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JM6/M4 Water Governance in Rural Kenya

Sirimon's Water Future: Community-Driven Opportunities for more Equitable Water Governance and Balanced Upstream-Downstream Relations

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II List of Abbreviations

ASAL	Arid and semi-arid landscapes
CETRAD	Centre for Training and Integrated Research in ASAL Development
GWP	Global Water Partnership
IWRM	Integrated Water Resources Management
KES	Kenyan Shilling
KFS	Kenya Forest Service
KWS	Kenya Wildlife Service
NEMA	National Environment Management Authority
PI	Participant from Interviews
PW	Participant from the Workshop
QCA	Qualitative Content Analysis
UENB	Upper Ewaso Ng'iro Basin
WPI	Water Poverty Index
WRA	Water Resources Authority
WRUA	Water Resources User Association
WWF	World Wide Fund for Nature

III Acknowledgement

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1 Introduction

Kenya is facing numerous water-related challenges which extent across the area of the entire country. With 90% of the country being arid or semi-arid (ASAL) and a growing proportion of water-intensive (economic) activities, from domestic to commercial level, water management and further water governance play an important role deciding over living conditions of the people, especially in rural areas like the Sirimon catchment. A Water Poverty Index (WPI) study conducted in 2022 concluded that the Sirimon catchment is facing “acute water poverty” (Mwaura et al. 2022, p. 41).

In last year’s course, the students investigating the Sirimon catchment highlighted several critical challenges within the area, including a commodification of water which is excluding low-income users, power imbalances favouring large-scale farmers, and a lack of clarity around the roles and responsibilities within governance structures. The most relevant governance bodies in this context are the Water Resources User Associations (WRUAs), further described in chapter 4.1. Despite the detailed identification of these problems, the existing literature offers limited insights into how such challenges might be practically addressed or resolved through inclusive, community-informed approaches.

This study seeks to fill that gap by co-developing pragmatic and context-relevant solutions with both communities and authorities in Sirimon. A participatory approach is critical, as community members often experience water scarcity firsthand and may already possess local knowledge or practical strategies that remain unrecognized. Similarly, incorporating authorities’ perspectives, along with those of upstream users like large-scale farmers, will provide a more balanced and integrative view of the governance landscape. This collaborative approach aims to not only surface solutions but also empower marginalized voices in shaping future governance frameworks, leading to the study’s key research question:

> **How can community-driven opportunities in water management contribute to enhancing inclusive and equitable water governance in the Sirimon catchment?**

The approach of this key question started with an overview of the research area and local governance actors and structures followed by an analysis of their interconnectedness, guided by the following objectives:

1. How is water access in the Sirimon catchment distributed and managed?
2. How do different stakeholders engage in local water governance and which water related constraints and opportunities result from their behaviour?
3. How does people’s position along the river influence their experienced constraints and to what extent do the river sections influence each other?

2 Background

2.1 Conceptual Background

The background of the conducted study lies in the conceptual frameworks of political ecology and (water) governance structures, with a particular focus on the hydrosocial cycle. Therefore, it is important to provide a brief introduction to these concepts to contextualize the study.

Political ecology as a field of research developed during the 20th century. While in early stages defined as “combin[ing] the concerns of ecology and a broadly defined political economy” (Blaikie & Brookfield 1987, p. 17), it was later described as a broad field with neither a focus on specific topics nor a particular socio-spatial focus. Perreault, Bridge and McCarthy framed political ecology as a “set of commitments” rooting in a critical social theory, conducting in-depth qualitative observations and aiming towards structural political change (Perreault, Bridge & McCarthy 2015). Still, it can be said that the basic assumption considers the interrelations of ecological systems and political structures, claiming that ecological systems are not only influenced by political and economic processes but on the other hand fundamentally political themselves (Robbins 2019). Meanwhile the aim of political ecological investigations does not lay in the explanation of social and environmental processes but rather in constructing alternative understandings of them (Perreault, Bridge & McCarthy 2015).

Water, when not only considered as the element of H_2O, but as a resource on which lives depend, is an example for an inherently political ecological topic (Bakker 2002). Another shift in perspective from considering water as an object of social processes towards “a nature that is both shaped by, and shapes, social relations, structures and subjectivities” (Linton & Budds, 2014, p. 170) emphasises the relevance of further discussion on the topic. Based on the difficulty of water management as a discrete activity, considering water’s social dimensions, the paradigm of Integrated Water Resources Management (IWRM) rose as the dominating principle in water governance in the 1990s (Linton & Budds 2014). IWRM is defined as “a process, which promotes the coordinated development and management of water, land, and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (GWP 2015, p. 11) by Global Water Partnership (GWP) and works along two main principles. The first one sets a watershed approach as basis of IWRM to narrow down the focus area. The second emphasises the importance of stakeholder participation on all governance levels to be able to resolve water conflicts (GWP 2015).

A monitoring of IWRM is set as indicator 6.5.1 for the SDG 6 (Clean Water and Sanitation). In Kenya, IWRM has been implemented primarily through the WRUAs and receives a medium-high degree for the implementation compared globally. While Kenya receives a high degree

for institutional structure, the category of management instruments is ranked medium-high. The lowest ranking is in the category of financing, only receiving a medium-low degree (Republic of Kenya 2023). The WRUAs are intended to improve local water management, but persistent governance challenges and financial constraints threaten their effectiveness and legitimacy.

The aspect of integrating cultural, ecological and economic aspects within the hydrological dimension of water is one of the main critiques of Linton and Budds, who call for a focus on the interrelations of the dimensions instead of integrating the one in the other. They present the hydrosocial cycle as a "socio-natural process by which water and society make and remake each other over space and time" (Linton & Budds 2014, p. 175), including a structural shift from water management towards water governance.

As Swyngedouw pointed out, "true scarcity does not reside in the physical absence of water in most cases, but in the lack of monetary resources and political and economic clout" (Swyngedouw 2009, p. 58), emphasizing how any political or personal actions considering water use and distribution are never politically neutral. This applies not only to their consequences but also refers to how water use and access is historically produced through power structures and market mechanisms, including accumulation by dispossession (ibid., Harvey 2007). Here the hydrosocial cycle offers a critical approach to analyse how water use and distribution reflect power relations and as already described as a central aspect of the political ecology framework, tries to construct alternative understandings or actions within existing structures.

This is where the following study comes in trying to investigate given structures in Sirimon's water management, highlighting constraints the communities are facing and their origins in order to finally determine opportunities to improve the situation through a set of different methods.

2.2 Description of the Study Area

The Sirimon sub-catchment is located on the northwestern slopes of Mount Kenya in the Upper Ewaso Ng'iro Basin (UENB) and is a diverse and important area in central Kenya. Covering about 157 km², it straddles Laikipia and Meru counties. The region lies between the towns of Nanyuki and Timau (see Figure 1, CETRAD 2014). In 2009, the catchment had a population of 36,229 living in 10,226 households (CETRAD 2014). The Sirimon River Basin provides vital water for the Ewaso Ng'iro North River Basin, which is the largest basin in Kenya, stretching from 0° 15' N to 1° 00' N and from 36° 30' E to 37° 45' E (Mutiga et al. 2010).

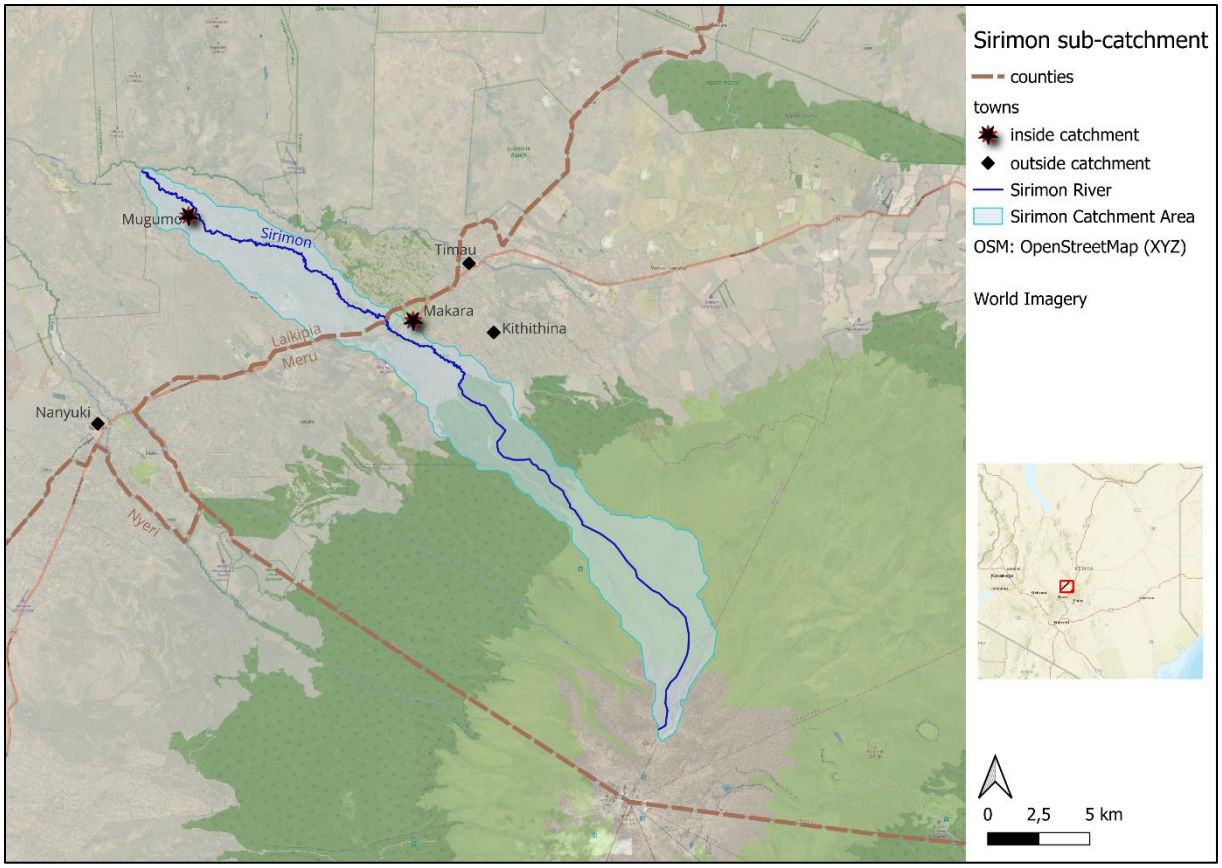

Figure 1: Map of the Sirimon sub-catchment (own illustration, OSM, CETRAD)

The Sirimon River starts in the high-altitude moorlands of Mount Kenya, at elevations above 3,000 metres. From its source, it descends northwest across steep, rainfall-rich slopes before entering the Laikipia Plateau, where the landscape changes to wider valleys and semi-arid plains (= “downstream” area). The Sirimon River is about 46 km long, and the total length of its network is roughly 112 km (Sirimon WRUA 2023). It eventually merges with the Ngare Nyiro and joins the larger Ewaso Ng’iro system. The catchment's varied topography creates distinct ecological differences, supporting many land uses and habitats.

The climate in the Sirimon sub-catchment is affected by its location on the leeward side of Mount Kenya. This leads to a shift from humid, cool highlands to more semi-arid lowlands. Annual rainfall varies greatly, with the upper zones getting much more precipitation than the lower areas. Temperatures also differ significantly with elevation, ranging from 7.6 °C in the higher zones to around 22 °C in the lower catchment (CETRAD 2014). This variability, along with distinct seasonal changes, results in significant fluctuations in river flow. Parts of the Sirimon run dry during the dry season, which lasts from December to April.

Compared to other rivers in the UENB, the Sirimon River maintains relatively good water quality, with a Multimetric Index (MI) of 0.6 (Mmerimba et al. 2014). However, households in Sirimon face serious water shortages (Mwaura et al. 2020). Long-term studies show that streamflow in the UENB has been declining, which increases water-related issues and causes conflicts between upstream and downstream users (Omwoyo 2017), which will be further discussed in this study. The land use in the area varies greatly. The upper catchment consists mainly of grassland and forest, while more fertile mid and lower zones have cropland and

settlements. The main crops grown are carrots, cabbage, potatoes, beans and corn, and a lot of land is used for livestock farming (CETRAD 2014).

Sirimon is recognized as one of the most water-stressed sub-catchments in the Upper Ewaso Ng'iro Basin. It faces serious water scarcity caused by natural and human factors (Mwaura et al. 2022). The area's dryness, continuing deforestation and the agricultural expansion increase the water loss. This situation affects the availability of surface water and groundwater. Water extraction for irrigation, domestic use, and livestock is high, while illegal withdrawals further stress the system. These pressures lead to an increase in pollution and degradation of the river areas, which endanger the water quality and ecosystem health.

The Water Act of 2016 stipulates that a Basin Area Water Resources Committee must be established for every major basin to manage their catchment (GWP 2015). These committees develop basin management plans, provide advice on water permits, and ensure sustainable water use. The Sirimon catchment is managed according to these legal guidelines, with boundaries and management roles clearly defined by the Water Resources Authority (WRA) and relevant laws (Richards & Syallow 2018).

3 Methodology

Three complementary methods for data collection were employed in this study: **semi-structured interviews**, **a participatory workshop**, and **participatory observation.** The study was conducted by a seven-member field team (four females, three males), including a local resource person. The Team included members fluent in Swahili, English, Kikuyu, and Meru, which was helpful since interviews were conducted in different languages. During interviews carried out not in English, the only-English-speaking members recorded audio, took notes and handled visual documentation. Parts of the interviews were translated directly, so everyone was able to pose follow-up questions and facilitate discussions. The resource person introduced the team to the communities, coordinated communication with local communities and government officials, and facilitated access to various sections of the river.

3.1 Data Collection

3.1.1 Participatory Observation

Fieldwork began with a transect walk along the river, covering the midstream section, and was later supplemented by another walk in the downstream area. Observations included water conditions, vegetation, constructions, and human activities. Regarding activities and infrastructure in water collection, distributions were observed. Data was recorded through notes, photographs and videos. These observations informed interview questions and provided contextual depth for interpreting workshop findings.

3.1.2 Semi-Structured Interviews and Participant Selection

Interviews followed an open-ended guide asking for perceptions of water availability, challenges, and potential opportunities (see Annex 2). Interviews were conducted door-to-door and in groups. This approach allowed for flexibility while maintaining reliability of key themes. Each session began with verbal consent, and audio recordings were permitted.

Participants were selected purposively to represent upstream, midstream, and downstream communities (see Figure 2), prioritising households near the river or boreholes, whereas upstream representatives were met under different circumstances outside the catchment. A total of 18 interviews with community members (sometimes in groups) and four with key informants (teachers, WRUA members, committee leaders) were conducted, plus three additional interviews with people from outside the catchment. This adds up to a total of 35 interview participants, from which 18 were male and 17 were female (see Annex 1). Key informants were identified based on their societal role and literacy levels, which positioned them as knowledgeable sources of information.

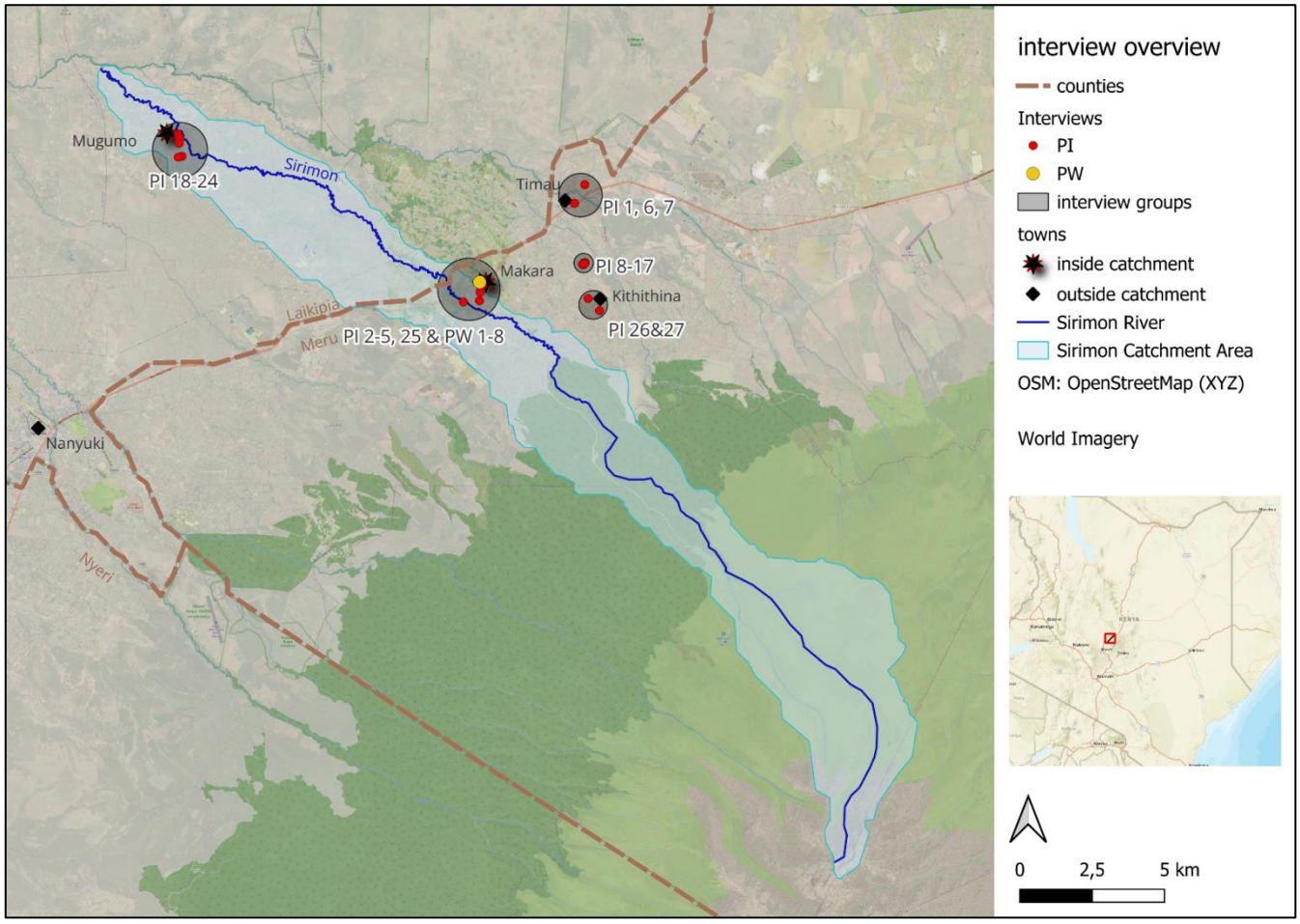

Figure 2: overview of conducted Interviews (PI) and a Workshop (PW) in the different sections of Sirimon Catchment (own illustration, OSM, CETRAD)

3.1.3 Participatory Workshop

A single workshop with eight participants (three males, five females) was conducted towards the end of the fieldwork. Participants were selected based on their gender, occupation and age diversity, hence divided into two small groups. The activity began with community mapping of water challenges, where participants identified issues and locations. This was followed by group discussions to develop ideas for tackling the challenges. Each group concluded with a brief presentation summarizing their findings and proposed solutions. The session lasted 1:15 h and was documented through audio and video recording with consent.

3.2 Data Analysis

After conducting several interviews, a workshop and two transect walks, the amount of collected data had to be transcribed and structured to continue with a qualitative analysis. While especially the Key informant interviews were translated literally, some household interviews were only summarized in notes. Qualitative analyses don't necessarily follow a strict structure but vary depending on the given material (Mayring 2022).

Data Analysis in this study was oriented on the structural qualitative content analysis (QCA) followed by a kind of type-building QCA, both described by Kuckartz and Rädiker (2022). Due to a lack of licenses for coding software to be used by the whole team, the interviews were divided to the team members and excerpts were collected in a shared Excel table.

In the first round of structural QCA, interview excerpts were assigned to categories containing the (water-related) challenges different stakeholders are facing. Key aspect of the structural QCA is a combination of both, deductive and inductive, categories that are created to structure the material (Kuckartz & Rädiker 2022). In this case, the excerpt-column was deductively separated into the three columns "challenges", "solutions" and "conditions". The final codes, that the excerpts were assigned to, were created inductively while going through the interviews.

In a second step a kind of type-building QCA was applied but deviating from the described scheme by not grouping the codes into types (where a main criterion would be shared values, which is not given in this case) but rather assigning them to overarching *themes*. The themes represented opportunities that may be available to solve or improve the situations mentioned in the assigned codes. As described in the steps of a classic structural QCA, several rounds of coding (and "theming") the material were conducted, trying to narrow down the codes and especially themes and reduce the number with each round (Kuckartz & Rädiker 2022). In a final step, the remaining themes were grouped into five overarching categories, guiding the discussion following the second objective before trying to combine all the collected information in a framework representing objective 3 and helping in answering the overarching research question.

3.3 Video Documentation

Additional to collecting data in form of notes and audio files to later be analysed, the field stay was also documented videographically. A borrowed video camera from the university of Bonn helped making the documentation more professional and also seemed to give the people a more comfortable feeling than if they were being pointed at with a smartphone. Especially the participatory workshop turned out to deliver valuable video data, which reflects the experienced atmosphere way better than just a written description could do. Same as in the interviews, filmed people were informed about being recorded and everything happened under permission. The presence of the big camera always arose attention, but mostly friendly and curious reactions. The collected videos were then sorted and cut together into a short film using the free software “DaVinci Resolve”. The final documentation can be accessed via the following link: Sirimon Video Documentation.

4 Findings – the Structure of Water Use in Sirimon

The water access and governance in the Sirimon catchment are influenced by multiple layers, the institutions, the community organisation and individual practices. Referring to objective 1 - How is water access in the Sirimon catchment distributed and managed? - first the structure and function of the Sirimon WRUA is examined (4.1) before compared to “real” local practices that were reported by residents of the area (4.2) and concluded in a stakeholder mapping (4.3).

4.1 Local Governance Structures and the WRUA Sirimon

The interviews highlighted the central role of the Sirimon WRUA as a grassroots institution for water governance. While the Water Act of 2002 (Republic of Kenya 2002) first introduced WRUAs to involve communities in the management and allocation of water, and the 2016 Water Act (Republic of Kenya 2016) further strengthened their position under the devolved system, it became clear from the interviews that the practical implementation of these roles depends strongly on local capacities and resources (GWP 2015).

The Sirimon WRUA was established in 1997 and formally registered in 2004 (PI2). It frames its work around the principles of IWRM, as outlined in its Sub-Catchment Management Plan (Sirimon WRUA 2023). It functions as an umbrella organisation linking community water projects to state regulators. Its management committee currently includes 15 members, with plans to expand to 20, and operates under a constitution and by-laws that regulate allocation, impose penalties for non-compliance and provide conflict resolution mechanisms (PI26). Sub-committees address finance, monitoring and climate resilience (PI2).

Finances remain a challenge. The WRUA’s annual budget for 2024–25 is 475,000 KES which is raised primarily through membership and joining fees, in addition to voluntary contributions

(PI26). External funding sometimes comes from the Water Services Trust Fund, the WRUA Development Cycle, or from NGOs such as the World Wide Fund for Nature (WWF) and Fauna & Flora (PI26). However, the WRUA continues to face difficulties in sustaining activities without external facilitation (PI2, PI3), as will be further discussed in chapter 5.1.1.

Membership is voluntary and open to different groups, including farmers, pastoralists and community organisations. Access to water, however, is usually tied to a membership in local water projects, which requires a household contribution. The relatively high cost of these projects can create barriers for poorer households and especially for women, who already face social and economic constraints (Coulter et al. 2018). Each project is managed by its own committee (chairperson, secretary, treasurer), which collects fees and maintains intakes, before remitting payments to the WRUA and regulatory authorities such as the WRA or Kenya Forest Service (KFS).

One of the WRUA's most important functions is water distribution, particularly during the dry season. Metering is being introduced to improve fairness, and rationing schedules have been formalised: Mondays are designated as "flush days" to release water to the downstream area, while the other six days are allocated to upstream and midstream intakes (PI26). However, these small efforts are not enough, and downstream communities remain disadvantaged, with fewer intakes and higher water insecurity. Respondents pointed to tensions over fee payments and perceptions of unequal access (PI22, PI15, PI3). Although IWRM principles have been formally integrated into the WRUA's planning framework, financial and structural barriers continue to limit their implementation on the ground.

Finally, the WRUA acts as an intermediary between communities and state institutions. The WRUA provides technical oversight, issues abstraction permits, and mediates conflicts (PI2), while agencies such as the National Environment Management Authority (NEMA), the Ministry of Agriculture and county governments contribute through regulation and training. Large-scale farms were described as cooperative partners, both by providing financial support and by contributing scouts for enforcement (PI26).

4.2 Community's Water Usage in Sirimon

4.2.1 Midstream

On the second day in the field the group started with a transect walk in the midstream section of the Sirimon river. The findings were summarised in PI3. Starting off at the Sirimon Bridge (see Figure 3), where the important trade road A2 (going all the way from the Ethiopian boarder down to Nairobi) crosses the catchment, the transect walk led some hundred metres in upstream direction. The bridge and the surrounding constructions directly contribute to the pollution of Sirimon river, examples including accidents on the bridge with vehicle parts falling down, nearby burials or WIFI cables that were laid close to the riverbank (PI3). While the area used to be a fishing area and contained lots of wildlife, the river present was quite narrow with a rather weak flow, slowed down by basalt rocks across the whole river span (see Figure 4).

Figure 4: the Sirimon bridge (own photo)

Figure 3: basalt rocks in the river (own photo)

Figure 5: agricultural land at the riverbank (own photo)

Along huge parts of the riverbank, forest was cleared to create land for farming. Even though there is a zone of 30 metres up from the river that should remain unfarmed, this rule is not paid attention to and mostly crops are growing directly up to the riverbank (see Figure 5), including plants like eucalyptus that consume amounts of water above average (PI3).

Figure 6: self-made dam (own photo)

Some illegal, self-made intake structures could be observed, like a concrete dam (with use of chemicalised concrete polluting the river, see Figure 6) and some pipes drawing water from the river directly to nearby fields (see Figure 7), before the transect walk ended at a large

intake. Though statements describing this intake were partly contradictory, the WRUA secretary confirmed that large intakes such as the one present here have to be permitted by the WRUA as well as the WRA, and this permit only happens for commercial purposes. The formal application process for such an intake starts with a request at the local WRUA who then writes a comment to the WRA to be given permit. Before permit is given, the WRA conducts a hydrological design of the area, investigating how much water is needed and how much can be taken at the specific place, refusing permission if blocking too much water for upcoming river sections.

Figure 7: illegal pump (own photo)

Figure 8: the group at Flamingo intake (own photo)

Figure 9: two inlets at Flamingo intake (own photo)

That being said, the interviewees later stated the farms building the intakes are “selfish”, blocking waterflow while pumping in their tanks (PI3). When permitted, the owner of the intake is responsible for paying and building it as planned. The installed intake belongs to the Flamingo farm further downstream at Sirimon river. The so called “Flamingo intake” consists of a water gate, a suction pump, suction pipes and a lister.

The cement water gate blocks the water during pumping cycle and contains several metal flaps controlled by a person responsible for opening them once the tank reaches its maximum volume (see Figure 8). An electric water suction pump of a size of more than three inches pumps the blocked water into the tank. The tank itself includes a lister, which is a more efficient alternative to a generator, sending the water through suction pipes up to the farm. Supplied by two inlets (see Figure 9), the tank of the Flamingo intake is full within a time span of two to three hours. The pumping cycle is supposed to take only 70% of the water, releasing 30% to the community. How exactly that is ensured, remained somewhat unclear (PI3).

4.2.2 Downstream

On day five in the field the group took a ride all the way downstream to Mugumo. While being accompanied by a resident of the area (PI23), the encountered river looked totally different to the midstream section near Makara. The water was dirtier and the flow of water much lower (see Figure 10). When talking to people living in the area, it became evident that their water supply is completely independent from any WRUA structures, since none of the interviewees in the area had ever even heard of the WRUA (PI18-24). With the river being often dry and polluted and therefore not an option, many households rely on fetching rainwater from boreholes (PI19). But installing tanks requires financial capacity and in dry season it doesn't rain for weeks which is why the people of the area also depend on the installed borehole (see Figure 11).

Figure 12: the Sirimon river near Mugumo (own photo)

Figure 11: Mugumo borehole (own photo)

Figure 10: Mugumo water pan (own photo)

The borehole is an electric water pump powered by solar panels, placed in a highly secured and fenced area. It connects to the groundwater and pumps water at specific times during the day, often early in the morning so that people had to get up very early to get water before the resources are exhausted (PI20). Currently, the Mugumo borehole is out of order after vandalism, which apparently dates back to four years ago (PI24). There was another borehole being drilled nearby, even though it remained unclear if this was done in responsibility of the government (PI24) or the owners of the land it's built on (PI23). Next to the borehole was a big water pan (see Figure 12), catching rainwater in a big, lake-like hole. But since the hole was built in the soil, the stored water was very dirty and can be used for irrigation purposes only (PI23).

Visiting both parts of the catchment and seeing the conditions really helped in understanding the local situation. What was of special interest was the management situation downstream

and how people had to organise their water supply completely independent from the WRUAs. Trying to understand how this status could occur and what other institutions and rules played a role in the local governance structure, the following stakeholder mapping was conducted.

4.3 Stakeholder Mapping in Sirimon

The stakeholder mapping presented in Figure 13 below, illustrates the diverse roles, interests and interrelationships among three groups 1) Individual users 2) Local government institutions and 3) Private sector & NGOs in water resource management in the Sirimon Catchment. The Venn diagram highlights the distinct responsibilities of each stakeholder group as well as the areas of overlap where cooperation among them is essential to achieve a collective outcome.

Individual Users

These are central actors in the water resource utilization of Sirimon Catchment. Their contributions include agricultural activities, commercial activities and domestic use alongside responsibilities such as river pollution control, monitoring illegal activities and water intake management. Additionally, they engage in decision making processes and support WRUA management by contributing their membership fees through water projects. Furthermore, they collaborate with the local government on waste management, conflict mediation, and contributions to WRUAs to ensure sufficient water supply. This shows their role as not only users but also regulators and supporters within their water governance systems.

Local Government Institutions

The LGIs include the Water Resources Authority (WRA), Water Resource Users Associations (WRUAs), Kenya Wildlife Service (KWS), and Kenya Forest Service (KFS). This group holds a regulatory and facilitative role, with responsibilities ranging from tree planting programs, water allocation, conflict mediation, allocation of financial resources and resettlement resolutions. Moreover, the local government such as WRA provides technical support on water management and monitoring of WRUA operations, therefore acting as critical actors for sustainability.

Private Sectors and NGOs

Private sectors and NGOs primarily function as a supportive and enabling group. They offer financial resources, technical expertise, capacity building and support for sustainable agricultural practices in Sirimon. Additionally, they contribute to infrastructure development such as improving water storage facilities and they also support in conservation efforts of the water source. Furthermore, they complement with the government's roles of ensuring technical

and financial support while fostering conservation, sustainable water use education and knowledge exchange to the community.

At the core intersection of all three groups lie the shared objectives of secured water supply, sustainable use and economic growth, emphasizing that effective water resource management depends on both individual responsibility, government and institutional collaboration.

Figure 13: Stakeholder Mapping in Sirimon (own illustration)

5 Discussion

5.1 Themes of Opportunities from Interviews & Workshop

After the different stakeholders and their actions and motivations were identified, the following discussion was led by the second research objective: which water related constraints and opportunities result from their behaviour. This was done following the five overarching themes that remained as a result of the applied type-building QCA, as described in chapter 3.2.

5.1.1 Water Resource Management & Financial Resolutions

Management Gaps and Inequities in Water Allocation

"Better management" seemed to be a key solution for a diversity of challenges people are facing along the whole length of the river (e.g. PI3, PI10, PI18). With management being a very broad term applicable to a majority of challenges, it is now tried to define what "better management" means and where it could truly deliver improvements.

Since the WRUA made it its main objective to provide everyone in the catchment with water (see chapter 4.1), it is reasonable to address them when suffering from water scarcity. To keep up with not only a shrinking amount of water due to climate factors but also a growing number of people and livestock in the area, reducing the amount of water by increasing the total consumption (PI6), the WRUA started a rationing program (as described in chapter 4.1) that receives ambivalent reactions. While the WRUA chairman emphasizes "*that rationing program and how the management committee has done, the river has not dried [for two years]*" (PI26), the local people complain that especially when growing crops, it's hard if water access is limited to specific days of the week: "*As you wait for your day of getting water… the crops get weak.*" (PI9). Meanwhile another person in the same group interview argued "*rationing is a good solution, because it is the only choice we have [that] everyone gets water*" (PI9) and PI6 claimed "*[rationing] has brought a lot of sanity, and the people don't worry now*".

Opposite to water scarcity in dry season, the problem of overflooding during rainy seasons is also not to be underestimated. While dry seasons could be regulated by rationing, in rainy seasons "too much water" destroys the farms (PI10). Apart from locking up the intakes, the area lacks a proper flood risk management.

Another aspect that came up in the interviews was inequitable water allocation. The presence of large scale up to commercial farms caused scepticism and the feeling of being treated unfairly: "*By the way, that's another reason why those rivers are dry. Go to Sirimon down here, there's a very big farm. They have dug very many boreholes. They are draining water from top to those. [...] They are cheating you. […]*" (PI6). Here it must be said that the scope of this study did not allow a full investigation of the voices and perspective of this "big farm". That

makes it only possible to convey the perception of the farms from an outside perspective, which must be treated with caution. What can be said however, is that while large scale farms are able to pay the WRUA to pump from big intakes (PI3), many people, especially downstream, lack financial resources to pay the membership fee or don't even have knowledge of WRUA structures existing (PI27, PI18-24).

This leads to the aspect that appeared most alarming regarding constraints in management, and where major opportunities remain: "*If we had the same WRUA structures downstream, it can help.*" (coming from a person who grew up downstream and now lives midstream, PI25). After being informed by the WRUA on the first day, that the whole area was covered by WRUA management and infrastructure (PI2), it was very surprising that none of the participants interviewed in the downstream area had ever even heard of the WRUA (PI18-24). This information was kept in mind when talking to the WRUA chairman on the last day and he admitted that "*downstream, we have the least members. Middle stream, we have but on upstream, we have many. Because upstream are the people have got a lot of intakes, many intakes. Downstream, from bridge from Mugumo, we have just two intakes. They are those people who are telling you are pump owners*" (PI26). But the question how this divide in management coverage came about and can persist remained unanswered, as it was not possible to receive meaningful input on that issue in the interview.

The Role of Finance in Strengthening Water Management

From both sides, the WRUA as well as people downstream, financial constraints are described as a major challenge, what already came across as Kenya's main concern in the tracking of IWRM implementation (see chapter 2.1, Republic of Kenya 2023). The WRUA lacks money to pay for adequate scouting of the area to sanction illegal abstraction and be able to establish a controlled structure along the whole river (PI26). While the WRUA chairman explained membership fees as their main source of income, people often lack financial resources to pay them (PI27). Consequently, the people demand lower membership fees while the WRUA is planning to solve their budget issues through an increasing number of members (= more membership fees), although plans of increasing the fee itself were not mentioned. This lack of financial resources on both sides is crucial and negatively effects the quality of water management that the WRUA can provide, what furthermore reduces the trust people have in the WRUA (PI5).

Opportunities in this field include a change in spending schemes, a fairer distribution of fees (let commercial farms pay more) and additional sources of income for the WRUA. Since the government does not really support with funding but mostly advisory, the WRUA actively tries to apply for cooperations with NGOs, which has already been successful in the past (PI26, see chapter 4.2).

The perception from the interviews was confirmed during the workshop, when the participants pointed out that the downstream part of the river is “marginalised in [the] WRUA governance” (PW1-8). They proposed more equitable governance through a strict regulation of upstream extraction and to create clarity regarding consequences for illegal abstraction or blockage of water. To make sure illegal actions are recognised, scouts as well as a functioning accountability mechanism is required, not only controlling abstraction but also enhancing the WRUA’s budget through penalty payments (PW1-8).

With enhanced budget, many of the previously listed solutions could be tackled more effectively, including (education on) waste management, flood risk management, and scouts as a controlling authority in the area.

5.1.2 Conflict Resolution & Cooperation

Community-Led Conflict Resolution

Rotational water-sharing and community meetings were identified as effective strategies to ease tensions during scarcity. In Sirimon, for example, meetings are convened to negotiate access, ensuring fairer distribution among competing projects. As PI9 explained, *“we are paying the same but there are still people with more water… some people have big pipes, some small, creating unequal distribution. The solution was agreed to be conducting meetings when water is scarce to negotiate access.”*

These measures respond to longstanding conflicts arising from unequal infrastructure and upstream–downstream tensions. Participants downstream argued that intakes for large-scale flower farming blocked water access: *“Upstream, those people… when there’s rain, they just block the water… So those people, they are more down, they cannot be able to access the water.”* (PI24). In contrast, upstream participants reported fewer disputes as their households received relatively reliable supply (PI17). The workshop confirmed these dynamics, highlighting that equitable scheduling reduces clashes.

Institutional Mediation and Enforcement

The WRUAs were credited for mediating disputes and enforcing fair use. *“When someone doesn’t get water, and we are fighting in between us, the WRUAs are responsible for resolving that conflict… when people try to steal water, they are the ones dealing with them,”* observed PI10. This confidence in WRUAs stems from their role in addressing vandalism, unfair diversions, and distribution disputes. The workshop reinforced this, noting that accountability measures such as scouting and river monitoring were necessary to regulate extractions and curb illegal activities. They further proposed that the Kenya Wildlife Service should help

manage wildlife-related damage, since migrating livestock and wild animals such as monkeys also sparked conflict by destroying crops (PW1-8).

Cooperation with NGOs and External Partners

Participants described successful partnerships with NGOs in building intakes, providing storage tanks, and training in sustainable agricultural practices. PI26 noted, *"the NGOs do help us with some facilitation… They either build common intakes; they teach people about how to use modern agriculture. They have given us tanks, storage facilities. We have WWF and Fauna and Flora."* These initiatives reduced pressure on rivers by improving infrastructure and water reliability. Cooperation also extended to private actors such as flower farms, which were described as supportive partners: *"Those farms have some things they give us… sometimes money for members to pay. We have no problem with that. And they have a lot of dams… they don't use the river mostly during dry periods."* (PI26). Such arrangements alleviate dependence on limited river flows and strengthen resilience during dry spells. The workshop supported the idea that diversifying funding and partnerships is critical, with participants stressing that *"if we can get another source, we can manage and improve, far from where we are"* (PW1-8).

5.1.3 Afforestation & Conservation

Deforestation in the Sirimon catchment has been taking place for many years. The upstream areas that once supported thick forests have been heavily reduced, as one interviewee recalled: "*Whole area was forest, there were leopards and hyenas…"* (PI3). With much of this cover now gone, the community is experiencing clear consequences for both water availability and ecosystem health.

In response, the WRUA and local communities have made river conservation a priority through tree planting. One interviewee explained: *"We have planted 10,000 seedlings to maintain riverbanks"* (PI2). These efforts are beginning to show results: *"So we have planted a lot of trees and it is when water has started increasing"* (PI26).

A key focus of these conservation activities is the removal of eucalyptus trees, which participants repeatedly identified as harmful to the river system. As one stated: *"So the major one is the drought, which has been brought by cutting the forest. Water scarcity"* (PI16). Another went further, describing their impact along riverbanks: *"These are the Eucalyptus. They are totally different from the other and they are planted next to them at the back of the river. They consume a lot of water. [...] These bluegums, they can be planted somewhere else. Maybe even 40 metres from there, at the back of the river, but due to ignorance, and not caring what they do, they just planted there."* (PI3).

Because of this, the WRUA and community have actively started removing the trees: *"We go around to cut down the trees that consume a lot of water like Eucalyptus."* (PI5). For downstream communities, the negative effects of eucalyptus are visible, particularly during the dry months: *"There are times where there is no water in the river, rationing 3 days from Friday to Sunday"* (PI15).

Another challenge is the encroachment of farmland into riparian zones: *"The next one is encroachment, encroachment of river. Along the river there are some farm owners. So, we have encroach, they leave the river naked [...] almost the whole river from up to downstream is naked. [...] There's no trees covering the river because they have cut it for farming activities."* (PI26). Without trees along the riverbanks, erosion worsens, water quality decreases, and the river is less able to recharge after droughts.

The workshop results confirmed these issues, showing that deforestation and eucalyptus planting are key challenges both upstream and downstream. Midstream and downstream communities experience the consequences most strongly: depleted water levels, slower recharge of the river during rains, and higher vulnerability to droughts. In addition, degraded ecosystems can reduce biodiversity and increase conflicts over water use (PW1-8).

From both interviews and the workshop it is clear that the next steps should focus on cutting down eucalyptus, planting sustainable species, and protecting riverbanks from farming encroachment. On the government side, an ecosystem-based governance approach will be crucial to balance livelihoods with long-term river conservation.

5.1.4 Maintenance & Infrastructure

Infrastructure plays a pivotal role in ensuring equitable and reliable access to water. Based on interviews, workshop and transect walk/observation to river stream result, several solutions that have been suggested according to several challenges mentioned are:

Storage facilities, including dams, tanks, other water storage systems and water harvesting activities, are essential to ensure water security. This solution is in line with the stakeholder mapping result, which revealed that individual users have an interest in reliable access to river water for multipurpose. This solution arose from challenges such as water scarcity due to dry season (PI17) and famine periods (PI27). On the other side participants mention how much water was wasted as it was not stored properly: "*During rainy season there is so much water is wasted because it is not stored. So [the water project members] want something to store it and they can use it during dry season*" (PI27, water project representative).

In addition to water scarcity, the situation is also exacerbated by water pollution especially in downstream, where waste from the river affects water quality. As noted in chapter 4.2, the downstream river looks dirtier. Another key challenge highlighted is water distribution where it

is mentioned that downstream has lower storage facilities than upstream. Even though upstream a storage also broke due to a disaster event. "*Downstream users experience low storage facilities, while upstream users sometimes have storage facilities that break down during floods*" (PI12)

Proposed opportunity calls on government to address enough water storage facilities so water distribution issues can be solved: "*The government should create bigger water storage facilities for us so that the issues of water distribution are reduced*." (PI10). In addition, this opportunity has become a priority interest for a broad range of stakeholders including individuals, government entities, and NGOs as can be seen in the stakeholder mapping.

Borehole infrastructure is suggested as a solution to either develop new ones or improve existing ones. They are driven by conditions and challenges related to water access, but compared to storage facilities, boreholes were mentioned less frequently, having more limited coverage and seen as short-term solutions (PI16, PI17): "*borehole it will only serve 10-20 households whereas a dam can serve even more than a 1000 household*s" (PI17). Furthermore, boreholes can also face challenges such as vandalism leading to broken infrastructure (PI24, PI20). This challenge is highlighted by a participant in the midstream area, while boreholes also face their own setbacks as they become a limited resource with restricted operation hours (PI18, PI19). As a result, participants particularly in downstream call for stakeholders such as the government in improving boreholes to better support livelihoods activities. (PI22, PI18, PI19).

Water intakes refer to total the amount of water persons consume. The solution of increasing intakes arose from water scarcity during dry season which has caused secondary impact, that is the inability to do livelihood activities such as farming. Participants in the downstream area highlighted that water intakes were destroyed by floods (PI26). Additionally, according to workshop discussions, intakes face challenges due to vandalism in both upstream and downstream locations. Therefore, the major destruction has been a focal issue regarding intake. Participants from the downstream area highlighted the insufficiency of water intake points. In line with this, upstream participants acknowledged that there are more intake points in the upstream areas. Additionally, based on observation unfortunately too many intakes possibly in upstream and midstream block water downstream which create another problem in developing this solution, this imbalance may have contributed to problems in ensuring adequate water distribution to downstream communities (PI26): "*One intake is used by so many people (up to 300)… and all have to get water*" (PI15/PI19).

This solution has full support from NGOs, either to build a common intake system or in teaching people how to use modern agriculture practice. They also mention improving infrastructure,

particularly the creation of a common intake that is more advanced than individual intakes (PI15, PI8).

These solutions align with the stakeholder mapping result of chapter 4.3, where all stakeholder groups share a common interest in infrastructure. Additionally, both NGOs and the private sector have a shared interest in providing technical support including the development of water infrastructure. It presents an opportunity to further develop these initiatives.

5.1.5 Community Engagement & Education

Pollution was identified as one of the main concerns in the catchment area, with interviewees often linking it to a lack of education on waste management. Several interviewees described the problem in detail, pointing to everyday practices that contaminate the river: "*A lot of pollution. "We have here high water pollution. Most downstream… waste? No. Some people when they clean they don't care about those… diapers, plastic bottles, chemicals, car wash"* (PI26). Another participant recalled how the community had to step in when waste disposal became unbearable: *"They even dumped the bottles and the diapers down there. There was the way they used to dump until the community themselves, we were to intervene"* (PI3). These suggest that while awareness exists, lack of knowledge and infrastructure continues to drive pollution.

The consequences of this poor water quality are felt most severely downstream, where scarcity combines with pollution to create tension. One participant warned: "*We will have more conflicts here because the more populations grow, the more need for this scarce water. Like now me and my wife use small amount of water"* (PI17). Another one recalled demonstrations sparked by dumping practices: "*Because now there was like a demonstration by the people in the area, they said no more water fetching. And they even wanted to come and destroy this area because of those people who are dumping the site there"* (PI3). These examples demonstrate that pollution undermines water security and can also fuel new conflicts between communities.

The WRUA was frequently mentioned as an important actor in addressing these challenges, both through workshops and by monitoring extraction and waste disposal. This gap reflects broader inequalities in engagement across the catchment. As one interviewee put it: *"Most of the people are illiterate, it's a completely different structure happening in the same catchment"* (PI25). Education and awareness programs therefore face structural barriers that make it difficult to reach all residents equally.

In terms of solutions, community members suggested the establishment of dumping sites and recycling initiatives, as well as better infrastructure to secure water supplies. These suggestions point towards the importance of community-led initiatives but also emphasise the

need for stronger coordination between WRUAs, the local government, and NGOs to improve waste management.

The workshop results aligned with the interviews, while also highlighting how pollution sources differ across the river sections (PW1-8). By mapping pollution sources, participants showed how problems accumulate along the river: beginning upstream with household waste such as diapers and plastics, continuing midstream with additional farm runoff, and becoming most severe downstream during the rainy season, when waste is washed further into the river system. This shared perspective made clear that the downstream communities are those who bear the heaviest burden of upstream practices, as one participant summarized: *"The consequences of upstream are experienced downstream"* (PI5).

5.2. Upstream-Downstream Relations in Sirimon

In the Sirimon catchment, water access and experiences differ significantly along the river's course. Upstream communities benefit from proximity to the source, with relatively better water availability and greater influence in the management of intakes. They are often better positioned to pay membership fees, connect to water projects, and participate in WRUA decision-making.

Midstream users occupy an intermediate position, experiencing moderate access but also competition from both sides. They depend on negotiated schedules and are directly affected by how upstream withdrawals are managed.

Downstream communities, by contrast, face the greatest constraints. They have fewer intakes, receive water of reduced quantity and sometimes quality, and often lack direct access to WRUA management structures. During dry seasons, they are most vulnerable to scarcity, even though they rely heavily on the river for farming, household use, and livestock.

These positional differences generate inequalities but also underline the river's interconnectedness: decisions and practices upstream inevitably affect midstream and downstream users. This creates both challenges - such as tensions and conflicts over allocation - and opportunities for collaboration, particularly through mechanisms like rationing schedules, collective conservation, and community-driven initiatives under the WRUA framework.

5.2.1 The Upstream-Downstream Framework

The framework was developed from the empirical data, structured around the five themes described in the discussion, including water resource management and financial resolutions, conflict resolution and cooperation, afforestation and conservation, maintenance and infrastructure as well as community engagement and education. The framework was guided

by the study's central objective of examining how people's position along the river shapes their experienced constraints and the extent to which the upstream, midstream, and downstream sections influence one another.

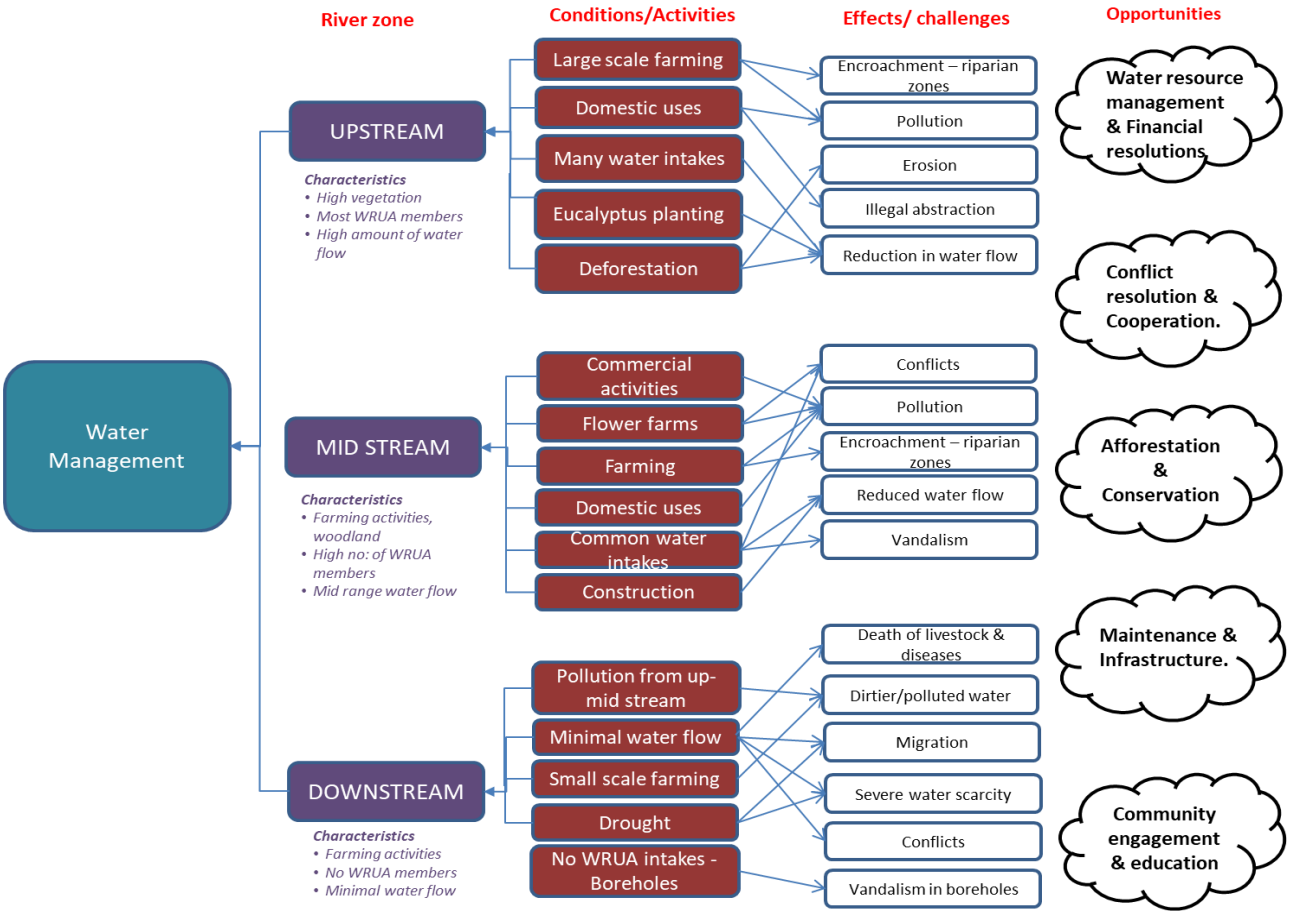

Figure 14: The conceptual framework of the Sirimon catchment showing the upstream, midstream and downstream dynamics (own illustration)

The framework illustrates how water is managed across the three sections of the river - upstream, midstream, and downstream. It highlights the main activities and conditions present in each zone, the resulting challenges and effects on water resources, and the opportunities that can be leveraged to improve management.

In the upstream zone, activities such as farming, eucalyptus planting, and deforestation contribute to issues of over-abstraction and reduced water recharge, despite the relatively high number of WRUA members. Midstream areas are characterised by intensive farming and numerous intake points, which often result in pollution, vandalism, and unequal distribution. Downstream communities, where WRUA presence is weakest, experience the most severe effects, including water scarcity, pollution, conflicts, and limited infrastructure.

The framework therefore establishes a link between local practices, the challenges they generate, and the opportunities available to strengthen water governance in the different river

zones. These opportunities include improved conflict resolution, financial reforms within WRUAs, enhanced infrastructure, ecosystem conservation, and greater community engagement and education.

5.2.2 Limitations of the Framework

While this framework provides valuable insights into water management across the river catchment, it faced constraints in achieving balanced coverage of all sections. Upstream perspectives were less extensively captured, which may affect the completeness of the analysis and limit the depth of comparison across zones. As a result, the framework highlights preliminary patterns that would benefit from refinement in future studies. More extensive field engagement could strengthen the comparative analysis and provide a more holistic picture of water management across the catchment.

6 Reflexion

Not only when reflecting back on, but also during the conducted field work, it was important to keep questioning our positionality and the impression we made when entering the field. The fact of being foreigners to the area was unable to hide given the fact that the group included white members. Additionally, the carried large video camera also arose a lot of attention. These aspects changed the perception of the interviewees and also how freely they spoke. At least one interviewee was very careful not to say anything negative about the government and therefore actively avoided some questions or contradicted himself in his statements. These factors sometimes made us question whether it was appropriate to join specific settings. Furthermore, multiple interview situations confronted us with the question where the results are taken, and some participants expressed happiness or hope for changes after sharing their situation. This brought us in the uncomfortable situation of being aware that these expectations were unable to be met through our output.

Apart from the partly cautious attitude towards the group, also the number and selection of participants influenced the outcoming results. We tried to include a variety of voices regarding not only their place of residence, but also criteria like age and gender. But when entering the field, we had to get used to local structures and quickly realized that a lot of things were not possible to be conducted the way we imagined, especially considering the availability of people for interviews and above all the workshop. We therefore chose to include whoever was available, being aware that more or different voices would have changed the outcome significantly.

After we realized our dependency on our local resource person and the spontaneity with which many things happen, making it impossible to plan much ahead, we did not only experience

disappointment, but also pleasant surprises. For example, when being invited spontaneously to join a meeting deciding over the future of a large area near Kithithina or when our resource person could make it possible to conduct a workshop in the end after being told for several days that it would be hard to realize. Never knowing what could happen during the day was challenging for us at first but being forced to always stay flexible and open-minded can be recorded as a great learning outcome on a personal level. Which is why, separated from the outcome of the study, each of the team members can look back on highly valuable experiences taken away from this course.

7 Conclusion

The study examined water access distribution, stakeholder engagement, and river positional dynamics in the Sirimon catchment, with a focus on community-driven opportunities for inclusive governance.

Findings show that water access is unevenly distributed, with access largely dependent on the ability to pay for supply. Those unable to pay are excluded, which has in some cases fuelled vandalism and illegal abstraction from the source. This uneven distribution is shaped by both formal mechanisms (WRUA rules) and informal practices (local negotiations and arrangements).

Stakeholder engagement is also uneven. Large-scale farmers and upstream users hold greater influence over resources, while smallholder farmers and downstream communities face significant constraints. Nevertheless, opportunities for more equitable governance emerge through collaboration and local initiatives.

The study further indicates that people's position along the river strongly influences their water experiences. Upstream users enjoy clear advantages, while downstream communities face scarcity, drought, and limited access to WRUA authorities. These inequalities are reinforced by existing governance arrangements, particularly through intake systems that favor some groups while disadvantaging others. At the same time, the findings suggest room for transformation if marginalized voices are more effectively included.

Community-driven opportunities, such as improved resource and financial management, conflict resolution, conservation and maintenance of water sources, infrastructure development, and community education, can strengthen equity, accountability, and adaptability in water governance. In addition, there's a clear chance to advance opportunity/ by utilizing the strengths of private sector and NGOs. The private sector can provide technical expertise, investment, while NGOs offer assistance in community engagement and water/river education.

Future work should pay closer attention to how water intakes operate and are managed, and how inclusion can be ensured for those unable to pay for water. Ultimately, sustainable and just water governance in Sirimon depends on centering community-driven opportunities and ensuring that all stakeholders, particularly marginalized groups, are part of shaping the catchment's water future.

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Annex

Annex 1 – Overview of Conducted Interviews

Interview Reference	Special conditions (KI = Key Informant; GI = Group Interview; TW = Transect Walk)	Date	Place of Residence	Gender	Age (Y = young; MA = middle aged; E = elderly)
PI1		06.08.	-	M	MA
PI2	KI	06.08.	-	F	Y
PI3	KI, TW	07.08.	Midstream	M	Y
PI4		07.08.	Midstream	F	MA
PI5		07.08.	Midstream	M	E
PI6	KI	07.08.	-	M	MA
PI7		07.08.	-	M	MA
PI8		08.08.	-	M	MA
PI9	GI	08.08.	Midstream	3x F	3x E
PI10	GI	08.08.	Midstream	4x F, 1x M	5x E
PI11		08.08.	-	M	Y
PI12		08.08.	-	M	MA
PI13		08.08.	Midstream	F	MA
PI14		08.08.	Upstream	M	MA
PI15		08.08.	Downstream	M	E
PI16	GI	08.08.	Midstream	2x M	2x MA
PI17	GI	08.08.	-	2x M	2x MA
PI18		08.08.	Downstream	F	E
PI19		10.08.	Downstream	F	E
PI20		10.08.	Downstream	F	Y
PI21		10.08.	Downstream	F	E
PI22		10.08.	Downstream	F	E
PI23	TW	10.08.	Downstream	F	Y
PI24		10.08.	Downstream	M	MA
PW1		11.08.	Midstream	F	E
PW2		11.08.	Midstream	F	Y
PW3		11.08.	Midstream	F	MA
PW4		11.08.	Midstream	F	MA
PW5		11.08.	Midstream	F	MA
PW6		11.08.	Downstream	M	Y
PW7		11.08.	Midstream	M	MA
PW8		11.08.	Midstream	M	Y
PI25		11.08.	Downstream	M	Y
PI26	KI	12.08.	Upstream	M	MA
PI27	KI	12.08.	Upstream	F	E

Annex 2 – Interview Questionnaire

1. Can you describe how you use water in your daily life (intake situation etc)/ livelihood activities?
    a. Are you a member of the WRUA?
        i. If yes, what is the WRUA/area called and what motivated you to join?
        ii. If not, what are your reasons for not joining?
    b. How is the structure of your water project? (number of members, name)
2. In your opinion, how effective is the WRUA in managing water issues such as access, fairness and conservation?
3. What are the main problems you are facing regarding water during the dry and rainy seasons?
4. Are there conflicts or tensions over water use in your area? If yes, how/which?
5. How would you describe the role of the local or national government in addressing these water issues? Are they helpful, neutral or absent?
6. Have you or your community taken any actions to solve water-related problems (e.g., building storage, rainwater harvesting, rules on water use)? Please explain.
7. What kind of support would help you manage water better training, funding, government support, equipment, etc.?
8. Were there any significant changes in recent times?
    a. Any problems successfully solved?
    b. Any problems enhancing/new problems rising?
9. If you had the power to change one thing about how water is managed in your area, what would it be and why?

Annex 3 – Interview Transcriptions

To not overfill this document, the full transcriptions of all conducted interviews can be accessed in a separate document available in the same Cloud as the Video:

Sirimon Interview Transcripts

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I hereby affirm that the term paper attached to this declaration is my own work and has been produced without any illicit help. Furthermore, I confirm that this term paper has not already been submitted to any other body for assessment, nor has it been published, either wholly or in excerpt. I further affirm that I have indicated each and every single individual element taken from an external source, including tables, maps, illustrations, etc., as well as other works and sources (including internet sources) that have informed or have been incorporated into this term paper, either in meaning or verbatim, and have provided exact references to all sources in question.

Course	JM4/M6 Water Governance in Rural Kenya
Lecturer	Prof. Dr. Detlef Müller-Mahn and Dr. Eric Kioko
Topic	Sirimon's Water Future: Community-Driven Opportunities for more Equitable Water Governance and Balanced Upstream-Downstream Relations
Number of charakters (incl. blanks and other remarks)	71.505

Bonn, 30.09.2025 — R. Brenner S. Kaerkes

Place, Date — Student Signature

*) This declaration must be attached to the independently produced term paper. Any term paper submitted without this declaration will not be accepted. You are hereby further reminded of the criminal implications of submitting a false declaration.