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Research Article

# The Sustainability of Water Access Services in Mozambique: From Policy to Practice

**Alves Nhaurire*, Rehana Capurchande**

Department of Sociology, Eduardo Mondlane University, Maputo, Mozambique

## Abstract

The access to water services is deficient in Mozambique, with only a little more than half of the population having access to this service. Investments have been made on the one hand in terms of construction and rehabilitation of new water sources and supply systems, and on the other hand in terms of elaboration of a legal and institutional framework that "favors" greater dynamism in the sector. In this paper, we seek to analyze the framework of policies and strategies institutionally designed to ensure sustainable access to water services in Mozambique. That is, to analyze the process of implementation of water policies in Mozambique, seeking to understand the relationship between theory and practice. This paper is part of a qualitative study based on phenomenological principles. Field work was carried out in Gaza province, Mozambique, alongside document analysis of the main policies and strategies of the water sector in Mozambique, and interviews with key informants in the sector. The study revealed that in theory, the availability of a legal framework and the existence of institutions at various levels may indicate that the foundations for sustainable access to water services are in place. However, the challenge lies in its operationalization. District governments have a weak grasp of the legal framework, and insufficient technical and financial capacities for its operationalization.

## Keywords

Sustainability, Access to Water, Policies, Mozambique

## 1. Introduction

Access to safe water is one of the greatest challenges facing humanity, particularly developing countries. On 28 July 2010, the United Nations General Assembly, through Resolution A/RES/64/292, declared clean and safe water and sanitation essential human rights for the full enjoyment of life and all other human rights. In 2015, this recognition was again referenced by the United Nations under the Sustainable Development Goals, in which Goal 6 recognizes access to clean water as a human right. However, a large part of the world's population still lacks clean and safe water. Global statistics indicate that 411 million people in the world do not have access to safe water. In rural areas 3 out of 4 do not have access to safe water [32]. In Africa and many countries in Latin America and Asia, access to safe water is still a problem. Despite the various investments that have been made in this area, much of the infrastructure that has been built, has over time, stopped working. Data indicates that 2 out of 3 pumps function properly. Thousands of people who once benefited from a safe source of water have returned to their original state [25]. The inaccessibility of clean water supply for both

*Corresponding author: alvesfr_nhaurire@yahoo.com.br (Alves Nhaurire)

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the rural and urban populace is the most pressing challenge, which has been exacerbated by extensive pollution and climate change crises [23].

In Mozambique, only half of the population has access to water, and the situation in rural areas is even more critical than in urban areas. In 2018, only 37 per cent of rural areas had access to drinking water [6]. Five years later, official statistics indicate 45% of the population in rural areas with access to water and 23% with access to sanitation according to DNAAS [7]. These figures show that there is a long way to go to achieve universal access by 2030 under goal 6 of the Sustainable Development Goals – the water and sanitation goal.

In addition to the low statistics on access to water, another problem with serious health consequences is related to the quality of the water that is consumed. A baseline assessment of PRONASAR carried out in 2011 indicates that a large proportion of households, around 94%, do not use any method of water treatment. This situation is exacerbated by the fact that the vast majority of the rural population does not have a secure water supply.

Water scarcity has an impact on the daily lives of women and girls. A study carried out in Kenya indicates that the burden of gender norms and tradition increases the burden on women, who can spend up to eight hours a day searching for water [33]. A similar study in Mozambique indicates that in many parts of Africa, women and children spend a lot of time in search of water. This time is spent both walking and waiting at the water source. During the dry season, women often walk more than three kilometers to a well, and then wait up to five hours for the well to refill [13].

There is a large body of literature and academic analyses that address the challenges of poor access to water supply services. In this article we will address some of them, namely: institutional arrangements, management models and policies.

The water crisis is a direct result of governance. Analyzing the institutions of the water sector plays a central role in understanding the state of water governance [4]. With regard to institutional challenges, one of the challenges posed is the fact that many countries in the region have not defined the long-term roles of the institutions involved in the water sector and have not put in place coordination mechanisms between the key players [24]. The author also points to the issue of political will to establish effective management mechanisms and the weak institutional capacity focused exclusively on resource management, coupled with a lack of up-to-date hydrometeorological information.

The systemic and long-standing lack of data and evidence, including historical trends in precipitation and groundwater recharge, only exacerbates the problem [33]. For its part, ROSC considers the lack of clarity in the coordination of the sector's policies and institutions to effectively deal with the demands of the sector itself, combined with weak inter-institutional coordination with the private sector [27]. This idea is in line with the perspective of Weimer (2012) in his study on decentralization in Mozambique [36]. For his part, Uandela considers that the institutional arrangements put in place for the management of water supply services are not strong. This is due, on the one hand, to the lack of the necessary capacities of the managers (public and private) of the water supply systems, and on the other hand, the existing institutions for managing services are discontinuous [31].

With regard to management, the analysis carried out by Uandela (2012) indicates that water supply systems in towns and small cities are managed by local governments and face serious technical and financial sustainability problems, pointing to their lifespan and size as part of the cause.

To guarantee the sustainable provision of water services, Mozambique has adopted a decentralized model in which the large water supply infrastructures are managed by FIPAG. In small towns and villages, the water supply systems are managed by the AIAS and in communities the management of water infrastructures (dispersed sources) is under community management. However, this model presents problems such as a lack of technical support after the installation of the system and the constitution of the committee. In addition, some of the principles underpinning community management, such as community cohesion, participation for the common good and the informal responsibility of a water committee have turned out to be more idealistic than practical [22].

These problems pose a challenge to the provision of sustainable water services. Rural water system projects fail to bring sustainable benefits and services to the people who need them because they do not consider the motivating factors such as externalities and links to other challenges that arise in the search for a regular water supply [33]. Another factor that has been questioned concerns the communities' sense of ownership of water source, i.e. the extent to which greater community involvement in the management of the source can be an element of its sustainability. A study carried out by WaterAid in 2021 presents 6 factors that affect the sustainability of rural water supply systems in Mozambique, namely: 1- System management, 2- Environment, 3- ownership 4- Financial management, 5- Gender issues and 6- Power dynamics [35].

For this article, we are going to focus our attention on the legal framework, as we are interested in analyzing the policies and strategies institutionally designed to guarantee sustainable access to water services in Mozambique. In this way, there is an urgent need to understand the phenomenon of sustainability, with a view to finding the strengths and weaknesses that do or do not favor the formulation and implementation of appropriate public policies and management systems that guarantee sustainable access to water for communities. Therefore, we will try to understand the problem of sustainability from the point of view of the normative and institutional framework of the water sector in Mozambique, with a view to the challenges of translating this normative-institutional framework into practical actions to guarantee sustainable access to water services for the population. In other words, we seek to analyze the process of implementing water policies in Mozambique, to understand the relationship between theory

and practice.

A further aim is to answer the question of how water policies have been implemented in order to meet the real needs of the population. Specifically, we first reviewed the current normative and institutional framework of the water sector in Mozambique and secondly, sought to understand the problem from the perspective of the key players in the sector through individual in-depth interviews.

In this analysis we focus on the 1995 water policy and two documents that operationalize this policy, namely the rural water supply strategy (2007) and the 2001 Rural Water Supply Project Implementation Manual (MIPAR). In the programme component, we analyzed the 2010 national rural water supply programme (PRONASAR). This programme was chosen on the one hand because it is one of the largest programmes to respond to the challenges of access to water in rural areas of the country in terms of technical capacity to guarantee maintenance, weak management capacity of water sources by the management committee [14], management models [31]; [16], and on the other hand because of its relevance in increasing national coverage levels as the main WASH sector donor's support the Mozambique government through this programme.

The theoretical foundation of this article is based on the concepts of the problematic world and the non-problematic world developed by Schutz [29]. The concept of the non-problematic world can help to understand the bottlenecks that exist in the legal and regulatory framework developed to meet the challenges of access to water. The concept of the non-problematic world can also help to understand what is defined as a problem in legislation and what solutions are put forward, and who legitimizes and supports political decisions when implementing policies in favor of sustainability. The analysis of the functionality or otherwise of the legal and normative framework was carried out through the discourses of the key players in Mozambique's water sector. On the one hand, the study contributes to improving the development and implementation of plans for greater access to water supply services. On the other hand, it will provide a scientific basis for understanding the problem of sustainability and support the formulation of public policies. It can also provide information on who defines sustainability as a problem and who legitimizes the possible solutions put forward to respond to the problem.

## 2. Materials and Methods

The study is qualitative and is part of a broader study on the sustainability of water supply services in Mozambique. The empirical component of this work was based on two districts in Gaza Province: Manjacaze and Xai Xai. The study included some institutions that were intentionally identified because of their roles and responsibilities in the regulation and provision of sustainable water services. In Gaza Province, six actors were interviewed from the district planning and infrastructure services of the Manjacaze and Xai-Xai districts and from the Provincial Directorate of Public Works and Housing, as well as the Provincial Government's representatives at Administrative Post level. Central level institutions were also involved, namely the Water Regulation Authority and the Water and Sanitation Infrastructure Administration. The institutions at district level were selected because of their role in operationalizing the country's water supply policies and strategies.

### 2.1. Procedures

We analyzed the National Water Supply and Rural Sanitation Programme, the National Water Strategy, the Water Policy, the Water Law, the Action Plan for the Operationalization of the Sustainable Development Goals and academic papers that analyze the problem of sustainability and the challenges of access to water at national, regional and global level. The documents analyzed here are available on the internet and some were consulted in the DNAAS library. They were selected because of their importance to understanding the regulatory framework and strategies of the water sector in Mozambique. In the government's policies, plans and strategies, we analyzed the objectives and targets proposed for increasing levels of access to sustainable water services and the approaches proposed for the sustainability of services. With regard to the overall objectives, we sought to analyze the content of goal (6) of the Sustainable Development Goals (SDG), on access to water and sanitation, and with regard to academic documents, we sought to understand how the issue of the sustainability of water supply services is analyzed in other contexts and what theoretical proposals are put forward.

The official documents used were obtained through internet searches. For data on district coverage and water committees, we used the DNAAS database (SINAS-National Water and Sanitation Information System) through the website - http://sinasmz.com/lizmap/lizmap/www/index.php/view/ The data obtained from the SINAS database was checked against data from the provincial directorates of public works in Gaza and from DNAAS. Plans for water supply in Mozambique were consulted in the DNAAS library.

The key words we used to obtain the data were sustainability, WASH, water management committee, access to water, policy and others. In this desk review analysis, we sought to understand the content of the government's policies and strategies with the aim of increasing coverage levels in the country, and what strategies the government has adopted to address the sustainability of water sources. In addition to analyzing the documents in depth, we interviewed key informants, namely the DAS of Gaza Province, the SDPI of Manjacaze, leaders of Madendere Locality, and the community leaders of Chiculute and Sumbanine. Our interlocutors were selected using a purposive sampling technique.

In the process of collecting data, we drew up a script of questions to guide individual interviews with key informants. Thus, among the various questions that guided the interviews,

the following stand out: *What gaps exist in the current legislation? How does DNAAS liaise with provincial directorates, SDPIs and communities in the process of managing boreholes? What strategies have been adopted to meet the sustainability challenges of dispersed sources? In what context were the water management committees set up? What is the relevance of setting up the committees? What are the challenges faced? What does the sustainability of water supply systems mean? What challenges exist in implementing the regulatory framework? What is wrong with the legislation? Who legitimizes the legislation? Who is for and against the legislation?* We also sought to explore the flow of information between DNAAS, DPOPH, SDPI and local authorities in guaranteeing the sustainability of water sources.

### 2.2. Data Analysis

We carried out a content analysis based on the model proposed by Richardson (2008), which consisted of five steps, namely: 1- transcribing the individual interviews; 2- categorizing the answers; 3- highlighting and selecting the data, which consisted of grouping it according to each question put to the target group; 4- selecting the data; and 5- drawing up an analysis scheme (narrative synthesis) [26]. We triangulated the data, which enabled us to compare documentary data and primary sources. In the process of analysis, the following themes emerged: the national and international context of access to water; management models and their implications for sustainability; how sustainability is dealt with in the government's plans and policies for access to water in Mozambique; the way sustainability is dealt with; the actions taken to respond to the problem of sustainability; challenges in implementation; and the knowledge of the legislation by the actors who legitimize it.

Analysis of the content of the 1995 water policy and the two documents that operationalize this policy, namely the rural water supply strategy (2007) and the MIPAR (2001), revealed the following main themes for analysis: The relevance given to the issue of sustainability in the plans and strategies; the role of institutional and community actors in implementing the plans and strategies; and the relationship that exists between the strategies and plans as well as their operationalization to guarantee the sustainability of the infrastructures and approaches.

We analyze in depth five priority documents for the water sector in Mozambique, namely: the water policy, the strategic plan for the water sector, PRONASAR, the action plan for implementing the sustainable development objectives and MIPAR. The documents were selected because they were designed at the central level of the sector to give direction and establish rules for the provision of water services in the country. Therefore, the policy framework and plans on access to water and their relationship to sustainability, the problematic and non-problematic aspects of the policy framework were the main themes that guided our analysis. The analysis was carried out using the concepts of problematic and non-problematic worlds, which served as the theoretical basis for this article.

## 3. Results

This section presents the details of the document analysis and key informant interviews. For a better understanding and knowledge of the documents consulted, the list and essence of the documents analyzed and their alignment with the operationalization plans will be presented throughout this chapter. The interviews provided an in-depth understanding of the alignment of policies with practice, and the constraints and challenges of their effective implementation.

### 3.1. Policy Framework and the Challenge of Sustainable Water Services

The water sector in independent Mozambique is governed by a legal framework that dates back to the 1990s. In 1991 the Water Law was created by decree law no. 16/91 of 3 August. This law establishes the principles of water management, the need to make an inventory of all water resources in the country, the utilization regime, the priorities, and the rights and duties of users [9].

"...The Ministry of Construction and Water will encourage the initiatives of its bodies, the people, public and private companies in the field of water management that are compatible with the guidelines of the general policy of the State..." (Water Law).

This law emphasizes state action and the role of the state in the provision of water services in order to meet basic consumption, sanitation and hygiene needs and the participation of the population in the management of water resources. In this way, state action will be operationalized through the then Ministry of Construction and Water with recourse to the National Water Council. This law emphasizes the need to involve the population in the management of water resources.

An in-depth analysis of the water law shows that it was instituted to provide a generalized response to the management of water resources. The management component is mentioned several times in article 8 where it is emphasized that "...The state will be responsible for implementing, progressively and in the regions defined as priority intervention, a water management policy aimed at achieving the objectives...", in article 15 on decentralized initiatives where the law emphasizes that. "…. The Ministry of Construction and Water will encourage initiatives by its bodies, the population, public and private companies in the field of water management that are compatible ....". Article 16 on inter-sectoral cooperation states that "...in the implementation of the general guidelines of water management policy and without harm to its own competences..." Like in Article 19 focuses on the bodies of regional water administrations [10].

One of the shortcomings of the law is that it treats water as a

resource and not from an access perspective, i.e., the law does not determine how the use of water for human consumption should be prioritized. "...In times of water crisis, the law does not prioritise human consumption ..." (key informant, Maputo). However, it should be emphasised that article 26 of the law states that: "the supply of water to the population, for human consumption and for the satisfaction of Human needs, has priority over other private uses" [10].

Regarding the relevance and importance of the law, one of the key informants considered that despite the gaps in the law, it is important and relevant because it provides for the protection of water resources, which in turn guarantees the supply of drinking water (key informant, 5 Maputo). Drinking water means water intended for food, the preparation and preservation of food, personal hygiene, domestic use and the manufacture of carbonated drinks, mineral waters and ice (water law, article 45).

The above points show that although the country has legislation that is, to a certain extent, favorable to the supply of water to the population, in practice, there is a need for an in-depth review of this legislation, especially with regard to the practicality of considering access to water as a priority for human consumption. Another important aspect of the policy must be to clarify the roles and responsibilities of the different players at the various levels in the context of decentralization.

## 3.2. A new Water Supply and Sanitation Law and the Sustainability of Services

Based on the argument that the 1991 water law is too broad by not separating water supply and national water resources and that it does not fit into a new context of deconcentrating and decentralization, the government is in the process of developing a new water supply and sanitation law. One of the most important provisions of the new water law is the fact that the new law considers water supply to be a well-regulated sector that simply responds to aspects of consumption.

About the water law, one of the interlocutors considered that:

"...after the water supply and sanitation law comes out, this law will need to be regulated..., because a law never defines everything, there are major milestones, major principles that then need to be regulated, so then a new MIPAR will probably come out, and that with all the issues of centralisation etc..." (Key Informant 2, Maputo).

It can be understood from the interlocutor that the water law itself is not enough to guarantee sustainable access to water supply services, as the law must be regulated in order for its assumptions to be put into practice. It should be noted that the 1991 water law makes no reference to the problem of sustainability in access to water supply services, nor does it refer to the role of the community in managing water sources, resulting in poor sustainability of the infrastructure.

The 1991 water law was transformed into a policy. This policy was first approved in 1995 as the National Water Policy (NWP). The aim of the policy was to provide guidance for the development of the water sector in Mozambique. This national water policy underwent a revision two years after its approval in 2007 and was renamed the Water Policy. In 2016, by resolution 42/2016 of 30 December, it was revised and renamed as Water Policy (WP). The policy's one-off revision was aimed at accommodating the country's commitments under the Sustainable Development Goals (SDGs).

The essence of the water policy is to meet the basic needs of the poorest population in rural and urban areas. Contrary to the law, the policy emphasizes the sustainability of infrastructure by advocating greater participation by beneficiary communities in defining the solutions to be adopted for access to water. It also emphasizes the regulatory role of the government and sets targets to be achieved with a focus on the SDGs.

"...The Government will focus on defining priorities, standards and regulations, establishing minimum service levels, promoting and channeling investments, promoting efficiency in the use of water, defining tariff policy, gathering and providing information and stimulating and regulating the activities of service providers, while promoting the private sector and other alternatives for the provision of services... [8].

Regarding the relevance of water committees as part of the assumption of community participation in the operationalisation of water policy, the key informants at the district and central level were unanimous in recognizing their role in the sector.

"...the water committees are relevant and will always be relevant, but the water committees cannot be left with total responsibility for the maintenance and sustainability of this infrastructure, that's where I feel we are sinning, because one thing is community management for very light aspects..." (Key informant 1, Maputo)

This informant's perspective also demonstrates how unrealistic the type of functions that have been assigned to communities in the framework of water source management have been. There are a total of 8 roles and responsibilities assigned to the water management committees to guarantee the sustainability of water services in Mozambique. However, the committee is focused on just a few activities, which it carries out with difficulty such as collecting fees, maintenance and cleaning.

Some of the activities that can still be verified concern fees collection and the organization of some sporadic meetings in the places where the study was carried out in order to discuss problems linked to the lack of contributions and the behavior of water source users. However, the activities that could guarantee the water source sustainability are little known and not often carried out, such as repairing faults, reporting faults to the competent authorities (SDPI) in real time, cleaning, planning, and reporting to users. This is contrary to the principle of empowering communities based on participation, decision-making, control, a sense of ownership and

cost-sharing.

The success of the demand principle can be compromised due to lack of acceptability, feasibility or the limited capacity of communities to sustain the chosen option [18]. It is beyond the scope of this analysis to discuss community management of water supply systems. However, not referring to community management of water sources is simply impossible, since community management is part of the institutionally established framework for the management and sustainability of water supply services in Mozambique.

Water policy emphasizes the demand principle, which is based on the assumption that the beneficiary communities or users demand the services, participate in the planning of infrastructure projects through the choice of location and technologies that they are able to sustain, and share in the investment, operating and maintenance costs of the services [8]. There is therefore recognition by the interlocutors of the importance of the demand principle in ensuring greater ownership by the beneficiaries.

The water policy also emphasizes the involvement of the local private sector or individuals, selected by the end users, to manage water services as an alternative solution to community management systems. The district is delegated responsibility for planning, supervising and monitoring water sources. The district level is also responsible for ensuring the sustainability of the services, promoting the maintenance and repair of facilities at community level.

The participation of communities in the water management process is described in the following excerpt from the policy:

"... to ensure sustainability and the rational use of resources, the participation of communities and water users will be promoted, with emphasis on the role of women in the planning, implementation, management, use and maintenance of water supply and sanitation infrastructures, so that the solutions adopted correspond to the wishes and economic capacity of the communities. The degree and forms of participation will be adapted to local conditions and the level of service provided..." [8].

It is important to note from the excerpt above that sustainability is at the heart of water policy, considering the role of the community in guaranteeing the functioning and maintenance of the water source.

With regard to the issue of sustainability, water policy was a pioneer in establishing the demand principle in Mozambique, which was later materialized by MIPAR. The water policy considers the demand principle as a strategy to guarantee sustainability. The principle is based on the assumption that beneficiary communities demand services, participate in planning and choose sustainable technologies. The demand principle approach has provided a model for many rural water supply systems, focusing on financial and management sustainability through participatory planning, informed choices, community management and cost recovery or cost sharing [18].

In addition, another problem with the policy from the point of view of the interlocutors concerns the unclear roles and responsibilities of the main institutions at the district level.

"...it's not clear even to us, it's not very clear how each actor acts in the water supply sector, we have for example the Ministry of Public Works, Housing and Water Resources itself, which is responsible for forecasting water supply and then to fulfil this responsibility it creates DNAS with responsibility to define, propose policies and strategies, then in parallel the ministry creates FIPAG, AIAS, which are institutions that are the arm for building the infrastructure by itself and mobilizing investment, and then the council of ministers creates the regulator (CRA) ... But then we almost stop there and we no longer define at the lowest level how this sector is organized, and that's why DINAS, recognizing this, has already started consulting, even to discuss these aspects in the context of decentralization, yes, but this will help us to define the role of each one..." (Key Informant, 1 Maputo)

"...we will have to define what the district does, what the province does, what the district does, how the province supports it, what the district does and the province supports it, how it is also supported at central level, all this has to be defined because we have to respect the revision of the constitution, the issue of water and sanitation and to decentralize..." (Key Informant 2, Maputo)

Both opinions show that there are still challenges regarding the roles and responsibilities of the main players in the water sector within the decentralization process. A lack of clarity about the roles and responsibilities of decentralized institutions can affect the sustainability of the infrastructure in the sense that, for example, it is not clear which institution should or should not provide technical assistance to infrastructure managers and with what resources they should do so.

### 3.3. Decentralizing Water Services and the Delegated Management Model

In 1991, the decentralization and deconcentration of water supply services and the operational management of water resources began. It was from this period that various policies and programmes were created to regulate water supply services and the management of water resources.

In 1998, the basis for the establishment of delegated water supply management was established by Decree 72/98 of 23 December. It was with this in mind that in the same year, Decrees 73 and 74/98 created the FIPAG and the Water Supply Regulation Council (CRA). The purposes behind this framework were to guarantee the efficient management of water supply systems and to respond to the sector's planning and development needs, as well as the implementation of the main objectives defined in the National Water Policy [31].

In 2009, two decrees were approved that set a new stage for the process of regulating and managing water supply and sanitation systems, namely Decree 18/2009 of 13 May, which extends the CRA's mandate to supervise the process of water supply in all urban centres, and Decree 19/2009 of 13 May, which creates the Water and Sanitation Infrastructure Ad-

ministration (AIAS), whose responsibility is to manage the assets of secondary public water distribution systems and public wastewater drainage systems. From this perspective, the management and operationalization of the systems are delegated to private operators and other entities. Therefore, while AIAS is responsible for the administration of secondary systems, FIPAG has a broader administration of water supply systems.

With regard to sustainability, the delegated management framework itself is a mechanism adopted by the government to improve sustainability in the provision of water services in Mozambique. With this in mind, the government has adopted a set of standards and management options for the supply of water by small systems. Among these options, empowerment stands out as the more viable form of sustainable management.

Article 36 of Decree 73/79 on delegated management emphasizes that:

"...In accordance with the National Water Policy, the Council of Ministers institutionalized by decree the Delegated Water Supply Management Framework, providing for the creation of a Water Supply Investment and Assets Fund, the body responsible for managing the assets and the public investment programme in the supply systems...promoting their development and economic sustainability..." [10].

For its part, the proposed water policy considers that "water supply systems, from large cities to small water supply systems, should be managed by autonomous institutions operating on the basis of commercial principles, as this is a necessary condition for the sustainability of the systems..." [8].

As for the relevance of the legal framework, all the interlocutors in the study unanimously agreed on the relevance of current policies and plans for the sector, emphasizing their role in guiding the implementation of water supply projects for communities. With the exception of one of the interviewees at central level, there was a tendency to refer to the water policy, MIPAR, PRONASAR and the regulatory framework as the main instruments guiding the water sector in the country and little reference was made to the water law, possibly due to the poor contact these actors have with this legislative instrument. However, despite its relevance to the operationalization of water projects at community level, there is recognition that the legal framework is not perfect and needs to be revised.

"... Well, we have implemented it, but not so much because we as a district never have the capacity to build. The constructions we had are from the provinces and the partners plans... the province just comes in and says it has this and that plan to implement…" (Key Informant 1, Manjacaze).

There is little articulation between the policy and the process of implementing water supply plans at community level, with a lack of capacity at district level being one of the reasons for the lack of effective implementation. Therefore, we can conclude that the challenge to the sustainability of water supply services has to do with poor planning in the sense that the plans are drawn up and financed at central and provincial level, and it is up to the districts to identify the sites and monitor the infrastructure construction works.

## 3.4. From the Legal Framework to the Operationalization Instruments

In order to better understand the logic behind the implementation of the legal framework for the water sector in Mozambique, the instruments used to make it operational must be analyzed. Among the various existing instruments, we have selected 3, namely MIPAR, PRONASAR and the Operational Plan for the implementation of the SDGs, which will describe and analyze below.

In 2002, the MIPAR was approved through Ministerial Diploma 23/2002. From the perspective of this diploma, the manual is a mechanism for implementing water policy in the sense that it establishes and guides the process of implementing water supply projects using a demand-driven approach. This means that communities must participate in all water supply processes (planning, implementation, management, maintenance and ensuring sustainability through monetary contributions from the communities).

Although the MIPAR is a guideline for the implementation of rural water supply projects, it has its expression and knowledge at provincial and central level.

Community participation in the planning and budgeting process is regulated through consultative councils. These are community-based institutions governed by the law on local state bodies. With regard to community participation, the ministerial decree creating MIPAR considers that:

In the implementation of projects based on the demand principle, the community must participate in all phases of the project. To this end, they must: be informed in advance and adequately about the existence of the project, the opportunities it offers, its implications and ways of accessing the services; make clear decisions about the type and level of services they want; choose the preferred area for the installation of the source, with respect for technical requirements; contribute to the investment costs corresponding to the level of service chosen; take responsibility for the operation, maintenance, repair, replacement and management of the systems; elect the members of the water committee and the maintenance group [20].

The perception of a lack of capacity and lack of harmony with actions on the ground is also pointed out by sector specialists at central level. Key informants at central level are also unanimous in their view that the legal framework for the water sector (water policy and MIPAR) is out of date with reality and that it needs to be revised in the context of decentralization, as can be seen in the following excerpt.

"... I don't know if MIPAR has been updated or not, but I think that in terms of principles, the principles are still valid, now for me the big challenge of MIPAR is the decentralization process and the accountability of the actors in the im-

plementation. This is the issue that still worries me a bit, at the lowest level, when I talk about MIPAR. I understand that the challenge of MIPAR is what is the governance structure that actually allows for the correct implementation of MIPAR, be it from the community, SDPI's and then public works, which are now two, and even the SDPI's are also two and then the DNNAS machine, that's really the challenge, the challenge for me is accountability for each of the implementation steps (Key informant 1, Maputo).

MIPAR considers capacity building to be one of the critical factors for maintaining the system, and this capacity building must be comprehensive at both levels (district and community). However, practice shows that this capacity-building doesn't always happen. At the community level, committee members benefit from an induction on how to operate the system and carry out minor pump repairs in the event of a breakdown. In this document, sustainability is analyzed as a critical factor in the permanent supply of water to the communities and they therefore play a fundamental role in the management and maintenance of the source. Therefore, guaranteeing sustainability is the responsibility of the community, which is assigned 8 roles and responsibilities ranging from participation in planning, monitoring, mobilizing funds and managing the infrastructure.

MIPAR continues to be a relevant document in the sector, especially in terms of community mobilization. However, MIPAR is a document that is out of date and needs to be revised, according to one of our interlocutors:

"...so, what MIPAR is going to do is an implementation manual, that's why we're going to have to review it, we're going to have to define what the district does, what the province does, how the province supports it, what the district does and the province supports it, how it is also supported at central level, all this has to be defined because we have to respect the revision of the constitution, the issue of water and sanitation and to decentralize..."... MIPAR is a product that no longer has much shelf life, it has passed its sell-by date..." (Key Informant 2, Maputo).

One shortcoming that has been pointed out that makes effective implementation of MIPAR unfeasible is the lack of articulation between the guidelines in the manual and the spare parts market. MIPAR advocates the demand principle and places the responsibility for managing and maintaining sources on communities. However, in the event of a breakdown the committee has nowhere to buy spare parts.

"...there have been major problems in making the demand principle viable, there are, and this is one problem. The other problem I don't think has been solved because it probably means that the solution was wrong was the famous supply chain. Because of the spare parts for the hand pumps, because the traders are not very interested. Of course, they are not. So, there is not much scale for the district trader to have some spare parts from the districts..." (Key Informant 2, Maputo).

PRONASAR has been implemented since 2010 as a mechanism for operationalizing the PESA-ASR. It aimed to increase sustainable access to water supply and sanitation for at least 70 per cent and 50 per cent of the rural population by 2015, respectively, as part of the efforts to achieve the Millennium Development Goals.

In order to adapt it to the context of the implementation of the action plan for the implementation of the SDGs and to adapt it to new challenges in the sector and new socio-economic and political dynamics in the country, PRONASAR was revised in 2020.

With regard to sustainability, PRONASAR sets out to contextualize the problem and recognizes it as one that threatens the provision of rural water supply services, and also considers that the cost of maintaining the sustainability of investments and services is still unknown. However, it highlights the plan to train hand pump mechanics and water supply system operators [5].

There is a very optimistic view of PRONASAR in that the new programme, compared to the previous one, provides for more elements that can contribute to sustainability, as one of our interlocutors considered.

"...PRONASAR is a programme that has several components, the construction component and the mobilization of funds for the construction of these small systems, the construction of dispersed water sources, but it also has a sub-chapter that has to do with the operation and maintenance of infrastructures and in this new PRONASAR, AURA has already been called in to play its role in monitoring this service that the state is making available to the communities and that's where AURA has to innovate and be able to contribute so that this PRONASAR is in fact sustainable at the end of the programme.." (Key informant 1, Maputo). However, the reality is different. PRONASAR looks far from meeting the sustainability: the sustainability study conducted by WaterAid [35] shows that most of the PRONASAR water supply system is not sustainable.

In response to international commitments, particularly the SDGs, the water sector's action plan for the implementation of the Sustainable Development Goals 2015-2030 was drawn up and approved in 2018.

The action plan for the implementation of the SDGs (2015-30) emphasizes the issue of the sustainability of sources as one of the challenges for access to water. The estimated cost of secondary infrastructures to achieve the targets is 886,859,817 US dollars, of which 825,997,519 USD correspond to investment in systems and 60,862,298 US dollars to investment in dispersed sources. However, an analysis of the levels of investment in water and sanitation that the country has been making over the last 7 years only allows it to reach around 1% of the estimated population at an average of 4.4%, which means a misalignment between the plan and what has been achieved.

The investment data presented in the previous paragraph in itself shows the disparity in investment between rural and urban areas. There is still little budget allocated to rural areas compared with urban areas, with only 18% of funds are al-

located to rural areas. However, according to the 2017 general population survey, around 61 per cent of the Mozambican population lives in rural areas.

In the view of WaterAid (2005), the sector's challenges in implementing policies are related to the weak technical and financial capacity of district governments. [34]. There is a understanding by the government that there are shortcomings in achieving the plans and targets set. For example, the objectives set by PRONASAR in the first phase of its implementation were to achieve 70 per cent access to water by 2015, a target that has not been reached. The PRONASAR 2 document points to the following causes for the failure to achieve the planned targets: weak institutional capacity at all levels, poor sustainability of services and low levels of funding. The document also points to interference by the central government in the implementation of the programme, leaving aside its role of policy formulation, strategic orientation of the sector, monitoring and evaluation.

One of the challenges pointed out by the sector experts interviewed is the weak implementation capacity in both technical and financial terms. "…Allied to these challenges is the challenge of prioritization by political leaders when they come to power", as described by one of the key informants. On the other hand, there are financial constraints on the districts to respond to the activities planned for the water sector, including the participation of communities in the planning, management and monitoring of water infrastructure. This makes the plans, strategies and guidelines merely normative documents.

In view of the gaps presented, there is a recommendation from the sector's players to revise the document as mentioned above:

"...MIPAR is against the law, the water policy of 2007 and the ministerial document of PRONASAR 2 this is absolute in practice, it was necessary to review it in depth, but now perhaps it's not worth it. After the water and sanitation law comes out this law will need to be regulated, this takes place because a law never defines everything. There are major milestones, major principles that then need to be regulated. Then a new MIPAR will probably come out, so that's it with all the issues of centralization etc..." (Key Informant 2, Maputo).

From the description and analysis of the regulatory framework and operationalization instruments, it is clear that the water sector in Mozambique has a wide range of policies, strategies and regulations for the sector. However, the challenges of implementing them and allocating sufficient resources persist. With regard to the implementation of rural water supply projects, MIPAR needs to be contextualized in order to make it a guiding and up-to-date instrument. The instrument must respond to the government's new commitment to management models and the type of services made available to rural populations.

## 4. Discussion

From the above review of the main national laws, policies and plans, there is a strong regulatory framework aimed at ensuring sustainable access to water, sanitation and hygiene services. However, the existence of these instruments is in itself a problem in terms of operationalisation. Using the concept of problematic and non-problematic worlds, the discussion will revolve around the following point: the alignment of strategies and plans with national policies, i.e. do plans and strategies respond to national policies for access to sustainable water services?

An analysis of the political and institutional framework shows that not only does the country have a rich legal framework, but that competences and responsibilities are well described and decentralized. This idea is endorsed by Hassamo [11] when he states that there is a greater decentralization of responsibilities, functions and competences, which, if well implemented, can bring significant gains for local communities. This idea is also defended by Uandela (2012) referencing Boehm (2010) when he considers that the political and strategic framework of the water sector in Mozambique is considered to be one of the best articulated in the African context [31].

In theory, the availability of a legal framework and the existence of institutions at various levels may indicate that the foundations for sustainable access to water services are in place. However, there is the challenge of operationalizing it, as we will describe below in the discussion on what is problematic.

There is a misalignment between policy and practice: MIPAR advocates the participation of the local population in the whole process of implementing a rural water supply project. However, what we see is that the community has no knowledge of the water infrastructure planning process, including the type of technology to be installed. This lack of knowledge is not exclusive at local level, but also observed at province and district level. Harvey (2004) considers that for policies to be put into practice, they must have: the right institutions and people; stakeholders who adhere to them; a consistent regulatory and legislative framework and adequate financial resources [12].

The innovation in terms of sustainability brought about by MIPAR is that the guarantee of sustainability must be ensured by the community [20], who are the managers of the water sources, with a view to bringing a greater sense of ownership of the source. However, the reality is that a sense of ownership does not always guarantee sustainability. This position is upheld by Kativhu [16], in his study on the sustainability of water sources under community management in Zimbabwe. The author considers that there is no automatic relationship between the sense of ownership and willingness to manage and the sustainability of water supplies systems, because although communities demonstrate their sense of ownership, sustainability in these communities may not be achieved. In turn, Sara (2013) consider that infrastructure condition is positively associated with water committee members' sense of ownership, whereas users' confidence and system manage-

ment are positively associated with households' sense of ownership [28].

Community management is a mechanism adopted by several countries in Africa and the southern region in particular. The South African Water Act, for example, provides for the involvement of communities organized into committees to carry out the functions of managing and maintaining water sources in a particular area. Also operating at local level, are water users' associations. The general function of these associations or committees is to ensure that people in the community using their resources carry out water supply activities efficiently [17]. The role of the water user committees is well analyzed by Abrams [1], Lockhood [19]. and by Carter [2, 3].

From an institutional analysis perspective, Uandela (2012) points out some of the water sector's weaknesses. According to the author, the fragility of the institutions and their inadequacy to establish political and strategic models create 'bottlenecks' for the development of the sector. The human capacity of the sector's institutions is still weak, at all levels. The DNA (now DNAAS) is reluctant to deconcentrate and decentralize competences, and still retains some operational functions, which disperse its capacity to pursue its role of formulating policies, providing strategic guidance and monitoring [31].

In theory, the regulatory framework for the water, sanitation and hygiene sector provides for the involvement of the private sector in various phases of the provision of water supply services, from construction, training, the sale of spare parts and technical assistance. With the involvement of the private sector, the government is expected to focus on activities related to regulation, licensing, arbitration, quality and coordination, areas in which the government is expected to take more action by involving the private sector [30]. However, the reality is that the private sector is more visible for system-building activities. The community has struggled with a double problem of access to spare parts, on the one hand due to the lack of a market and on the other the financial inability to purchase parts in markets outside the community.

The legal instruments analyzed in this article make reference to the issue of sustainability at all levels (central, provincial, district and community) with the exception of the 1991 water law. The fact that sustainability began to be addressed in policies and plans five years after the water law was passed may demonstrate the government's concern about the negative impact this phenomenon has on access to water services for communities. Regarding policies and strategies in the water sector, Harvey (2004) considers that many of these policies can positively and negatively affect the sustainability of services. Many of the policies developed in this area and in relation to "poverty alleviation in Africa" were developed under the influence of international organizations such as the International Monetary Fund (IMF) and the World Bank (WB). We cannot attribute this conclusion to the case of Mozambique, as this was not the aim of this study, but it is clear and well known that donors have strong influence in the WASH sector in Mozambique.

Should be noted that it was only in 2002 with the introduction of MIPAR that the government began to present some clear actions on how to tackle this challenge, for example the issue of community participation in the management of water sources as part of the decentralization process.

In MIPAR it is problematic that the government emphasizes the role of the community in guaranteeing sustainability through its involvement in the whole process that culminates in the installation and operation of the system, but in practice most of the roles and responsibilities assigned to communities are theoretical rather than practical. The community does not have the technical and financial capacity to guarantee effective maintenance and management of the water supply systems. A study carried out by WaterAid in 2005 points to the lack of proper use of policies including MIPAR, which results in failures to implement water projects. The study also emphasizes that the issue of technological choices is also problematic in the 1995 water policy in the sense that although the Afridev pump has been adopted as an alternative technology, the community does not have the financial, technical and management capacity to guarantee the pump's operability [34].

In the case of the Manjacaze district, where we carried out the most comprehensive study, we found that since the departure of World Vision, which was the organization providing support for the operation of the water supply system, the community has been struggling with problems of access to water services. This is also seen in other African countries where the majority of water supply projects are funded by Non-Governmental Organizations. The fact that most rural water projects are funded by Non-Governmental Organizations, their strategies and objectives have had a negative impact on the technical and institutional factors of sustainability [15].

Therefore, throughout this section it has become clear that there is a normal and even functional perspective of the water sector in establishing a robust legal framework capable (in theory) of responding to the sustainability challenges of water supply services. However, it has also become clear that the way in which the legal framework is implemented in practice is problematic, from its lack of knowledge, especially at the grassroots level, to the lack of resources to operate it in order to achieve sustainable development objectives. The water and sanitation sector's action plan for operationalizing the Sustainable Development Goals proposes reaching 23,078,967 (100%) people by 2030 [21].

The challenge of operationalization is identified by Harvey (2004), who considers many African governments to have very ambitious targets for increasing levels of rural water coverage in order to align themselves with global targets. In addition to the "ambitious" targets, there is the factor of external dependence for investments in the water sector. We highlight the fact that communities do not fully fulfill all the tasks for which they would be responsible as members of

water committees. Water management committees have no legal status, which means that they have no legal responsibility for the ownership of the water source [12].

While there are limitations to analyzing all aspects of the issue raised here, there are three areas of community involvement in the management of water sources that merit in-depth investigation, namely: the issue of access to information for the choice of appropriate technology, willingness and ability to manage and maintain, and willingness and ability to pay for services. One of the limitations in this article concerns the lack of access to coherent and up-to-date data on access to water in Mozambique. WaterAid [34] suggests that this problem stems from the weak monitoring capacity of water supply systems. Thus, there is an urgent need for studies that focus on the issue of the availability of up-to-date and coherent data on access to water in Mozambique. Up-to-date and coherent data is fundamental for better decision-making on the investments needed to increase coverage levels.

## 5. Conclusions

Mozambique has a robust legal framework, with instruments to regulate the sector as well as to ensure greater coverage of water supply services. With the exception of the 1991 water law, the various legal instruments, plans and strategies emphasize the issue of sustainability as a challenge for access to drinking water services. The existing legal and normative framework clearly emphases the issue of sustainability and there is a well-structured institutional framework at all levels (central, province and district). However, the existing legal framework has failed to establish a functional model at rural level for better management of water supply systems.

There is no clear approach to addressing the issue of sustainable water services, as well as the ineffectiveness of the decentralization measures under implementation in Mozambique. The MIPAR is an outdated document that needs to be updated in order to keep up with the changes taking place in the rural context, such as growing urbanization, the option for small water supply systems to the detriment of dispersed water sources, which are leading to a gradual change from community management models to private management, and which make the current water management committees less relevant.

The analysis of the legal framework of water supply services is not in itself sufficient to understand the phenomenon, but it is a significant step that goes beyond the current sustainability studies and analyses based solely on the technical aspects of infrastructure functionality. It is clear that sustainability is seen as a problem and that is why it is mentioned in almost all the instruments of the water sector in Mozambique, but recognizing the problem does not mean knowing about it. We therefore recommend that academic studies and research be carried out to investigate the implications of the current decentralization process underway in Mozambique for guaranteeing the sustainability of water supply services, thus looking at issues of governance, transparency and accountability.

## Abbreviations

| | |
|---|---|
| AIAS | Water and Sanitation Infrastructure Administration |
| AURA | Water Regulator Authority |
| DNAAS | National Directorate of Water Supply and Sanitation |
| DNAS | National Directorate of Water and Sanitation |
| DNA | National Directorate of Water |
| FIPAG | Water Assets Investment Fund |
| IMF | International Monetary Fund |
| MIPAR | Rural Water Supply Project Implementation Manual |
| MOPH | Ministry of Public Works, and Housing |
| MOPHRH | Ministry of Public Works, Housing and Water Resources |
| NWP | National Water Policy |
| PRONASAR | National Rural Water and Sanitation Programme |
| PMER | Planning, Monitoring, Evaluation and Research |
| PESA-ASR | Strategic Plan for the Water Sector - Rural Water Supply and Sanitation Component |
| RWSN | Rural Water and Sanitation Network |
| ROSC | Civil Society Forum for Child Rights |
| SDG | Sustainable Development Goals |
| SINAS | National Water and Sanitation Information System |
| SDPI | District Planning and Infrastructures Services |
| USAID | United States Agency for International Development |
| UNICEF | United Nations Children Fund |
| WP | Water Policy |
| WB | World Bank |

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## Author Contributions

**Alves Nhaurire:** Conceptualization, Data curation, Resources, Formal analysis, Investigation, Methodology, Writing original draft

**Rehana Capurchande:** Data curation, Methodology, Supervision, Validation, Writing-review & editing

## Data Availability Statement

The data that support the findings of this study can be found at:
http://sinasmz.com/lizmap/lizmap/www/index.php/view/

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## Conflicts of Interest

The authors declare no conflicts of interest.

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## Biography

**Alves Nhaurire** is PhD student at Eduardo Mondlane University in Mozambique. He holds a Master in Sociology of Development., He holds a Monitoring for Social Accountability by PSAM and Rhodes University. As professional, he has a vast experience of more than 10 years on WASH sector in, with vast experience in PMER as well as WASH programme manager. He participated in international conferences sharing his reflection and thoughts on the problem of access to water, with the sustainability of water services being his main topic of interest. He currently works for an international cooperation agency as a WASH program manager.

**Rehana Capurchande** holds a PhD in Sociology–Vridje Universiteit Brussel, Belgium, and a Master in Management and Analyses of Social and Economic Development in Africa:– ISCTE-Lisbon, Portugal. She is a Lecturer at Eduardo Mondlane University; She is an academic professional and researcher with a strong technical background in researching gender and development, gender and politics sexual and reproductive health. She is the Head of Central Department of Training at Centre of Coordination of Gender issues at UEM. Her areas of interest are Gender and Development, Social Identities and Health and Childhood.

## Research Field

**Alves Nhaurire:** The logic of peasant involvement in agricultural associations, Sustainability of water service provision in Mozambique, Water committees in the implementation of decentralization measures in Mozambique.

**Rehana Capurchande:** Adults perceptions on adolescent attitudes towards pregnancy, Challenges of doctoral programs in Mozambique, Trust within capacity building for the development of supervision trainings, Between compliance and resistance: exploring discourses on family planning in community health committees in Mozambique, Violence is bad for health and quality of life: concepts, theories and typologies of violence.