agriculture) (Ngau 1987). Holmquist (1984) makes the caveat that self-help was primarily concerned with construction and while the people bore about 90% of this cost (with state, non-state organizations and outside private contributors providing the rest), the state would be expected to bear most of the very high recurrent costs. In schools and hospitals for instance, the community would build the facilities with the hope that the government will then provide teachers and doctors and nurses to run the facilities. For piped water supplies, however, concerns over rising cost of operation and maintenance led to a strategy change starting in the late 1970s to involve benefitting communities in meeting these costs.

Given the significance of the Harambee system to rural development, it is no surprise that the initiation and/or construction of five schemes evaluated under this research demonstrate aspects of the Harambee spirit. Further, it is evident that community participation in water supplies was a policy and strategic approach in Kenya prior to its global emphasis under the First Water Decade. Project initiation and construction in Muthambi 4K, Murugi Mugumango, Kamwene, and Mwonge Range is anchored on self-help. In Ngagaka, project initiation and construction of main distribution lines was by government but the community – driven by self-help – played a critical role in network densification by laying pipelines to extend water supply to their homesteads.

#### ***4.2.1 Harambee as a grass-roots form of social exchange of labor***

Ngagaka is unique in that the main distribution network at the scheme was conceptualized and constructed by the government under its Rural Water Supply Program. The scheme comprised of the water intake works and 19kms of arterial distribution pipelines. It was commissioned in 1982<sup>18</sup> after which it was placed under the District Water Office for management. A de facto approach to installation of secondary water distribution pipelines emerged within the supply area in the years post-commissioning. An estimated 78 small-scale neighborhood self-help groups, some with as little as 10 members, formed within the project area for the purpose of extending water services from the government installed pipeline to bring it closer to homesteads.

Interestingly, the DWO often helped community groups with developing cost estimates for the pipeline extension. Further, new connections within a pre-existing self-help group would only be formally registered with the DWO following approval by group members. By 1987, about 146

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<sup>18</sup> It is unclear if the commissioning happened in 1981 or 1982. Documents under the WAFIM/WUTP refer to both years; The IDI with the General Manager mentioned 1982.



kms of secondary water distribution pipelines had been laid by the community self-help groups. This represented about ninety percent of the total water distribution network and accounted for about eighty percent of the water connection holders (Ministry of Water Development 1988a; WAFIM Project 1991).

The mushrooming, organization and operation of these groups very much reflects the pre-independence conceptualization of Harambee as a grass-roots form of social exchange of labor. Individual groups would organize around collective labor towards trenching, laying water pipes, and making financial contributions towards purchase of materials required for pipeline extension from the main line to their households. Where the cost of materials was too high for the community to raise, they sought external assistance (e.g., DWO or donor funding). Once the goal of getting water closer home was accomplished, the group would become dormant and only called back to life i) in case of repairs where the DWO tarried and repairs required financial/labor contributions, and ii) to collect membership contributions from prospective members wishing to tap into the pipeline extension. The contributions were determined as a monetary equivalent of labor inputs that pioneer members put towards the pipeline extension.

The community arrangement at Ngagaka had obvious implications for management of the water supply system in 1980s - 1991. The neighborhood groups had a very clear objective – extension of piped water services to their households – and as such, they bore a collective responsibility in ensuring that water kept flowing. This responsibility was, however, exercised in a larger institutional framework where Ngagaka Water, as a government commissioned project, was formally managed by the DWO, where the DWO was mandated with collecting water tariffs and conducting repairs as need arose. This mandate was, arguably, loosely administered. For instance, in 1987, about a quarter of connection holders at the scheme did not appear in the

DWO customer ledgers and were therefore not being charged for water consumed. Consequently, neighborhood groups often had to ‘pull together’ to implement repairs when the government tarried. Fortunately, with Ngagaka being a fully gravity scheme, day-to-day O&M needs of the scheme were rather simple. Additionally, with over 78 neighborhood groups responsible for small sections of the otherwise large scheme, the weight of the O&M responsibilities was distributed. The 78 groups would later (in 1991) be reorganized for the purpose of formally managing the water supply scheme under the government commissioned Water Use Test Project, the ramifications of which will be discussed in Chapter 6.

#### **4.2.2 *Harambee as a distinct development effort post-independence***

Muthambi 4K, Murugi Mugumango, Kamwene, and Mwonge Range exemplify the application of the Harambee system to self-help community projects in post-independent Kenya. Ngau (1987) and Holmquist (1984) observe that a typical harambee project consisted of five stages: initiation, planning, fund-raising, implementation, and follow-up. The ability of a project to navigate through the stages had a significant impact on the success of the project as is demonstrated by these four schemes. For the outcome of interest under this chapter (*Construction of water distribution networks*), the discussions will focus on initiation, planning and fundraising, and implementation. Follow-up will be discussed in subsequent chapters which focus on operation and management of the schemes.

##### ***a) Initiation***

The initiation of self-help projects as presented by Holmquist (1984) reflects the order of events observed in all four schemes. He observes that the generation of the self-help idea usually came from within the community, most likely beginning with a minority group who would work out a rough plan before holding a general meeting with the community to share the idea and get

informal consensus. Ngau (1987) and Mbithi and Rasmusson (1977) on the other hand observe that project initiators were often the local elite (businessmen, clergymen, teachers, and government administrative officers) who normally had considerable clout in the rural areas and were economically upwardly mobile thus forming what Ngau terms as the ‘rural petty bourgeoisie’.

Murugi Mugumango illustrates Holmquist (1984) and Ngau (1987) observations very clearly, though these are also evident in the other narratives. Three of the five individual schemes that amalgamated to form Murugi Mugumango<sup>19</sup> were all initiated by a few people: five members of the Kathituni Village who wanted to buy a hydram in the case of North Mugumango; the Kiera location chief and divisional water development officer for South Mugumango called for a meeting to discuss water access challenges in which community resolved to start the South Mugumango water project; and in the case of Wiru, ‘only a few thirsty participants’ (as worded in the project’s history document) came together to start a water furrow project. Records show that meetings were held with community members in all three schemes, and on multiple instances, to discuss the idea and agree on the way forward.

The events at Murugi Mugumango parallel those at the other schemes. In Kamwene for instance, a group of 15 friends who had registered a self-help group for the purpose of financial savings decided to start a water project. With this, they opened the group membership to the community and held a community meeting to share the idea. With members agreed on starting a water

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<sup>19</sup> Murugi Mugumango Water project was born out of an amalgamation of five smaller water projects which included Wiru (formed in 1975), Kianjagi (1977), Kiriani/Kithare (1978), South Mugumango (1978) and North Mugumango (1978) in today’s Murugi and Mugumango locations. Wiru, Kianjagi and Kiriani/Kithare amalgamated in 1980 to form Murugi Water Project. South and North Mugumango projects merged in 1982 to form the Mugumango Water Project. The two larger schemes merged in 1983 under the advisement of the District Water Office and the Canadian Hunger Foundation (a potential donor at the time) to form Murugi Mugumango Water Project.

project, community contributions were collected as part of membership fees to the group and a fundraising event (*Harambee*) was organized towards collecting the finances needed to purchase materials. In Mwonge Range, the area chiefs and a former district water officer are credited with mobilizing community members towards starting their water project. Unfortunately, the historical account of Muthambi 4K prior to 1991 was quite limited making it difficult to deduce the initiation process<sup>20</sup>. That said, the concerted efforts towards fundraising for the scheme seen in 1991 were mobilized by the area chief and sub-chiefs who put together a committee of 48 representing the local elite (described by the IDI as “community influential and well-educated members that included engineers, accountants, and school principals”) for the purpose of resource mobilization.

The composition of the founding committees at Muthambi 4K, Murugi Mugumango, Kamwene, and Mwonge Range confirm Ngau’s (1987) assertion on the role of the local elite in initiating self-help projects. Ngau argues that the local elite, who came to occupy the niche between the peasants and the state structures following independence, tended to control the local economy and politics. In the case of self-help, they helped the communities organize and put-up social amenity services, and their decisions on the types of projects often reflected their interests and perceptions of development. Further, Holmquist (1984) observes that for initiatives coming from within the community, propagators of the original project ideas usually ended up on the project management committees. The four schemes echo Ngau’s and Holmquist’s observations where the founding committee chairmen represented part of the local elite as summarized in Table 11. Additionally, the opening statement of the History of Wiru Water Project, a document written in

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<sup>20</sup> Muthambi 4K Water Project was initiated in 1982 following the amalgamation of four small projects whose names started with letter K: Kaburi, Kaathi, Kariethera and Kandungu. The four projects were in the then Muthambi Location.

the late 1970s and archived at the Murugi Mugumango offices, aptly captures the initiator’s motivations in line with Ngau’s (1987) argument on initiators’ perception of development: “In 1962 the plans to begin water furrow at Wiru Village started with its intention to ban the burden of women versus children of fetching water in the village.”

**Table 11: Summary of positions held by founding committee chairmen**

#	Water Scheme	Positions of Founding Committee Chairman
1.	Murugi Mugumango	- Primary school head teacher - Chairman of the Meru South Farmers Union
2.	Muthambi 4K	- General Manager, Meru South Farmers Co-op Union - Chairman, Muthambi Girls High School - Chairman, Muthambi Boys High School
3.	Mwonge Range	- Retired primary school headteacher
4.	Kamwene	- Chairman, Mitheru Coffee Farmers’ Society

Arguably, then, while the ideals of self-help under Harambee created an enabling environment for initiation of water projects, local elites interested in improving water access within their communities played a key role in mobilizing members into action.

### ***b) Planning***

It may be argued that successful project initiation was marked by progression into planning on how to implement the project. For the case studies under this research, planning presented itself in two main ways – technical support towards surveying and construction designs for the physical infrastructure and resource mobilization towards construction. This section focusses on technical support while the section on Fundraising will discuss resource mobilization.

External technical support in conducting surveys and developing designs for water supplies was critical to construction of the water supply network across all four schemes. For Murugi Mugumango, Kamwene, and Mwonge Range, the District Water Office played a critical role, and one that was institutionally provided for, in providing technical support. Kenya’s

development plan for 1974-1978 for instance identified Self-help Water Supply as one of the programmes under the Water Department, and the government had a budget towards technical and financial assistance for self-help water projects across all districts. Further, the DWO was mandated with all aspects of rural water supplies under the District Focus for Rural Development.

Wiru Water Project, eventually a part of the Murugi Mugumango water supply, provides the most detailed written account of the critical role played by DWO towards scheme construction. While the project was conceptualized in 1962, actual construction of the water furrow did not start until 1972 when a representative from the ministry of Agriculture (which housed the Water Department at the time) helped identify a suitable water abstraction point. New bureaucratic processes were, however, introduced in 1974 following creation of the Ministry of Water Development, among which was the registration of water projects with the Water Bailiff's office. Wiru Project registered with the office in 1975. Following registration, the water bailiff visited the project to survey the furrow and recommended significant changes to the designs previously provided by the Ministry of Agriculture. This introduced constraints to construction and the project stalled until 1979 when surveyors from the Meru District Water Office helped identify a new and suitable water intake point within the Mt. Kenya Forest Reserve. Construction of the intake began in 1980 and it eventually formed part of the water supply infrastructure when Murugi-Mugumango water supply was formed.

A similar role by the DWO was reported in Kamwene and Mwonge Range. The water committee for Kamwene sought surveying and design services from the DWO in Meru for a potential water intake point and the required pipeline network. The DWO Meru office recommended an intake 6km into the Mt. Kenya Forest Reserve on Nithi River. Concerned that this intake was hard-to-

reach due to very rough terrain, the committee sought a second opinion from the DWO – Chuka office who confirmed initial design recommendations. With the designs, the committee progressed with resource mobilization and eventual construction of the intake. Similarly, the technical designs for Mwonge Range were provided by DWO. These included designs for a new intake along with the pipeline required to connect to a pre-existing network under the defunct Karingani Water Project<sup>21</sup>.

Muthambi 4K provides a different example, but one that confirms the need for external technical support. Eng. Njagi – a member of a committee assembled by the area chief in 1991 with the goal of resource mobilization for a water project – is credited with developing the water system designs that were used in fundraising proposals submitted to potential donors. Following financial support from SIDA in 1994, engineers from the Catholic Diocese of Meru (which administered the SIDA grant) resurveyed and redesigned the scheme prior to initiating construction.

While the need for external technical support towards construction of water supplies may seem obvious, it is an import one to highlight in consideration of current trends in the conceptualization of community management of rural water supplies and the need for ongoing support. Specifically, observations from these four cases echo Hutchings (2018) argument that it is better to think of rural water supplies under community management as coproduced service delivery involving both private citizens at the community level and broader supporting entities, particularly government bodies. He makes the point that “current discourse [on voluntary community management of rural water supply] is remiss not to describe the substantial role of

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<sup>21</sup> Karingani Water Project was constructed in the 1970s under the government funded Rural Water Supply Programme and served the Mwonge Range Supply area. Water supply, had however, been redirected in favor of a neighboring urban center in the 1990s leaving Mwonge Range without piped water supplies.

the state and other supporting agencies in financing and supporting service provision”, often treating it as either a community participation or collective action problem. Instead, Hutchings (2018) argues for a focus on coproduction as a route to overcome sustainability problems in rural water supply and asserts that establishing effective relationships between communities and supporting entities can create necessary structures for effective and equitable services. Indeed, despite communities studied under this research being anchored on the principles of Harambee, the DWO and Diocese of Meru (in the case of Muthambi 4K) played a critical role in the foundation years of the projects which starts to demonstrate the argument on coproduction within their operations. The role of external players remains relevant throughout the case analysis.

*c) Fundraising*

Resource mobilization towards construction of water supplies at the four schemes, as well as in Ngagaka, presents itself in two distinct ways: internal resource mobilization and external resource mobilization. Elinor Ostrom’s design principles for CPR (common-pool resources) institutions are applied in evaluating internal resource mobilization. External resource mobilization, on the other hand, is evaluated under the broader socio-economic and political climate in Kenya at the time of project implementation. Together, the analysis provides key policy considerations in funding the initial capital expense for rural water supplies.

*i) Internal resource mobilization*

Communities in Ngagaka, Murugi-Mugumango, Muthambi 4K, Kamwene and Mwonge Range contributed towards construction of their water supplies through a combination of in-kind contributions and financially towards purchase of required materials. A standard approach is observed towards in-kind contributions across all five schemes. Members were responsible for the manual labor requirements towards construction of the water intake, trenching, carrying pipes



and materials to the construction site (sometimes deep into the forest reserve), and covering up pipeline trenches. The Project Manager at Murugi Mugumango as well as the committee treasurer at Mwonge Range noted how men would go into the forest reserve carrying materials and camp there for multiple days to construct the water intake and lay required pipelines.

The approach to financial contributions was also quite similar across most of the schemes.

Except for Ngagaka, the other schemes required payment of a registration fee to express interest to join the group and a membership fee (often referred to as Share Capital). The registration fee across the schemes was relatively low (no more than KES 200) making upfront single payments possible. Membership fees on the other hand were significantly higher at between KES 1,500 and 10,000. Given the low-income levels of most people in the area at the time, measures were put in place to enable part-payments. Murugi Mugumango and Muthambi 4K enabled payments through coffee vouchers<sup>22</sup>. Mwonge Range on the other hand spread the membership fee into small installments of KES 200<sup>23</sup> to be paid as part of the monthly water charge.

Internal fundraising in Ngagaka varied across the groups. As earlier mentioned, there were about 78 neighborhood groups within the Ngagaka water supply area by 1990. These groups had installed pipe networks of varying lengths and complexity meaning resource needs were vastly different. Broadly speaking, however, reports on Ngagaka indicate that group members would review the materials needed to extend their pipeline and cost them, often with the help of the DWO. For low amounts, group-determined individual contributions were sufficient. If the amount was higher than the group could afford, the group resorted to external resource

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<sup>22</sup> The water schemes opened accounts with the local coffee cooperative societies and farmers could deposit some of their coffee produce to the account; payment against the coffee was counted towards the farmers' membership fee.

<sup>23</sup> This amount was initially at KES 500 but was lowered to improve affordability and encourage members to register their own connections and rather than sharing a single water connection among multiple neighboring households.

mobilization from the DWO or NGOS, and group contributions were only called upon in case of a deficit.

Why is it that the communities at Kamwene, Muthambi 4K, Murugi Mugumango and Mwonge Range were able to organize and mobilize financial and in-kind contributions resources towards construction of their schemes? Ideals of the Harambee movement in post-independent Kenya can be argued to have provided an enabling environment to self-organize. Ostrom's writings on governing the Commons (Ostrom 2015) provide a useful framework for interpreting community organization under this enabling environment, but with two caveats. First is that the commons under investigation in this research is the main water supply network (inclusive of the water intake point and the main water distribution lines). While the traits of this commons do not parallel those of standard commons such as forests, ground water or fisheries, construction of these water schemes required a significant level of collective action and cooperation. To this end, Ostrom's Design Principles for CPRs provide a basis for understanding how the target communities were able to self-organize towards construction of their water supplies. Herein lies the second caveat - while Ostrom's design principles for CPR are generally applied to design interventions, the assertion here is that communities under this research mirror the type of communities Ostrom studied to develop the design principles. The discussion therefore discusses evidence of the principles. Table 12 lists the principles verbatim (Ostrom 2015), and these are discussed based on the order of events at the water schemes.

**Table 12: Design Principles of CPR Institutions**

#	Design Principle	Description
1.	Clearly defined boundaries	Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.
2.	Congruence between appropriation and provision rules and local conditions	Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labor, material, and/or money
3.	Collective-choice arrangements	Most individuals affected by the operational rules can participate in modifying the operational rules.
4.	Monitoring	Monitors, who actively audit CPR conditions and appropriator behavior, are accountable to the appropriators or are the appropriators.
5.	Graduated sanctions	Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or by both.
6.	Conflict-resolution mechanisms	Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
7.	Minimal recognition of rights to organize	The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.

First, we see from the discussion on project initiation that there were clear forums for decision making by consensus among community members. This is consistent with the collective-choice arrangements principle (Design Principle 3) which poses that most individuals affected by the operational rules can participate in modifying them. Arguably, the existence these forums within the scheme areas can be attributed to a facilitative political regime that advocated for and supported the Harambee system. The system not only encouraged self-help projects, but it had also laid in place general structures for how to start a self-help project (Design Principle 7 on minimal recognition of rights to organize). It is from these structures that we see community meetings being held for consensus on starting a water project, elections of committee members to oversee project implementation as required of self-help groups by government, and agreements on matters such as membership contributions towards scheme construction. In some

cases, decisions would need to be reviewed to ensure that the community was fully supportive. For instance, an initial member's contribution of KES 2,500 had been proposed for Wiru Water Project in 1975. Following contributions by only a few members, the area assistant chief organized a meeting to clarify concerns following which a KES 1,500 contribution fee was agreed upon and was to be paid via coffee vouchers.

Beyond project initiation, clear boundaries of membership (Design Principle 1) would be drawn. The first of these boundaries was geographical boundaries. The boundary at Muthambi 4K, for example, was drawn along the administrative boundary of Muthambi location following amalgamation of four individual schemes located within the location in 1982. Similarly, Murugi-Mugumango was also drawn along the administrative locations of Murugi and Mugumango. Among factors affecting the geographical extent of a scheme was the estimated project cost. Community-initiated projects had to construct the main water distribution network before they could effect extensions to homesteads. The projects were therefore faced with significantly high capital expenditure costs, and they often extended their supply area to increase the number of members and spread the economic burden. In contrast, the community in Ngagaka (whose main water distribution network was government sponsored) was more concerned with extending supply from an existing network to households. The cost of extending water supply at Ngagaka was thus significantly lower allowing boundaries to be drawn at the neighborhood level – about 78 groups were formed within the supply area, most of which had less than 100 members; only three groups had more than 100 members.

The second boundary is seen in membership contributions. The most basic of these was payment of registration fees seen across Muthambi 4K, Murugi Mugumango, Kamwene and Mwonge Range. According to the Chairman at Muthambi 4K, the registration fee provided a way to

identify people who were willing to participate and contribute towards the water project. Once construction efforts started, consultative meetings were limited to those that had registered as members. Beyond registration, members would agree on labor and financial contributions towards the scheme. Eventual connection to water supply was dependent on a member meeting these pre-agreed upon contributions. The two levels of membership provide a basic form of graduated sanctions (Design principle 5) from a construction perspective – a member could not be connected to water unless they were a registered member, and they had met both labor and financial contributions.

The number of registered members was higher than the number of active connections at all the schemes evaluated under this research. Herein lies the impacts of Design Principle 2 (evaluation of costs versus benefits), and Design Principle 4 (Monitoring). Here, the focus on these principles pertains to resource mobilization towards construction efforts. It may be posited that the concept of rational action, which predicts that individuals will select strategies whose expected benefits are expected to outweigh expected costs, is sufficient to explain initial community contributions towards construction efforts. This discussion is, however, built on in Chapter 6 with a more detailed analysis on the impact of community translation of information on costs and benefits on adoption of professional management by the schemes.

The argument for rational action is predicated on a contextualized analysis of perceived benefits and costs among water users. Two key benefits were apparent from the in-depth interviews. First is that most community members relied on surface water sources for their domestic needs with women and children often mandated with the responsibility of collecting water from rivers and springs. With the schemes being located within the central highlands, which were part of the areas occupied by white settlers during colonization, communities had early exposure to the

benefits and convenience of piped water supplies. The heightened call for development projects in rural areas through self-help under the Harambee system created an opportunity for the communities to try and materialize these benefits for themselves. Second is that development of socio-economic activities within the scheme areas called for better water supply systems. For instance, the Project Managers at Murugi-Mugumango and Muthambi 4K noted that among their very first water connections were local boarding schools; children from Ntumu Boarding Primary School, which was Murugi Mugumango's first connection, collected water from a river about 2kms from the school. Additionally, the schemes are located within coffee farming zones and local factories required a reliable source of water for cherry processing.

Regarding costs, observations from Kamwene, Muthambi 4K and Murugi-Mugumango indicate that these were often presented as costs towards construction. Any discussions on the costs towards scheme management came at a later stage – understandably so, but with obvious consequences as explored in Chapter 6. Determination of construction costs was quite direct. Financial contributions were agreed upon by consensus informed by the estimate of cost of materials as presented in the designs. Aside from some of the small neighborhood groups within Ngagaka, member contributions usually met only a fraction of the cost of materials, and it was expected that external resources would be sought.

Labor contributions were based on required man-days to construct the entire main distribution network. Any costs (both financial and labor) towards extension of supply from main lines to the household was individually borne. A man-day was often equated to digging a 20ft trench, laying pipes and covering it up. System designs helped towards estimating the number of man-days required per registered member and a water committee member was usually appointed to maintain a record of number of man-days provided per household (Principle 4 on Monitoring).

Kamwene had the provision to connect consumers once the main pipeline reached within their premises with the expectation that the member would continue to contribute towards their labor expectations. The scheme strongly discouraged financial contributions towards labor costs instead encouraging members to engage paid labor directly if that was their preferred approach. Muthambi 4K and Murugi-Mugumango required the full contribution prior to connection but had the provision for financial contribution in lieu of labor contributions.

Conflict resolution (Design principle 7) was usually provided by local government administration officers, specifically chiefs and assistant-chiefs. Two examples are drawn here. One is the previously provided example from the Wiru Water Project (eventual member of Murugi Mugumango) where the chief had to mobilize a meeting to address concerns over use of member contributions where members had expressed concerns that their contributions were being misappropriated. Chiefs were also very instrumental in negotiating with people who refused to provide wayleave for water pipelines. One of the respondents noted that if the chief could not resolve such a conflict, the pipeline would need to be redesigned, and the specific household would be banned from connecting to the water supply for a minimum of six years.

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Applying Ostrom's design principles for CPR helps to rationalize how the communities were able to organize and start construction of their schemes under Kenya's Harambee movement. However, construction efforts were often limited and quickly stalled across all schemes due to limited finances to purchase required materials. While the actions of community members in the case studies were well intended, they proved too ambitious for their economic ability. Kamwene, for instance, only managed to construct their intake and lay 2.5km of pipeline out of at least 6km

that were needed to get the water out of the forest reserve. External resources became a critical piece of the puzzle for eventual scheme construction.

*ii) External resource mobilization*

External resources, either from government or donor entities, have been critical to the construction and extension of the piped networks at Kamwene, Muthambi 4K, Murugi Mugumango, and Mwonge Range. Table 13 summarizes main sources of external funding as reported either in audit reports, reviewed documents or the IDIs. Support was often in the form materials worth the stated amounts with very rare instances of cash transfers. Where cash transfers were made to the schemes, (the few exceptions being funding from Community Development Trust Fund and the Water Sector Trust Fund), the IDIs noted that the funds would be credited to a dedicated bank account with stringent requirements for accounting and auditing measures.



**Table 13: Summary of main sources of external (government or donor) funding**

#	Source	Year	Amount	Description of main uses
<b>Kamwene</b>				
1.	Government <sup>24</sup>	2008	KES 3 million	Construction of new intake point
2.	Water Sector Trust Fund (WSTF)	2013	KES 7 million	Water Management Committee training, 1 <sup>st</sup> storage tank, pipes for distribution network, 2 water kiosks, demonstration VIP latrines
3.	WSTF	2015	KES 7 million	2 <sup>nd</sup> Storage tank, pipes for distribution network, water meters
4.	County Government	Est. 2016	KES 3 million	Pipes
5.	Tana WWDA	2018	KES 47 million	Materials for 3 <sup>rd</sup> Storage tank, office block accompanied by office desks and a computer, intake repairs, parallel line from intake point to 1 <sup>st</sup> storage tank, modern ablution block
6.	Tana WWDA	2021	KES 8 million	Materials for sedimentation tank and pipes
	<b>Total</b>		<b>KES 75 million</b>	
<b>Muthambi 4K</b>				
1.	SIDA <sup>25</sup>	1994	KES 15.9 million	Materials for 1 <sup>st</sup> water intake point, sedimentation tank, Break Pressure Tanks and storage tanks, 18km of main distribution network
2.	CDTF	2005	KES 12 million	Funds for 2 <sup>nd</sup> intake point, 4.2km of main distribution network, sedimentation tank, storage tanks
3.	Ministry of Water and Irrigation		KES 9.9 million	Materials for 4km parallel pipeline (200mm diameter) from intake
4.	MISEREOR <sup>26</sup>		KES 4.4 million	Materials for office block and demonstration VIP latrines
5.	Tana Water Services Board	2006 – 2016	KES 18.4 million	3 motorbikes; A car; computers; pipes of various sizes; training of staff, billing software
6.	UTaNRMP <sup>27</sup>		KES 7.4 million	Extension pipes from 3 <sup>rd</sup> water intake
7.	WSTF	Est. 2015	KES 4.3 million	Funds for 4.1 km extension pipeline (110mm)
8.	Catholic Diocese of Meru (DOM)		KES 0.7 million	Water meters
9.	County Government		KES 1.6 million	Contribution towards 3 <sup>rd</sup> intake point, pipes
	<b>Total</b>		<b>KES 74.6 million</b>	

<sup>24</sup> The IDI noted that the scheme accessed KES 3million through the facilitation of the area Member of Parliament. It is probable that the source of the funds was the Constituency Development Fund (CDF)

<sup>25</sup> The Swedish International Development Cooperation Agency

<sup>26</sup> German Catholic Bishops' Organisation for Development Cooperation

<sup>27</sup> Upper Tana Natural Resources Management Project

<b>Murugi Mugumango</b>				
1.	Canadian Hunger Foundation (CHF)	1984	KES 2.8 million	Upgrading water intake points, 60kms of main distribution pipeline and main branches, storage tanks, 10 Break Pressure Tanks
2.	Ministry of Water Development	1988	KES 200,000	Materials contributed towards construction of the office block
3.	CHF <sup>28</sup>	1990	KES 275,000	Materials to improve the 2 <sup>nd</sup> intake
4.	SIDA	1992	KES 300,000	Water meters
5.	CHF	1993	KES 1.5 million	Materials for 150m <sup>3</sup> storage tank and 4km main distribution pipeline
6.	Belgian NGO	1997	Est. KES 30 million	8 containers of pipes were donated to the scheme
7.	Ministry of Water	2003	KES 2 million	Pipes provided through the DWO
8.	Ministry of Water	2004	KES 3 million	Pipes provided through the DWO
9.	Tana WSB	2006 – 2016	Est. 18 million	Pipes of various sizes worth est. 16 million, 4 motorbikes, 5 desktop computers, 1 laptop computer, and individual and master meters and associated fittings
10.	WSTF	Est. 2016	KES 7.3 million	Funds for water meters, meter testing kit, demonstration VIP latrines at a school
11.	County government	2018	KES 2 million	Water pipes
	<b>Total</b>		<b>KES 67.4 million</b>	
<b>Mwonge Range</b>				
1.	Ministry of Water	2003	KES 2 million	Materials for pipeline extension
2.	Ministry of Water	2003	KES 4.5 million	Materials for pipeline extension
3.	Constituency Development Fund		KES 4 million	Pipes
4.	County government		KES 5 million	Pipes
	<b>Total</b>		<b>KES 15.5 million</b>	

<sup>28</sup> CHF activities in Murugi Mugumango were very successful leading CHF to enter into an agreement with the Scheme to provide training to other rural water supplies. Murugi Mugumango would be compensated in materials equivalent to the cash amount from their services. Such compensation was received in 1990 and 1993.

The fundraising efforts at the four water schemes happen within different settings of the Harambee Movement in Kenya leading to differentiated experiences. Holmquist (1984) observes that following independence, the idea of self-help took off in the mid-1960s aided by the “coalition of peasants and rural petty bourgeoisie initiating projects” and the with political legitimacy provided by President Kenyatta. The character of self-help, however, changed over time in very subtle yet complex ways (Mbithi and Rasmusson 1977; Ngau 1987; Holmquist 1984). Among the most obvious of these changes were the progressive set-up of bureaucratic structures to regulate and control self-help activities, and the evolving role of state and non-state actors in the Harambee movement. These changes were of evident consequence to the schemes investigated under this research, specifically on access to financial resources towards construction activities.

The amalgamation of the individual schemes at Muthambi 4K and Murugi Mugumango was, in part, influenced by hopes to access government funding for the water projects. Individual schemes at the two water projects were initiated in the late 1970s and amalgamations finalized in 1982 and 1984 respectively. The timing of the amalgamation corresponds to the government’s policies for financing rural water supplies of the day. Kenya’s Development Plan for 1984 – 1988 notes that the strategy for self-help water programmes implemented within rural area would involve giving priority “to those projects that have been approved by the District Development Committees in accordance with the ‘District Focus’ approach to rural development” (Republic of Kenya 1984). The interview with the chairman at Muthambi 4K indicated that the then area MP advised the four schemes of Kaburi, Kaathi, Kariethera and Kandungu to merge and form a location wide project (Muthambi Location) to increase their chances of accessing government funding, as these were not being directed to small projects. In a similar manner, the DWO

advised the Murugi and Mugumango schemes to merge to qualify for funding that was being availed by a donor through the recommendation of the DWO. Murugi Mugumango was awarded a CHF grant of Canadian \$200,000 (eq. to KES 2.8 million at the time) in 1984 following recommendation by DWO. The grant covered the cost of imported materials and technical support towards construction of 60km of main line distribution, along with management support to establish relevant management structures. In contrast, Muthambi 4K did not receive any significant funding until 1994 when it was awarded a KES 15.96 million grant by SIDA that was administered by the Catholic Diocese of Meru (DOM). The funding was used towards a new water intake, 18km of main distribution lines, a sedimentation tank and multiple break pressure tanks and storage tanks.

The experiences at Muthambi 4K and Murugi Mugumango reflect a broader shift on the global discourse in financing rural water supply in developing countries at the time – international donors preferred to work directly with communities through non-governmental organizations by the 1990s rather than directly engage with governments (Discussed in Chapter 2). Unlike Murugi Mugumango that received its grant following recommendation by DWO, the Muthambi 4K community had to self-mobilize and submit at least seven proposals to donor entities soliciting for funds. The grant from SIDA was the only positive response. Access to funding through NGOs, however, remains evident in the expansion of the two schemes in the 1990s. Following the SIDA funding, Muthambi 4K established a lasting partnership with the Catholic Diocese of Meru, and the scheme has received multiple grants channeled through the Diocese (e.g., a KES 11.9 million grant towards a second intake and related pipeline, and a KES 4.4 million grant towards construction of an office block). Murugi Mugumango on the other hand received a

donation of KES 30 million worth of pipes (8 containers) through a Belgium based NGO which were used towards augmenting water supply.

Kamwene and Mwonge Range present a contrasting experience where their construction was funded mostly through community fundraising events and government resources rather than donor funding. In its founding years, Kamwene conducted a '*Harambee*' in 1991 in which about KES 400,000 was raised. Combined with community contributions of about KES 210,000, the project managed to construct its intake and about 2.5km of pipeline before stalling. *Harambee* in this context refers to the colloquial term used for fund-raising events towards a social cause rather than the concept/ideas of self-help as discussed in the previous section. It is reflective of the changes that affected the conceptualization of the Harambee movement over time. In a very well-argued article titled '*Formalizing clientelism in Kenya: From Harambee to the Constituency Development Fund*', Ochieng' Opalo (2022) observes that a Harambee cycle involved identification of a project, acquiring a fund raising permit from the government, meetings to determine community contributions, and finally community fundraising – all of which is consistent with earlier discussions. With time, however, he observes that the community fundraising morphed into a public fundraising event where “wealthy patrons [...] would serve as ‘guest of honor’ and individuals would publicly declare the value of their contributions”. This is the type of event that came to be referred to as a *Harambee*, and this is how Kamwene raised the KES 400,000 in 1991.

Ochieng' Opalo (2022) argues that while the Harambee movement was an important informal institution that structured distributive electoral politics and was the cornerstone of Kenya's grassroots developmental philosophy, a political culture quickly bloomed around it providing a platform for politicians to signal their efforts through fund-raising towards public goods and

services. In this way, politicians often served as ‘guest of honors’ in *Harambee* events which became a manifestation of localized patronage politics. The politicization of Harambee intensified following re-introduction of multi-party politics in Kenya in 1992 due to increased electoral competitiveness. Mwangi (2008) observes that *Harambees* “became an election driven activity and a vehicle for bribing voters” – in the 1980’s, election years accounted for only 7% of the decades total Harambee funding; the two election years of the 1990s accounted for 60% of total Harambee funding. Ochieng’ Opalo (2022) quotes a legislator’s complaint from 1999 that “once you become an MP you go bankrupt [. . .] Everything is done through Harambee! And every *Harambee* is on the MP!”.

It is, arguably, within this context that Mwonge Range mobilized its external resources in 2001. Mwonge Range held a *Harambee* in 2001 in which Uhuru Kenyatta, then newly nominated as a Member of Parliament and appointed minister for local government was invited as the *Harambee*’s ‘guest of honor’. He contributed KES 1 million. While Uhuru Kenyatta was yet to hold an elected position at this time, he would later run for president in the 2002 general election under the Kenya African National Union (KANU) party. Accompanying Uhuru Kenyatta to the *Harambee* in Mwonge Range as a guest was Mbuba Ntwiga, then area MP and member of KANU, who contributed KES 200,000. Mbuba Ntwiga unsuccessfully ran for re-election in 2002. The community contributed an estimated KES 800,000 for a total of about KES 2 million from the fundraising efforts, and these funds went towards construction of the scheme’s new intake and initiated the pipeline laying process.

Beyond funds raised during the *Harambee* events, the Constituency Development Fund (CDF) played a critical role in construction of Kamwene and Mwonge Range schemes. Ochieng’ Opalo (2022) argues that CDF emerged in 2003 as legislators’ (M.P.s) attempt to formalize certain

aspects of the Harambee movement amidst rising costs - without a government budget for Harambee, politicians had to dip into their personal funds or fundraise from their wealthy patrons for *Harambee* events. CDF allowed for allocation of 2.5% of the national government's share of ordinary tax revenue to constituencies. The fund was expected to enable rural communities to participate in development through identification and implementation of projects (Chesire and Chege 2015). Further, the CDF Act specified that projects funded by CDF needed to be community-based projects, and the communities needed to submit proposals to their respective CDF offices. In this way, the Act formalized clientelism by providing MPs with a budget for projects while granting them direct control over project choice and implementation in their constituencies (Ochieng' Opalo 2022). In Mwonge Range, the IDI respondent noted that the scheme received KES 4.5 million in 2003 from the area M.P. – there is a very high probability that these were CDF funds. The scheme later received KES 4 million worth of pipes which was directly attributed to CDF. In Kamwene, the IDI noted that the area M.P. facilitated allocation of KES 3 million towards construction of a new intake in 2008 which contributed towards resuscitation of scheme construction. Similarly, it is very likely that these were CDF funds. This M.P. is also credited with facilitating Kamwene's access to other government funds (e.g., through Tana WWDA) so that the scheme is colloquially referred to as his project. In contrast, Muthambi 4K and Murugi Mugumango did not mention receiving any financial support from the CDF despite being in the same constituency as Kamwene. Asked why this was the case, the responses alluded to a clientelist approach to financing water schemes - both schemes noted that they maintain an arm's length relationship with politicians, with one adding that they do not allow politicians to speak at their annual general meetings.

Beyond CDF, all four schemes have received financial support from the Ministry of Water or its associated institutions such as the Water Sector Trust Fund towards service extension since introduction of water sector reforms under Water Act 2002. Interestingly, except for Muthambi 4K, access to these funds in at least one occasion at each scheme is credited to ‘facilitation’ by either a politician or an area resident who held an influential position within the Ministry. Muthambi 4K credited the support of DOM in applying for and accessing Ministry funds.

### **4.3 Chapter summary**

Construction of piped water supplies is capital intensive and rural communities often cannot meet these costs upfront. From the cases covered in this research, it is evident that extensive resources were mobilized within and beyond rural communities to implement piped water schemes. From the example of Ngandori Nginda, Ngagaka and Gatua-Karimba, we see programmatic approaches by the national government with support from donors in the 1970s led to construction of main water distribution pipelines in the target areas. Unfortunately, for a sector that was significantly donor dependent, a shift in global discourse in the 1990s towards approaches such as the VLOM approach (village-level operation and maintenance) and the DRA (Demand-Responsive Approach) meant that there were limited resources towards such government driven programmatic responses to piped rural water supplies.

The communities in Muthambi 4K, Murugi Mugumango, Kamwene and Mwonge Range self-organized towards construction of their water supplies. Analysis of their narratives indicates that a culture of self-help under the Harambee movement bolstered by a political climate that gave legitimacy to the Harambee movement provided an environment for communities to initiate water projects. Even then, local elites that considered water access as a key developmental issue played a critical role in mobilizing communities into action. Following project initiation,



communities organized in a manner that reflects Ostrom's design principles for CPR which allowed members to commit both labor and financial contributions towards scheme construction. The relevance of Ostrom's design principles within this setting raises a critical consideration for the wider application of community management of rural water supplies within rural areas in Sub-Saharan Africa – is this widely applied, and generally accepted approach implemented in a manner that considers the relevant principles to enable cooperation and collective action?

The availability of external support by either government or NGOs is seen as critical to actual construction efforts. Technical support was mainly in surveying and design services for the water infrastructure, often provided by the district water offices. The availability of financial resources from sources external to the community was critical towards purchasing materials needed for the main distribution network. External resources were availed either through donor organizations or government funding. This interaction between communities and external supporting entities (i.e., both technical and financial support) demonstrates the coproduction of piped water rural services at the schemes involving both private citizens at the community level and broader supporting entities. Unfortunately, clientelism is seen to have influenced allocation of government funding towards these rural water schemes. This demonstrates a potential risk to coproduction of rural water services where supporting entities are expected to be government entities.

# **Chapter 5. Societies as an appropriated route to rural water management**

## **5.1 Introduction**

Application of Ostrom's Design Principles for CPR in Chapter 4 helped us appreciate how communities were able to organize and construct the water supplies studied in this research.

Despite their collective action, however, it was apparent that external resources were critical to actual construction of the schemes' infrastructure. With construction of main distribution networks completed, this chapter evaluates how the communities adopted professional management of their scheme operations.

An obvious point of departure in addressing this question is the observation that five of the seven schemes registered with the government as legal entities under the Societies Act at some point in their history. The five schemes are Murugi Mugumango, Muthambi 4K, Mwonge Range, Kamwene, and Ngandori-Nginda. Registration as a society contrasts with general practice in the sector where rural water projects under voluntary community management often register as self-help groups, a purely administrative registration process. These five schemes reflect a departure from volunteerism of water management committee members as often observed with community

management of rural water supplies to engage paid-for staff in delivering professional, competent, and effective management of day-to-day operations of the water schemes. In contrast, Gatua-Karimba, which is registered as a self-help group, is characterized by a voluntary water committee performing most operational procedures. Ngagaka on the other hand was registered as a society between 1991 and 2011 when it registered as a public limited liability company following intervention by the Ministry in charge of water to transition it from community management following concerns of financial mismanagement. Ngagaka is professionally managed and will be discussed further in more detail in Chapter 6.

Registration as a Society established the five schemes as legal entities with specific required operational frameworks as later expounded on in this chapter. Why did these schemes register as societies? At the heart of this chapter's argument is that community experiences with coffee cooperative societies enabled them to appropriate institutional arrangements from the coffee cooperatives societies to management of their water schemes. The result was evolution of community management at the water schemes into an organizational arrangement that is distinct from the voluntary community management approach. Institutional arrangements are distinct from organizational arrangements – the former refers to the 'rules of the game' (i.e., "the humanly devised constraints that shape human interaction") (North 1992); the later are the 'players of the game' (i.e., "vehicles for the promotion or protection of a mix of individual and shared interests and ideas") (Leftwich and Sen 2011).

To make the case for this appropriation of institutional arrangement from the coffee cooperative societies, this chapter starts with an overview of societies under the Kenyan law. This is followed by a historic overview of the cooperative movement in Kenya to i) demonstrate the buildup of

social capital<sup>29</sup> among target communities, and ii) contextualize the relevance of the coffee cooperative societies to the discussions. Finally, the governance structure of the coffee cooperatives is discussed, drawing out parallels with management of the water schemes to make a case for appropriation of the institutional template from the coffee cooperatives in membership, member control and, most critically, scheme operations.

## **5.2 Societies under the Kenyan law**

First enacted in 1968 and with amendments in 1997, 2015 and 2017, the Societies Act defines a society as including “any club, company, partnership, or other association of ten or more persons, whatever its nature or object, established in Kenya or having its headquarters or chief place of business in Kenya, and any branch of a society”, but does not include any entities defined and registered under other written law (e.g., a company as defined by the Companies Act, trade union as provided for by the Trade Unions Act, or Cooperative Society as provided in the Cooperative Societies Act). The scope of societies is therefore broad with the office of the Attorney General noting that forms of societies include organizations that are charitable in nature (e.g., education and scientific research foundations), professional bodies, recreational clubs among others.

For a society to acquire legal status it must apply to the Registrar of Societies, and the Constitution of the Society forms a critical component of the application process. The Constitution is the constitutive document that contains the objectives, rules, and procedure that

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<sup>29</sup> Putman, Leonardi, and Nonetti (1993) describe social capital as the “norms of reciprocity and networks of civic engagement” within a society and includes features of social organization like trust, norms, and networks. In this definition is a sense of established yet unwritten common rules on goodwill that apply to all members of the society leading to fair play for all and by all. Consequently, this sense of established fair play allows members of the society to trust each other and voluntarily work together leading to more efficient and cooperative societies; the converse is true.

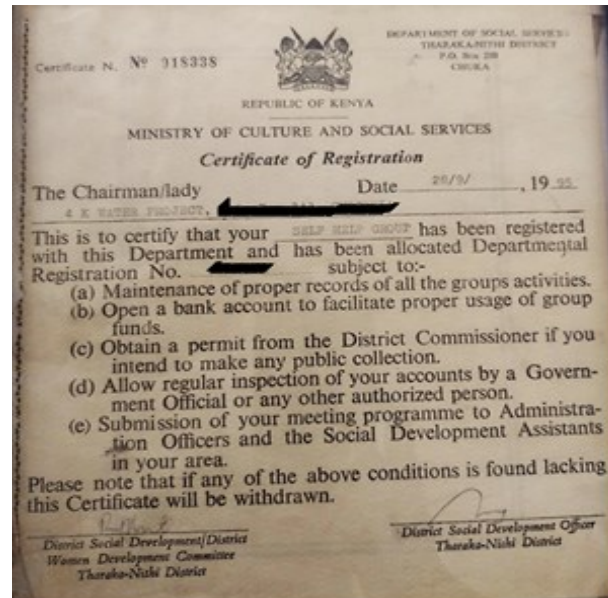
will govern the society to achieve its set objectives. The full list of matters that must be provided for in the constitution as required by the Societies Act are listed in Figure 6.

<ul style="list-style-type: none"><li>• The name of the association</li><li>• The whole of the objects for which the association is to be established.</li><li>• The persons to whom membership is open.</li><li>• The rates of entrance and subscription fees (if any) for membership.</li><li>• The method of suspension or expulsion of members.</li><li>• The titles of officers and auditors and their terms of office, and the method of their election, appointment, dismissal, and suspension.</li><li>• The composition of committees (if any) of the association, the terms of office of members of such committees and the method of their election, appointment, dismissal, and suspension.</li><li>• The authority for and the method of filling vacancies on committees.</li></ul>	<ul style="list-style-type: none"><li>• The custody and investment of the funds and property of the association, and the designation of the persons responsible therefor.</li><li>• The purposes for which the funds may be used, and in particular the prohibition of the distribution of funds among members.</li><li>• The inspection of the books and list of members of an association, by any member or officer.</li><li>• The annual or periodical audit of accounts.</li><li>• The formation of branches, if branches may be formed.</li><li>• The manner of amending the name and constitution of the association.</li><li>• The manner of dissolution of the association and the disposal of its property on dissolution.</li><li>• Grievance procedures</li></ul>
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**Figure 6: Matters to be provided for in the Constitution of a Society**

From the list of items required within a Society's constitution, the structuring of societies may be argued to be open ended, and members need to be deliberate in developing their constitution. In the case of a water scheme, it would need to be well organized, and its structure clearly thought out prior to registration. Indeed, while 4 out of 5 of the schemes started out as self-help groups (the exception is Ngandori-Nginda), the timing and motivation in their registration as a society varied across the schemes. As discussed in Chapter 4, community mobilization for construction of the 4 schemes was under the Harambee movement. The government set-up bureaucratic structures to regulate and control self-help activities through registration of self-help groups with the Ministry of Culture and Social Services. Such registration, however, was purely administrative and did not yield legal entities (Barkan and Holmquist 1986; Mumma 2007).

Further, the conditions to maintain a certificate of registration were not stringent and included maintenance of proper records of group activities, opening a bank account to facilitate proper usage of group funds, obtaining a permit towards any public collections, allowing regular inspection of accounts by government authorized persons, and submission of meetings minutes to relevant government officials (see Figure 7 – Muthambi 4K’s Certificate of Registration).



**Figure 7: Muthambi 4K Certificate of Registration**

Given the much more stringent requirements of being a Society, the schemes are seen to have made this choice for varied reasons. In Murugi-Mugumango for instance, the scheme registered as a service rendering society in 1984 under the advisement of a consultant, a move that was expected to enable it to effectively conduct its business and “avoid direct interference from the government or political organizations” as stated in reviewed documents. In Muthambi 4K, the Chairman noted that the scheme registered as a Society in 1999 following a legal dispute – he mentioned that because a self-help group is not a legal entity, the private property of committee members remained at risk in case of a court ruling against the group; registration as a Society made the scheme a legal entity that can sue and be sued. In Kamwene and Mwonge Range, the IDIs noted that registration as a society was expected to enable the schemes to operate effectively. Despite the motivation for registration, why societies were perceived to provide a route to effective management and adopted across schemes under this research becomes a

pertinent question. I argue that this perception was borne out of the communities' experiences with coffee cooperative societies.

### **5.3 Cooperatives societies – an appropriated route to rural water management**

A recurrent observation across 4 of the 5 schemes registered as Societies (the exception being Mwonge Range) is that founding Water Management Committee (WMC) chairmen were significantly engaged with coffee farmers' societies. Specifically, the founding chairman at Murugi Mugumango served as the chairman of the Meru South Farmers' Co-operative Union; at Muthambi 4K, he was the General Manager of the Meru South Farmers' Co-operative Union; at Ngandori Nginda, the chairman was described as a 'major co-operator' in two IDIs and he served with the Embu District Co-operative Union; in Kamwene, the current chairman who is credited with reviving scheme activities is popularly referred to as 'Chairman' having served in multiple community initiatives including 17 years as the chairman of Mitheru Coffee Farmers' Society. For context, the former Embu and Meru Districts – located in Kenya's central highlands and where all seven schemes under this research are located – are major coffee growing areas following its introduction by the British in the early 20<sup>th</sup> century. Coffee in Kenya, like most other agricultural produce such as dairy, sugar, wheat and pyrethrum, was traded solely through government-controlled cooperative societies post-independence until their liberalization in the 1990s (Wanyama 2009).

#### **5.3.1 *An overview of the Kenyan cooperative movement***

As the Harambee movement provided a vehicle for rural development in post independent Kenya, the Cooperative movement was a key vehicle for economic growth for Kenya's mostly agriculture based economy (Bager 1980; Zeleza 1990). Worth noting is that Cooperative

Societies are a distinct form of societies under the Kenya Law. The Cooperatives Act, enacted in 1966 and with amendments in 1997 and 2012, notes that a society which has as its objects as the promotion of the welfare and economic interests of its members, and that has incorporated in its by-laws the co-operative principles (i.e., voluntary and open membership; democratic member control; economic participation by members; autonomy and independence; education, training and information; co-operation among co-operatives; and concern for community in general) may be registered by the Commissioner as a co-operative society.

Cooperatives are, arguably, an alien institution that has been acculturated to the Kenyan context over time. The first cooperative society in Kenya, the Lumbwa Cooperative Society, was formed in 1908, by European settler farmers as a dairy cooperative (Zezeza 1990; Ministry Of Industrialization and Enterprise Development 2014). The first Cooperative Society Ordinance was passed in 1931 to consolidate the settler cooperative movement and regulate the operations of cooperatives – the Ordinance did not allow Africans to form cooperatives. However, due to weaknesses in settler agriculture, the need for a peasant sector that was productive enough to provide revenue for operation of the colonial state meant that African cooperatives were not actively suppressed (Zezeza 1990). It was only after 1945 when a new ordinance was passed that Africans were allowed to form cooperatives.

With the growth of peasant commodity production, this Ordinance is argued to have ushered a new era of the Kenyan cooperative movement. Many cooperative societies were formed especially in the then Central and Nyanza province, both of which had extensively developed peasant commodity production. Zezeza (1990) reports that there were over 400 cooperative societies by 1958 up from 160 societies in 1952 and 75 in 1950. Cooperative unions, whose membership is primary cooperative societies within specified areas, also took off in the 1950s.



Zezeza (1990) reports that Nyeri District Cooperative Union and Embu District Cooperative Union (part of which are the Ngandori-Nginda and Ngagaka supply areas under this research) were registered in 1954 as the first Cooperative Unions. Meru Farmers' Co-operative Union Ltd – within whose coverage area the other 5 water schemes under this study lie – was registered in 1958 (Kirigia 1988). Founded by Englishmen, the main objective of these Unions was to receive coffee produce from primary societies and market it on behalf of farmers (Kirigia 1988).

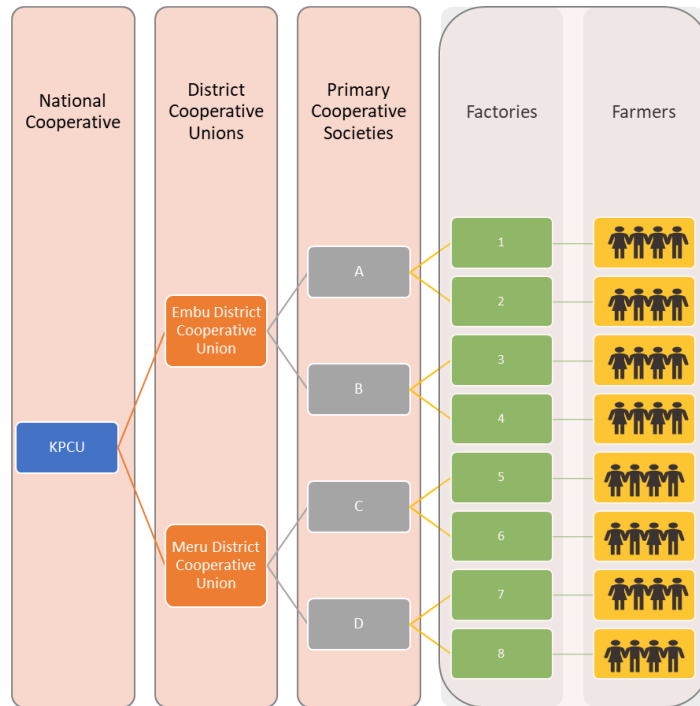
Cooperatives experienced tremendous growth following independence with 820 new cooperative societies registered between 1963 and 1966. The first Kenyan official planning document after independence (Development Plan 1964 – 1970) dedicated a chapter to cooperatives, recognizing that they played an important role in the country's agriculture. This would be repeated in later development plans, though with varied emphasis and optimism depending on cooperative performance (Hedlund 1992). Among the most optimistic was the 1979 – 1983 Development Plan which emphasized that the cooperative movement was an important instrument to obtain mass participation in national development as a means to increase the members' standard of living and as a tool for generally creating better possibilities for earning money in rural areas (Hedlund 1992). Arguably, this increased optimism was born out of increased coffee prices and the great national coffee boom of the late 1970's (Zezeza 1990; Wanyama 2009; Hedlund 1992). Notably, this is the time when community mobilization towards both Murugi Mugumango and Muthambi 4K water schemes was happening. This is also when Ngandori Nginda, Ngagaka, Gatua-Karimba and Karangani (part of whose supply area would later become Mwonge Range) were constructed under the government funded rural water supply programme in high potential agriculture areas.

The cooperative movement in Kenya became more diverse and complex in the 1960s and 1970s following varied government influences and policy changes. Scholarship on cooperative development in Kenya may be divided into two main eras, the era of state control seen until the transition period of the 1990s into the era of liberalization observed today. While there exists a substantial amount of literature on this (e.g., (Wanyama 2009; Develtere, Pollet, and Wanyama 2008; Zeleza 1990; Hannan 2014; Kobia 2011; Bager 1980), the next section turns its focus to coffee cooperatives to contextualize how cooperatives influenced management of rural water supplies in the case study areas.

### **5.3.2 *Structure of coffee cooperative societies***

Coffee growing was reserved exclusively for Europeans until 1933 when an experiment, documented by Barnes (1979), was undertaken with coffee cultivation by African farmers in Gusii, Embu, and Meru areas – the latter two areas house the case studies under this research. The experiment proved to be a success not just in the quantity of coffee produced, but also the quality (Barnes 1979). Ogutu (1979), in an essay on development of coffee in Meru, notes that even before the end of the experiment period, coffee from Meru was deemed to be of first-class quality with the region’s agricultural officer acknowledging that “Meru had produced some of the finest quality coffee in the world”. The consequence was rapid growth of the coffee industry in the region and its eventual spread to other ecologically suitable regions (‘the coffee belt’) (Ogutu 1979). Forward to the late 1970’s and early 1980’s, and coffee had become a classic export crop with only about 3% consumed within Kenya; in 1984, coffee accounted for almost 30% of the country’s total export earnings (Hedlund 1992).

Given the importance of coffee to the economy, government policy informed the formation of a distinct four-tier hierarchical co-operative structure for the purpose of marketing the commodity (Hedlund 1992; Kobia 2011; Hannan 2014; Zeleza 1990). Figure 8 summarizes this structure.



**Figure 8: Structure of Coffee Cooperatives**

All small-scale coffee growers (less than five hectares) were required by law to sell their coffee through a cooperative society; and to sell coffee through a cooperative society, one must be a member. In this way, at the bottom of the cooperative structure were primary cooperative societies whose membership was restricted to individuals (Hannan 2014; Zeleza 1990; Hedlund 1992). Because cooperatives societies could cover extensive areas (e.g., multiple locations within a district), a cooperative society could have more than one factory to ease delivery of coffee berries by farmers. As such, farmers were associated with specific factories within their cooperative society where they delivered their coffee berries for processing and drying. An administrative system introduced by the government in the 1970s required that the factories

would form independent economic units of the primary coffee cooperative society that operated at a profit and contributed to the society's overheads (Hedlund 1992). The factories were expected to maintain their own books of accounts and financial records with Hedlund (1992) observing that the reason for this was, quite simply, for the local committee and cooperative members to become concerned about their factories profitability and increase farmers' financial awareness. Primary societies aggregated coffee produce from their coffee factories for delivery to the district cooperative union. Like their member factories, the primary cooperative societies also maintained records on member details, books of accounts and finances.

At the district level, cooperative unions were formed with their membership restricted to primary societies. Government policy from the late 1960s encouraged increasing centralization of functions such as book-keeping and accounting (conducted in parallel with the cooperatives), banking, bulk-purchasing of stationery, farm inputs and stores under the district cooperative union (Hannan 2014; Zeleza 1990; Hedlund 1992). Distribution of materials would be done through the primary cooperatives and their factories. The banking function of the Unions included distributing coffee revenues to farmers. Cooperative societies and cooperative unions formed members of the Kenya Planters Cooperative Union (KPCU), along with other members that controlled 50 or more acres of land under coffee. KPCU collected coffee produce from its members and coordinated the final processing and grading of coffee prior to delivery to the Coffee Board of Kenya for sale (Kobia 2011).

Ultimately, it is observed that with coffee growing being the main economic activity within the geographical area under this study, community members were familiar with cooperative societies, and with the process and expectations of joining a society.

### ***5.3.3 Governance of coffee cooperative societies and its appropriation to water management***

Expectedly, the distinct cooperative hierarchy presented in the previous section was accompanied by a governing structure. Consistent with state control of cooperatives observed in Kenya until the 1990s (Wanyama 2009; Develtere, Pollet, and Wanyama 2008; Hannan 2014), Hedlund (1992) observes that the activities of coffee cooperative unions were firmly steered by the government with officials from the Ministry of Co-operative Development closely monitoring union activities, which were regulated in detail by government ordinances. In contrast, however, members of primary cooperative societies and their respective factories had more control of their societies and reflected aspects of cooperative movement principles including voluntary and open membership, democratic member control, economic participation, and autonomy and independence. Even then, the ministry's control was still considerable with the administrative structure and routines of the factories and the cooperatives societies being centrally regulated. The sections that follow highlight how some of these administrative structures were carried on to management of water supplies.

#### ***a) Membership fees***

Membership fees to the water societies, specifically for Murugi Mugumango and Muthambi 4K that were formed in the early 1980s, can be argued to have borrowed from practices within the coffee cooperative societies at the time. Membership to the coffee cooperative societies entailed a one-time registration fee that included registration costs and share capital. Giving the example

of Kibirigwi Coffee Society studied by Hedlund (1992)<sup>30</sup>, the registration fee was KES 105 – 5 shillings for the registration costs, and five shares each valued at 20 shillings. The Cambridge Dictionary defines share capital as money invested in a business in the form of shares.

Technically, farmers would receive dividends against their shares in addition to their coffee revenues if their cooperative and/or factory was profitable. Dividend allocation was, however, much more complex and factored in operations of the various entities along the cooperative structure.

In the founding years of the Muthambi 4K and Murugi Mugumango, membership entailed labor and financial contributions towards scheme construction; today, a connection fee is charged. In Murugi Mugumango for instance, pioneer members paid a one-time membership fee of KES 3,050 in 1987, while late entrants (i.e., those that did not participate in collective action towards scheme construction) paid the KES 3,050 in addition to a KES 200 penalty and KES 900 in labour charges. Table 14 provides a breakdown of membership fees in 1987 and 2021.

Interestingly, part of the membership fee at both Murugi Mugumango and Muthambi 4K is a charge for share capital which is retained to this day. When queried on what this was for, the response from the IDI in Muthambi 4K was, paraphrased, “share capital has to be paid to join a society”; in Murugi Mugumango the IDI noted that he was unsure why it is charged, but it is a practice that has been retained since the scheme’s founding years. Evaluated critically, however, the share capital amount during the schemes’ founding years equates to the community

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<sup>30</sup> Unfortunately, detailed literature on the activities of primary coffee cooperative societies is limited. Hedlund (1992), however, provides an anthropological study of Kibirigwi coffee cooperative in Kirinyaga District, a neighboring district to Embu and Meru, which was conducted between 1984-1986. The study details the structure and operations of the coffee cooperative, and these are assumed to mirror the structure and operations of the cooperatives within the case study area. This assumption is in consideration that general structure of coffee cooperatives was influenced by rules and regulations introduced by the ministry, and from personal experiences having lived within the coffee belt in Murang’a and Kiambu districts where, though much further from Kirinyaga, the coffee cooperatives reflect a similar structure.

contributions towards scheme construction that were agreed upon by consensus during project initiation. Arguably then, the schemes borrowed terminology from the coffee cooperatives and have carried on the charge despite the successful construction of their schemes and a lack of technical relevance. On the latter, the schemes are non-profit making entities and do not expect to pay out any dividends from scheme performance.

**Table 14: Murugi Mugumango Membership fees breakdown**

<b>Item</b>	<b>Membership Fee (1987)</b>	<b>Membership Fee (2021)</b>
Application forms	20	200
Entrance Fee	20	500
<b>Share Capital</b>	<b>1500</b>	<b>7165</b>
Pipes deposits	600	5500
Metre deposit	470	6100
Water use advance	120	240
Connection fee and Standpipe	320	6305
Labour fee charges	900	3440
Goodwill		500
<b>Total</b>	<b>3950</b>	<b>29950</b>

The coffee cooperatives also provided an avenue for part payment of the membership fees to the water schemes. A significant majority of farmers within a primary cooperative's jurisdiction were, arguably, members of the said cooperative. This is because most coffee growers in the region were small holder coffee growers (< 5 hectares) and the law required that such growers sell their coffee through a cooperative. Consequently, water users at Muthambi 4K and Murugi Mugumango were also often members of the area coffee cooperatives societies, and this allowed them to pay their membership fee to the water schemes using coffee vouchers. The water schemes opened accounts with the local coffee societies and farmers could deposit some of their coffee produce to the account. Any payment against the coffee was counted towards the farmers' membership fee to the water scheme.

In contrast, Mwonge Range and Kamwene, which were also community initiated but became operational in the 2000s, charge a membership fee but this does not include a charge for share capital. Instead, they charge an application fee and a cash equivalent of members' labor contributions towards construction. For Mwonge Range, the total amount is set at KES 30,000 for which members must pay a minimum of KES 5,000 upfront to get a connection. The remainder is distributed into monthly instalments of KES 200. In Kamwene the costs increase over time. The application fee started at KES 1000 in 2006 and had risen to KES 6,000 by 2020. Labor contributions are set at 100 man-days and the cash equivalent determined by prevailing market rates. In 2020, one man-day was equated to KES 500 making the total membership fee KES 56,000. The IDI, however, noted that the scheme had recently lowered the connection fee to KES 16,000 at the request of the area M.P., who is credited with facilitating significant resources towards the scheme's construction. Ngandori-Nginda and Gatua-Karimba, which were constructed as government initiatives only charge an application fee.

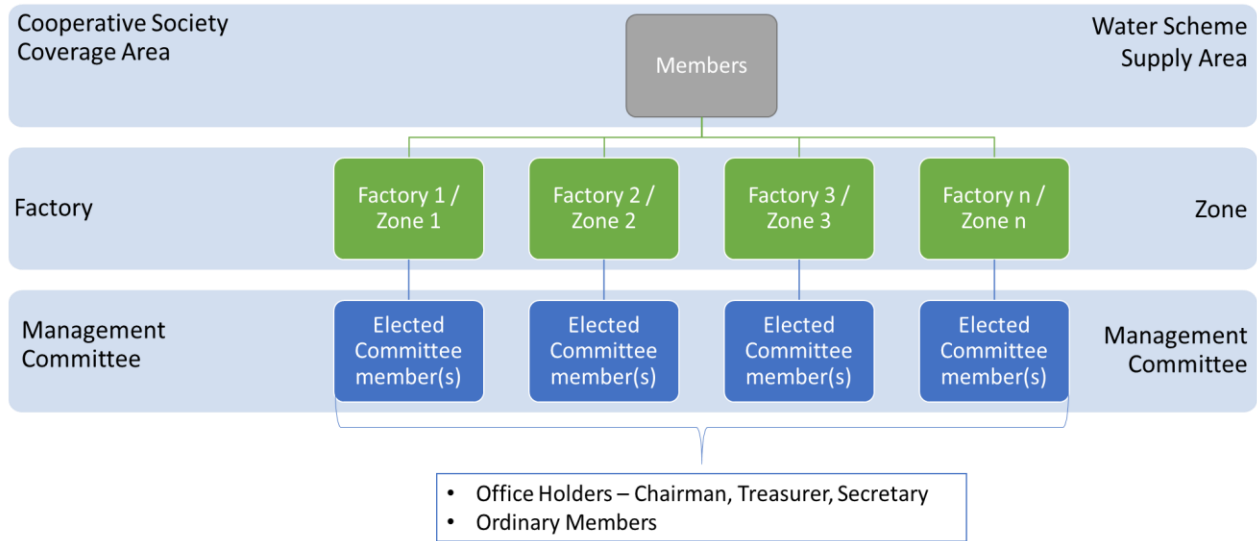
***b) Member control***

The structuring and division of power at the coffee cooperatives is reflected, almost exactly, at the water schemes. This is seen, first, in the election and power structure of committee members. Primary coffee cooperative societies would span extensive areas (e.g., multiple sublocations or locations) as the government limited creation of new cooperatives in some instances while consolidating others to promote the economic performance of cooperatives (Hedlund 1992; Kobia 2011). To reduce distances travelled by farmers to deliver coffee berries as well as ease processing of the berries, primary cooperatives had multiple factories as needed. Management of a coffee cooperative society was the mandate of an elected committee with representatives drawn from the coffee factories. Worth noting is that the details of the administrative structure,



including election procedures, committee work, and eligibility for the committee, were prescribed by the state (Hedlund 1992).

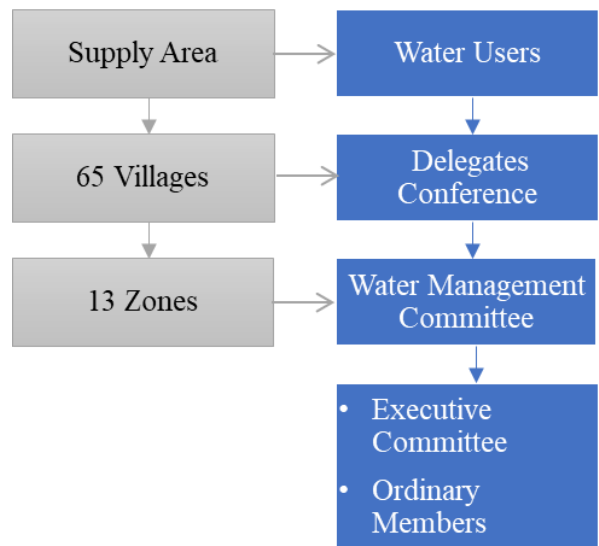
By way of example, the Kibirigwi coffee society had five factories (Hedlund 1992). Members of each factory within Kibirigwi coffee society elected two committee members except for the smallest factory which elected one member for a total of nine board members. The nine board members would then appoint office bearers among themselves (i.e., the chairman, vice-chairman, treasurer, and secretary), and the remainder five members would serve as ordinary board members (see Figure 9). The office bearers were seen to represent the interests of the cooperative society while ordinary members represented the interests of their specific factory. Hedlund (1992, 73) notes that “it would be unthinkable, for example, for an ordinary committee member to go to another factory area or somewhere outside the cooperative’s domain and make a statement as a Kibirigwi representative”. The board members were elected for one year, and the chairman could only hold the position for three years after which they had to resign; all members could be re-elected after their term. The board would not receive an actual salary but the cooperative compensated board members for transport costs and paid an allowance for board meetings. Ordinary committee members could, however, perform official visits within their factory area to provide advice to farmers – the visits were not compensated financially but considered a natural part of the committee member’s leadership.



**Figure 9: Parallels between structure of committee elections at the coffee societies vs water schemes**

Similarly, the water schemes are divided into zones and each zone elects a representative to the water management committee (WMC) (see Figure 9). Except for Ngandori Nginda, the elected WMC members elect the office bearers from among themselves (i.e., the chairman, treasurer, and secretary). The office bearers are often referred to as the Executive committee. Elections are held every three years, and WMC members have the possibility for re-election.

Ngandori Nginda covers a significantly larger supply area, and it is divided into 65 villages, with the villages further grouped into 13 zones of five villages each. Each village elects a delegate for a total of 65 delegates. The 65 delegates form members of the apex decision making body of the General Meetings (i.e., Delegates Conference). Further, each zone elects a delegate from its five members to the



**Figure 10: Structure of committee elections at Ngandori Nginda**

WMC. Delegates and WMC members are elected for a term of three years. Ngandori Nginda is unique in that it retires a third of its WMC (and by extension their appointing delegates) annually on a rotational basis. Consequently, there are elections happening every year at the scheme for a third of the villages. Delegates can be re-elected but with a mandatory retirement age of 70 years for any delegates aspiring to be elected to the WMC. In mentioning the elections approach at Ngandori Nginda's to the IDI with the Catholic Diocese of Meru as part of a conversation on how to improve community management of rural water schemes, the IDI observed that the approach reflects the practice at the coffee cooperative unions whose membership comprises the primary coffee cooperative societies.

The executive committee at the water schemes is mandated with a more active role in providing oversight in the management of the water scheme. Board members across the schemes are not paid a salary but are reimbursed for any costs incurred towards the water scheme operations, and they are paid an allowance for meetings. Committee members are, however, expected to be 'the local eyes' within their zones, for instance reporting any leakages, pipe bursts, or admonishing members that misuse water, a role that they are not reimbursed for.

Beyond similarities in structure, the composition of water scheme WMCs reflects qualifications criteria of the coffee cooperative societies. For instance, the Ministry of Cooperative Development gave a public directive in 1982 barring election of politicians from cooperative society boards. All the water schemes reported a similar practice – not only are politicians not allowed to run for WMC positions, but any member of the WMC who wishes to run for a political seat must resign prior to launching their campaign. Interestingly, Hedlund (1992) draws an anthropological distinction between a 'leader' - *mutongoria*, and a 'political leader' – *muthamaki*, where he notes that there is little in common between the two types of leaders in the

Kikuyu culture. A *mutongoria* is a prominent personality in local institutions who is “expected to exhibit a greater sense of community responsibility and to behave in a different way from a politician”. Politics and politicians, in contrast, are often associated with “personal gain, boasting flamboyant speeches, and empty promises” (Hedlund 1992; 66). Within this understanding, Hedlund (1992; 122) observes that the positions of office bearers (especially the chairman and the treasurer) were reserved for strong personalities perceived by the community as ‘*mutongoria*’. Seeing that the founding chairmen of three of the five schemes evaluated under this section were chairmen of their area cooperative society / union, and one served as General Manager of the district cooperative union, the community’s approach to electing cooperatives committee members arguably carried on to the WMCs.

Hedlund (1992) observes that with this structuring came various institutional conflicts, especially between the larger WMC and the office bearers. In recognition of this observation, I contend that community familiarity with the structuring of member control of coffee societies (through elections) made it possible to easily adopt the structure to the water schemes. Coffee production was the most important basis of the local economy at the time thus a large majority of community members were dependent on the coffee business and familiar with its operations. However, the ability of individual water schemes to navigate through the institutional conflicts that arose from the adapted structure differentiates their performance as explored in Chapter 6.

### *c) Scheme operations*

The set-up of scheme operations also borrowed from the coffee cooperatives. This is seen, first, in the employment of staff mandated with scheme operations and operating from a permanent office. This is in contrast with the voluntary community management model which does not

generally provide for hiring of staff and committee members are expected to perform tasks like collecting water revenues (e.g., in the example community management of Gatua-Karimba).

The operations of coffee cooperatives can be characterized into society level activities and factory level activities, a structure that was introduced by the Ministry of Cooperative Development in the 1970s (Hedlund 1992; 73). The cooperative society would be headed by a Secretary Manager who was hired and paid by the cooperative union. The secretary manager together with his/her staff formed the central administration whose responsibility was to keep the members' register and accounts and maintain records of all members' transactions. The coffee factories also had their specific employees including a factory manager, an assistant, a mechanic, laborers, and watchmen, and were expected to maintain their separate books and finances to monitor their factory's profitability. Except for the secretary manager, all cooperative society staff were paid by the society.

The role of the secretary managers at the coffee cooperatives mirrors that of the project/general managers at the water scheme – they provide general oversight of day-to-day operations, including management of employed staff. In this structure, the role of operations by employed staff is separated from that of oversight by an elected committee. Because of the experience of the founding chairmen with the coffee cooperatives, it can be argued that this separation was apparent to the chairmen hence their engagement of a hired staff from the onset of the water projects. Whether they understood the conceptualization of separation of roles and were deliberate about it is a different question. A striking observation, however, is that these founding chairmen and their committee members did not perform operational duties at the water schemes. Instead, the current project managers at the five schemes (Murugi Mugumango, Muthambi 4K, Ngandori Nginda, Kamwene, and Mwonge Range) were all among the very first hires when the

schemes started operations. In Ngandori Nginda, which came under community management in 2003, the manager served as the scheme's first project manager in 2004-5 when he left but returned in the same capacity in 2018. In Muthambi 4K and Kamwene, the current project managers were the schemes' first employees. The Muthambi 4K chairman noted that once the scheme started to register members, he observed the need for a permanent employee to maintain member records and accounts. The current manager was employed as a general clerk and the chairman organized for his training in bookkeeping. A plumber was hired soon after the general clerk with additional staff hired over time as scheme operations expanded.

The second observation is seen in members' recognition of the need for a paid-for staff and their willingness to contribute towards their remuneration. As earlier noted, the staff at the coffee cooperatives were paid by the cooperatives, where an O&M contribution was drawn directly from individual coffee payments before remittance of revenues to farmers. Unlike coffee cooperatives that were income generating, members at the water schemes had to agree to monthly payments for their water services and the money was to be used towards scheme operations. All five societies reported having a water tariff that was adopted at a general meeting of members. The IDI at Ngandori Nginda noted that low enforcement of revenue collection by the NWCPC led to very poor payment for water services by the time the scheme transitioned to community management in 2004. A key message by the chairman to the community in attempt to change behavior was that, paraphrased, "if you want free water, you go collect it from the river; if you want tapped water, you have to pay the person that ensures water is flowing".

The third observation is seen in appropriation of operational procedures such as records, bookkeeping, and auditing. These were standard practices at the coffee cooperative societies, and they were adopted by Murugi Mugumango, Muthambi 4K, and Ngandori Nginda right from the



*d) Exogenous factors and water scheme management*

While the influence of the institutional arrangements applied in coffee cooperative societies on water schemes is apparent, it would be remiss to not acknowledge factors beyond the community on their ability to adopt professional management of their schemes.

First is that, while the schemes' institutional structures reflect those of the coffee cooperatives, funding entities (either government or donor) at Muthambi 4K, Murugi Mugumango, and Kamwene also influenced operational procedures. A great example for this was provided by the Chairman at Muthambi 4K who noted that while his academic training in cooperatives and experience with the coffee unions helped him set the correct operational procedures, it is training provided by SIDA and the Catholic Diocese of Meru that taught him how to run a water scheme and apply his knowledge. In Murugi Mugumango, part of the Canadian Hunger Foundation (CHF) support went towards designing and installing an accounting and financial control system as well as a water system maintenance program. Because of this support, for example, the scheme has been audited since 1985 while AGM minutes today reflect the structure of minutes from the founding years. In Kamwene, funding from the Water Sector Trust Fund in 2013 required that the project hires a manager and sets up an office; similar office requirements were associated with the CHF grant to Murugi Mugumango.

The second factor is prevailing education levels in the country and the availability of skilled workforce to provide professional and competent services at an affordable rate to the water schemes. As earlier mentioned, the project manager at Muthambi 4K was hired as a general clerk in 1994 and received on-the-job training in bookkeeping. He would later receive multiple other trainings through the Catholic Diocese of Meru on operations and maintenance of a water scheme. In a similar manner, the project manager in Murugi Mugumango was hired to the



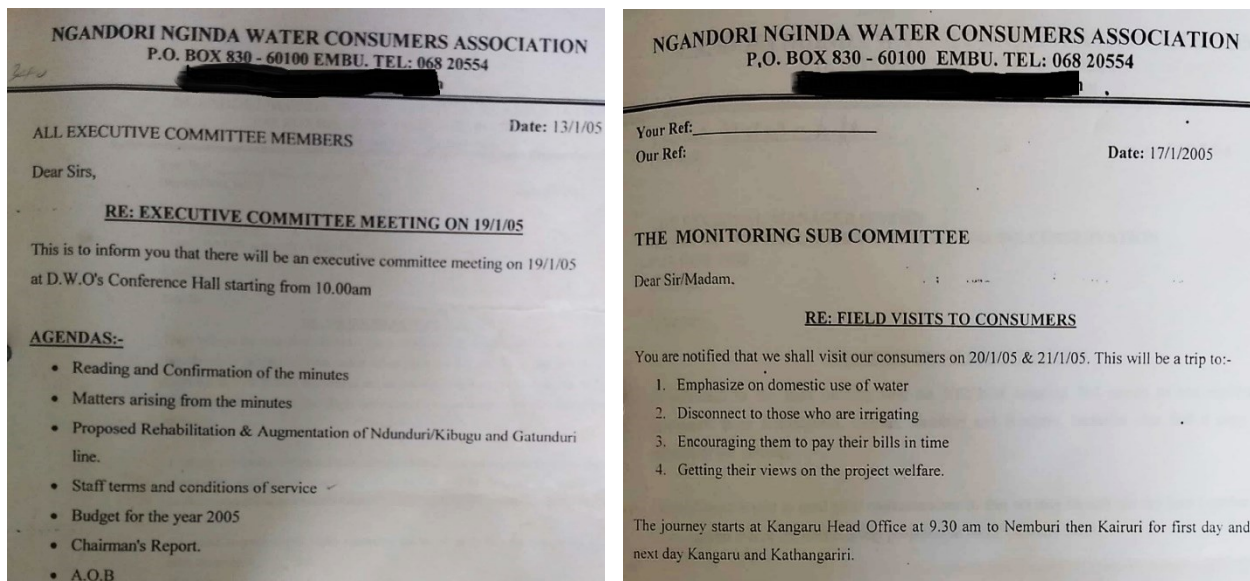
scheme in 1984 and received on-the-job training from the CHF project implementing agencies (Technoserve Inc., and Research and Planning Services Ltd.) on accounting and financial control systems as well as water systems maintenance. In contrast, Kamwene, Mwonge Range and Ngandori Nginda became operational under community management in the 2000s, a time when education was much more accessible in Kenya. The three schemes hired trained and qualified personnel for both administrative and technical functions from the onset who helped establish professional management of operations.

Third is the role of external actors (government or donor) in organizing communities towards management of their schemes. Gatua-Karimba and Ngagaka stand out from the other five schemes in that community management under these schemes was externally orchestrated. In the case of Ngagaka, an external consultant under the Water Use Test Project designed the scheme's management structure in 1991. Part of this exercise included calling to life 78 dormant neighborhood groups that had been formed towards extension of water supplies; restructuring the groups into 58 groups and registering them as individual self-help groups; and facilitating formation of the Ngagaka Water Users Association, a society that federated all the self-help groups and oversaw operations. In Gatua-Karimba, the scheme was under the management of the District Water Office until enactment of the Water Act 2002 which provided that rural water schemes be transitioned to community management. With this transition, the DWO facilitated registration of a self-help group comprised of consumers from the water scheme supply area, and the group took over management. Gatua-Karimba and Ngagaka are important contrasts in making the case for appropriation of institutional structures from the coffee cooperatives societies to management of the water schemes. Members of the two schemes share socio-economic traits with the five schemes previously discussed – Gatua-Karimba serves the same

administrative locations as Kamwene, with some consumers connected to both water schemes; Ngagaka, originally referred to as Ngandori B, was constructed as part of a larger government intervention that included Ngandori Nginda. Why then did Gatua-Karimba and Ngagaka not appropriate the institutional structures in coffee cooperatives to their operations? I contend that with the schemes' organization externally influenced within pre-defined timelines, their respective communities neither had the advantage of a 'natural evolution' in appropriating structures from the coffee cooperative to their operations nor the choice of a leader (*'mutongoria'*) well versed with the cooperative structure to steer the process. This contention is based on i) the failure of the society at Ngagaka, which is discussed in detail in Chapter 6, and ii) the contrasting experiences of Ngandori Nginda and Gatua-Karimba, which is expounded on below.

Ngandori Nginda and Gatua-Karimba transitioned to community management in 2004 following enactment of Water Act 2002. The two schemes had significant technical challenges and unreliable water services at the time. Gatua-Karimba, which is overseen by a voluntary water management committee carrying out O&M activities, continues to be plagued by these challenges. Ngandori Nginda on the other hand registered as a society from the onset and, evidently, borrowed operational practices from the Embu District Cooperative Union. This was realized under the guidance of the founding chairman, who was a major cooperator and had served with the Embu District Cooperative Union. In 2021, the scheme was fully functional with about 13,000 paying consumers despite being described as "almost dead by 2004" by one of the IDIs while another noted that parts of the scheme had not received any water for over 20 years. One of the revenue clerks who joined the scheme in 2004 noted that there were only about 375 paying water users in 2004. Scheme records indicate that activities of both the management

committee and a hired staff were critical to reviving the scheme. The committee concerned itself with high level governance issues such as planning for the rehabilitation of infrastructure, staff terms and conditions of service, and payment for water services as demonstrated in Figure 12. Additionally, the committee had hired about 17 employees by the end of 2004 among them being a project manager, revenue clerks, plumbers, and a finance manager who were mandated with day-to-day operations.



**Figure 12: Example of invites to committee meetings at Ngandori Nginda**

The appointment of Eng. E.N. Mugeru as Ngandori Nginda's General Manager in 2005 was especially beneficial. Eng. Mugeru had retired from civil service in 2003 after years of service as a District Water Engineer. Having been trained as a water engineer in newly independent Kenya, he was well versed with all aspects of water services provision including engineering, operations, and management. He was therefore very instrumental in the mapping and rehabilitation of dry lines within the scheme, redesign and augmentation of various aspects of the water supply network and enforcing operational procedures at the scheme. He also established a relationship with Eslon Plastics, a private sector player, which allowed the scheme to access pipes on credit

for the rehabilitation and augmentation of the infrastructure. Asked why he considered his efforts to have been successful, he noted, “if I used to be in-charge of multiple schemes within a district, what was a small scheme like Ngandori-Nginda?”.

## **5.4 Chapter summary**

This chapter started by giving an overview of Societies under the Kenyan law before posing the question – ‘why were societies perceived to provide a route to effective management and adopted across the schemes?’ Over the course of the chapter, three key observations are made.

First is that communities within target scheme areas were familiar with the concept of societies from membership in coffee cooperative societies. With this membership came two key things. First was the buildup of social capital among community members due to shared experiences from growing and selling coffee, the region’s main economic activity. Second was familiarity with institutional and administrative structures introduced through various government issued rules and regulations on how to run the coffee cooperative societies. Familiarity with these rules and regulations provided an institutional template for adoption in managing the water schemes.

Second is that communities in four of the five water societies elected persons leading coffee cooperatives / unions as founding chairmen of their water schemes. Unsurprisingly, the institutional and operations structures in the water schemes borrowed heavily from the coffee cooperatives societies under the guidance of these founding chairmen. One such area of appropriation was the separation of oversight provided by an elected committee and day-to-day operational functions by an employed staff.

Third is the significance of external factors in the success of the water societies. For the older schemes, (i.e., Murugi Mugumango and Muthambi 4K), donor support (i.e., CHF and Catholic Diocese of Meru respectively) is seen as critical towards providing extended training to

employed staff on day-to-day operations in order to realize professional management of the water schemes. The newer schemes (Mwonge Range, Ngandori Nginda and Kamwene) on the other hand employed trained and qualified personnel from the onset of operations to establish professional management of the schemes.

To the chapter's question then, societies provided a legal entity that allowed communities to run their operations in a professional manner, one comparable to their experiences with the coffee cooperatives. The ability to borrow from this institutional template was critical to the success of these schemes given the institutional ambiguity of rural water management in Kenya at the time which left rural water supplies without formal guidance on how to operate professional organizations.

# **Chapter 6. Incentives and accountability frameworks within community managed schemes**

## **6.1 Introduction**

As previously discussed, an institutional state of limbo resulting from the global focus on community management and a hesitancy for policy reform in the 1990s within Kenya's Ministry of Water Development left a gap in management of rural water supplies in Kenya. In the same breath, community management became the de facto institutional set-up for rural water supplies given the country's high reliance on donor funding to extend water services. Chapter 5 argues that five schemes studied under this research appropriated institutional structures from coffee cooperative societies towards professional management of their schemes. This chapter contends that this appropriation led to an organizational arrangement distinct from voluntary community management of rural water supplies as often applied in rural Sub-Saharan Africa. However, the effectiveness of this arrangement varies across the schemes yielding differentiated performance.

To make this case, the 2004 World Development Report (WDR) (World Bank 2003) presents a useful framework for analyzing relationships between the various actors at the water schemes.

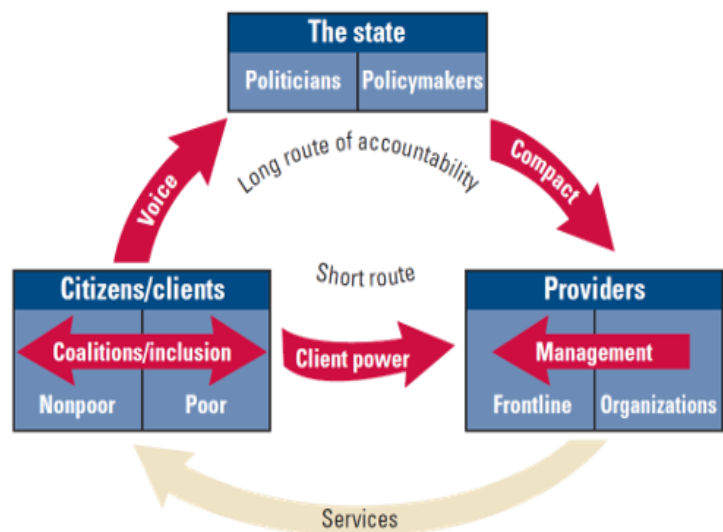
The report, which is titled ‘*Making Services Work for Poor People*’, argues for the need to “strengthen accountability in three key relationships in the service delivery chain: between poor people and providers, between poor people and policy makers, and between policy makers and providers”.

Figure 13 presents this framework. To make its case, the 2004 WDR observes that for services such as health, education, water, and sanitation, society has decided that these shall be provided through the government taking responsibility rather than through market

transactions. Further, it poses that while this approach is informed by various good reasons, it has an unfortunate consequence where there is no direct accountability of the provider to the client –

i.e., the short route of accountability in

Figure 13. Instead, a long route of accountability must evolve where the clients (also seen as citizens) must influence policy makers (who include politicians and represent the State) who in turn influence service providers. When any aspect of this long route of accountability fails, service delivery fails, and this is often the case for poor people.



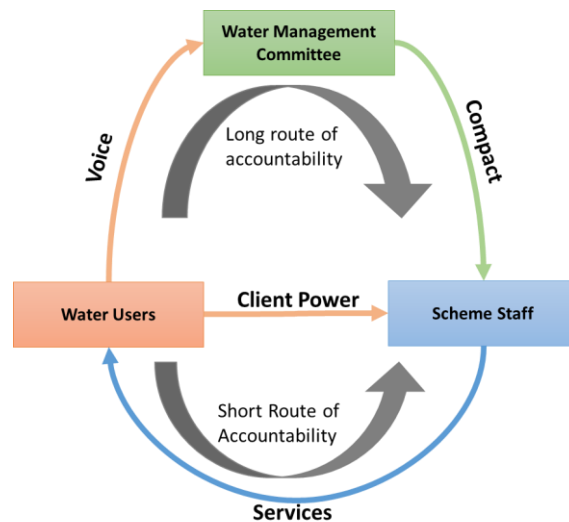
**Figure 13: Key relationships of power in service delivery (Source: 2004 WDR)**

From a broader perspective, failures in the long route of accountability contributed to the state of rural water supply in Kenya. This is seen in the lack of clear policies for rural water supply and the consequent state of institutional limbo within the sub-sector. Despite this, some schemes under this study have managed to adopt professional management of their organizations and delivered effective water services. The 2004 WDR framework is localized to the research’s context to understand the frameworks of incentives and accountability within the schemes that have enabled professional management. In this localization, demonstrated in Figure 14, three main actors are identified: the water users as the clients; the water management committee who are elected to their positions and are responsible

for governance of the water scheme; and the scheme staff as the service providers. By applying this framework in the sections that follow, the analysis points to the need for the co-existence of an effective long route and short route of accountability within community managed rural water supplies for effective organizational arrangements – and consequently

water service delivery – to evolve.

This chapter starts out by using the example of Gatua-Karimba to demonstrate how incentives and accountability frameworks played out in its adoption of the voluntary community management approach. This is followed by an evaluation of the general structure of the relationship between actors at the five schemes that appropriated institutional structures from coffee cooperatives while drawing out the incentives and accountability structures. The



**Figure 14: Key relationships of power within case studies**



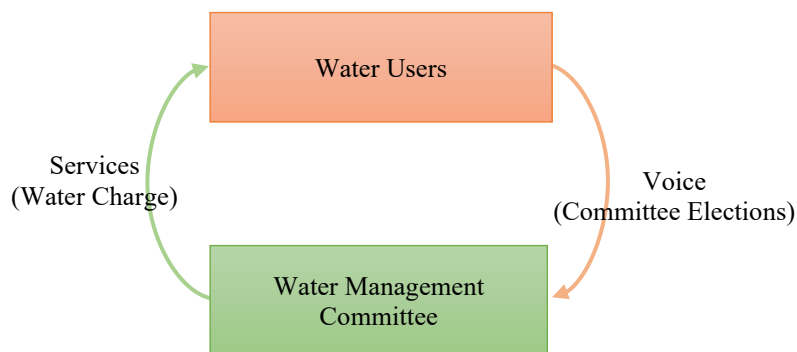
experience of the five societies is then contrasted with that of Ngagaka under community management to demonstrate the need to ensure that the incentives and accountability frameworks are adequately aligned. Finally, an evaluation of how these incentives and accountability frameworks play out at the specific schemes is performed to explain differentiated organizational effectiveness.

## **6.2 Accountability structures as Gatua-Karimba Water Project**

Among the cases selected for this research, Gatua-Karimba provides a critical example in making the case that community management as practiced at the selected case studies presents a distinct organizational arrangement from that of voluntary community management – it does not fit the mold. Instead, it reflects the conceptualization of community management characterized by significant levels of volunteerism as discussed in Chapter 2. As a recap, voluntary community management of water supplies often plays out in intended water users organizing themselves into a group and electing a water committee. The role of the committee is usually related to the management, administration, operation, maintenance, revenue collection, and repair of the water scheme. Further, the committee is often expected to operate on a mostly voluntary basis, though allowances may be paid for meetings.

Gatua-Karimba was among government constructed projects under the Rural Water Supply Programme of the 1970s-80s. It remained under the management of the District Water Office until 2002 when it was transitioned to community management following the Water Act 2002. At this time, the community organized into and registered a self-help group with the goal of water supply in line with reforms under the new Water Act. Part of the registration process involved electing a water management committee which was mandated with overseeing day-to-day operations on a mostly voluntary basis. Consistent with the application of voluntary

community management of rural water supplies as often observed within rural Sub-Saharan Africa, the scheme does not have an employed staff mandated with O&M, with this role assumed by the management committee. The committee, however, engages a plumber who is trained through apprenticeship on a casual basis in case of repairs. The accountability framework thus involves interactions between the water management committee and the water users. The committee is elected by, and thus accountable to, the water users. Water users on the other hand pay a water charge, and these revenues are expected to cover the committee's meeting allowances along with costs towards O&M. Ideally, if consumers are paying the water charge, poor water services would lead to a replacement of the committee during elections as represented by the short route to accountability under the 2004 WDR framework. Consumers could, however, choose not to pay for water services for a variety of reasons.



**Figure 15: Actor relationships within Gatua-Karimba**

The scheme faces challenges with payment for water services. Unfortunately for Gatua-Karimba, the community inherited a scheme that had technical challenges, and these have not been addressed over the years. Water supply is therefore unreliable which has negative consequences on revenue collection. The chairman noted that people only pay their monthly charge when the scheme has consistently had water. A vicious cycle has thus developed where the committee lacks sufficient funds for repairs, and payment for water services is poor due to inconsistent

supply. Even then, accountability mechanisms for any revenues collected are very weak if any. While revenues are collected (albeit intermittently), it was unclear how much is collected and what it is used towards. Registration as a self-help group, as is the case in Gatua-Karimba, has expectations such as opening a bank account and maintaining financial records. However, these are not statutory requirements and enforcement is often weak. Gatua-Karimba's bank account was dormant when the current chairman was elected in 2020, and he indicated that he was still in the process of reactivating it at the time of data collection (October 2021).

A more interesting take-away from this weakness in accountability, however, is a flaw in the incentives structure arising from the expectation of the water committee to operate on a mostly voluntary basis though they have a significant workload expectation. The chairman noted that because the scheme is in a poor financial state, he has been limiting the number of full committee meetings held – with thirteen members, a full seating incurs KES 6,500 per meeting. He, however, has more frequent meetings with the executive committee (vice chairman, secretary, and treasurer), a group he described as more understanding and paraphrased, “will agree to meet even when there is no allowance to be paid because they know the financial state of the project”. Regarding his own contribution, he noted that being chairman is a “a lot of work” which he views as “service to his community”. In this description is a clear misalignment of incentives for the committee to serve the interests of the water users. Unfortunately, this misalignment of incentives within the voluntary approach to community management of rural water schemes is not unique to Gatua-Karimba. Its origins may be attributed to a cultural idealization of the sense of cooperation among rural communities in managing water schemes highlighted in Chapter 2. With respect to committee elections, the responsibility for organizing elections at Gatua-Karimba lies with the water committee itself. This effectively shifts the power dynamics from the water

users to the committee, and consequently weakens users' voice. In Gatua-Karimba, the previous committee had not organized elections for many years forcing community members to eventually petition the local administrative office and the office of social development to be able to elect a new committee. This experience demonstrates how the expected accountability of water management committees to the water users fails to play out in situations where external oversight for self-help groups is weak/absent as is the case with Kenya, where institutional frameworks for rural water management remain ambiguous yet most rural water supply is organized as self-help projects.

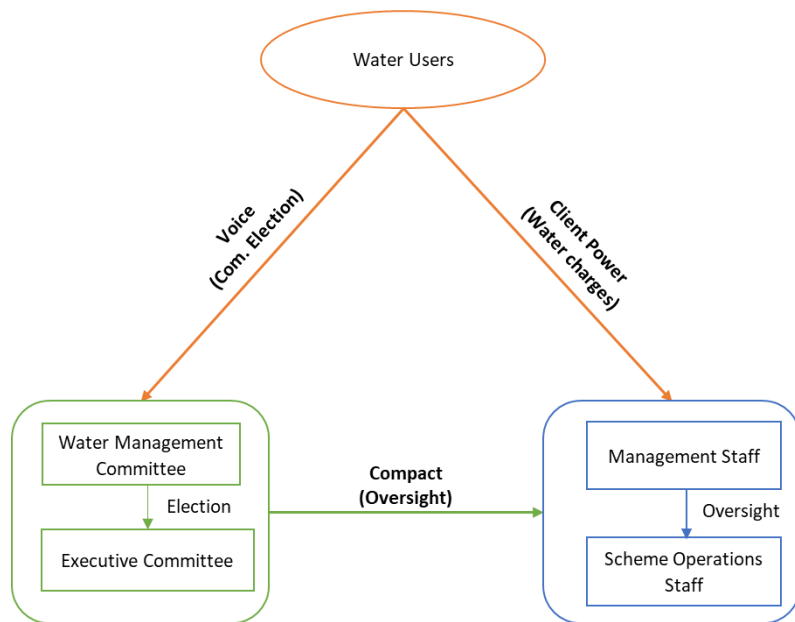
The example of Gatua-Karimba is also not to say that community management characterized by high levels of volunteerism does not work at all. Islands of success exist as acknowledged by Hutchings et al. (2015); Mesa et al. (2014); Mekala et al., (n.d.). Even then, research by Hutchings (2016) drawing on successes from India makes a strong case for the need for external support to ensure success. In an argument for coproduction between the state and citizens in rural water supply, Hutchings (2016) observes that water committees in rural India are nested within the broader system of local self-government (the Panchayat Raj system of local self-government which promotes self-rule within Indian villages; Gram Panchayats form the lowest level of government in rural India). Under this system, statutory responsibility is given to the Gram Panchayats for delivering public services, a mandate they deliver through formation of sector-specific sub-committees. For rural water services, a Village Water and Sanitation Committees (VWSCs) is established to assist and advise the Gram Panchayat, often on a voluntary basis, on the provision of water services. This role is institutionalized in the organizational arrangements proposed by the National Rural Drinking Water Programme (NRDWP) in India. The NRDWP guidelines mandate VWSC with providing water services in rural areas but the committee should

be a registered sub-committee of the local self-government institution of the Gram Panchayat. The committees thus operate within a broader institutional framework with specific oversight mechanisms effectively blurring the lines between public and community management.

### **6.3 Accountability frameworks at the water societies**

The example of Gatua-Karimba provides a backdrop from which to appreciate appropriation of the coffee cooperatives' institutional structure to water management at the five schemes that are registered as societies (i.e., Murugi Mugumango, Muthambi 4K, Mwonge Range, Ngandori-Nginda and Kamwene), and the consequent development of a more nuanced chain of relationships among the various actors at these schemes. This evolution occurs within a broader institutional framework that provides neither direct guidance nor oversight to the operations of community managed rural water schemes as highlighted in Chapter 2.

Figure 16 is a generalized schematic of the accountability relationships at these five schemes viewed under the framework from the 2004 WDR. Unlike in Gatua-Karimba where the water management committee is mandated with the full responsibility of day-to-day O&M, the water management committee at these five cases is mandated with oversight and governance at the scheme while an employed staff performs day-to-day O&M functions. This arrangement leads to a clear accountability framework.



**Figure 16: Generalized actor relationships at water societies**

The management and scheme operations staff are responsible for day-to-day O&M functions at the schemes to ensure water supply services. The incentive for their performance is salaries, which are paid for from revenue collection – i.e., poor water services results in poor revenue collection thus inadequate funds for salaries; the inverse is true. The scheme operational staff is hired by and answerable to the management staff. The management staff is hired by and answerable to the water management committee. This speaks to the short route of accountability under the 2004 WDR framework where there is a direct link in accountability between staff as the service providers and water consumers.

To enable staff operations, the schemes have hired trained and qualified personnel towards their operations as seen in Chapter 5. All five schemes have a project manager mandated with the overall administration. Where the project manager does not have a technical background, a technical manager (Muthambi 4K, Ngandori Nginda) or a field supervisor (Kamwene, Mwonge Range) is employed to oversee the works of plumbers and meter readers as applicable among other technical issues. The schemes have also employed personnel trained in accounting serving

as commercial manager (Murugi Mugumango), internal auditor (Ngandori Nginda), accounting officers, revenue clerks and billing clerks depending on the level of training and size of the scheme. All the schemes have digitized their accounting systems through use of software such as Quickbooks. Further, all schemes but Kamwene reported implementing or piloting a billing software (the software allow SMS billing among other functionalities). Finally, all schemes have adopted mobile money payments for water services, and they all indicated hopes of transitioning to a cashless system in future.

The water management committee (WMC) provides operational oversight to the staff and leads the planning and budgeting for activities at the water schemes. Except for Ngandori Nginda, the WMC is elected by water users at a General Meeting. In Ngandori Nginda, the WMC is elected at a general meeting of delegates, where delegates are elected by water users. WMC members are expected to represent the interests of water users in their respective zones in the operation of the water scheme. This is achieved through oversight of the scheme staff through periodic meetings for the purposes of planning, budgeting, and reporting. The WMC is also responsible for hiring and firing of staff as well as monitoring their performance. Beyond the prestige that comes with election into the committee, committee members are paid an allowance for meetings. Re-election to the water WMC, if desired, hinges on the quality of water services within a member's representation area (i.e., their zone).

The WMC elects an executive committee that provides more active oversight to the management staff. This committee included a chairman, treasurer, and secretary across all five schemes, and depending on the size of the water scheme, a vice chairman and a vice secretary was also elected for a maximum of five members. The level of engagement of this executive committee varied across the schemes. Some executive committees provided significant autonomy to the

management staff and only held monthly reporting meetings. On the opposite end of the spectrum were chairmen who were very involved in the day-to-day operations of the scheme. Like the WMC, executive committee members are paid an allowance for their more involved engagement with the scheme. Additionally, re-election to the executive committee is dependent on perception of performance by the larger water committee. Combined, the ability of water users to elect representatives to the WMC and the oversight role of the WMC to the scheme staff represent the long route of accountability in reference to the 2004 WDR framework.

Recognizing the institutional ambiguity of rural water management in Kenya over the years, the five schemes have managed effective (though to varied success) management of their water supplies by adopting the described organizational arrangement with little to no external oversight. Evidently, the arrangement demonstrates the co-existence of both the short and long routes of accountability per the 2004 WDR accountability framework. Among the strengths of this organizational structure is the simplicity and straightforwardness of the incentives and accountability frameworks. Ngagaka's experience under community management provides a contrast towards this point.

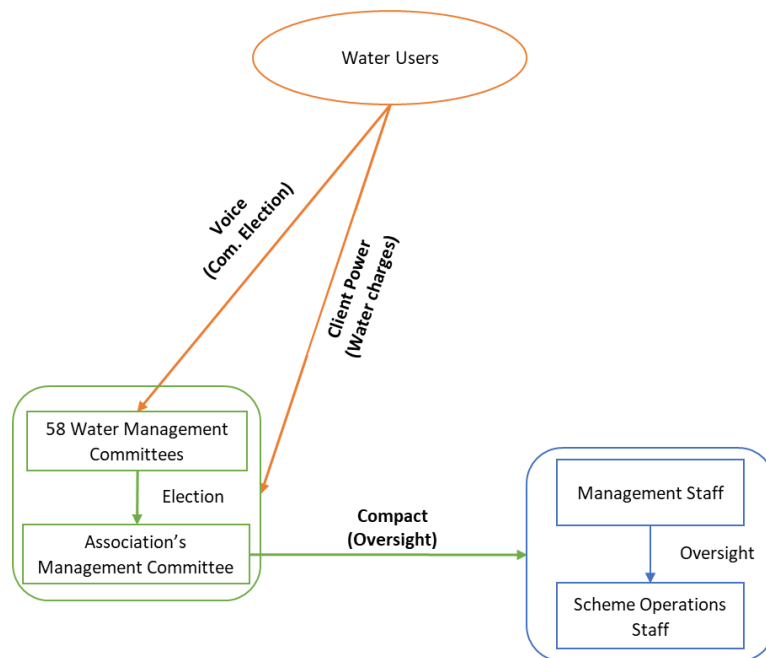
## **6.4 Accountability frameworks at Ngagaka Water while under community management**

Ngagaka Water transitioned to community management in 1991 following the Water Use Test Project (1987-1991). It remained under community management until 2011 when it was registered as a public limited liability company following government concerns over mismanagement. While all the incentives and accountability structures at the five societies were present in Ngagaka under its community management phase, its structuring was convoluted and



more accurately resembled the long route of accountability under the 2004 WDR framework.

Figure 17 shows the various relationships between actors at Ngagaka.



**Figure 17: Organizational structure in Ngagaka Water (under community management)**

Ngagaka's organizational structure was designed by a consultant under the Water Use Test Project, and it had various moving parts. Key among these as documented in the Organizational Structure and Set-up are (Business and Economics Research Company 1992):

- Water users were organized into 58 neighborhood groups; each was registered as a self-help group and elected its water management committee consisting of at least a chairman, treasurer, and secretary.
- A Water Association was formed as a federation of the 58 neighborhood groups and registered as a society. Among other things, the Association was responsible for operation and maintenance of the main water distribution network, correspondence with government entities, and technical support to the neighborhood groups. Provisions were made for the

Association to hire staff led by an Inspector General, and including technicians, plumbers, and revenue clerks.

- Neighborhood water management committees were group along the 11 administrative sub-locations within the supply area, and each grouping elected one of their own as a representative to the Association's management committee, for a total of 11 elected Association committee members.
- The neighborhood water management committees retained the responsibility of billing, revenue collection and receipting. They were also expected to patrol secondary water distribution networks within their specific service areas and report any major challenges to the Association. These committees were not expected to hire staff and their services were to be provided on a voluntary basis. The community was, however, expected to meet minor costs incurred towards repairs as well as committee allowances through collected revenues. The balance of revenues was expected to be remitted to the Association to cater for the costs of running the association, including salaries for hired staff.

This structure yielded multiple breakpoints in incentives and accountability frameworks between the water users, the neighborhood water management committees, the Association's committee, and the Association's staff. The most obvious and consequential one is that water revenues were collected by the neighborhood committees yet the entity responsible for overall operation and maintenance was the Association. Arguably then, there was a misalignment in the incentive for the committees to remit revenues to the Association as they could easily blame the Association for poor services. It was unclear from the research if the Association had any enforcement mechanisms for the remittance of revenues by neighborhood committees. Whichever the case,

one of the major challenges identified by the time the scheme transitioned to management as a company in 2011 was parallel receipting – neighborhood committees would collect water revenues and issue receipts, but some committees had multiple receipt books so that those remitted to the Association for accounting purposes did not always reflect the true picture of revenue collection.

The second breakpoint, and a critical distinction between Ngagaka and the five water societies represented under Figure 16, is that there is no direct path of accountability between the scheme staff and the water consumers. Instead, the neighborhood committees serve an intermediary role – staff salaries are hinged on the committees’ diligence in collecting revenues and remitting these to the Association; reliable water supply to consumers depended on the effectiveness of the committees. Consequently, there was a risk of capture of neighborhood supply areas by the water committees. The IDI at Ngagaka observed that by the time the scheme transitioned to a water company in 2011, some neighborhood committees had significant control over their supply areas with very little accountability to the Association.

The disconnect in the flow of revenues from water users to the Association led to a break in the compact between the Association’s management committee and the employed staff. By 2011, the Association had a debt of about KES 9 million in statutory and salary arrears - the IDI at Ngagaka noted that the scheme owed about 9 months in salary arrears to its staff. Concerns over financial management at the scheme were raised following the scheme’s failure to meet its statutory obligations introduced by licensing of water service providers under Water Act 2002. Being a government funded initiative, the scheme’s assets were held by Tana Water Services Board and the Board facilitated the scheme’s registration as a company (this is discussed in more detail in Chapter 7). The various community water management committees were disbanded,

and the water scheme put under a board of directors. Officials from various government institutions were seconded to the scheme to take over management of day-to-day operations including the current general manager who was seconded from the Ministry of Water, the commercial manager seconded from Tana Water Services Board, and the Technical Manager seconded from Embu Water and Sanitation company. The scheme staff were, however, retained to preserve the scheme's institutional memory. This restructuring resulted in improved operational performance at the scheme leading to restoration of water supply services from a supply area of an estimated 30 sq. kms to over 120 sq. kms.

Contrasting the experience at Ngagaka while under community management with that of the five societies discussed earlier, it may be argued that the co-existence of both routes of accountability at the five water societies resulted in a balance of power between the various actors leading to a better outcome than in Ngagaka.

## **6.5 Effectiveness of community management across the case studies**

Drawing from the example of Ngagaka and Gatua-Karimba, previous sections demonstrated how misalignment of incentives and frameworks for accountability along actor relationships limited the schemes from evolving into effective organizational arrangements. This section takes its departure from the recognition that while the other five schemes (Kamwene, Muthambi 4K, Murugi Mugumango, Mwonge Range and Ngandori Nginda) depicted this desired alignment by appropriating experiences from coffee cooperative societies, they have differentiated organizational effectiveness as summarized in Table 15. In reference to Figure 16, this section identifies 5 key indicators for use as a basis for evaluating how the incentives and frameworks

for accountability play out at the schemes to yield differentiated effectiveness. Gatua-Karimba is included in the discussion for contrast.

**Table 15: Organizational effectiveness among case studies**

Increasing organizational effectiveness							
		Gatua-Karimba	Kamwene	Muthambi 4K	Mwonge Range	Murugi Mugumango	Ngandori Nginda
Indicator	Scoring Definition	Score					
Effectiveness of revenue collection	2 - Monthly billing based on universal metering 1 - Monthly billing based on flat rate / partial metering 0 - Irregular Billing	0	1	2	1	2	2
Accountability of committee and staff to users	2 - Evidence of consistency in transparency / accountability measures 1 - Reported practice / partial evidence of consistency in accountability measures 0 - No evidence or report of any accountability measures	0	1	1	1	2	2
Effectiveness of WMC election by community	1 - Competitive elections held on a pre-determined schedule 0 - Infrequent elections (not as per By-laws)	0	0	0	1	1	1
Effectiveness of EC election by WMC	1 - Competitive elections held on a pre-determined schedule 0 - Infrequent elections (not as per By-laws)	0	0	0	1	1	1
Autonomy of Staff from WMC / EC	2 – WMC / EC is removed from day-to-day operations but has scheduled reporting meetings 1 - WMC / EC is involved in the day-to-day operations of the executive staff 0 - No executive staff and WMC / EC performs O&M duties	0	1	1	2	2	2

It is observed that weaknesses in one indicator does not necessarily translate to immediate failure. Instead, these weaknesses point to a challenge or risk that threatens the overall

sustainability of the scheme in the long run. For example, ineffective systems for electing water management committees and the executive committee coupled limited autonomy of the scheme staff from the committees poses at least two risks to a scheme. First is the risk of ‘scheme capture’ by the committee due to weakened accountability structures to water users, which could lead varied challenges such as financial mismanagement. Second is a risk of developing management and O&M systems around individuals (e.g., a very powerful chairman) so that the scheme’s sustainability is threatened in their absence. The sections that follow provide a discussion on the impact of each indicator on the schemes’ operations.

### ***6.5.1 Effectiveness of revenue collection***

Availability of funds for operations and maintenance of water supply schemes is critical to scheme operations and sustainability. For community managed schemes in Kenya, setting the right water charge/tariff and effective revenue collection are critical as these often do not receive any government subsidies or external financial support towards O&M - support may be received for major capital investments or maintenance needs, but rarely for day-to-day O&M.

All schemes evaluated in this research have a monthly water tariff of KES 200 – 300 (about US\$ 2-3) charged as either a flat rate for unmetered connections, or as the first band of a graduated tariff for metered connections (See

Table 16). In this way, the water schemes are guaranteed a minimum revenue collection, at least on paper, based on their number of active water connections, i.e., a scheme with 2,000 active connections at KES 200 has a predictable minimum income of KES 400,000 per month. This, however, depends on water user’s willingness and ability to pay for water, the scheme’s structures for revenue collection and the enforcement mechanisms for non-payment.

**Table 16: Summary of Water Tariff at the Water Schemes**

Scheme	Metering	Individuals		Institutions	
		Volume	Cost	Volume	Cost
Murugi Mugumango	Metered (100%)	0-50 m <sup>3</sup>	KES 270	0-50 m <sup>3</sup>	KES 590 (Small) KES 1,120 (Large)
		50 – 100 m <sup>3</sup>	KES 2 / m <sup>3</sup>	>50 m <sup>3</sup>	KES 10/ m <sup>3</sup> (Small) KES 12/ m <sup>3</sup> (Large)
		>100 m <sup>3</sup>	KES 10 / m <sup>3</sup>		
Muthambi 4K	Metered (100%)	0 – 10 m <sup>3</sup>	KES 200	-	KES 12/ m <sup>3</sup>
		>10 m <sup>3</sup>	KES 15 / m <sup>3</sup>		
Ngandori Nginda	Metered (100%)	0-10 m <sup>3</sup>	KES 200	-	KES 20/ m <sup>3</sup>
		10 – 20 m <sup>3</sup>	KES 25/ m <sup>3</sup>		
		20 - 50 m <sup>3</sup>	KES 30/ m <sup>3</sup>		
		50 – 100 m <sup>3</sup>	KES 45/ m <sup>3</sup>		
		100 – 300 m <sup>3</sup>	KES 75/ m <sup>3</sup>		
		>300 m <sup>3</sup>	KES 100/m <sup>3</sup>		
Mwonge Range	Metered (All institutions; ~5% Individuals)	0-10 m <sup>3</sup>	KES 200	0 – 600 m <sup>3</sup>	KES 20/ m <sup>3</sup>
		10 – 20 m <sup>3</sup>	KES 25/ m <sup>3</sup>		
		20 – 50 m <sup>3</sup>	KES 30/ m <sup>3</sup>		
		50 – 100 m <sup>3</sup>	KES 45/ m <sup>3</sup>		
	Unmetered	-	KES 100		
Kamwene	Metered (~45%)	0 – 20 m <sup>3</sup>	KES 200	-	-
		>20 m <sup>3</sup>	KES 12/m <sup>3</sup>		
	Unmetered	-	KES 200		
Gatua-Karimba	Unmetered	-	KES 200	-	-
Ngandori Nginda <sup>31</sup>	Metered (100%)	0-10 m <sup>3</sup>	KES 200	0–600 m <sup>3</sup>	KES 40/ m <sup>3</sup>
		10 – 20 m <sup>3</sup>	KES 50/ m <sup>3</sup>	600–1200 m <sup>3</sup>	KES 80/ m <sup>3</sup>
	Domestic & commercial connections	20 - 50 m <sup>3</sup>	KES 65/ m <sup>3</sup>	>1200 m <sup>3</sup>	KES 120/ m <sup>3</sup>
		50 – 100 m <sup>3</sup>	KES 80/ m <sup>3</sup>		
		100 – 300 m <sup>3</sup>	KES 100/ m <sup>3</sup>		
		>300 m <sup>3</sup>	KES 130/m <sup>3</sup>		

Muthambi 4K, Murugi Mugumango and Ngandori-Nginda depicted the most effective revenue collection structures in line with the Regulator’s (WASREB) guidelines. All consumers within these schemes are metered, and billing is based on monthly meter readings. Table 17 summarizes

<sup>31</sup> Included for information only; The discussions do not include Ngagaka as its now registered as a water company

revenue collection efficiency (i.e., ratio of revenue collected against amount billed) for the four schemes that submit their performance data to WASREB for the past five years. With all the schemes registering efficiencies over 90% for the 2020/21 financial year, revenue collection mechanisms are seen to be generally effective.

**Table 17: Revenue collection efficiency (%)**

<b>Scheme</b>	<b>2016/17</b>	<b>2017/18</b>	<b>2018/19</b>	<b>2019/20</b>	<b>2020/21</b>
Muthambi 4K	89%	-	54%	60%	100%
Murugi Mugumango	116%	100%	100%	92%	116%
Ngandori Nginda	94%	123%	102%	100%	93%
Ngagaka <sup>32</sup>	96%	95%	102%	90%	99%

The IDIs at Murugi-Mugumango and Muthambi 4K noted that metering has been enforced since the beginning of operations following their grant funding in 1984 by CHF and 1994 by SIDA respectively. Further the cost of the meter is borne by the consumer and forms part of the connection fee. In Ngandori-Nginda, the scheme was unmetered at the time of transition from NWPC to community management in 2004. IDIs from the scheme indicated that a metering drive was initiated in 2009; full (99%) metering had been achieved by 2017 according to WASREB annual reports. Metering was at the cost of the scheme, though consumers are charged a monthly meter rent (KES 50). Kamwene and Mwonge Range are partially metered: about 45% of connections are metered at Kamwene; all institutions and about 5% of household connections are metered at Mwonge Range. Connections at Gatua-Karimba are all unmetered. Billing is done on a flat rate for unmetered connections. For all five schemes (Gatua-Karimba being the exception), bills are dispersed on specific dates, there is a set payment window as well as a disconnection window for non-payment. A reconnection fee is charged before restoring supply for any disconnections due to non-payment. Further, all five schemes have employed personnel

<sup>32</sup> Included for information only; The discussions do not include Ngagaka as its now registered as a water company



responsible for meter reading (where relevant), billing, revenue collection and accounting. Worth noting is that all accounting officers had relevant academic training, though the level of training varied with the size of the scheme ranging from a Diploma to a Bachelors degree / Certified Public Accountant–Kenya.

While the five schemes have adopted professional management in their revenue collection, metering stands out as a key differentiating factor in scheme operations. The IDIs in both Kamwene and Mwonge Range indicated that water users are very opposed to metering with the general perception being that metering would restrict their water use. This because metering ensures that water users pay for actual volume consumed and most. Most water users rely on the scheme for subsistence farming and watering their livestock and are therefore concerned that their water bill would increase beyond the flat rate amount. Unfortunately, the IDIs noted that the consequence of unmetered water use is water wastage which forces the schemes to ration water supply. The IDIs in both schemes opined that metering would lead to availability of a lot more water in the system to not only stop water rationing, but also extend supply. This opinion was validated by experiences from Ngandori-Nginda where the former General manager noted that the metering drive between 2009 and 2017 led to significant water savings from users providing more water within the system to enable extension of water services. In Murugi Mugumango, a WSTF funded initiative that assisted the scheme to conduct a mass replacement drive of old meters allowed the scheme to increase hours of supply from an average of 20hrs/day to 24hr supply.

The community hesitance to metering in Mwonge Range and Kamwene is, arguably, evidence of an underlying sense of entitlement to unlimited water services. Evaluation of the IDIs responses to the question ‘why are people opposed to metering’ reveals two key issues. First, the IDI at

Mwonge Range responded that, paraphrased, “the scheme members or their family members carried pipes into the forest and camped there to dig trenches and lay pipes; they therefore feel that they should not be limited in how much water they consume”. These sentiments are reminiscent of the discussion on evaluation and understanding of costs versus benefits of being scheme members as presented in Ostrom’s Design Principles for CPR (Chapter 4). Evidently, contributions of labor towards scheme construction were not limited to Mwonge Range but were also observed in Muthambi 4K and Murugi Mugumango. The distinction is that for Muthambi 4K and Murugi-Mugumango, community trainings were conducted at the onset on the importance of metering which helped avert initial opposition to the practice. For example, NETWAS Kenya was contracted in 1996 by SIDA to conduct a series of trainings with the Muthambi 4K WMC, part of which included the need for metering; the committee thereafter conducted multiple *barazas* (community meetings) hosted by local chiefs and sub-chiefs to share the same information (TREND 1996). Arguably then, members understood from the beginning that beyond labor contributions, their piped water supply would be provided at a fee based on metered consumption.

In contrast, the motivation behind consumers in Mwonge Range was to build a new intake and lay the pipeline required to connect to a previously existing, government funded pipeline. Once the connection was done, water flows resumed to previously un-metered household connections. Recognizing the need to contribute towards recurrent costs of operating the scheme (which I argue was in appropriation of experiences from the coffee cooperative societies), members agreed to a monthly flat rate contribution of KES 100 as reflected in the scheme’s by-laws. While the by-laws prohibit use of the water for irrigation, there were no limitations to amounts of water that can be consumed, and subsistence farming (e.g., kitchen gardens) and livestock are

considered acceptable water uses. With this consideration, metering would restrict the members' expectations for unlimited water use at a flat rate charge, and it is therefore unsurprising that the community is opposed to it.

Kamwene, like Mwonge Range, was not metered from the onset and members are generally opposed to metering. They, however, agreed to a monthly flat rate charge of KES 200 towards recurrent costs. Water users at the scheme may be argued to hold the perception that water supply is '*mali ya umma*' (public good). The IDI observed that because of the area MP's heavy influence in mobilizing funds towards scheme construction, the community perceives the scheme as a government project and the issue of metering tends to be highly politicized. That said, the community accessed funding from the Water Sector Trust Fund in 2015-18, part of which went towards purchase and installation of 550 meters. Unfortunately, the IDI noted that pipeline diversion by consumers to by-pass the meters is a significant challenge at the scheme.

Interestingly, similar behavior was observed in Ngagaka following the introduction of meters under the Water Use Test Project (1987 – 1991). A significant proportion of consumers in Ngagaka either by-passed the meters or deliberately interfered with the meter readings, a behavior attributed to '*mali ya umma*' attitude among consumers (Business and Economics Research Company 1992). The IDI at Kamwene further noted that because the initial meters were provided at no cost to the water consumers, this set a precedent that that scheme is responsible for metering costs. Consequently, extension of the metering drive has been very slow following the WSTF project due to limitation of funds to cover the initial cost of metering. At the time of data collection, the scheme had only metered 160 additional connections reaching a metering ratio of about 45%.

The varied experiences of the schemes with metering demonstrate a clear value in metering water connections from the onset of water supply. This is especially so where consumers make financial or in-kind contributions towards scheme construction. Further, it is important to critically think about who meets the cost of metering. In Murugi Mugumango and Muthambi 4K, the cost of metering was borne by the consumers as a one-time cost. In Ngandori Nginda (and also Ngagaka) the cost of metering was borne by the scheme and consumers are charged an amount for meter rent. With the latter structure, the schemes can replace malfunctioning meters with revenues drawn from the meter rent. In contrast, Murugi Mugumango and Muthambi 4K must tap into their revenues to replace meters. Unfortunately, this may not be done on time due to competing needs. For instance, Murugi Mugumango reported a significant increase in revenues following a meter replacement drive funded by the WSTF, an indication that many of their meters had been malfunctional prior to the replacements.

Gatua-Karimba provides a contrast where professional management of revenue collection has not been adopted, and revenue collection was the weakest. The scheme is unmetered, and there is an agreed upon month flat rate charge of KES 200. The scheme has no permanent employees and revenue collection is done by either the WMC chairman or treasurer. The chairman noted that though people are not consistent with payments, he, paraphrased, ‘recognizes that times are hard, and water is a human right’ and therefore avoids disconnecting people. Instead, he negotiates with consumers to at least make some payment. Unfortunately, without any records available, it was difficult to establish the scheme’s financial state.

### **6.5.2     *Accountability of committee and staff to users***

Closely related to effectiveness of revenue collection is levels of accountability of the committee and the staff to water users on revenues collected and scheme operations. By virtue of being

registered as Societies, among the objects that the water schemes must detail in their constitutions are: i) the titles of auditors, their terms of office, and the method of their election, appointment, dismissal, and suspension, ii) terms and procedures for annual or periodical audit of accounts, and iii) the inspection of the books and list of members of an association, by any member or officer. In these requirements is an inherent expectation for annual financial auditing of the societies.

Beyond accountability of revenues is the quality of the water users' participation in planning and budgeting for operations within their schemes and the committee's accountability of these plans to users. The annual general meeting (AGM) of members was identified as the apex decision making body at Kamwene, Mwonge Range, Murugi Mugumango and Muthambi 4K; the delegates conference marks the apex body at Ngandori Nginda. In the absence of interviews with the users, inferences on accountability practices were made from information and documents shared by the schemes. Murugi Mugumango and Ngandori Nginda stand out in the effectiveness of accountability structures.

***a) Financial transparency***

All five schemes reported conducting annual external audits of their finances, but these were only made available for review at three schemes as seen in Table 18. Where available, it was evident that annual auditing has been practiced consistently since scheme registration as a society.

**Table 18: Audit practices at the Water Schemes**

<b>Scheme</b>	<b>Year Registered as Society</b>	<b>Earliest Financial Audits</b>	<b>Audit Reports presented to Members</b>	<b>Audit report availed under this research</b>
Kamwene	2008	2019	Unclear	No
Murugi Mugumango	1984	1985	Yes	Yes

Muthambi 4K	1999	1995	Unclear	Yes
Mwonge Range	2001	2009	Unclear	No
Ngandori Nginda	2004	2004	Yes	Yes

Among the key challenges associated with community managed rural schemes is that while revenues are collected, it is often difficult to tell how much is collected, and what the money is used towards. Through consistent auditing, however, the three schemes that availed their audit reports not only serve as an accountability tool but also provide historical data for insights on their operations as summarized in Figure 18, Figure 19, and Figure 21. For context, these are multi-village piped water schemes covering multiple administrative sublocations and/or locations. All schemes are gravity flow. Basic water treatment (i.e., chlorination) is carried out by some of the schemes. Muthambi 4K is the smallest while Ngandori Nginda is the largest as seen in Table 19.

**Table 19: Summary of water service delivery at Muthambi 4K, Murugi Mugumango and Ngandori Nginda**

<b>Scheme</b>	<b>Est. # of Pioneer Active Members</b>	<b>Est. # of Active Members (2021)</b>	<b># of Permanent Staff (at founding)</b>	<b># of Permanent Staff (2021)</b>	<b>Est. Supply Area (sq. km)</b>
Muthambi 4K	<1,000	2,200	3	12	-
Murugi Mugumango	430	4,600	17	24	90
Ngandori Nginda	<2,600	13,000	17	69	130

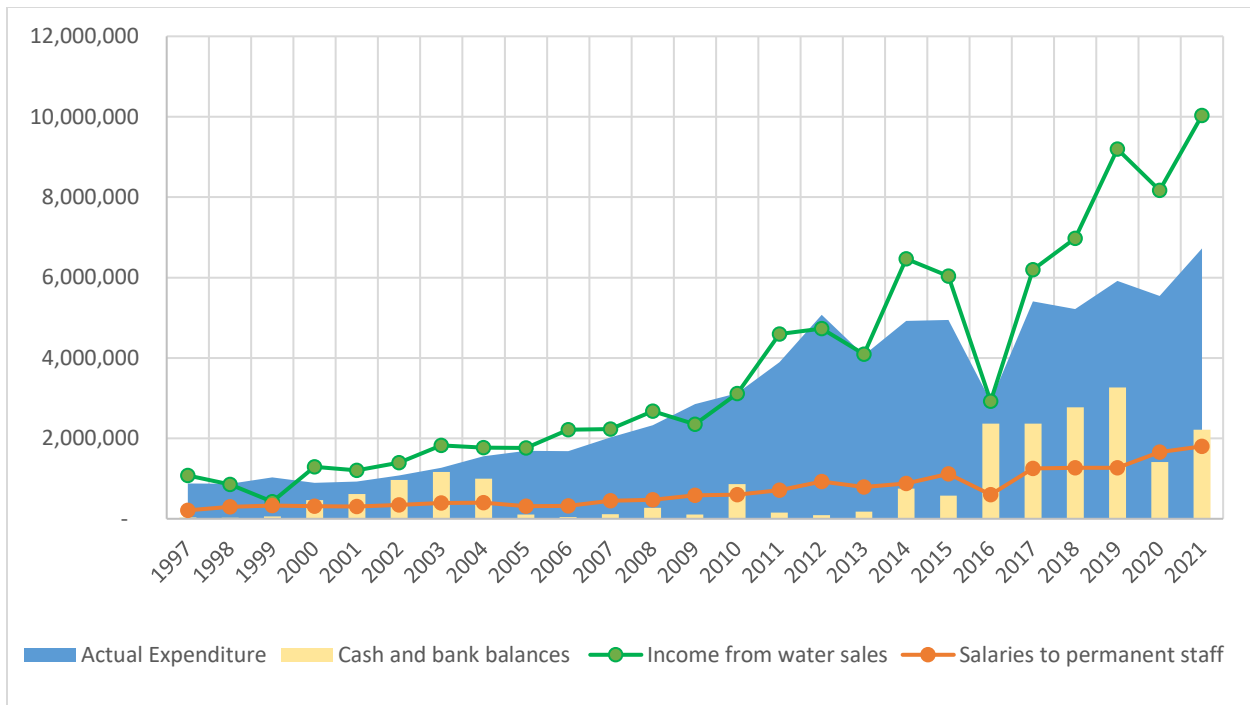
Data from the annual audit reports was used to generate the graphs below. It is evident that the three schemes are, on average, able to collect enough revenues to cover their actual expenditures. Income sources include revenues from water sales, connection fees, and fines and penalties (e.g., from reconnection and water theft). Expenditure items are broad and include i) salaries to both

permanent and casual staff, ii) administrative costs including statutory levies (e.g., water abstraction fees) and water management committee expenses, iii) repairs and maintenance costs, and iv) depreciation. Actual expenditure (as used in the graphs was calculated as the difference between the total expenditure and the estimated depreciation<sup>33</sup> as presented in the audit reports. Most noteworthy is that the schemes maintain some level of cash and bank balances at every point speaking to the availability of funds to address repair and maintenance needs.

Evidently, the schemes have adopted professional management of the O&M functions on a self-financing basis. Figure 18 summarizes Muthambi 4K's data, the smallest of the three schemes. Total income has, on average, exceeded actual expenditure for the life of the project despite its relatively low number of active consumers. This has allowed the scheme to generate savings used towards network extension and rehabilitation, including reported construction of a 3<sup>rd</sup> intake funded with internal resources at a cost of KES 4.8 million. Further, Muthambi 4K has maintained relatively low staff costs as a proportion of total expenditure over the years, reaching a peak of 37% in 2021. The scheme registered a marked increase in total income in 2018 following a revision of the scheme's water tariff. The tariff at the scheme between 1997 – 2018 was KES 100 (~ USD 1) for any consumption below 10m<sup>3</sup> per month; KES 12 was charged for any additional unit consumed; institutions were charged KES 9/ m<sup>3</sup>. The revised tariff raised this to KES 200, KES 15, and KES 12 respectively.

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<sup>33</sup> According to the audit reports, depreciation is calculated at annual rates estimated to write off each asset over the term of its useful life. For example, depreciation for fixed assets at Muthambi 4K for the year ended 31<sup>st</sup> March 1999 were 10% for the water intake point, and 12.5% for pipes, meters, fixtures, fittings, and office equipment. Similarly, the following are some of the rates applied for depreciation of fixed assets in Ngandori Nginda for the year 2011/12: 10% - Building; 12.5% - furniture and equipment; 10% - pipes; 5% - water metering; 20% - water fittings.

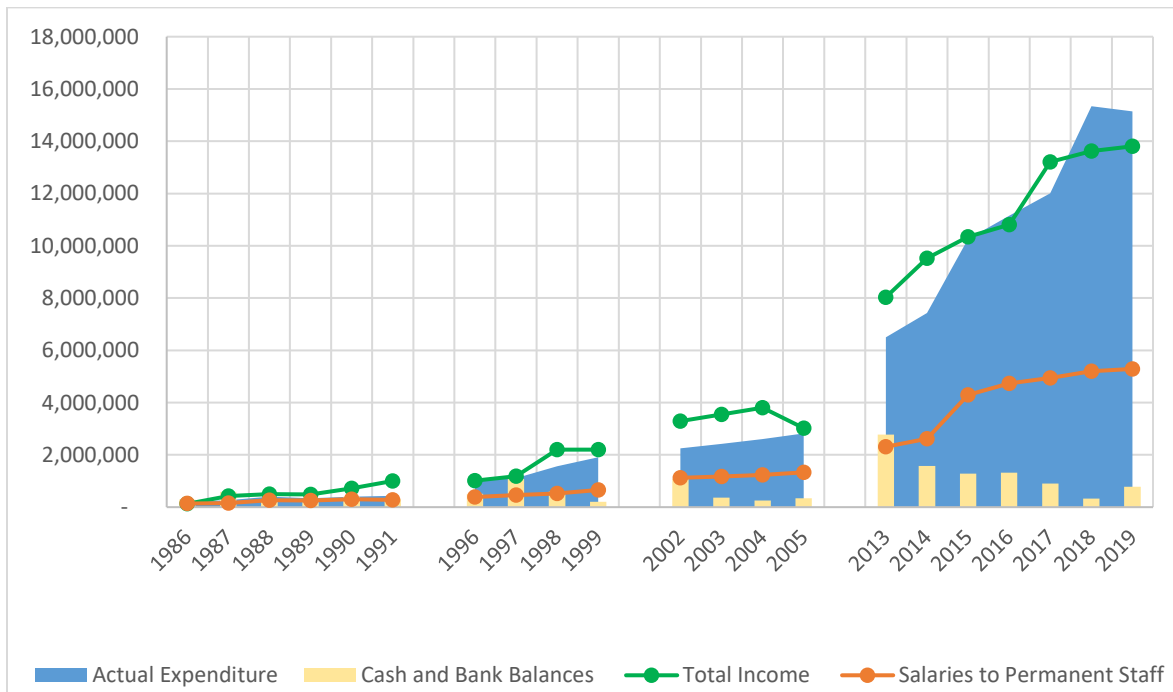


**Figure 18: Summary of financial records - Muthambi 4K**

Murugi Mugumango (see Figure 19) demonstrates the benefit of instituting accounting and financial management measures from project on-set, regardless of the size of the scheme. One of the IDIs, who joined the scheme in 1984, observed that the scheme engaged workers on a daily rate at the time where he was paid KES 10/day. This was gradually adjusted as infrastructure was built and household connections made. While the number of staff has not increased significantly over the years, the total remuneration has increased as a factor of both salary increments for long serving staff (e.g., both the Project Manager and his secretary have been with the scheme since the mid-1980s) and an attempt to match market rates to attract qualified staff. Consequently, increasing staff costs are among reasons for increased actual expenditure over time. Similarly, the scheme has gradually adjusted its water tariff over the years starting from a monthly charge as low as KES 20 (0-30 m<sup>3</sup>) reported for 1989 to KES 270 (0-50 m<sup>3</sup>) in 2021. This, coupled with increase in number of active connections account for increasing total income over the years. Like



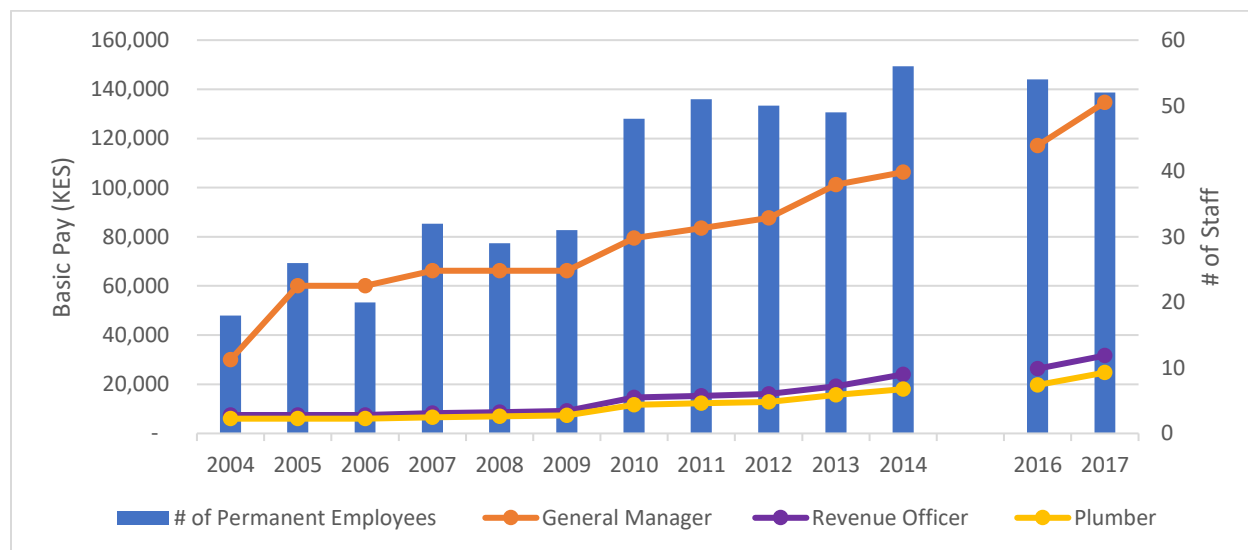
in Muthambi 4K, total incomes have on average exceed actual expenditure allowing for savings for scheme extension and rehabilitation. It was also understood that there have been a lot of pipe repairs in recent years necessitated by damages during road construction within the service area leading to the high expenditures observed in 2018 and 2019.



**Figure 19: Summary of financial records - Murugi Mugumango**

Ngandori Nginda can be argued to demonstrate the value of the short route of accountability (i.e., direct accountability of scheme staff to water users through use of collected revenues to pay salaries) most clearly. Prior to 2004, the scheme was managed by the NWCPC whose staff were government employees and thus on government payroll. Consequently, the effectiveness of their operations did not directly affect their remuneration and service levels at the scheme were generally poor. As earlier noted, the scheme was described as ‘almost dead’ by the time it transitioned to community management but has since experienced significant growth in active water users. The interview with the revenue officer, who joined the scheme in 2004 as a clerk,

noted that it had 375 paying connections at the onset. A copy of the scheme’s quarterly report from 1<sup>st</sup> Quarter 2006 indicated that the scheme had 4,081 registered members of which 2,646 were active connections. By June 2021, membership had grown to 17,917 registered connections of which 12,948 were active. With this growth has been a consequent growth in number of staff to meet operational needs from 17 in 2004 to 69 in 2021. Expenditure on staff costs has consequently grown with increasing staff numbers as well as increasing remuneration amounts as summarized in Figure 20.

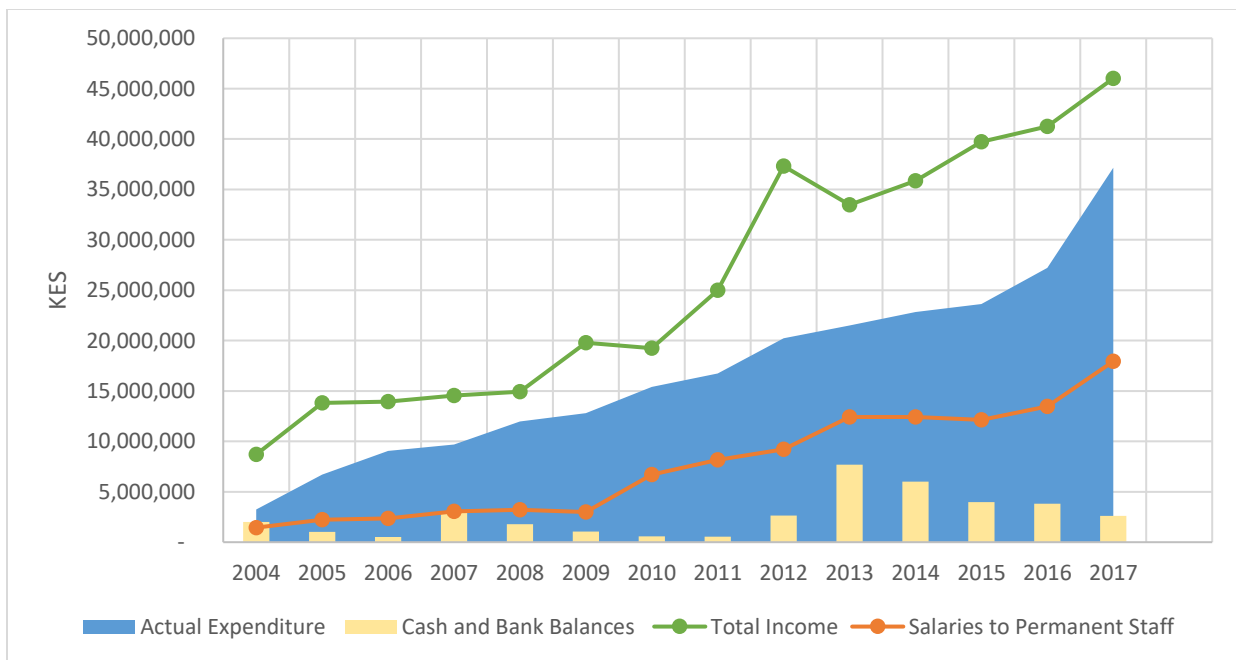


**Figure 20: Historical employee numbers and salary scale and Ngandori Nginda**

Figure 21 shows that income at Ngandori Nginda has always exceeded actual expenditure. This has allowed the scheme to conduct significant extension of the main water distribution network to meet increased water demand with limited external (government or donor) resources<sup>34</sup>. The IDIs with the scheme’s current and previous general managers indicated that most of the rehabilitation and expansion efforts at the scheme have been driven by internal revenues. This is

<sup>34</sup> The scheme received donations and/or grants worth a total of KES 22.5million between 2009-2019 according to its annual financial audits.

enabled by a long-standing relationship with Eslon Plastics Company, a private sector player, which enables the scheme to access piping infrastructure on credit terms. Among notable extensions enabled by this partnership was installation of a 6-inch pipeline over 6kms to serve an area that had not had water services for over 20 years, the construction of a partial water treatment facility, and installation on a 12-inch parallel line from the intake to the partial treatment works (1.5km) to boost supply. The scheme had pipes worth KES >2million on credit from Eslon Plastics at the time of data collection. The scheme’s audit books also indicated that it had accessed a bank loan of about KES 3.8 million in 2019, further demonstrating its creditworthiness. Beyond network extension, the scheme has also constructed an office complex, all of which was funded by internal revenues (see Figure 22).



**Figure 21: Summary of financial records - Ngandori Nginda**

While Mwonge Range did not avail their audit books for review, the scheme demonstrates the traits observed in the three schemes above. Its membership has grown from the original 450 pioneer members in 2001 to about 2,200 active connections in 2021 across four administrative

locations. It had 10 permanent staff in 2021. Prior to 2020, the scheme reported averaging about KES 1million per month in water revenues; this amount had fallen to about KES 700,000 per month in 2021 due to supply interruptions by road construction works. Among the scheme’s major accomplishments, all of which were reported as having been achieved from internal revenues, were construction of a modern KES 4 million office complex (Figure 23) and accompanying desks and office computers, purchase of 5 motorbikes for use by plumbers, and repair of supply network necessitated by damages from road constructions works. The Field Supervisor observed that these successes were only possible because of the stringent financial management measures enforced by the Project Manager. The scheme has also been audited since 2009.



**Figure 23: Mwonge Range Office Complex**



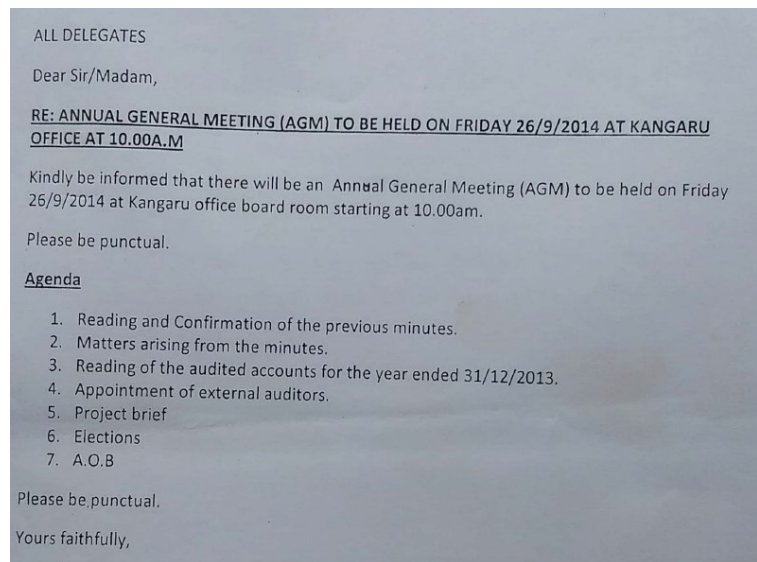
**Figure 22: Ngandori Nginda Office Complex**

### ***b) Consumer participation***

These being community managed schemes, where water users elect representatives to the water management committee, it is important that the committee is accountable to the water users.

Consumer participation, evaluated from user engagement in planning, budgeting, and reporting of financial resources at the schemes, provides an avenue for this accountability.

Expectedly, the annual audit reports should be availed to the AGM of members for review, and with the opportunity for members to raise questions. This practice was confirmed for Murugi Mugumango and Ngandori Nginda during the review of sample AGM meeting minutes. In the sample invitation to the AGM provided in



**Figure 24: Sample Delegates Invite to AGM from Ngandori Nginda**

Figure 24, the AGM of delegates at Ngandori Nginda not only provides a platform for review of audited accounts but also appointment of external auditors. Similarly, review of financial statements is performed at the AGM of members at Murugi Mugumango and matters arising discussed. An example is drawn from minutes of a meeting held on 10<sup>th</sup> March 2018 at the Society's office with 1,350 members present. Among matters raised was concerns over unpaid bills and services to the scheme – the members asked that the chairman takes legal action against such members and recommended the use of the credit reference bureau (CRB) against them. While review of audit reports at AGMs was reported by the IDI with Mwonge Range, evidence to confirm this was not availed. Kamwene on the other hand only started auditing their books in 2019. The IDI noted that by the time the reports were ready, COVID-19 restrictions on gatherings were in place and the scheme had not had a chance to present the reports to members; financial reports were, however, presented to the full WMC. The practice in Muthambi 4K was

unclear. As will be presented in the next section, the scheme has not held committee elections since 2016 and as such, it is valid to assume that they have also not held general meetings since. Some of the audit reports, however, bore signatures of additional committee members beyond the chairman suggesting that they are at least reviewed by the water management committee.

Transparency practices with the audit reports mirror the quality of members' participation in planning and budgeting for activities within the scheme. Under the titles of 'Chairman's Report' and 'Project Brief' in Murugi Mugumango and Ngandori Nginda respectively, AGM minutes reflect the water committee presenting various issues for discussion by members, and they also record actions that are agreed upon by members. Drawing from the minutes referenced above from Murugi Mugumango, one of the paragraphs in reaction to the Chairman's Report records: "Members were worried of the increasing number of water theft. This was discussed at length and members approved the chairman's recommendation of ksh. 10,500 as a fine for water theft".

In Mwonge Range, corroborating examples were provided by the two IDIs helping infer a level of community engagement in decision making. The Filed Supervisor noted that the generalized agenda at the AGMs includes review of i) the progress report, ii) proposed budget and iii) planned activities for the new year, after which opinions and feedback from members is received.

The IDI with the treasurer provided a practical example of this agenda in noting that as the treasurer, he proposes development activities to members for approval. This is how the scheme managed to agree and save towards construction of their office building and they were saving towards purchase of a scheme vehicle at the time of field data collection under this research.

Like Muthambi 4K, Kamwene has also not held elections since 2016 leading to the assumption that they also are not consistent with annual general meetings. The quality of the water user's voice at both schemes is thus assumed to be poor.

### **6.5.3 Effectiveness of WMC and EC election**

The most straightforward approach to review effectiveness of the elections process was to look at consistency of holding the elections as required in the scheme by-laws and as reported by the IDIs and documented in minutes and audit reports. As previously presented, the six schemes evaluated under this section are registered as either a Self-help group or a Society with the government. Members are required to develop by-laws as well as elect a committee as part of the registration process under both options. From an accountability perspective, the water users need to be able to elect the best committee members and to vote them out in case of non-performance. This makes the elections process key to the effectiveness of community management as an organizational arrangement. However, as seen with Gatua-Karimba, the onus to organize elections is usually left to the management staff and the incumbent committee across all schemes. In the absence of an external regulating body to ensure that these elections are organized, this practice effectively shifts the power balance in favor of the committee. For example, a committee could choose to postpone an election if they were concerned of an unfavorable outcome. Murugi Mugumango, Ngandori Nginda and Mwonge Range are observed to have effective election processes, while the processes at Kamwene, Muthambi 4K and Gatua-Karimba demonstrate key weaknesses.

A review of audit reports from Ngandori-Nginda and Murugi Mugumango showed changes in overall board composition every three years suggesting that elections are held as provided for in the by-laws. While most WMC members tended to be re-elected, the audit reports reflect changes in at least one member every three years. These changes were also recorded in AGM minutes, the most abundant of which were reviewed in Ngandori-Nginda. Unfortunately, audit reports were not available at Mwonge Range and evaluation of its election process is based on the

IDIs. The Field Supervisor noted that elections are held every three years and while members may be re-elected, every single member of the WMCs that has been elected since he joined the scheme in 2009 has been voted out at some point. In a corroborating statement, the treasurer observed that WMC elections are very competitive, evidence being that he is the only member of the founding WMC that is still serving in the WMC.

The IDIs at Ngandori-Nginda, Mwonge Range and Murugi Mugumango noted that WMC elections have become more competitive over the years. There has been a lot more interest in recent years to join the WMCs and aspirants are more vocal in their campaigns. A very apt analogy for this increased competitiveness, which was provided in Murugi Mugumango and echoed at the other schemes, was that '*the cow now has milk*'. As it takes a lot of effort to nurture a calf to the point of milk production, it has taken years to set up the water schemes and the number of people willing to join the WMCs during those years were few. Now that the schemes seem to be a lot more financially sustainable with significantly higher WMC allowances than in founding years, there is a lot of interest to join WMCs. In Murugi Mugumango for instance, the scheme registered as a society in 1984 but the founding committee members did not receive any allowances until 1986 when these were first paid at a rate of KES 40/member/ sitting. Today, members are paid KES 3000 per sitting with the executive committee meeting monthly and the full WMC meeting quarterly.

The election process at the three schemes is organized and managed by the scheme staff but the actual election event is presided over by government representatives. In Ngandori Nginda, part of the document review revealed letters addressed to the Ministry of Water and Irrigation, Embu County with the request that the ministry provides election supervisors. The letters also included names of scheme staff that would assist the ministry officials with the exercise. For Murugi



Mugumango and Mwonge Range, chiefs within the supply area serve as the presiding officers during elections. The chiefs also serve as the trustees of the scheme's assets.

While general WMC membership is competitive, this is not the case for the executive committee positions in Murugi Mugumango and Ngandori Nginda where detailed data was available. For instance, the founding chairman at Murugi Mugumango served from 1984 – 1997 when he stepped down. Prior to 1984, he had been Chairman of the Kianjagi Water Project, which was formed in 1977, and was elected as Chairman of the Murugi Water project when several projects merged in 1980. He was then elected chairman when Murugi and Mugumango water projects merged. His successor, a former Provincial Trade Officer under the Ministry of Trade and Commerce, was identified and elected in absentia and has served since 1997. The IDI at Murugi Mugumango noted that while this current Chairman has expressed the desire to retire from the position, the community requested him to defer his retirement, until at least to such a time when the scheme manages to navigate through reforms introduced by Water Act 2016<sup>35</sup>. Both chairmen are lauded for their exemplary leadership in overseeing scheme operations.

In Ngandori-Nginda, the scheme had the same people serving as chairman, vice-chairman, treasurer, and secretary between 2004 and 2014. Unfortunately, the demise of the founding chairman, who was described as a major co-operator, in 2014 forced changes in the executive committee – the vice-chairman was elected as the new chairman, the secretary was retained, and new members took up the vice-chairman and treasurer positions. Further, Ngandori Nginda has instituted a mandatory retirement age of 70 years for its WMC members. With this requirement, a member of the executive committee aged out and was replaced in 2018.

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<sup>35</sup> The reform process is explored in more detail in Chapter 7.

Muthambi 4K and Kamwene provide a contrast where elections have not been consistently held according to the scheme by-laws nor been competitive in recent years. In Muthambi 4K specifically, a review of the audit reports suggests that the last elections were held in 2016 as deduced from change in board composition between 2015 and 2016 reports. This observation is supported by the IDI with the Catholic Diocese of Meru Water and Sanitation Services (DOMWASS)<sup>36</sup> – Muthambi 4K’s key external partner – who estimated that the scheme last held election in 2016. The 2016 elections were said to have been “very political” with some members determined to oust the Chairman, who has held the position since 1991. In the period leading up to the WMC elections, intense campaigns were said to have been conducted within the scheme area with aspirants promising to provide water for free to the community if elected. While these aspirants were successful at the WMC level, the election of the chairman by WMC members came down to a vote, which was cast in favor of the incumbent. In reference to the interview with DOMWASS where it was noted that the management of water schemes in general may choose to delay elections when it looks like they may be chaotic or lead to negative outcomes for management, it is unsurprising that Muthambi 4K has not held elections since 2016. Elections at the scheme are presided over by DOMWASS, which also holds the scheme’s assets in trust. Consequently, the scheme is generally seen as a project of the catholic church. However, DOMWASS noted that it does not directly interfere with the operations of the schemes they support, including in the election of WMCs, unless the committee or the community reaches out to them.

Kamwene demonstrates how exogenous factors can affect the effectiveness of elections within schemes. The scheme credits a lot of its access to external financial resources to facilitation by

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<sup>36</sup> Detailed introduction to DOMWASS is provided in Chapter 7

the current area MP, and the scheme is commonly referred to as his project. The last WMC election at the scheme was conducted in 2016. The IDIs observed that with this election happening within a year of Kenya's national elections, the event turned "political" with aspiring Members of the County Assembly (MCAs) turning the event into a campaign platform. Consequently, the area MP is reported as having requested the elected committee to hold off any other elections "until he is done with the project". The scheme has not held elections since. Gatua-Karimba provides an extreme example of what may happen when the management committee delays elections amidst growing consumer dissatisfaction. The project has faced a myriad of technical and management challenges leading to irregular water supply services. While there was a management committee, it was unclear when elections were last had. In 2020, members sought to oust the pre-existing committee and approached the current chairman with a request to lead a new committee. Following the request, it was reported that a members' meeting was convened with the area chief and sub-chiefs and in the presence of representatives from the department of social services where members expressed a request to be allowed to elect a new WMC. Following investigations (e.g., the project secretary could not produce any meeting minutes or member records), the government officials approved the need for an election, and this is how the current chairman was elected to this position.

The contrasting experiences of Murugi Mugumango, Ngandori Nginda and Mwonge Range versus those of Kamwene, Gatua-Karimba and Muthambi 4K demonstrate the vulnerability of WMC elections as an accountability framework to the quality of leadership by incumbent committees. As seen, WMCs can postpone elections at will rendering the accountability mechanism introduced through voting of WMC members ineffective. This highlights the need

for an external oversight body (e.g., the regulator) to enforce provisions for elections, along with consumer participation that was presented in the previous section.

#### **6.5.4 *Autonomy of staff from WMC / EC***

Autonomy here refers to the ability of employed staff, who are hired by the WMC, to make decisions in their professional capacity and perform their mandate without undue control or influence from the WMC or the EC. Calling back the discussion from the cooperative societies, hiring of trained and competent project staff for day-to-day operations helps to separate the role of operations from that of oversight by a committee elected by water users. For schemes evaluated under this research, the level of involvement of the WMC / EC in day-to-day operations of the scheme provides a proxy for understanding the degree of autonomy.

The institutional structure of societies provides for some level of involvement of WMC / ECs in operations of the water scheme with the most common of these being requirements for scheme signatories. Murugi Mugumango, Muthambi 4K and Kamwene indicated that either the chairman, the treasurer or both were designated as a mandatory signatory on scheme documents, contracts and/or cheques. Further, the scheme's constitutions provide for regular WMC meetings for the purposes of reporting, planning, and budgeting with provisions for emergency meetings. In these provisions, we see differentiated levels of involvement by the committees. A critical caveat to this evaluation on autonomy is that the observations were based on in-depth interviews with representatives of either the WMC, the staff or both. As such, what was said becomes as important as how it was said, and observations / interactions had.

The committees at Murugi Mugumango, Ngandori Nginda and Mwonge Range were considered to have extended significant levels of autonomy to the management staff. In Murugi Mugumango

for example, the project manager requested that I reschedule my first visit to the scheme so that it coincided with a scheduled committee meeting. In so doing, I presented my request to include Murugi Mugumango as a case study under this research to the committee. Following a few clarification questions, the committee gave the project manager the go ahead to share data as he found appropriate. During the IDIs, the manager noted that the scheme holds such scheduled meetings with the EC in which they discuss the performance of the scheme and make plans. He also noted that he is lucky to have a very supportive EC giving the example of the treasurer who avails himself to sign checks without expectations of any reimbursements or allowances. In a similar example, the project manager at Mwonge Range noted that while the scheme could participate in an IDI, they could not share such documents as audit reports or meeting minutes as that required the approval of the WMC. She noted that unfortunately, the next meeting was scheduled beyond the data collection timeline and such a request did not warrant calling an emergency meeting of the WMC. Finally, in Ngandori Nginda, the request for research was submitted to the scheme's general manager who not only became an IDI respondent, but also assigned someone to help with the data collection. Review of files from Ngandori-Nginda revealed regular meetings of not only the executive committee, but also sub-committees mandated with i) audit, ii) monitoring, and iii) Planning, Finance & Staff.

Kamwene and Muthambi 4K provide contrasting experiences with their chairmen significantly more involved in day-to-day operations. In Kamwene, the Chairman noted that he is allocated one day a week to go into the office to deal with varied operational issues for which he receives an allowance. He also noted that because of the amount of construction works going on at the scheme, he needs to be available on call to resolve disputes arising between the community and contractors, especially on the issue of wayleave for water pipelines. Given the nascent stage of

Kamwene with respect to scheme construction and expansion compared to the other schemes, this level of engagement by the Chairman is justified. However, while his role is prominent, the level of engagement of other committee members was unclear.

Muthambi 4K presents a similar example where the Chairman is significantly involved in day-to-day operations, especially on monitoring the scheme's financial matters. The extent of this engagement was most apparent in his noting that, paraphrased, "DOMWASS often asks what will happen to the scheme when I retire". Posing the same question back to him, he responded that he was unsure and expressed a lack of confidence in the ability of the larger committee to adequately manage the scheme. Passing statements with at least three respondents within the county pointed to the chairman's extended involvement with the day-to-day operations with one person noting that 'he treats the scheme as his personal project' while another mentioned that that the scheme is perceived as 'the chairman's project' by community members<sup>37</sup>.

Gatua-Karimba provides the extreme example where the scheme has no permanent staff, and the executive committee is largely responsible for operations and maintenance. The chairman, however, noted that he engages a plumber on casual terms depending on repair needs. Even then, this plumber does not have formal technical training but has learnt how to do repairs through apprenticeship.

Arguably, the degree of autonomy between the WMC/EC and the scheme staff correlates with the quality of operational systems at the scheme that would allow effective operations beyond the persona of specific individuals. This is deduced from the observation that, for schemes with weak autonomy, there exists a close association between the schemes' success and specific

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<sup>37</sup> These statements are quoted anonymously having been made in conversations that were not part of formal interviews.

individuals. The departure of such individuals from the scheme presents a significant risk to sustainability of operations. In Muthambi 4K for instance, DOMWASS expressed concerns over sustainability of the scheme's operations upon exit of the WMC chairman. The chairman himself echoed these concerns. Similarly, scheme operations at Kamwene and Gatua-Karimba are very closely associated with the chairmen. In contrast, Mwonge Range and Ngandori Nginda have had recent changes to the composition of their executive committees with continued operations. In Murugi Mugumango, the chairman was reported to often delegate his responsibility for recurrent meetings to the vice chairman as has grown older.

## **6.6 Chapter summary**

This chapter demonstrates the value of having division of roles and responsibilities accompanied by clear incentives and accountability frameworks between the various actors involved in community managed rural water supplies. It is observed that successful schemes are those that have successfully established and govern effectively along both the long and the short routes of accountability per the 2004 WDR accountability framework. The co-existence of both routes of accountability is argued to provide a balance of power among the various actors. With the scheme staff dependent on revenues collected from water users, the staff are incentivized to ensure water service delivery (i.e., short route of accountability). The water users also need to be able to elect representatives to the WMC who can provide more active oversight to the scheme staff and ensure operations (i.e., long route). Election of WMC representatives should be informed by the members' perception of the scheme performance based on their participation in planning, budgeting, and reporting of activities within the scheme. In the absence of effective external regulation to enforce these accountability mechanisms (i.e., WMC elections and

consumer participation), scheme operations become highly vulnerable to the ability of the committee, and especially the chairman, to enforce the scheme's by-laws.

The chapter also provides ample evidence from four schemes that it is feasible for piped rural water supplies to self-finance their O&M functions. Muthambi 4K, Murugi Mugumango, Mwonge Range and Ngandori Nginda have not only managed to cover costs of salaries from internal revenues, but they have also extended their networks and rehabilitated infrastructure. Further, Ngandori Nginda and Mwonge Range have pursued developmental initiatives including construction of their own office complexes. With these activities, the schemes demonstrate that it is socially and financially feasible to extend water services to most people within the supply area once the main water distribution network has been developed. This is marked by the increase in number of connections over time across all the schemes while maintaining an arguably affordable water tariff (i.e., < USD 3/month at all schemes). For the latter, the caveat that these are all gravity systems with minimal water treatment conducted must be provided.

Closely linked to the discussion on self-financing O&M is the need for metered water consumption. Metering as a sector best practice ensures water consumers pay for actual volume consumed. The schemes under evaluation present key considerations on how to effectively introduce metering. First, consumer education on the need for metering as well as actual metering should be carried out from project on-set. With the examples of Kamwene and Mwonge Range, it is significantly more difficult to introduce metering to water users who've previously had unrestricted water consumption at a flat rate. Second, a critical analysis of who bears the initial cost of metering is necessary. Replacement costs are often solely borne by the water schemes where initial costs were met by the consumer. In contrast, a meter rent towards future replacement may be charged where the initial metering cost is borne by the water scheme.



## **Part III: Governance of Rural Water Systems – Research Implications**

This research sought to understand how selected community managed rural piped water schemes have achieved professional management of their water services, even to the point of regulation for some. Chapters 4-6 argued that application of an institutional template drawn from the coffee cooperative societies enabled five of the case studies to adopt professional management of their operations. This third and final part of the thesis turns its focus to governance considerations, specifically the formalization and regulation of rural water supplies. As highlighted in the Methodology, a proxy indicator for regulation was used to identify relevant case studies – consistent ranking of a rural water supply scheme in WASREB’s annual Impact Reports for the past five years. Murugi Mugumango, Muthambi 4K, Ngandori Nginda, and Ngagaka met this selection criteria. Mwonge Range, Kamwene and Gatua-Karimba on the other hand, do not submit performance data to WASREB and were included in the research as ‘negative but possible’ cases.

Chapter 7 starts out with a discussion on how the four schemes came to report their performance data to WASREB while the rest did not, a discussion that is framed within reforms introduced by Water Act 2002. This is followed by a critical reflection of the relationship between the schemes and WASREB to evaluate the responsiveness of regulatory frameworks to the needs of rural

water schemes emerging from Chapter 4-6. Recognizing that reforms take time and require resources, and acknowledging that WASREB has made incremental attempts to bring the rural water sector under regulation, Chapter 7 argues that reforms under Water Act 2002 perpetuated a state of institutional ambiguity with respect to rural water supplies by adopting an opt-in approach to reporting performance data. Further, the reforms did not provide concrete guidelines reflective of the needs and practices of rural water supplies. More critically, however, these reforms are indicative of the sector's hesitation to adopt community management of rural water supplies characterized by volunteerism as a *de jure* approach.

Kenya now has another opportunity to develop a regulatory framework that supports rural water supplies. The Water Act 2016 was enacted to align the water sector to the Kenya Constitution of 2010 which devolved the mandate for water and sanitation services to 47 newly created county governments. A discussion of how the case studies have navigated this transition is also provided in Chapter 7, before highlighting key provisions from WASREB developed tools to guide these new reforms. Ultimately, Chapter 7 demonstrates that though Kenya recognizes the *de facto* role of voluntary community management of rural water supplies, its policy framework effectively rejects it as a *de jure* approach. The onus is left to county governments created by the Kenya Constitution of 2010 to identify appropriate strategies and approaches towards formalizing rural water supplies.

Chapter 8 will draw on the case analysis to propose policy considerations for the county governments in Kenya specifically, and Sub-Saharan Africa more generally, as part of conclusions and recommendations from this research.

# Chapter 7. Regulating Kenya's Rural Water Supply

## 7.1 Management of rural water supplies under Water Act 2002

As highlighted in Chapter 2, The National Water Policy, adopted by Parliament as Sessional Paper No. 1 of 1999, formed the basis for significant sector reforms in Kenya. Among other things, the policy redefined the government's role away from direct service provision to ensuring an enabling environment through appropriate policies and regulations; service provision would be left to local governments, private sector and communities (Ministry of Water Resources 1999). This paved way for the formalization of community management of rural water supplies. The policy called for a review of the Water Act, Chapter 372 (first passed in 1952, and revised in 1972), a process that culminated in the gazettelement of a new Water Act in October 2002 and the law coming into effect in 2003. As introduced in Chapter 2, however, these reforms did not put in place necessary structures for systemic support to rural water supplies under community management. Consequently, the community groups that were formed to take over water supplies from district water offices received little to no follow-up support in managing their schemes. Even then, Water Act 2002 reflects Kenya's policy ambitions to regulate all water supply. Section 46 of the Act created the Water Services Regulatory Board (WASREB) and vested on it regulatory functions previously held by the Minister in charge of water affairs (Mumma 2007). The Act mandated WASREB with licensing of providers of water and sewerage services that

serve more than 20 households. As such, community managed water schemes needed to obtain a license from WASREB to continue providing water to their members under the new regulatory framework. This was a departure from previous practice where community systems (unlike other water supply systems) operated without a license (Mumma 2007). Among other functions of WASREB were setting standards for the provision of water services to consumers, monitoring and regulating licensees and enforcement of license conditions, developing guidelines for, and providing advice on the cost-effective and efficient management and operation of water services, and disseminating information about water services.

Regarding provision of water and sewerage services, section 51-54 of the Water Act 2002 created Water Service Boards (WSBs), outlining their functions, powers, and composition. Specifically, WSBs were responsible for provision of water and sewerage services within their areas of coverage and were therefore expected to be licensed by WASREB. The Boards were created as regional institutions, and their service areas demarcated to coincide largely with boundaries of water catchment areas. The Act, however, prohibited the WSBs from engaging in direct service provision and instead expected them to identify another party, water service providers (WSPs), to provide water services as their agents. The exception was provided for circumstances where WASREB was satisfied that the procurement of such an agent was not possible or that the provision of such services by an agent was not practicable.

The process of obtaining a license to operate as an agent of the WSBs demonstrates the perpetuation of institutional ambiguity for rural supplies. More critically, however, it reflects the sector's hesitation (or more strongly, rejection) of community management characterized by volunteerism as the *de jure* approach to managing rural water supplies. To obtain a license, the Water Act 2002 and the Water (Service Regulatory) Rules of 2012 (Kenya 2012) required that

applicants must satisfy the WSBs that they had the requisite organizational, administrative, technical and financial competences to provide services. Further, applicants needed to present a sound plan for the provision of efficient, affordable and sustainable services, and demonstrate that they would operate on commercial basis in accordance with sound business principles and with acceptable tariff structures (Mumma 2007; Kenya 2002; 2012). Arguably, these requirements precluded many rural water schemes from obtaining licenses. Further, as Mumma (2007) critically observes, to enter into an agreement with the WSBs, an entity needed to be a legal person under the law. Many community organizations operating rural water supplies, however, are registered as self-help groups, a purely administrative registration process, making them non-legal entities. As such, many rural water supplies could not obtain licenses, unless they were sufficiently self-organized and coordinated to register as legal entities. Except for Gatua-Karimba which is registered as a self-help group, schemes studied under this research are registered as either a society or a company and are thus legal entities.

Service Provision Agreements (SPAs) signed between Tana WSB and Murugi Mugumango, Muthambi 4K, Ngandori Nginda and Ngagaka water supplies enabled the schemes pursue water provision licenses and come under regulation. Part of the SPA requirements was that the schemes submit their performance data to the WSB and to WASREB. According to the Water (Plan of Transfer of Water Services) Rules, 2005 (Kenya 2002), the SPA provided a framework that would enable WSBs to influence the use of water services facilities owned by NGOs, community-based organizations, community self-help groups, or small-scale water service providers. This was in recognition of the multiplicity of types of water service providers with the Rules noting that “private entities, community-based organisations, or non-Governmental organisations providing water services under previous water undertakership arrangements shall

enter into management contracts with water services boards for appointment as water service providers”. The Rules also provided for identification and engagement of successor water service providers between 1<sup>st</sup> July 2005 and 30<sup>th</sup> June 2008 according to their schedule of transfer. In that duration, a rapid situational assessment would be conducted by each WSB to compile a list of water service providers within their jurisdiction. Further, the WSBs would enter negotiations with the identified providers culminating in service provision agreements by 31<sup>st</sup> March 2008. It is through this process that schemes under this research came to sign SPAs.

IDIs at Mwonge Range, Muthambi 4K and Murugi Mugumango indicated that following formation of the WSBs, Tana WSB called a meeting of piped community managed water schemes within its service area in which the water sector reforms were introduced and the need to sign SPAs discussed. To align with the new regulations, Murugi Mugumango and Muthambi 4K signed the SPAs under what were considered category II SPAs as evidenced by a list of analyzed SPAs published by WASREB in 2007 (WASREB, n.d.). Deducing from the list, category I SPAs were issued to water supplies established by local authorities as autonomous entities that registered as public limited liability companies under the Companies Act; category II SPAs were issued to all other types of schemes (i.e., water projects, associations, and societies, most of which were rural water supplies). Table 20 summarizes SPAs issued by October 2007.

**Table 20: Summary of analyzed SPAs by WASREB in 2007**

#	Water Services Board	Category I	Category II	Total
1.	Rift Valley WSB	5	8	13
2.	Northern WSB	6	12	18
3.	Coast WSB	6		6
4.	Athi WSB	10	1	11
5.	Lake Victoria North WSB	4		4
6.	Lake Victoria South WSB	9	10	19
7.	Tana WSB	17	9	26
	Total	57	40	97

While it was unclear from the IDIs what influenced Ngandori Nginda and Ngagaka water schemes to sign the SPAs, it is highly probable that this was not a decision for the communities to make. As previously mentioned, both schemes were constructed under the government funded rural water supply programs of the 1970s-80s, and as such, the schemes' assets belong to the government and were put under Tana WSB in the wake of Water Act 2002.

At Mwonge Range, the treasurer noted that the scheme was opposed to signing the SPA with Tana WSB. He explained that following the meeting with Tana WSB, a meeting was held with scheme members where the agreement not to enter an SPA was reached. In his words, paraphrased, "the community did not want their scheme to be taken over by the government". This sentiment is, arguably, indicative of the community's limited understanding of the nature of the SPAs and broader sector reforms. While the letter of the law provided that the ownership of the schemes remained within the communities, this message does not seem to have been clearly communicated to members of Mwonge Range. It could also point to a hesitancy by the water scheme to engage directly with government institutions considering that the community had lacked any water services from the government installed infrastructure for over a decade, until it came together to reinstate water supply.

These concerns were echoed in the interview with the Catholic Diocese of Meru Water and Sanitation Services (DOMWASS). In explaining the formation of DOMWASS, the respondent noted that DOMWASS was formed in response to reforms introduced under Water Act 2002. According to the key informant, the ministry had intentions to cluster rural water projects together under one management with the hope of improving performance. Because the diocese has implemented many projects in the region over the years, "it was decided to cluster them together under DOMWASS rather than have them taken over by government". Twelve of

DOM's largest projects were the initial signatories of an agreement that recognized DOMWASS as the trustee of project assets while the communities manage the schemes. The IDI noted that concerns over government taking over schemes stemmed from past experiences where, prior to the 2000s, government was practically dormant with regard to advancing rural water access and NGOs like DOM had stepped in to fill the gap. Handing over these schemes to the government was therefore seen as risking their operations. Even then, five of the twelve schemes under DOMWASS – including Muthambi 4K – had signed category II SPAs with Tana WSB by October 2007.

It is likely that this 'misunderstanding' of the reforms under Water Act 2002 was not limited to Mwonge Range and DOMWASS. The greater region within which these schemes are located has multiple other piped water schemes. For example, a technical audit of community water supply schemes in Nyeri County, a bordering county to Embu County and also within the coffee belt, identified 81 water schemes within the county. 79 of these schemes were gravity flow piped schemes constructed in the 1970s - 90s (Origa 2020). While it is unclear if the schemes are registered as legal entities, some of them draw a lot of parallels with schemes studied under this research: 60% of the schemes charge a monthly flat rate of KES 100-200 for water consumption; three schemes are reported as having metered connections where the users are charged based on consumption; ~25% of the schemes have more than 1,500 household connections; ~25% of the schemes have employed at least three staff. None of these schemes, however, had signed SPAs with Tana WSB by October 2007 and none of them appear to have submitted their performance data to WASREB since the regulator started publishing Impact Reports in 2008.



## **7.2 Responsiveness of reforms under Water Act 2002**

Evidently, while the National Water Policy of 1999 provided for community management of rural water supplies, the institutional framework provided by the Water Act of 2002 and its associated rules and regulations locked out most community schemes from the formal framework by virtue of their being non-legal entities. Further, by adopting an opt-in approach to signing SPAs, the decision to come under regulation was left to qualifying rural water supplies, arguably, informed by their perception of benefits accrued from a relationship with the WSBs.

Only 8 of the 40 schemes issued with category II SPAs prior to October 2007 have been consistently ranked in WASREBs impact reports over the past five years (2016/17-20/221); four of these are considered under this study. Asked why they have consistently submitted their performance data to WASREB while their peers either discontinued or are inconsistent with the practice, the managers at Murugi Mugumango, Muthambi 4K and Ngandori Nginda indicated that they have enjoyed multiple benefits from working in partnership with Tana WSB.

Interestingly, submission of performance data was linked more with scheme interactions with Tana WSB than the regulatory function of WASREB. The IDI at Murugi Mugumango remarked that the scheme has “seen the fruits of regulation and a relationship with Tana WSB”. Among benefits listed was provision of computers, motorbikes, and pipes at the three schemes - (5 desktop computers, 4 motor bikes, 1 laptop computer, meters and master meters and their accompanying fittings worth >KES 2million, and pipes worth > 16 million at Murugi Mugumango; 3 motor bikes, computers, a car, and 8-inch pipes all valued at >18 million at Muthambi 4K). Training of staff on various O&M issues was also reported by the three schemes. In addition, Muthambi 4K mentioned that they had accessed a billing software with the help of Tana WSB which had contributed to improvements in their revenue collection. Ngandori Nginda

noted that reporting to WASREB was helpful in providing some level of external oversight on the Board, especially on their financial expenditure.

Unfortunately, the case selection did not include a scheme that signed an initial SPA but discontinued reporting to the WSBs and WASREB. Understanding reasons for discontinuation is an area for further research. However, responding to why they thought their peers discontinued reporting performance data to WASREB, the IDI at Murugi Mugumango, Muthambi 4K and DOMWASS highlighted two issues. First was concerns over levies paid to WASREB and WSBs, which are charged as a percentage of total revenue. Drawing parallels to experiences in Ngagaka, the general manager reported that the scheme had accumulated KES 9 million in debt by the time of transition to a water company in 2011; KES 3 million of these were arrears to Tana WSB/WASREB that accumulated between 2006 and 2011. Being a government constructed scheme, and thus the ownership of assets was put under the Tana WSB, the WSB had the rights and power to force a transition in scheme management by registering a water company in 2011. For community managed schemes where government contributions were marginal, the levers of control are arguably limited to a scheme's perception of the benefits versus costs of maintaining a relationship with the WSB. They may therefore choose to opt out of reporting their performance data depending on this perception.

This argument is premised on the response from the Mwonge Range treasurer on thoughts on the likelihood of the scheme starting to report performance data to WASREB. He noted that this was unlikely under current circumstances. He observed that the scheme had achieved a lot from their internal revenues (e.g., purchased 5 motorbikes, computers, and tents and chairs for use during AGMs, constructed an office complex, and maintained a stock of pipes worth millions). In this way, the scheme could access the benefits provided by a relationship with WSB from their

internal funds. Arguably then, these benefits were not a sufficient incentive for a relationship with the WSB. Additionally, and echoing the second concern raised by the IDIs on why schemes don't report their performance data, the treasurer highlighted the need for metering as enforced by WASREB. He noted that members of Mwonge Range were opposed to metering, and the scheme was therefore unlikely to submitting performance data. In Kamwene, the project manager considered the scheme young and still small to be reporting to WASREB. This is despite the scheme having comparable connection numbers to Muthambi 4K. Further, concerns were raised that the scheme is partially metered, and members are generally opposed to metering, yet WASREB enforces universal metering and as such, the scheme is not yet at a place to start reporting its performance data.

Drawing from the examples of Muthambi 4K and Murugi Mugumango, which are community owned and managed, it may be deduced that their relationship with the WSB / WASREB under Water Act 2002 was mostly transactional. The schemes remitted a percentage of their revenues and their performance data; WSBs extended technical support and materials. This relationship could also be argued to be an incentivizing approach from the WSB's perspective. However, until recently under Water Act 2016, there was no indication of the scheme's relationship with WSBs and WASREB going beyond technical operational performance. For example, there was no mention of the WSBs or WASREB playing an oversight role in the internal management of community managed schemes (e.g., election oversight, and enforcing AGMs and external financial audits). As such, the internal dynamics of a scheme's management to enable their technical performance was purely the responsibility of the schemes. Arguably then, while the water sector's legal framework under Water Act 2002 provided a prescription of requirements for licensing of community managed schemes, the necessary institutional systems to help rural

water supplies meet such requirements were not in place. If anything, this legal framework turned a blind eye on the de facto application of community management of rural water supplies under self-help projects despite its wide application.

### **7.3 Management of rural water supply under Water Act 2016**

The Water Act 2016 presents an opportunity for further reforms and hopefully significant gains from experiences implementing the 2002 Act. The new Act follows the promulgation of the Kenya Constitution of 2010 which, among other things, devolved the function of water services delivery to 47 newly created county governments. The Water (2016) sought to provide details and clarity of roles between the national and county governments under the Kenya Constitution 2010. Among the Acts provisions that are relevant to this research is that WASREB was retained as a national regulator with its functions including its mandate to monitor and enforce water services standards and issue licenses to water service providers. The responsibility for provision of water and sewerage services was mandated to 47 newly created county governments with Article 77 of the Act providing that County Governments shall establish water service providers. As part of these reforms, all water service providers were required to apply for new licenses directly with WASREB.

#### **7.3.1 *Transitions under devolution***

Muthambi 4K, Murugi Mugumango, Ngandori Nginda and Ngagaka have had varied experiences in navigating institutional changes introduced by the Water Act (2016) which provide valuable insights for policy considerations in governing rural water supplies going forward. The most obvious consequence of the Act has been defining the autonomy of the schemes within a context where water service delivery is the mandate of county governments,

and the Act provides that the counties establish WSPs. This is especially significant given the broader political environment which is characterized by clientelism in allocation of resources for water supplies as argued in Chapter 4.

The challenge of defining autonomy is exemplified in the experiences of WSPs within Embu County, where Ngandori Nginda and Ngagaka are located. Ngandori Nginda's Strategic Plan for 2019-2024 identifies negative political influence as one of the limiting factors in achieving their target of 100% coverage. It also identifies political interference as one of their threats in the scheme's SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis. Asked to expound on this (an obviously sensitive question), the IDI noted that while the scheme has had a cordial relationship with the county government, it is aware of experiences of other WSPs in the county and interference poses a threat with every change in the political environment.

The experiences referenced were likely those of Embu and Kyeni Water and Sanitation Companies (WASCO), whose shareholding falls wholly with the county government as public limited liability companies under the Water Act (2016). In Embu WASCO, the Managing Director of the Company was suspended by the Board of Directors but a report investigating the suspension found that due process was not followed in suspending him. The report pointed to interference by the executive arm of the county government (and more so the county executive committee (CEC) member in charge of water) in an attempt to micromanage the company (Nyaga 2021). In Kyeni WASCO, two IDIs noted that the county government orchestrated the suspension of the WSP's top management and seconded county staff to the scheme. This administrative change had significant negative impacts on the Company's operational performance. Unfortunately, while WASREB has published guidelines for corporate governance in water companies (including the competitive appointment of board of directors), these are at

high risk for capture by the county governments as owners of the WSPs. Interviews with two government officials gave examples of how county governments influence the outcomes of competitive board appointments either by influencing the selection of the interviewing committee or pre-vetting of shortlisted candidates. Consequently, the autonomy of the water companies from county politics is easily compromised.

In a comparable experience to Embu and Kyeni WASCO, the IDI at Ngagaka noted that the CEC for Water had, in 2014, demanded the transfer of the scheme's audit books and signatories to the county government following the effectiveness of devolution in 2013. These demands were not yielded. The IDI noted that the Manager could not be suspended from his role for defying the CEC's demands as he is not an appointee of the Board of Directors. Instead, he was seconded to the scheme by the Ministry, where he is a permanent employee, and any suspension could only be by letter from the appointing entity. Similarly, it was apparent from various conversations<sup>38</sup> within Embu County that, as with Ngagaka, the county government had attempted a transfer of signatories at Ngandori Nginda. The scheme, however, did not yield to these demands on the basis that this was a community managed scheme. Insistence of the transfer was said to have a posed political liability for the county government.

An interview with the Embu County Director for water confirmed the County's attempt to take over management of the water schemes but noted that the intention was to merge them with Embu WASCO and form a county-wide WSP. The County Director attributed the failure to take over management of the schemes to asset ownership, where assets belonging to both Ngandori Nginda and Ngagaka are held by the national government and mechanisms for asset transfer are not yet in place. Further, and more insightful, it was noted that the schemes are 'small fish' with

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<sup>38</sup> Opinions during these conversations were shared on condition of anonymity

respect to revenue collection. They also cover relatively small geographical areas. Combined, this means that the schemes do not attract too much political interest in the control of revenues, and consequently, control of their internal affairs. This is compared to the county’s main WSP – Embu WASCO – which has significantly higher revenues and multiple interested parties drawn from its expansive service area as demonstrated below.

	<b>Embu WASCO</b>	<b>Ngandori-Nginda</b>
# of Wards / Members of County Assembly	15	6
# of Constituencies / Members of Parliament	4	1
Annual Turnover (KES, 2019/20)	365 million	62 million

Murugi Mugumango and Muthambi 4K are located in Tharaka Nithi county, and both schemes noted that they have had very limited interactions with the county government. In Muthambi 4K, the IDI noted that the county government attempted to merge the scheme’s operations with those of the county WSP – Nithi Water and Sanitation Company (Nithi WASCO). The scheme was very opposed to the suggestion noting that, first, Muthambi 4K has significantly better operational performance than Nithi WASCO as reflected in the Impact Reports and a merger would risk management of Muthambi 4K’s operations. Second, it was noted that with Muthambi being a community scheme, the community needed to agree to the merger, which they did not. In Murugi Mugumango, the IDI noted that the scheme has not had any direct interactions with the county government. It is, however, looking to transition from a society to a company, a decision motivated by the desire to stay aligned to the Water Act 2016 as well as to mitigate political risks. Recognizing that the scheme’s assets were previously held in trust by the area chiefs – who were phased out under the new Constitution, part of the restructuring is expected to identify the county as a trustee of the assets. The scheme noted that they were in conversations with WASREB on how to structure this transition.

The decision by the four schemes to maintain an arm's length relationship with the county governments has, unfortunately, translated to little or no access to financial resources from the county governments. Arguments in Chapter 4 demonstrated how clientelism has significant influence on allocation of government funding towards rural water supplies in Kenya. All four schemes reported very minimal support from the county governments since 2013, and any support received has been in the form of materials such as pipes or storage tanks. Clientelism in this case is further supported by the observation that all four schemes, as well as Mwonge Range, identified competition from newly implemented water projects within their supply area as a threat to their revenues. These new projects were identified as irrigation projects funded mostly by the county governments, though some are funded through the national government with their implementation credited to the facilitation of the area MP. Consumers, however, rely on the irrigation projects for both domestic and irrigation water uses. Management of the irrigation projects is modelled under community management of water supplies under self-help projects, with the appointment of a water committee mandated with scheme operations and maintenance on a voluntary basis. Water consumption at these irrigation projects is unmetered.

While these irrigation projects pose an immediate threat to revenues at the five schemes, the schemes didn't seem to consider them a threat to their overall sustainability. The most apt explanation for this was provided in Mwonge Range where the Field Supervisor considered this short-term threat as potentially beneficial to the longer-term operations of the water society. He observed that the irrigation schemes provided basis for the scheme to enforce metering among members with multiple water connections. Further, he did not exude confidence in the long-term sustainability of the irrigation schemes and opined that running a water project is costly and requires stringent management of financial resources. The irrigation schemes, in his opinion,



neither had sufficient membership numbers to raise enough resources to manage their water supplies, nor the management structures required for stringent financial management. He expected that most consumers would continue to pay for Mwonge Range water services due to reliability of their supply. His pessimism on sustainability of the irrigation schemes was echoed in Murugi Mugumango which has at least seven irrigation projects implemented within its supply area. The IDI at Murugi Mugumango noted that one of the schemes had not been operational for at least two years due to technical challenges. Murugi Mugumango has, however, had significant revenue losses from high water consumers who prefer to use the unmetered connection for irrigation. Disconnections for non-payment of water services are also said to have become less effective as people with multiple water connections turn to their irrigation water connections in case of disconnection. According to the IDI at Ngagaka, WSPs have petitioned WASREB and the Ministry on the threat posed by irrigation projects to rural water supplies with the hope that these can be brought under WASREB's regulations.

### ***7.3.2 Responsiveness of reforms under Water Act 2016***

WASREB has published multiple regulatory tools to guide reforms under Water Act (2016) since 2016. As with reforms under Water Act 2002, these guidelines are clear on the requirement for engagement of legal entities as water services providers. This effectively confirms the sector's rejection of community management of rural water supplies under self-help groups as a de jure approach. Even then, WASREB's Guideline for provision of water and sanitation services in rural and underserved areas in Kenya, published in 2019, recognizes that "voluntary community management of small-scale water systems has been the de facto practice in rural Kenya for over three decades" (WASREB 2019a). In its background section, the Guideline, quoting World Bank estimates, suggests that there are about 1,200 small-piped water systems

that provide water to 3.7 million rural Kenyans, and these exclude community managed hand-pumps. This number is only likely to increase considering that interviews with the Embu County Director for water and the Tharaka Nithi County Water Engineer indicated that, where it is not feasible for the county established WSP to take over management of new rural water installations, these are often handed over to the community for management. Recognizing that most of these small-scale rural water projects are abandoned when there's a breakdown and communities often tend to approach NGOs, donors or the government for new schemes, the Guideline calls for formalization and professional management of rural water supplies.

With these considerations, the Guideline provides options for service delivery depending on the conditions within a county. County established WSPs are presented as the vehicle through which WASREB intends to regulate water service delivery in rural areas, and the WSPs are allowed to engage private sector players and user groups where appropriate. County governments are expected to identify the most appropriate strategies and approaches for water service delivery. This could include extending the mandate of existing WSPs to take up service provision in rural areas, setting up new WSPs focused on rural areas, or facilitate county WSPs to engage third party entities through WASREB issued licenses.

To enable engagement of third-party entities, WASREB published model license documents for small scale service providers (SSSPs) in 2020. These documents provide needed direction on licensing options for schemes such as Murugi Mugumango, Muthambi 4K, and Ngandori Nginda along with other water supplies that are not established by county governments but exist as legal entities. An interview with WASREB's Director for Monitoring and Enforcement indicated that county governments had faced extensive opposition in their attempts to take over management of established community managed rural water supplies following devolution in 2013. The SSSP

license document gives provisions that allow the appointment of such schemes by county governments as service providers and be licensed under their current management structures.

This license document gives the role of oversight for SSSPs to the County/Regulated. Among other things, the SSSPs are expected to prepare quarterly reports on technical and financial performance and submit these to both the county WSPs and WASREB. They should also submit annual reports to the county WSP and WASREB that include independent technical and financial audits. The county WSPs on the other hand are expected to monitor the performance of the SSSPs in line with performance targets and to provide technical, financial, and other support required to enable the SSSP to meet its obligations. While these guidelines provide a significant step for Kenya towards regulating rural water supplies, they need to be more apparent on the role of oversight over governance procedures (e.g., committee elections and AGMs where water schemes are registered as societies). Further, with over 1,200 small scale rural water supplies under voluntary community management, the onus is on county governments to identify and develop optimum strategies to wean the sector off this de facto approach. Chapter 8 draws insights from the case studies under this research to make policy considerations towards such strategies.

## Chapter 8. Conclusions and Recommendations

Community management of rural water supplies has become the dominant, though de facto, approach to management of rural water supplies in Kenya over the past 30+ years. This is often characterized by community projects registered under self-help groups, and an elected committee mandated with operations and management on a mostly voluntary basis. This arrangement is argued as having its foundation in Kenya's Harambee movement where rural communities were encouraged to form self-help groups towards developmental projects in post-independent Kenya. Community management was further entrenched as a consequence of decades of global efforts to promote community participation in water supply and sanitation starting with the International Drinking Water Decade (1981 – 1990) which sought to “generate greater political will to make [community participation] work”, and where elements of the decade's approach sought to emphasize community participation as a matter of policy and strategy (World Health Organization 1981). Despite these efforts, as well as a recognition of the key role played by this de facto institutional arrangement in ensuring rural water access, Kenya has consistently demonstrated a hesitation to recognize it in formal policy, institutional and regulatory frameworks. This is marked by the requirement for formally recognized water service providers to be legal entities yet registration as self-help groups does not yield legal entities. Additionally, there has been a marked level of institutional ambiguity on the mandate for supporting rural water supplies (especially in the

years since 1990) despite recognition of the role and dominance of self-help projects in water service provision.

In recognition of current global water policies under SDG 6.1 (which aims for safely managed drinking water, and a component of which is the availability of water on premises), this research looked at how select rural piped water schemes in Kenya were able to establish and govern professionally managed community organizations. This is despite the lack institutional and organizational frameworks targeted at rural water supplies until very recently. Policy considerations for governing rural water supplies are drawn from the experiences of these schemes. These recommendations are especially relevant for Kenya's county governments which are mandated with water supply services within the counties, and county WSPs form the basis for which WASREB wishes to regulate rural water supplies. They are, however, also relevant for other Sub-Saharan countries working towards bringing their rural water supplies under regulation.

A critical consideration in the application of these policy recommendations is that they are drawn from non-ASAL regions of Kenya. The specific case studies are all gravity flow piped water supply systems that draw their water from rivers within the Mt. Kenya Forest Reserve. Water supply is through individual and institutional/ commercial connections with only one scheme having communal water kiosks – day-to-day operation of the kiosks is leased out to individuals. The schemes conduct minimal treatment of water supplied within their systems, if any, and this includes sedimentation and chlorination.

## **8.1 Approach rural water service delivery from an area-wide basis**

The seven schemes studied under this research cover multiple administrative units (i.e., sublocations and/or locations). For Murugi Mugumango and Muthambi 4K water projects, which were community initiated, multiple individual schemes (5 and 4 respectively)

amalgamated in the early 1980s to form the multi-village schemes. The hope was to increase the schemes' economic viability and attract government funding towards scheme construction. The other five schemes were designed as multi-village schemes under the government implemented rural water supplies programme. Herein lies the lesson to treat rural villages as part of a continuum rather than siloed units. County governments can play a coordinating role in design of interventions and allocation of resources within this continuum. This is as seen with the DWO influenced merger between the Murugi and Mugumango schemes before they could access CHF funding in 1984. In the absence of such coordination, county governments risk duplicating efforts as seen in Kamwene and Gatua-Karimba under this research – the two schemes are located within the same ward and some consumers have individual connections from each scheme. The two schemes have, however, received separate funding to augment supply. The same is seen with irrigation projects implemented within the supply area of most schemes under this research yet consumers use water from both the water schemes and irrigation projects for both domestic and irrigation water uses.

The need for area-wide interventions is especially relevant considering population distribution in Kenya. With about 89% of the country's land mass considered as either arid or semi-arid lands (ASAL), a majority of the population (est. 62%) lives in the non-ASAL areas (i.e., 11% of the land mass). Considering that 72% of Kenya's total population lives in rural areas (World Bank Data 2020), it may be deduced that rural areas in Kenya's non-ASAL regions are mostly densely populated. Consequently, these varied settlement patterns across Kenya's rural areas (i.e., rural dense in non-ASAL areas and rural remote in ASAL areas) require different strategies to rural water supplies. Treating densely populated rural areas as a continuum as seen with case studies under this research provides a basis for planning for interventions in piped water supplies. Such an outlook would allow for aggregation of rural communities into commercially viable entities. WASREB observes that there are over 1,200

small scale water supplies serving over 3.7 million rural Kenyans today under voluntary community management. These schemes are often small making it a challenge to raise enough revenue to cover operations and maintenance costs. Consequently, such schemes are often abandoned in the event that communities cannot raise funds for high maintenance costs. Aggregating them along relevant boundaries (e.g., administrative or catchment areas) as was the case with schemes such as Muthambi 4K and Murugi Mugumango would improve their economic viability.

## **8.2 Revisit understanding of financing piped rural water supplies**

Among key challenges to the prospect of piped water supplies in rural areas is the cost of initial capital investments, and whether communities can finance O&M of their water supplies for improved operational performance. The latter has been the subject of investigation for decades with the Water Use Test Project of 1987-91 being one example.

Unsurprisingly, construction of schemes studied under this research confirms the need for external resources – government or development partners – to construct required infrastructure. A programmatic approach such as the Rural Water Supplies Programme (RWSP) of the 1970s-80s is seen to have long lasting impacts – 5 out of 7 seven schemes studied under this research have their roots in this programme. Government and/or donor resources are observed to have been critical for construction of original main distribution networks. Extension of the networks, however, has relied on both internal revenues from water charges and external resources. Ngandori Nginda provides a useful and unique example in network extension where it has relied on its long-standing relationship with a private sector player to access pipes for rehabilitation and extension of the main distribution network on credit terms, and this debt is settled using internal revenues.

The schemes under this research provide evidence that piped rural water supplies can self-finance their O&M functions without external subsidies or transfers. Among these O&M costs are statutory charges such as water abstraction fees, salaries to permanent staff, and both major capital expenditure such as replacement of large pipes destroyed during road construction works and network extension costs. These costs are covered by water revenues and the schemes have maintained an arguably affordable water tariff (i.e., < USD 3/month at all schemes) as either a flat rate for unmetered connections or as the first band of consumption on a graduated tariff for metered connections. The number of customers (i.e., household, institutional and/or commercial connections) at the schemes range from about 1,500 – 13,000. A necessary caveat here is that these are gravity schemes, and they conduct minimal water treatment of their supplies (mostly chlorination). The water abstraction points are all within the Mt. Kenya Forest reserve and the water generally has very low turbidity. These observations point to the need to revisit policy ambitions for rural water supplies from a financing perspective. Government and/or donor resources are seen as critical to initial investments and cost recovery may not always be feasible. However, these schemes also demonstrate that rural piped water supplies can self-finance their O&M functions in the longer term and ensure continued operations. This allows limited government finance to stay focused on capital investments rather than subsidizing operations.

### **8.3 Emphasize professional management of rural water supplies**

The ability of community managed rural water supplies to self-finance their O&M functions is dependent on the ability of the schemes to establish and operate professionally managed entities. Four crucial traits are observed among schemes that successfully adopted professional management. These traits can inform the conceptualization of community management of rural water supplies as county governments consider appropriate strategies.



First is clear division of roles and responsibility between an elected water management committee responsible for oversight and a hired staff mandated with day-to-day operations. Successful schemes were observed have engaged hired staff from the onset of operations at the schemes. The staff were trained and competent persons in their areas of operation such as accounting or technical issues. The levels of training varied with position held as well as the size and complexity of the scheme. Training had been through either on-the-job training or formal academic institutions.

Second, the division of roles and responsibilities was accompanied by incentives and accountability frameworks among the various actor relationships. The clarity and effectiveness of such frameworks was seen to contribute to the success of the scheme. Key among these is a direct accountability link between water users and the scheme staff – salaries for the scheme staff are dependent of water revenues. This incentivizes the staff to ensure that water services are maintained, and the users are adequately informed in case of challenges. Additionally, it is important that water users can elect representatives to the water management committees who provide active oversight to the scheme staff and ensure operations. Election of WMC representatives should be on a pre-determined cycle and informed by the members' perception of the scheme performance based on their participation in planning, budgeting, and reporting of activities within the scheme. Combined, these accountability channels provide a balance of power between the water users, the WMC and the scheme staff in controlling the affairs of the scheme thus contributing to sustainable operations. In the absence of effective external regulation of the various incentives and accountability mechanisms, this balance is unfortunately highly vulnerable to the actions of the WMC and the scheme staff who are often responsible for organizing elections and meetings such as AGMs.

Third is the importance of instituting accounting and financial management measures from project on-set, regardless of the size of the scheme. This includes auditing of financial records and sharing the audit reports with members to ensure transparency. Murugi Mugumango and Muthambi 4K demonstrate the feasibility of such a practice. Murugi Mugumango has been audited annually since as early as 1986 when the scheme's annual income was about KES 127,000 and the scheme had an estimated 430 members. In Muthambi 4K, audit reports were available from as early as 1995 when the scheme was still under construction but collected membership fees. Such practices not only ensure accountability of funds but also provide a basis for planning and budgeting for activities at the schemes.

Finally, is the need to enforce metered water consumption for all water connections. Metering as a sector best practice ensures water consumers pay for actual volume consumed. The schemes under evaluation demonstrate the need for consumer education in implementing metering to ensure community buy-in. Further, metering should be enforced from project on-set with the examples of Kamwene and Mwonge Range demonstrating that it is significantly more difficult to introduce metering to water users who've previously had unrestricted water consumption at a flat rate. A critical analysis of who bears the initial cost of metering is also necessary. On the one hand, consumers could meet the initial cost of the meter, but this has the consequent effect that any meter replacement costs are borne solely by the water schemes. In contrast a meter rent towards future replacement may be charged where the initial metering cost is borne by the water scheme.

#### **8.4 Anchor institutional and organizational arrangements for rural water supplies on statutory laws**

Establishment and operation of professionally managed entities requires the existence of enabling institutional and organizational arrangements. Successful cases under this study are argued to have appropriated an institutional template from the coffee cooperative societies in

their evolution to an organizational arrangement with clear division of roles and responsibilities among hired staff (responsible to day-to-day operations) and water management committees (responsible for oversight). Registration under the Societies Act established the schemes as legal entities that can serve as formally recognized water service providers.

In contrast, most rural water supplies in Kenya are organized and registered as self-help groups, a registration that neither yields legal entities nor has guidelines that support the emergence of professionally managed community organizations. Instead, an elected water management committee is often mandated with operations and management of the water supplies on a voluntary basis. Considering the historical significance of the ideals of self-help in approaches to rural water supplies in Kenya, the sector could benefit from developing a policy framework that builds on the strengths of self-help, addresses its key weaknesses, and remains responsive to dynamics within Kenya's rural areas. One such approach could be adoption of societies as an appropriate legal entity for management of rural water supplies in the same way that WASREB recognizes registration of county WSPs, which have traditionally served urban areas on commercial basis, under the Companies Act of 2015.

The Societies Act contains operational expectations that would provide guidance on adoption of professional management of rural water schemes while retaining the strengths of self-help. Further, it allows for registration of non-profit making / non-commercial organizations as legal entities which is relevant to the socio-economic setting of rural communities. Such an arrangement should be considered given the sub-sector's operating environment where most community managed rural water schemes are opposed to handing over management of their schemes to county WSPs as observed with the schemes under this research. Consequently, water societies would provide recognized entities for county governments to cooperate with rather than implement competing projects as seen with the irrigation projects implemented

within the study areas. Most importantly, such an arrangement would retain a direct accountability link between water consumers and the scheme staff through collection of water revenues to cover O&M costs, which is observed as crucial to continued operations.

The use of societies should, however, be cognizant of and seek to utilize pre-existing channels of interactions within the supply area and their contribution to building social capital and trust. Coffee cooperative societies formed the basis of interactions among water consumers within the case studies hence the relevance of the appropriation of their institutional template to management of water schemes under this research.

## **8.5 De-risk rural water supplies from political clientelism and/or capture by individuals**

Allocation of government resources for construction of rural water supplies as well as community management of schemes by elected committee members is inherently political. The design of institutional and organizational arrangements should therefore seek to de-risk community organizations from political interference, clientelism or capture observed within some case studies.

One such avenue could be through the County WSPs mandate for oversight of licensed small scale service providers (SSSPs) in line with WASREB guidelines for rural water supplies. The Guidelines give county governments the option to engage third party entities in service provision through WASREB issued SSSP licenses. Community managed water societies could form some of such entities. Part of the County WSP's oversight role would include enforcement of license requirement as well as statutory requirements under the Societies Act including annual financial auditing and enforcing annual general meetings and election of office holders. As such, the County WSPs would enforce accountability mechanisms between water users, elected committee members and scheme staff and mitigate against vulnerability of the schemes from the actions of committee members and the scheme staff.

Second, design considerations for water societies could borrow from experiences from the case studies on mitigating political risks. Among these is having minimum qualifications for prospective committee members to ensure competence of representatives elected to the WMCs. Additionally, instituting a mandatory retirement age for executive committee members would help to de-risk development of governance structures around specific individuals. Further, the elections cycle at the water schemes should be delinked from the national elections cycle to mitigate against patronage politics. One such approach could be retiring part of the water management committees on an annual rotational basis so that there are elections happening every year within the scheme for a proportion of users.

Finally, both county and national governments should transition to a practice that requires that management of water supplies constructed through government resources be handled by organizations registered as legal entities. In so doing, government actions would match the legal rhetoric on requirement for formal water service providers. This is instead of the current practice where the management of rural water projects (both domestic and irrigation) is often handed over to community groups registered under self-help thus perpetuating this de facto approach. Very deliberate efforts will be needed by both the national and county governments to break this practice that has become entrenched by years of global efforts, and that favors political clientelism in the allocation of resources for water supply developments.

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