

The African Water Vision 2025: its influence on water governance in the development of Africa's water sector, with an emphasis on rural communities in Kenya: a review

Kristin Mutschinski^{a,b} and Neil A. Coles^{c,d,*}

^a Faculty of Agriculture, Kiel University of Applied Sciences, Kiel, Germany

^b Participant of Mentoring Programme for Young Professionals, Rural Water Supply Network, St Gallen, Switzerland

^c Water@Leeds, School of Geography, Faculty of Earth and Environment, University of Leeds, Leeds, UK

^d The UWA Institute of Agriculture, The University of Western Australia, Crawley Perth, Australia

*Corresponding author. E-mail: n.a.coles@leeds.ac.uk; neil.coles@uwa.edu.au

ABSTRACT

Reliable and secure water resources for rural communities in Africa continue to be at the forefront of the challenges facing these communities in the last 20 years, particularly for smallholders, agricultural sector productivity, food security and economic development increasingly exacerbated by climate change and rapidly growing urban populations. Addressing these challenges requires well-structured policy in the water sector, to implement commitments and investments effectively, and ultimately ensure the quantity and quality of water supply. The AWV 2025 for Africa was commissioned by the World Water Council in 2000 to create a framework to target these aspects in Africa. We examine the progress towards achieving this vision after two decades, through the initiatives, government policies and water strategies that have been implemented. We take a closer look at the top-down impact of the AWV 2025 in the national context of Kenya and its rural population. While the water sector has evolved since 2000, it remains difficult to meet international standards, both at the continental level and in Kenya. This requires continued efforts to strengthen good governance in the water sector, address the financial challenges associated with the expansion of the infrastructure, and developing decentralized approaches to water supply provision.

Key words: Africa, Agriculture, Climate change, Food security, Water governance, Water resources

HIGHLIGHTS

- Development of secure water resources is critical for rural communities to achieve climate resilience.
- The Africa Water Vision 2025 outlined four goals to promote water governance.
- Limited success has been reported in delivering these goals.
- Investment has focussed on private water services and urban infrastructure.
- Water law reforms in Kenya have been enacted, but their impact has been minimal in rural areas.

INTRODUCTION

Writing two decades ago, a report from the independent World Commission for Water (WCW) looking forward to the 21st century stated that:

‘Water is life. Every human being, now and in the future, should have access to safe water for drinking, appropriate sanitation, and enough food and energy at reasonable cost. Providing adequate water to meet these basic

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needs must be done in an equitable manner that works in harmony with nature. For water is the basis for all living ecosystems and habitats and part of an immutable hydrological cycle that must be respected if the development of human activity and well being is to be sustainable' (Cosgrove & Rijsberman, 2000).

Furthermore, it was stated that as of the turn of the century:

'We are not achieving these goals today, and we are on a path leading to crisis and to future problems for a large part of humanity and many parts of the planet's ecosystems. Business as usual leads us on an unsustainable and inequitable path. A holistic, systemic approach relying on integrated water resource management must replace the current fragmentation in managing water' (Cosgrove & Rijsberman, 2000).

In response to the WCW report, the World Water Council commissioned a series of water vision statements for countries and regions around the world. We examine the impact of one of these reports, the African Water Vision 2025 (AWV 2025)¹, and provide some insight into the effectiveness of this framing in relation to the development, management and governance of water resources in Africa. An assessment of the barriers or mechanisms that have hindered or assisted in delivering on this vision statement is given. Due to the great complexity associated with different countries in Africa, in a more detailed analysis, we focus exclusively on Kenya and its rural population to capture the top-down impact of AWV 2025 in Kenya and its rural population. We provide an analysis of the actions of successive Kenyan governments in improving water governance in the last 20 years, with direct reference made to the goals and objectives set out in AWV 2025.

AN ANALYSIS OF WATER MANAGEMENT IN AFRICA

The importance of reliable water resources for agricultural sector productivity, food security and economic development in Africa has been known for decades (Hope *et al.*, 2020). Particularly in rural areas, where rain-fed agriculture is largely self-sufficient, rendering food security highly dependent on rainfall or on stored water availability. This is especially the case for rural communities, who are predominantly smallholders with limited access to secure water supplies. The additional impacts of climate change will result in higher temperatures and shifts in precipitation (both in amount and timing) posing a significant threat to their water and economic security (Niang *et al.*, 2014; Nicol *et al.*, 2015). At the turn of the 20th century, as a counter to the predicted longer-term decline in water security in Africa, The Economic Commission for Africa (ECA), the African Union (AU) and the African Development Bank (ADB) released the 'Africa Water Vision 2025' in order, on the one hand, to highlight the existing issues and challenges of the past decade with regard to water resources in 2000, and on the other hand, to formulate a framework for action.

Presented in 2000, the AWV 2025 aimed to establish a transition towards: 'An Africa where there is equitable and sustainable use and management of water resources for poverty alleviation, socio-economic development, regional cooperation and the environment by 2025' (UNECA, 2003). This vision developed through a multi-stakeholder process is based on the Dublin Principles², driven by the World Water Vision independent commissions report

¹ Presented at the World Water Forum, March 17–22, 2000, The Hague, The Netherlands.

² The 1992 Dublin principles were an attempt to concisely state the main issues and thrust of water management:

- Freshwater is a finite and vulnerable resource, essential to sustain life, development, and the environment.
- Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels;
- Women play a central part in the provision, management, and safeguarding of water.
- Water has an economic value in all its competing uses and should be recognised as an economic good.



Fig. 1. | Cross-reference and alignment of the objectives of the AWV 2025 and the subsequent MDGs 1 and 7 and SDGs 2, 4 and 6 (Cosgrove & Rijsberman, 2000; Savage, 2003).

(Cosgrove & Rijsberman, 2000) and the growing awareness of the potential impact of climate change. The AWV 2025 highlights issues surrounding water availability and security for communities in Africa and notes that it is closely linked to factors of food supply, human health, prosperity, economic development and the protection of existing ecosystems. The framework of the AWV 2025 contains four main goals (Figure 1), which are to be achieved by 2025 in order to improve sustainable water management in Africa (UNECA, 2003). Subsequent to these goals being set, the Millennium Development Goals (MDGs) and Sustainability Development Goals (SDGs) were established as global aims. Five of these goals align with goals 1–4 set out in the AWV 2025 (Figure 1).

Water resources use and management in Africa: an overview (2000–2020)

The AWV 2025 describes the state of water resources in Africa at the beginning of the 21st century as ‘increasingly threatened’ by transboundary issues, climate change, water scarcity, desertification, pollution and environmental degradation (UNECA, 2003). Water availability and security on the African continent has always been challenging due to differences in both geophysical (e.g. soil landscapes, biodiversity and wide climatic variations including high evaporation rates and extreme variability in precipitation and temperature) and geo-political (e.g. water governance, political stability, cross-border conflicts and socio-economic) conditions in each Nation State (Desanker & Magadza, 2001; Hulme *et al.*, 2001). Furthermore, man-made actions have led to declines in both the quality and available quantity of water (UNECA, 2003).

The IPCC Report on ‘Climate Change’ (IPCC, 2001) underlines this, with the statement that water problems in urban and rural areas are very likely to increase through, competing demands, rapid population growth⁵ and a lack of infrastructure. At the same time, Africa is the continent with the lowest conversion factor of precipitation to runoff (just 15%) and faces challenging high evaporation rates (IPCC, 2001; UNECA, 2003). More importantly, the larger surface water resources in Africa, which are accessed by 75% of the population, are mainly large lakes

⁵ Projected population (millions) in Africa: 1.679 (2030); 2.478 (2050) (UN, 2015b).

and rivers, with only 15% of water sourced from groundwater reservoirs. Current global climate projections show that warming temperatures will, and have, caused more frequent weather extremes, such as heavy rainfall events, floods and storms or more extensive and persistent droughts (IPCC, 2012, 2019; Nicholson, 2017). According to WHO (2019), climate change impacts are often manifested through water resources and there is a need for the implementation of climate adaptation measures to assure water security and subsequently resilient communities and ecosystems. Therefore, a greater investment by governments and their relevant institutions in sustainable water infrastructure (i.e. water storage infrastructure for management of floods and droughts) is needed.

Small-scale agriculture in Africa is highly dependent on rainfall events since it is primarily rain-fed rather than irrigated (Barrios *et al.*, 2008; FAO, 2016). This means that traditional farming systems are strongly influenced by drought and flood events, especially at the beginning of the planting and germination periods. The availability of local water resources, their long-term security and sustainability, and self-sufficient water supplies, have gained increasing importance over the last two decades as climate change has impacted on their resilience, reliability and quality (Adhikari *et al.*, 2015; Nicol *et al.*, 2015). By the beginning of the 21st century in some parts of Africa, for example East Africa, with an average annual precipitation amount between 800 and 1,200 mm, there is sufficient rainfall available which could be accessed through the efficient use of rainwater harvesting (RWH⁴) systems, but remains unrealized (UNECA, 2003; Nicholson, 2017; Twaweza, 2018). Due to a lack of technical, financial and human capacity, adaptation to climate change, and therefore resilience, is insufficient (Branca *et al.*, 2011; Arslan *et al.*, 2017), creating the potential risk for unexpected (or extreme) climatic events to severely impact rural communities in the short, medium and longer term.

Over the past 20 years, the water sector in Africa has been strongly influenced by international and national measures (e.g. the World Water Vision (Cosgrove & Rijsberman, 2000), the MDGs⁵ and the SDGs⁶). Influence was also exerted by the Global Water Programme (GWP), the ADB and various other programmes conducted by African Water Facility (AWF), Rural Water Supply and Sanitation Initiative (RWSSI), African Water Week (AWW) and WASH activities. In particular, the introduction and implementation of the concept *Integrated Water Resource Management* (IWRM)⁷ supported a rethinking of the management of water resources in relation to the impacts of climate change, environmental needs and governance (AMCOW, 2012; GWP, 2012). But, the shift towards providing reliable and secure water resources, in combination with a reduction of water-related risks, is still considered inadequate by continental and international organizations (AMCOW, 2018a).

Analytical approach

This research is based on a qualitative evaluation of the available government, institutional and scientific literature. A distinction is made between a presentation of the influence of AWV 2025 on continental African water governance and a specific evaluation of the national implementation and influence of AWV 2025 on the Kenyan water sector. The aim is to illustrate the top-down impact of AWV 2025 and subsequent declarations and commitments for the country of Kenya and its rural population most affected by climate change. It should be noted that no direct or simple comparison of the conclusions for Kenya can be made with other African countries in this regard.

⁴ Rainwater harvesting can be defined as the collection, conveyance and storage of rainwater for an intended use. Most often, the intended uses are for biomass production, such as for crops, trees or pasture, or for domestic needs (Malesu *et al.*, 2006).

⁵ <https://www.un.org/millenniumgoals/>.

⁶ <https://sdgs.un.org/goals>.

⁷ 'IWRM is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems' (GWP, 2000).

In evaluating the published goals of AWV 2025, it should be noted that no interim reports with respect to the milestones set for 2005 and 2015 were publicly available in the published literature. The delivery of the set objectives can, therefore, only be assessed indirectly through third party reports and datasets recorded by independent assessments. These often do not refer to Africa as a continent but analyse developments on the basis of subregions such as ‘Sub-Saharan Africa’ or ‘Western Asia and Northern Africa’ or exclusively on the basis of the single countries, which makes it difficult to relate them specifically to the objectives of the AWV 2025. Due to a lack of data for all nations in Africa, definitive figures regarding the amount of water withdrawn, the share of the sectors in water withdrawal and the share of internal renewable water resources could not be compared over the last 20 years. Likewise, no clear government figures could be found on investments in the water sector and infrastructure.

However, considering the overlap of the expected actions outlined in the AWV 2025 by the MDGs and SDGs (Figure 1), an assessment based on the implementation of SDG 6 and its subgoals is possible. SDG 6 promotes actions that will ‘Ensure availability and sustainable management of water and sanitation for all’ and includes eight subgoals which are contained within the four goals of the AWV 2025 (UNECA, 2003; UN, 2015a):

1. strengthening governance of water resources (SDG 6.1, 6.2, 6.3, 6.4, 6.5, 6.6),
2. improving water wisdom (SDG 6.5, 6.b),
3. meeting urgent water needs (SDG 6.1, 6.2, 6.3, 6.4, 6.5) and
4. strengthening the financial base on the desired water future (SDG 6.5, 6.a).

IWRM is a key aspect of the sustainable development of the water sector, which was addressed at the beginning of the century by the AWV 2025 and subsequently by the SDG 6.5⁸ measured through the indicator 6.5.1⁹. As such progress in implementing IWRM over the past 20 years can be used to compare the progress towards the goals outlined in the AWV (Figure 2). As described in the Status Report on the Implementation of IWRM Africa (AMCOW, 2018b), the African continent has achieved the slowest progress towards completion using a global comparison, with an implementation score of 41 (medium-low). According to Indicator 6.5.1, IWRM comprises four elements, which are also reflected in the four actions of AWV 2025 (UNECA, 2003; AMCOW, 2018a, 2018b; Figure 2).

Given that the AWV 2025’s objectives are subordinate to the SDG actions for 2015 (i.e. ‘development of national policies and comprehensive institutional reform; full implementation or financing urgent water needs; mobilizing finance from national and international sources’), the majority of the SDG goals should have already been met or a pathway for implementation secured. In contrast, the findings of the Status Report on the Implementation of IWRM in Africa (2018), the different actions were introduced with varying degrees of success, such that actions covering ‘enabling environment’ and ‘institutions and participation’ have a higher score (48) than ‘management instruments’ (40) and ‘financing’ (33) (AMCOW, 2018b).

Considering that the maximum score is 100%, which was not achieved for any of these actions, it can be assumed that the objectives set by AWV 2025 were not achieved by the 2015 milestone and is unlikely to be met in 2025 (UNECA, 2003; AMCOW, 2018b). Furthermore, while other publications state that even as African nations adopt water and sanitation measures at the highest political level, there is recognition that the potential to actually achieve the SDG 6 WASH goals on-ground is limited and among the lowest globally (AU, 2015; UNEP, 2016; Herrera, 2019; UNESCO, UN-Water, 2020).

⁸ SDG 6.5: By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate (UN, 2015a).

⁹ Degree of integrated water resources management implementation (0–100) (UN, 2015a).

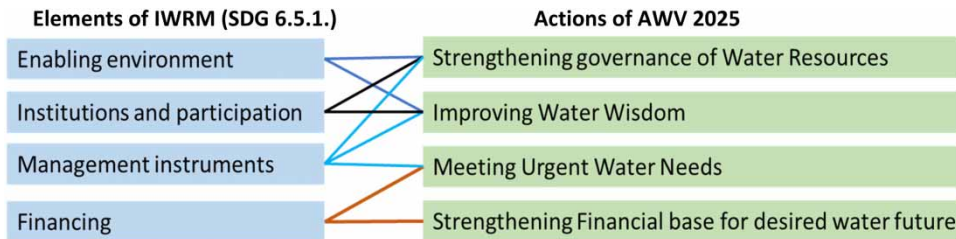


Fig. 2. | Potential overlap between SDG 6.5.1 and the actions outlined in the AWW2025 report.

Governance in the African water sector

The water scarcity on the African continent, which was already described in 2000, remains a challenge even after 20 years of the AWW 2025 existence (UNECA, 2003; AMCOW, 2018b; FAO & ECA, 2018). This is evidenced by the negative trend regarding water resources shown in comparing figures for 2001, where 300 million people in Africa were living in water-scarce environments; to 2015 where this had grown to around 340 million (IPCC, 2001; AU, 2015; AUC_AMCOW, 2016).

Further indications of moderate development of the African water sector and its governance can be found in the surveys recently conducted by Howard & Han (2020). These show that half of the Africans surveyed rate the government's performance in water supply as 'fairly badly' or even 'very bad'. Rural regions in particular are experiencing severe disadvantages in terms of access to safe and clean water. The surveys also highlighted aspects of corruption (i.e. respondents indicated that bribes were demanded from one in five Africans if the government was to provide services).

In 2000, the AWW 2025 describes the political situation in Africa as 'fragile' owing to weak adoption of international law, low regional cooperation, insurgency and conflicts between countries. The water sector is characterized by inappropriate governance, poor institutional arrangements and a failure to invest in water resource assessments, protection and development. Additionally, an inadequate legal framework surrounding the ownership, cross-border use and resource management of water constituted a considerable challenge to its equitable governance and in raising the awareness of the value of water in the communities it supports (UNECA, 2003).

In the past 20 years, the governance of the African Water Sector has continued to evolve with several new declarations, institutional establishments and initiatives implemented. Figure 3 illustrates the timeline for the essential political developments over the last 20 years. By the time that AWW 2025 was drawn up, bottom-up institutional arrangements and new policy, strategies as well as legislative frameworks were accepted as instruments for achieving the AWW 2025 objectives. The approach of water self-sufficiency through systems such as RWH is only marginally mentioned in the documents developed.

The AWW 2025 framework formed the basis for many of these new initiatives, including the establishment in 2003 of the African Ministerial Council of Water (AMCOW) which increasingly holds a major role in water governance in Africa. The establishment of AMCOW enabled 'water' to be assigned political significance and reinforces the operationalization of the goals set in the AWW 2025 (AMCOW, 2018a). AMCOW has steadily gained political importance over the past 20 years, such that by 2017, all AMCOW organs and structures were successfully integrated into the African Union Commission (AUC), and was coordinating the sectoral committee on WASH for the Specialized Technical Committee (STC) on agriculture, rural development, water and

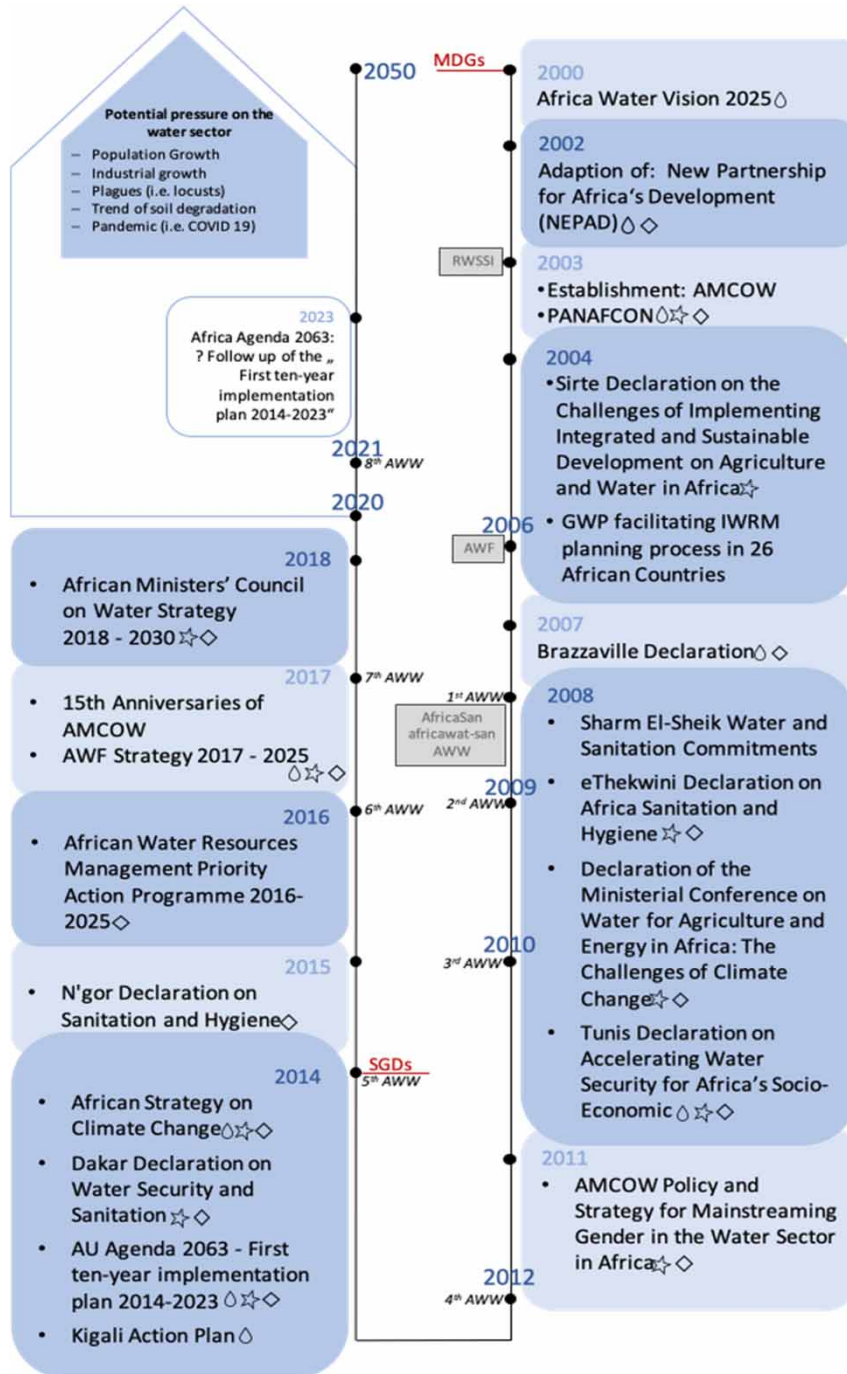


Fig. 3. | Timeline of African water sector development (2000–2020 and beyond). ◇ = RWH mentioned; ◇ = MDG or SDG mentioned; ☆ = AWW 2025 mentioned (drawn up on the basis of: NEPAD, 2003; UNECA, 2003; AU, 2004, 2008a, 2008b, 2008c; UN-Water/Africa, 2004; AMCOW, 2008, 2011, 2014, 2018a; FAO, 2008; AfricaSan, 2015; AUC, 2015a, 2015b, 2015c; AWF, 2016; One World, 2017).

environment (ARDWE) (AMCOW, 2018a). Under the council's leadership, various initiatives to strengthen the water sector were developed and implemented between 2003 and 2018. These include the

- AWF,
- RWSSI,
- AWW and
- Africa Water Sector and Sanitation Monitoring and Reporting System (Africawat-san).

The future outlook foreshadows the biotic and abiotic stress factors for the continued development of the water sector in Africa. With a predicted population of more than 2.4 billion people by 2050 (UN, 2015b), food security challenges, increasing urbanization, extreme weather events and other negative events, such as the locust plague and pandemic caused by the COVID-19 virus in 2020, will increase the pressure on water security and the water sector in general (WHH, 2020).

THE SIGNIFICANCE OF WATER AS A RESOURCE IN KENYA

The further analysis focuses on Kenya, which is particularly, vulnerable to drought as its economic and social development is based around extensive rain-fed agricultural practices (Mogaka *et al.*, 2005; Githui *et al.*, 2009; Huho & Kosonei, 2014; Ondigo *et al.*, 2018). About 79% of the population lives in rural areas and is dependent on agriculture for short- and long-term security. The livelihoods of the rural population in Kenya are mainly based on small-scale rain-fed agriculture, which supports self-sufficiency and generates income through the sale of goods at local markets, which generates a daily income (Mohajan, 2013). The agricultural sector in Kenya contributes the second largest share to the Kenyan economy, accounting for 52% in 2020 (ADB, 2020) of the total gross domestic product (GDP), and thus plays an essential role in Kenya's socio-economic development. Therefore, any negative effects on the economy and people's livelihoods caused by floods and droughts on agricultural production are often significant, as demonstrated in various publications (Huho, 2011; Huho *et al.*, 2012; Huho & Kosonei, 2014; Nicol *et al.*, 2015).

In order to reduce the negative effects of climate instability and strengthen the climate resilience of small farmers in the future, a transformation of the existing agricultural systems is needed. In this context, water as a limiting factor plays a key role in spreading the positive impact of effective water management for ecological, social and economic aspects (Branca *et al.*, 2011; Theib *et al.*, 2012; Rockström & Falkenmark, 2015). Hence, precipitation in Kenya is considered one of the most important climatic variables, with its quantity and distribution significantly affecting agriculture yields. Thus, it not only contributes to the stabilization of the Kenyan economy, which has a long-term impact on the development of the population's prosperity, but also the daily food security of the population (Otiende, 2009; Huho *et al.*, 2012; Huho & Kosonei, 2014).

Beside precipitation, Kenya's other major water resources consist of the large surface water reservoirs provided by Lake Victoria and Lake Turkana and the five water towers (Aberdare Rangers, Cherangany Hills, Mau Forest Complex, Mt. Elgon and Mt. Kenya)¹⁰ which are central to Kenya's economic and social well-being (MEMR, 2012; JICA, 2013; Kameri-Mbote & Kariuki, 2015). The 'five towers' provide an estimated 75% of the country's water resources. Groundwater storage in combination with surface resources are used nationwide to meet water demands, with the volume of annual renewable surface water being significantly higher than groundwater sources (Mogaka *et al.*, 2005).

¹⁰ Water towers are forested, high elevation landscapes from which most of the country's major rivers (e.g., Tana, Mara and Ewaso Ng'iro) originate (Global Waters, 2019).

By the beginning of the 21st century, Kenya was among a number of countries with chronic water stress¹¹ (Mogaka *et al.*, 2005) and, according to Jemmali (2018), was classified as a water-scarce country. In Kenya, the total renewable water resource per capita has declined from 1.060 m³ in 1997 to 806 m³ by 2007 and further reduced to 618 m³ in 2017. In addition, only parts of Kenya's total water resources are accessible for domestic use, due to a lack of infrastructure, technical knowhow and financial capacity (Mogaka *et al.*, 2005; Ondigo *et al.*, 2018; FAO, 2019). Different water scarcity coping strategies are applied by smallholders who practise rain-fed agricultural production such as soil moisture retention practices (e.g. terracing and stubble retention) and water storage (e.g. sand dams and rainwater tanks), but these activities are constrained by a lack of skilled labour to install and maintain these adaptations (Kalungu *et al.*, 2015).

The challenges described in AWV 2025 also apply to Kenya's water resources (UNECA, 2003; WRA, 2019). Kenya faces challenges posed by having one of the world's lowest annual water recharge rates, as it struggles with insufficient investment in the development of potential water resources to provide for their increasing population. Due to a lack of political will, appropriate policies and regulation, and financial resources, it is difficult to distribute water equitably, to control illegal water withdrawals and wastewater discharges as well as to protect water catchment areas. Consequently, those water sources that are accessed are being overexploited and polluted by inadequate management and low reinforcement by the state, which, in the longer term, will result in their decline and loss as a secure viable resource, with urbanization creating significant pressure on environmental and water resources (Ondigo *et al.*, 2018; ROK, 2020a). The greatest challenge in resolving the complex interrelationships is the sectoral coordination of institutions, stakeholders and investors in order to use, maintain and develop existing water resources in a sustainable manner (UNECA, 2003; Mogaka *et al.*, 2005; Mati & Mugo, 2018).

During the last two decades, the development of the legal framework of the Kenyan water sector has been influenced by national and international strategic guidance provided by the AWV 2025, Kenya National Water Masterplan 2030, MDGs and SDGs (AMCOW, 2018a). Under these frameworks, the availability of drinking water for the rural population has improved from 37% in 2000 to 50% by 2017; water supply coverage has increased countrywide from 48% in 2009 to 57% in 2018; although RWH in Kenya is undertaken by 77% of households, it is viewed as a supplementary water supply. Such that, about half of these households do not have more than 1 month supply of stored rainwater (Twaweza, 2018). The UN-Water Global Analysis and Assessment of Sanitation and Drinking Water (GLAAS) country survey of 2018–19 showed that Kenya returned 100% approval for the creation of national WASH policies for rural and urbanized regions, but only has a limited distribution of WASH implementation plans. In addition, less than 50% of the financial support and trained workforce capacity required to implement WASH plans is available (WHO, 2019). Investment in water infrastructure remains a critical factor in improving water supply connection, quality and reliability (K'Akumu, 2004; K'Akumu & Appida, 2006; Akinyi Were, 2019). The implementation of SDG 6.5.1 action on 'financing' is rated higher in a continental comparison (40), but in a direct comparison of the four IWRM elements of the SDG 6.5.1 in Kenya, it is rated as the lowest (AMCOW, 2018b).

Furthermore, the availability of financial resources or the ability to pay is of crucial importance from the consumer's point of view since the installation of the infrastructure for a qualitative and quantitative supply of water is only stimulated by the financial investment by the recipients of water (K'Akumu, 2004). Recent surveys by Twaweza (2017) show that only 48% of the poorest have access to improved water sources, which in turn indicates that the poorest pay more for clean water due to costs associated with time spent fetching water, treating

¹¹ Chronic water stress is defined as the annually available renewable freshwater reserves are less than 1000 m³ per inhabitant (Falkenmark, 1989).

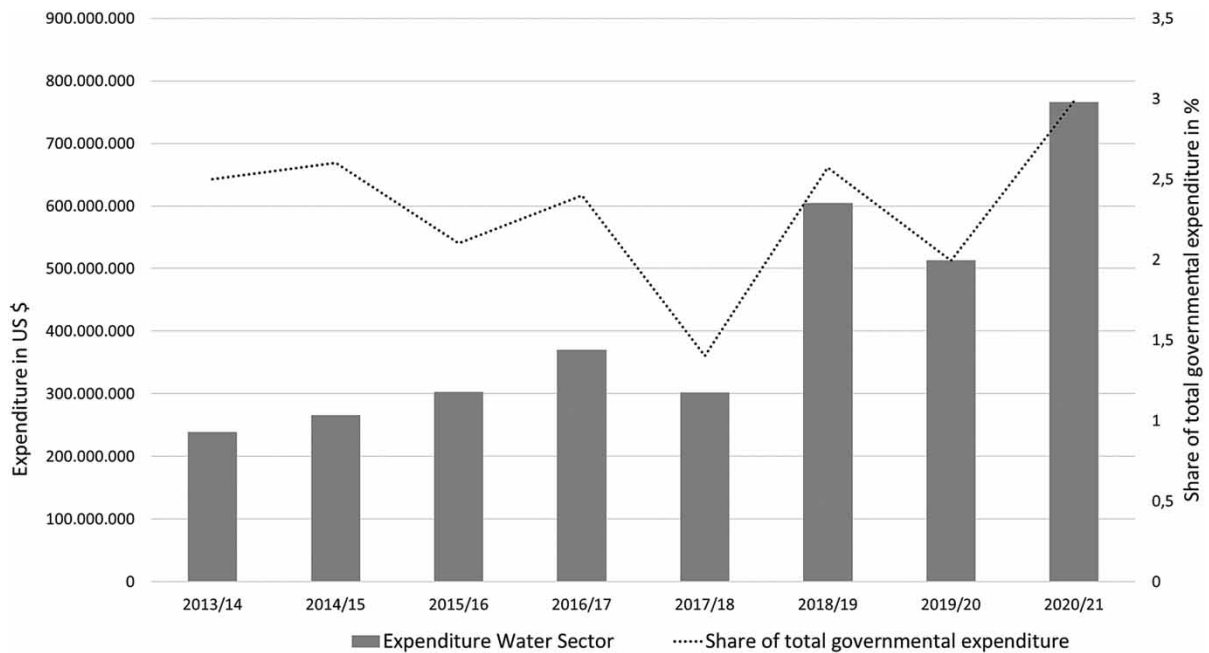


Fig. 4. | Expenditure of the Kenyan Government within the water sector 2013/14–2020/21 (drawn from data in GOK, 2018c, 2019b, 2020; ROK, 2020a reports). Monetary units adjusted from KHS to US\$ based on December 2020 exchange rate.

poor quality water or even buying bottled water (Recha *et al.*, 2013; Amos *et al.*, 2016). The annual performance report of WASREB (2019) shows that infrastructure development for water supply is more appealing in urban regions, where prosperity is higher than in rural regions. Water supply in urban regions increased by 1.3% in 2015/16, whereas in rural regions, the increase was only 0.8%. Kenya as a whole is making slow progress towards achieving water and sanitation coverage goals, with no major exceptions (WASREB, 2019; ROK, 2020a).

Figure 4 shows that government expenditure in the water sector has steadily been increasing since 2013/14, with exceptions for financial years 2017/18 and 2019/20, with total expenditure increasing threefold in the seven years between 2013/14 and 2020/21. Investment in the water sector, as a percentage of total Kenyan government budget, has fluctuated during this period, between 1.4% (2017/18) and 3% (2020/21) (GOK, 2018c, 2019b, 2020; ROK, 2020b). A more detailed examination of the funding distribution over the last three financial years illustrates that investment in ‘Water & Sewerage infrastructure’ has risen significantly, while the ‘Water Resource Management’ segment has declined (Supplementary Appendices 1–3). The consistent positive economic development of Kenya since 2012 can be seen as one reason for the increase in government expenditure in the water sector (since 2021, GDP has not fallen below 4.5 (WB, 2021)), since the further economic development of the main contributors to the GDP (Service Sector, Agriculture, Industry) strongly depends on the availability of water (AfdB, 2019). Nevertheless, according to Ministry of Water, Sanitation and Irrigations estimates¹², the water sector will require investments of US\$ 16,150 million¹³ by 2030, indicating an annual

¹² <http://www.waterreforms.go.ke/financing-water-sector-in-kenya/>.

¹³ Exchange rate December 2020.

recurrent expenditure of around US\$ 915 to US\$ 1,750 million¹⁴ over next decade, which is significantly higher than the current expenditure of about US\$ 750 million (ROK, 2020b).

Despite the increase in spending for the water sector (Figure 4), the performance of the Kenyan government in infrastructure investment, governance, coordination of funding and enforcement of sectoral policies, necessary to establish an effective water resources management strategy that meets the country's needs, is deemed inadequate (Mogaka *et al.*, 2005; Akivaga *et al.*, 2011; Mati & Mugo, 2018). The rapidly growing population and the increasing frequency and intensity of extreme weather events pose a growing challenge to the already structurally weak water sector to effectively deploy existing financial resources. In order to assess and measure the quality and equity of the water services provided and to identify possible effective levers for investment in the water sector, it would be useful to collect performance indicators, which are still lacking despite increased spending (WASREB, 2019; WHO, 2019). In addition, in line with the African water services survey, access to the government water supply is described as 'difficult' or 'very difficult' by 61% of Kenyans surveyed. Likewise, the problem of corruption in relation to connection to water supplies is also prevalent (Howard & Han, 2020).

Historical development of water governance in Kenya

The development of Kenya's water governance framework, starting from post-colonial times until the new millennium, is characterized by different political directions and priorities (Nyanhaga, 2007; Akinyi Were, 2019). According to Notley *et al.* (2010) since independence in 1963, the Kenyan water sector has developed in the following phases:

- socialism principles (60s to mid 70s),
- self-help approaches (mid 70s to early 80s),
- decentralized and commercialized adaptation measures (early 80s to mid 90s) and
- stagnant period (mid 90s to 2000) up to the first trend-setting post millennium reforms such as the Water Act 2002 which outlined fundamental changes in the water sector (i.e. devolution of responsibility to counties).

Water sector reforms initiated through Kenyan national programmes for sustainable development in water, energy and agriculture, in the last two decades have not referenced the AWW 2025, nor has it been mentioned in the national water-related programmes, strategies and guidelines. But, the awareness of the importance of water as a resource for sustainable economic and social development is reflected in a variety of national strategies, policies and Acts, with a direct link to the MDGs and SDGs (Figure 5).

A core water issue still remains in Kenya, the financing and realization of a nationwide, reliable and safe water supply. Water suppliers are empowered through the State Regulatory Board by the issuing of licences. These licences are required to companies, public benefit organizations or other persons providing a water supply¹⁵. Further, with the ratification of the Water Act 2016¹⁶, water services are required to be provided on a commercial basis¹⁷.

Akinyi Were (2019) argues in this context that the principles of the free market cannot be applied to water resources (referring to water as a human right) and in particular, does not sufficiently recognize the poor and mostly rural disadvantaged population. Moreover, there is a lack of operating standards necessary to protect rural communities that are disadvantaged by the commercialization of water supply services. Finally, it should

¹⁴ Depending on timing of investment, infrastructure costs and differences in exchange rates.

¹⁵ Water Act 2016: Part I Section 2.

¹⁶ The Water Act 2016 supersedes the Water Act 2002.

¹⁷ Water Act 2016: Part IV Section 86 (5).

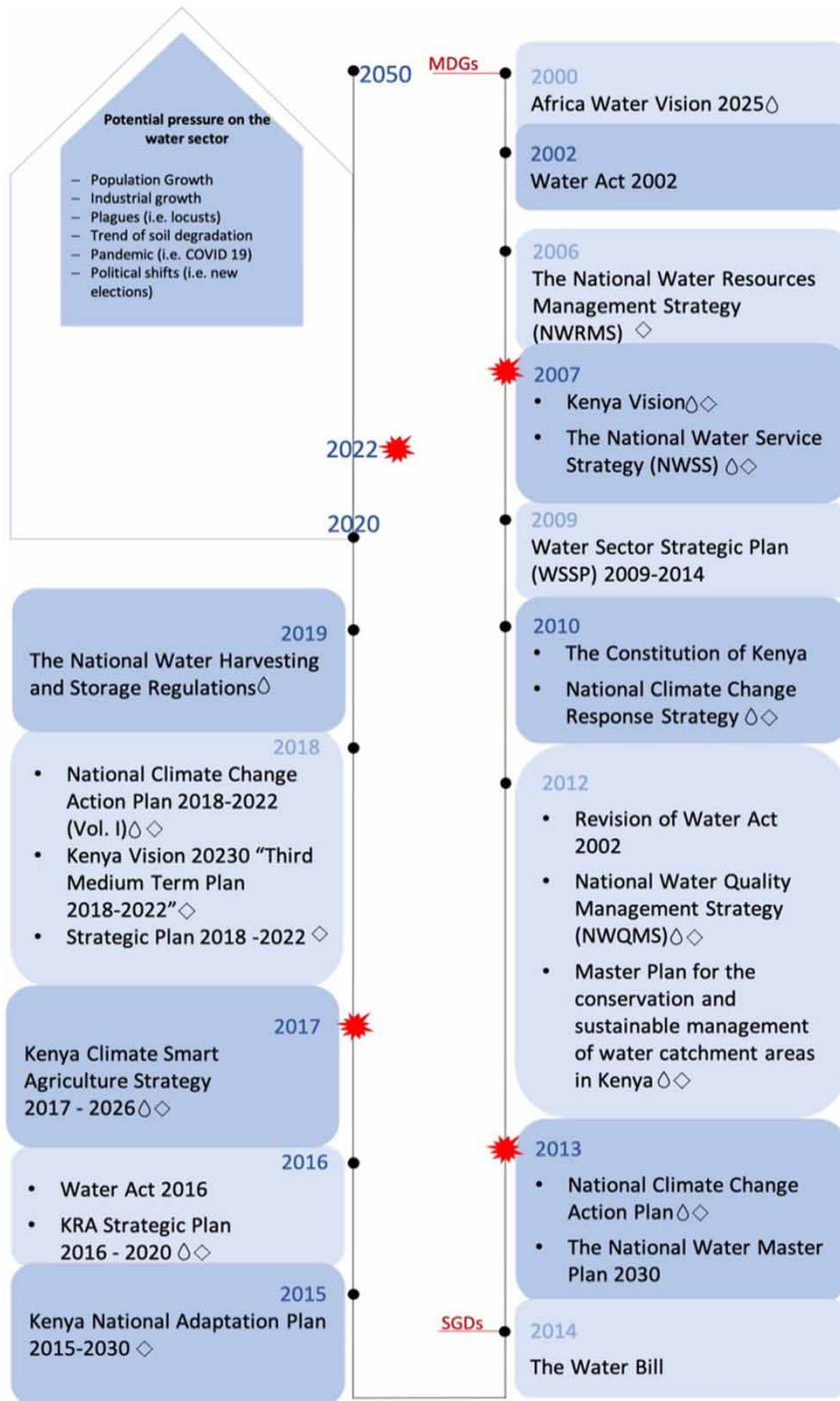


Fig. 5. | Timeline of Kenyans water sector development (2000–2020 and beyond). ◊ = RWH mentioned; = MDG or SGD mentioned, ★ = elections in Kenya (drawn up on the basis of: GOK, 2006, 2007, 2010a, 2010b, 2015, 2016, 2017, 2018a, 2018b, 2019a; ROK, 2007, 2009, 2013, 2014, 2015, 2016, 2018; MOWI, 2012; MEMR, 2012; JICA, 2013; KRA, 2016).

be mentioned that the continued development of the water sector is closely linked to the overall stability of the Kenyan government. In this context, Kenyan elections have often been marked by turbulence and political instability (IEA, 2017).

Status of water governance in Kenya

In the following sections, we examine the effectiveness of these legal frameworks in delivering good governance in the Kenyan water industry, whilst at the same time strengthening the climate resilience of the rural population. The definition of water governance according to GWP¹⁸ and the three fundamental principles characterized by the UNDP (2013)¹⁹ will be used to orientate this discussion. The concept of climate resilience is defined by the IPCC (2012)²⁰ and states that the more cross-sectorial the governance approach, the greater the strength of the system. Lind *et al.* (2016) emphasized that this requires coordinated planning and intervention over time across several levels of government to be successful.

An inadequate water supply is often the result of poor governance of the water sector, while at the same time, access to safe water is considered a key factor for the future development of Kenya (WASREB, 2019). Therefore, identifying measures and characteristics of good water governance is important in delivering a sustainable water sector (Rogers & Hall, 2003). In recent years, Kenya's political orientation and its foundations have been guided by international guidelines, goals and principles of sustainable development as well as integrated water management approaches (e.g. IWRM), thereby creating the necessary legal foundations for good governance (Figure 5). The political foundations of the water sector in Kenya are based on legislation enacted through the Water Act 2016²¹ (GOK, 2016) and the Kenyan Constitution²² (GOK, 2010a). Both encapsulate IWRM principles in formal and institutional arrangements to foster improved water governance and resilience for rural communities (GWP, 2015; Gachenga, 2019).

This is observed, for example, in the recognition of the human right to water²³ (UN, 2010) in both documents^{24,25}, the decentralization of political institutions²⁶, and thus a division of tasks within the water sector between the national government and counties²⁷. The injustice of water supply inequity in rural regions and its potential for improvement is highlighted²⁸. The division of Kenya into 47 counties²⁹ supports the devolution of the water sector, which was already legislated in the Water Act 2002³⁰, as an approach to improve the

¹⁸ 'Water governance refers to the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society' (Rogers & Hall, 2003).

¹⁹ Transparency, Accountability, Participation.

²⁰ 'Resilience: The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions'.

²¹ https://wra.go.ke/wp-content/uploads/2019/05/The_Water_Act_2016.pdf.

²² <http://kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=Const2010>.

²³ UN General Assembly Resolution: A/RES/64/292 (<https://documents-dds-ny.un.org/doc/UNDOC/GEN/N09/479/35/PDF/N0947935.pdf?OpenElement>).

²⁴ Water Act 2016: Part II, Section 9.

²⁵ Constitution 2010: Chapter Four, Part 1, Article 43.

²⁶ Constitution 2010: Chapter Eleven, Part 1, Article 174.

²⁷ Constitution 2010: Fourth Schedule Part 1 & Part 2.

²⁸ Water Act 2016: Section 94(2).

²⁹ Constitution 2010: Chapter Two, Article 6 & First Schedule.

³⁰ <http://extwprlegs1.fao.org/docs/pdf/ken37553.pdf>.

effectiveness and sustainability of water resource management, and the provision of water services within the country (WSP, 2003; GWP, 2015; Gachenga, 2019).

The question then arises as to – ‘Whether political decisions actually affect the improvement of water supply?’ – especially for the rural population. As early as 2003, the Water and Sanitation Program (WSP) described considerable challenges for the sectors policies, especially in terms of the transfer of responsibilities in practice and the development of management strategies (WSP, 2003). The GWP (2015) technical focus paper subsequently assessed the ‘division of responsibilities’ as a strength of the water sector in Kenya. However, it should be noted that in the context of the Water Act 2016, and its renewed focus on decentralization, Gachenga (2019) points out that it is debatable to what extent the Water Act 2016 actually addresses the issue of effective and feasible devolution within the water sector. Furthermore, to what extent the division of responsibilities, today, 4 years after its adoption, has been completed.

The Constitution provides elementary guidelines which refer to the right to gender equality and participation in government decisions³¹. The Water Act 2002 already enshrined the IWRM principles and further encouraged development away from the traditional top-down approach, towards holistic management, which includes participatory procedures (GWP, 2015). The Water Act 2002 was superseded by the Water Act 2016, which enabled further institutional authorities to be formed within the water sector and in some cases, management responsibilities were reallocated (GOK, 2015, 2016). The various tasks of the existing institutions are described in detail in the Water Act 2016 (GOK, 2016) and in various other publications (Kameri-Mbote & Kariuki, 2015; Akinyi Were, 2019; Gachenga, 2019).

The alignment of the current policy base with approaches to strengthen rural water supply through concepts of decentralized self-sufficiency is only marginally evident in Kenyan government policy documents^{32,33}. For example, the provision for mainstreaming RWH for rural water supply through the creation of the National Water Harvesting and Storage Authority (NWHSA)³⁴ has not yielded widespread uptake. Instead, there has been greater interest in developing commercial water supplies³⁵ than promoting frameworks for the use of self-supply technologies at the household level.

The AWV 2025 promoted stronger bottom-up orientated political structures based on the example of historically driven community-based activities (e.g. Harambee³⁶) and strengthening the water infrastructure for rural area. Harambee activities shaped the development of water sector infrastructure in the mid-70s through the early 80s. However, owing to lack of government support, the structures created by community activities could not be maintained for the longer term (UNECA, 2003; Notley *et al.*, 2010). A modern version of Harambee, are the created political participating associations, namely Water Resource User Associations (WRUAs). These community-based associations promote the participation of a wide range of stakeholders, thus following both the values of good governance and IWRM principles, for the collective management of water resources (GWP, 2015). Under the current Water Act (2016), the WRUAs are legally entitled to manage water resources in their geographical area³⁷ and have recently gained in importance (Notley *et al.*, 2010; WRA, 2019).

³¹ Constitution 2010: Chapter Four, Part 2, Article 27.

³² Water Act 2016: Part VIII.

³³ Water Act 2016: The National water harvesting and storage regulations, Part VII Section 35–38.

³⁴ Water Act 2016: Part VIII Section 30.

³⁵ Water Act 2016: Part III Section 32 (1a & 1b).

³⁶ Harambee is a Kenyan tradition of community self-help events, e.g. fundraising or development activities.

³⁷ Water Act 2016: Part VII Section 29 (2).

Highlighted non-governmental initiatives in the Kenyan water sector

In addition to government institutions, the Kenyan government collaborates with various non-governmental organizations (NGOs) and civil society organizations (CSOs). For example, the Kenya Water Partnership (KWP), as a local arm of the GWP, promotes the dissemination of IWRM. KWP has access to financial resources and knowledge regarding technical guidelines, policy strategies and toolboxes. The aim of KWP is to develop a national IWRM plan that can be integrated into Kenya's water policy framework (Beisheim *et al.*, 2018). The Kenyan Water and Sanitation Network (KEWASNET) is also active in the water sector. As a sector-specific initiative, they aim at self-regulation, transparency, coordination, the dissemination of best practices in the water sector and provided performance reports on the Kenyan water sector. These reports monitor at regular intervals. The development of the water sector focussing on recording and evaluating activities undertaken by NGOs.

According to KEWASNET (2020), CSOs are considered as key players in the Kenyan water sector. Investments by CSOs have increased from US\$ 33 million³⁸ to US\$ 109 million³⁹ over the fiscal years, 2017–18 and 2018–19, which represents a quarter of the Kenyan government's investment in WASH and WRM (KEWASNET, 2020). The largest share of the investment, 47%, went to the category of 'Safe sanitation and hygiene' and the second largest, 40%, to 'Safe water supply'. Only 8% funded 'Capacity building and training', and 2% went towards 'WRM and/or conservation' and 'Lobby and advocacy'⁴⁰ (KEWASNET, 2020).

DISCUSSION

The sustainable use of water resources is recognized as one of the key factors for the long-term development and security of socio-economic structures in Africa. Effective water governance is of central importance for addressing and solving cross-cutting issues and challenges. The awareness of systematic, socio-environmental and research-policy divides in relation to water governance is reflected in the AWV 2025 and subsequently supported by several political declarations, action and strategy papers over the last 20 years. These have contributed to changes in the AU's water sector, including the water governance in Kenya. Through the establishment of AMCOW and its increasing political importance, international forums providing direction through the MDGs and SDGs, the development of African water governance has been positively influenced. At the same time, only marginal improvement on the ground is observed in Africa and in individual member states, such as Kenya. By global comparison, there is still great potential for improvement in water governance. Therefore, it is questionable as to what extent the structural and strategic adjustments at the political level actually deliver water supply opportunities for communities and improves their resilience to climate change.

The challenges associated with insufficient water supply in Africa can be traced to the acknowledgement that, although theoretical measures and operationalization plans can be formulated through political goals, these decisions are ineffective, if the operationalization of these goals is not adequately supported or funded. The devolution of political responsibilities facilitates (i) the operation and delivery of targeted measures by the water sector, (ii) assignment of responsibility for the more complex aspects associated with the sector, and (iii) definition of institutional and community responsibilities more clearly. However, the decentralization of these tasks (or operations) should not result in responsibilities being shifted back and forth between institutions, and a strategic, comprehensive and fair framework of funding and support should be developed. An evaluation of

³⁸ Exchange rate December 2020.

³⁹ Exchange rate December 2020.

⁴⁰ Total numbers in Supplementary Material, Appendix 4.

the evolving political structures in Kenya over the last few years has shown that this is critical to framing actions ratified under the Water Act 2016 as highlighted by Akinyi Were (2019) and Gachenga (2019). Although the formulation of decentralized structures within the water sector in Kenya meets international standards and recommendations, such as those proposed under the IWRM concept, there are reservations raised by Gachenga (2019) in relation to the consistent, effective and transparent distribution of resources and funding. In the context of this review, we have identified there is the limited on-ground impact of the policy measures adopted so far, particularly in rural areas.

Akinyi Were (2019) emphasizes further, the negative impact that the commercialization of the water sector has had on access to water in Kenya, which is promulgated under the human rights to water (UN, 2010)⁴¹. The Water Act 2016, while it cast as a basis for improved water governance, has in fact promoted the interests of those advocating the commercialization of water resources and water services. This has negatively impacted the poorer rural population which have limited access to adequate infrastructure, and thus water security. Rural communities were precisely the target group for improved access to water resources to which the legislation was to have addressed. Particularly as this group is characterized by higher levels of poverty, a dependence on rain-fed agriculture possesses limited opportunities to contribute financially to the cost of accessing water resources. While the political declarations emphasize the disadvantage of the rural population, there is a lack of appropriate support measures, if this legal framework focuses on the promotion of commercial water suppliers. The financing of the water sector and its further development is a critical factor for both the AU and rural areas and urban services in Kenya.

Although the Kenyan governments spending on the water sector has increased in recent years as a percentage of the government's total budget, independent surveys show that, in addition to a lack of capacity for on-ground implementation, there is also limited overall financial support. Demonstrating that despite increasing budget allocations, the current approach taken by the government does not adequately finance operational strategies or works plans. One reason for this situation may be that, despite the increase in spending in the last decade, there is still a large gap between what is spent and what is actually needed. The expenditures made are thus still well below the level required and cannot achieve the desired impact. In this context, the incidents of corruption mentioned by the surveys should be taken into consideration. The extent to which monitoring mechanisms exist for the use of public funds in the water sector could not be captured within the scope of this analysis but could provide indications in a subsequent analysis as to whether the low level of effectiveness of increasing expenditures is related to corrupt processes at the political level. Furthermore, the migration of the population from rural settings towards greater urbanization results in increased investment to provide additional services but does not necessarily deliver better or more equitable access to water supplies in line with the increases noted in government expenditure.

The success or failure of the decentralization programme undertaken in Kenya must be critically examined in this context. Moreover, the current government expenditure on the water sector is not sufficient to meet the projected level of investment required to expand and secure future water supplies in Kenya. This highlights that Kenya either lacks financial resources to invest more in the water sector or lacks monetary resources due to other priorities.

The historical development of water policy can be used here in two ways to explain the current ineffective allocation of resources and slow development trends in the African water sector. On the one hand, political organizations are still relatively new due to de-colonization in many AU states, and the development of strong

⁴¹ UN General Assembly Resolution: A/RES/64/292 (<https://documents-dds-ny.un.org/doc/UNDOC/GEN/N09/479/35/PDF/N0947935.pdf?OpenElement>).

democratic political organizations takes time. The example of Kenya shows that from the time of the country's independence in the 1960s until the turn of the millennium, political development is characterized by widely divergent political trends. In the course of the 21st century, this political uncertainty is evident in the nationwide riots during recent elections. Trust in the political process, in relation to the water sector, continues to be rated poorly by the population and this is unlikely to improve due to corruption within the government and water service providers. The implementation of new complex and holistic political processes, governance and legislation has also taken longer within this environment, leading to delays in formulating a comprehensive strategy to deliver water security across all sectors of the country. On the other hand, the political and funding structure has been aligned for decades with financial support from external development partners and may still not have completely broken away from this strategic orientation. Thus, it can be argued that the current political orientation of the water sector of the AU and in Kenya basically establishes the operational and policy conditions in accordance with international standards to enable foreign development partners to invest in local infrastructure.

According to the KEWASNET reports, investment by development partners in Kenyan CSOs, which plays a key role in the development of the water sector, has increased. Historically, the tendency of community-driven activities has been particularly prevalent in Kenya between the 1970s and early 1980s. In regard to these short-term successful water infrastructure projects, it is notable that they did not provide sustainable long-term water security. The lack of strategic orientation of the political leadership necessary to enhance and maintain the structures created through community-based activities meant that there have been limited long-term improvements in the water sector. Transferring this problem to the current situation and the high investment volumes in community-based projects, similar tendencies can be expected, and the slow improvements experienced in the past are likely to continue.

In the context of climate change and given the strong dependence of Kenyan socio-economic dependency on rain-fed agriculture, the development of the water sector should be directed towards securing long-term access to water resources and creating an internal water supply infrastructure, especially in rural areas. Given the above-mentioned orientation of the water sector to commercialization, providing rural regions with an adequate water infrastructure is not very attractive for private investors. Firstly, because of the high level of investment which would have to be paid for due to very poorly developed infrastructure in rural areas, and secondly, because the rural population belongs to the lowest income group in Kenya and cannot pay for a comprehensive water supply system. Similarly, the transfer of responsibilities to development partners to build long-term infrastructure is not promising and requires government support through good governance backed by strategic policies and legislation that supports investment, education and training in rural areas.

One approach to avoid these systematic distortions can be to focus more resources on localized water supply infrastructure by providing and promoting self-supply systems (i.e. RWH) in rural areas. This provides the advantages of localized storage, without the issues encountered in providing unaffordable interconnected water services. Difficulties around design, construction and expensive infrastructure associated with commercialization of the rural water sector can be avoided. Water stored during the rainy season (or from any rainfall event) can then be available to the community during low rainfall periods. While funding, training and capacity building will still need to be made available through government initiatives (or partnerships), RWH systems can provide domestic supplies and play a positive support role in agricultural production systems. They have the potential to provide a more secure water supply, supporting a transformation towards more sustainable and resilient farm practices. Among other things, by bridging periods of drought and reducing other negative environmental impacts such as erosion, the resilience of small farmers is actively strengthened. By improving climate resilience, this not only allows smallholders to enrich their livelihoods in the long term by supporting sustainable yields and strengthening Kenya's overall economy.

Nonetheless, the global benchmark should be used in the assessment of the Kenyan water sector to identify the potential for improved water infrastructure and water resource management, including self-supply approaches. Understanding the difficulties associated with improving rural water supplies in the context of the Kenyan government's policies and governance strategies throws up some interesting dichotomies. On the one hand, there has been significant progress in developing policies and legislation. For example, the ratification of the Water Act 2016, the devolvement of responsibility to counties has been achieved through institutional restructuring, and the level of funding to the water sector has increased. On the other hand, rural water supplies have not shown significant improvement over the same period, especially for different socio-economic groups, resulting in an uneven distribution of water supply infrastructure and water services across the country.

Furthermore, poor on-ground support and administration has been complicated or prevented due to a lack of reporting procedures, or having qualitative and quantitative benchmarks in place, that could guide investment and policy development. We found that is very little linkage back to the original goals of the AWW 2025, which hinders the implementation of the original vision and limits its usefulness as an effective strategic document that acts as a framework for future development. While we have been able to indirectly link the subsequent policy documents, the commitments to the MDGs and SDGs, there appeared to be no continuous strategic framing for the development of the water sector in Kenya. Standardized, comprehensive evaluation and regular monitoring could strengthen decentralization and the development of long-term critical water infrastructure requirements, alongside self-supply approaches, within national, regional and local government.

Kenyan treasury documents indicate that investment in the water sector has increased over the last 3 years (Supplementary Material, Appendices 1–3); however, there are no uniform allocations, or details of recurrent expenditure within the water sub-sectors, making a comprehensible analysis of the investment strategy difficult to ascertain. Relating these investments to the three fundamental principles of water governance, as defined by UNDP (2013), 'Transparency' and 'Accountability' in particular, score poorly. Notable progress can only be identified with regard to the principle of 'Participation' through the political strengthening of WRUAs. Increasing political awareness raises the influence of WRUAs and thus that of smaller and community-based organizations in political decision-making. Nevertheless, to achieve sustainable water resources and a comprehensive water supply, greater focus on the development of a cohesive, participatory strategy which encourages the cooperation between rural communities, the private sector, NGOs/CSOs and local, regional and national governments is required. This can only strengthen and improve the resilience of the Kenyan water sector and provide much needed climate resilience to smallholders, rural communities and the agricultural sector.

CONCLUSION

While the states of the AU, including Kenya, have achieved their initial commitments to create administrative systems to improve water security, water resource management and WASH through wide-ranging policies and legislation, they have as yet not committed to fully supporting on-ground outcomes. Actual implementation and investment in water supply infrastructure, particularly in the rural communities, has been limited or partially achieved at best. However, at the national level, as shown with Kenya as an example, we still see great potential for improving water governance and resilient water supplies.

The development and management of water resources, its distribution and supply to the entire population are ongoing. The political organizations of the AU and Kenya show that their institutions are oriented towards the global or international network, so as to provide access to funding through external organizations. Long-term strategies and on-ground works to support rural and urban water supplies have been compromised due to the lack of a coherent implementation strategy over the last two decades as outlined in the AWW 2025.

We also acknowledge that while there have been improvements in urban water supply networks in Kenya, and the Kenyan government has moved to restructure government policies and the national agenda in recent years, the majority of rural communities are still significantly disadvantaged, particularly when faced with climate change, reduced incomes, limited government support and a lack of skills to build local water infrastructure. Despite the significance of rural communities to the Kenyan economy and its agricultural activity, there are, on the whole, few government policies linked to on-ground support that promote the development of water resources and infrastructure in rural areas. Given the impacts of climate change are likely to become more pronounced, if not severe, in the coming decades, we would expect a higher level of investment and support to rural areas to strengthen climate resilience, improve productivity and the sustainable use of water resources.

DATA AVAILABILITY STATEMENT

All relevant data are included in the paper or its Supplementary Information.

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