



Development Geography Occasional Paper

The Transformation of Hydrosocial Relations

A Political Ecology of community-based water governance and land use change in the Mount Kenya West Region, Kenya

Johannes Wild

No.18, April 2023, Bonn

Edited by the section for Development Geography
Department of Geography
University of Bonn

Occasional Papers of the section for Development Geography serve to disseminate research results prior to publication in order to encourage the exchange of ideas and academic debate. Inclusion of a paper in the Occasional Paper Series does not constitute publication and should not limit publication in any other venue. Copyright remains with the authors.

The section for Development Geography cannot be held responsible for errors or any consequences arising from the use of information contained in this Occasional Paper; the views and opinions expressed are solely those of the authors.

Copyright for this issue: © Johannes Wild
Contact: wild.johannes@gmx.de

Suggested citation: Wild, Johannes (2023): The Transformation of Hydrosocial Relations
A Political Ecology of community-based water governance and land use change
in the Mount Kenya West Region, Kenya. Development Geography Occasional Papers, No. 18, Bonn,
April 2023.

Author of cover picture: Johannes Wild

All Occasional Papers of the section for Development Geography can be downloaded free of charge:
<https://www.geographie.uni-bonn.de/de/forschung/arbeitsgruppen/ag-mueller-mahn/paper-series>

Abstract

Community-based water governance (CBWG) approaches aspire to alleviate multiple challenges around water. They aim to facilitate participation, promote sustainable practices, and create awareness. However, outcomes of community-based projects sometimes fall short of expectations and can even exacerbate the same power asymmetries they attempt to mitigate. In the study area of Mount Kenya West Region (Kenya), land use change, political-institutional restructuring, development inequalities, and climatic changes constitute a contested socio-environmental space. Framed by a multi-scalar Political Ecology and a hydrosocial cycle approach, this study investigates how community-based Water Resource Users Associations (WRUAs) are embedded in this region in water-related challenges and uncertainties, land use change, and transforming power relations. Specifically, the study emphasizes the multiple ways in which hydrosocial interactions shape exclusion and participation around CBWG, as well as different governance performances of two case study WRUAs at Likii and Nanyuki river. This thesis employs an exploratory qualitative research design with semi-structured interviews, participatory observations, and subsequent qualitative content analysis. Results show that first, perceptions around the attribution of water-related challenges differ remarkably among stakeholders and affect WRUAs' operations. Second, skyrocketing land acquisitions and intensified land use – mostly through increased small-scale farming – disadvantage specifically pastoralists and altogether overwhelm CBWG capacities. Third, (perceived) cross-scalar power asymmetries around water impair governance success, albeit differently among WRUAs. Fourth, in the face of multiple pressures, some WRUAs yield important best-practices and innovations on adaptation and participation. Overall, the study illustrates the importance of scrutinizing hydrosocial processes, underlying governance visions and knowledge forms, and the resulting heterogeneous achievements of WRUAs. A clearer definition of responsibilities, awareness creation, and addressing multi-dimensional inequalities around water can crucially advance CBWG to be truly inclusive, resilient, and versatile.

Statement of authorship

I hereby certify that this thesis has been composed by myself and describes my own work, unless otherwise acknowledged in the text. All references and verbatim extracts have been quoted, and all sources of information have been specifically acknowledged. It has not been submitted in any other application for a degree.

Johannes Wild

Date: 30.11.2022

Conflict of Interest

For the field research of this thesis in Kenya, the researcher received funding support by his supervisor Mr. Prof. Müller-Mahn from the Geography Department of the University of Bonn. Despite these third-party funds, the researcher was not restricted in the study design, the research questions, the theoretical orientation, or methodology. Furthermore, the researcher is not aware of any external influence.

Table of Contents

List of Abbreviations	5
List of Figures	7
1 Introduction	8
1.1 Research Problem and Approach	9
1.2 Research Questions and Structure	11
2 Setting the Scene – Water Governance & Land Use Dynamics in the Mount Kenya West Region	13
2.1 Mount Kenya West Region – Characteristics & Issues at Stake.....	13
2.2 From Historic Land Use to the Recent “Land Rush”	16
2.3 Kenyan Water Policy and Devolution	19
2.3.1 Overview of Water Actors	21
2.3.2 Water Resource Users Associations and Case Study Sites.....	24
3 Theoretical Perspective: Linking Water and Society	26
3.1 Resource Governance and Power Relations.....	27
3.2 Political Ecology and Natural Resource Governance	30
3.3 Political Ecology of Scale & the Hydrosocial Cycle.....	32
4 Methodology	36
4.1 Research Design	36
4.2 Work Flow: Literature Review, Data Collection & Analysis	38
4.3 Critical Appraisal: Positionality & Limitations	41
5 Results – Challenges & Opportunities for Community-Based Water Governance 46	
5.1 Current & Anticipated Challenges for Water Governance.....	46
5.2 Land Use Change and Water Governance.....	52
5.3 Power Relations Inside and Around WRUAs.....	56
5.4 Likii & Nanyuki WRUA – Neighboring, yet “two different worlds”	58
5.4.1 WRUA Best-Practices	60
5.4.2 WRUA-specific Challenges.....	66
6 Discussion – Governing Water in a Transforming Hydrosocial Space	69
6.1 Diverging Perceptions on Water Governance Challenges	70
6.2 The Land Question: Decisive for Successful Water Governance?	75
6.3 Transforming Power Relations in a Polycentric Governance System	78
6.4 Moving from “the same every year” towards Resilient Governance?.....	82

7 Conclusion.....	85
References.....	94
Annexes	102
Annex 1: List of Interviews.....	102
Annex 2: Interview Transcript Excerpts around Citations.....	103
Annex 3: Interview Transcripts.....	116
Annex 4: Exemplary Interview Guideline	117
Annex 5: Exemplary Full Interview Transcript.....	118
Annex 6: MAXQDA Codesystem	126
Annex 7: Additional Figures.....	128

List of Abbreviations

ASAL	<i>Arid and Semi-Arid Lands</i>
CB	<i>Community-Based</i>
CBNRM	<i>Community-Based Natural Resource Management</i>
CBWG	<i>Community-Based Water Governance</i>
CETRAD	<i>Center for Training and Integrated Research in ASAL Development</i>
CWP	<i>Community Water Project</i>
KI	<i>Key-Informant</i>
LUC	<i>Land Use Change</i>
m.a.s.l.	<i>Meters above sea level</i>
MEAL	<i>Monitoring, Evaluation, Accountability, and Learning</i>
MKEWP	<i>Mount Kenya Ewaso Water Partnership</i>
MKWR	<i>Mount Kenya West Region</i>
MWSI	<i>Ministry of Water, Sanitation and Irrigation</i>
NAWASCO	<i>Nanyuki Water and Sanitation Company</i>
NGO	<i>Non-Governmental Organization</i>
NLC	<i>National Land Commission</i>
PE	<i>Political Ecology</i>
QCA	<i>Qualitative Content Analysis</i>
SRQ	<i>Sub-Research Question</i>
UN	<i>United Nations</i>

WASREB	<i>Water Services Regulatory Board</i>
WRA	<i>Water Resources Authority</i>
WRMA	<i>Water Resources Management Authority</i>
WRUA	<i>Water Resource Users Association</i>
WSTF	<i>Water Sector Trust Fund (before 2016: Water Services Trust Fund)</i>

List of Figures

Figure 1: Upper Ewaso Ng'iro North River Basin map..... 14

Figure 2: Different landscapes and land uses of MKWR 15

Figure 3: Land rush in MKWR 18

Figure 4: Overview of water actors 22

Figure 5: Map of Nanyuki and Likii WRUA sub-catchments 26

Figure 6: The hydrosocial cycle 35

Figure 7: Migrating pastoralists during drought..... 53

Figure 8: Water storage reservoir of a flower farm 61

Figure 9: River water intake inside Nanyuki WRUA..... 61

Figure 10: WRUA sign to create awareness along Likii river 62

Figure 11: Protected riparian zone inside Nanyuki WRUA 63

Figure 12: Transect through MKWR annual water balance 128

Figure 13: Exemplary water rationing schedule of Nanyuki WRUA 129

Figure 14: Workflow and research structure 129

Figure 15: Irrigation agriculture equipment shop in MKWR 129

Figure 16: Nanyuki river during drought.....129

1 Introduction

The Horn of Africa, including parts of central and northern Kenya, is experiencing one of the most severe drought-related humanitarian crises as four consecutive rainy seasons failed (BBC, 2022; UN OCHA, 2022). Already before the current drought, Kenya was classified by the United Nations (UN) as “chronically water-scarce” and faces a combination of recurring water issues related to land use dynamics, ecosystem degradation, and conflicting water user constellations (Mulwa, Li and Fangninou, 2021; Mwaura et al., 2020, p.2; Njora and Yilmaz, 2021). Climate change effects are projected to exacerbate man-made, local- to regional scale drought-related challenges (IPCC, 2022, p.62).

Mount Kenya West Region (MKWR) – the study area of this thesis – represents a highly dynamic and heterogeneous part of central Kenya. Tracts of the region closer to Mount Kenya (5,199 m.a.s.l.) are high-potential agricultural areas with prosperous regional urban centers. Often less than 50 kilometers away from these zones are the remarkably drier lowlands of MKWR. These are sparsely populated and livelihood activities are often limited by hydro-climatic conditions to nomadic pastoralism (Ifejika Speranza et al., 2018). Thus, the region is characterized not only by a steep eco-climatological- but also by a socio-economic gradient. The interaction of land use change (LUC), upstream-downstream inequalities, restructured water governance, and climatic changes makes MKWR a contested hydrosocial space, meaning that social and environmental aspects are intertwined (Dell’Angelo et al., 2016; McCord et al., 2017; Ulrich et al., 2012). Especially water accessibility and LUC are cross-cutting themes that are closely linked to livelihoods, conflict and cooperation, and development pathways in MKWR (Mwaura et al., 2020).

In such multifaceted and competitive situations around natural resources, participatory water governance approaches experience increasing popularity since around the 1990s. Community-based natural resource management (CBNRM) aims to facilitate participatory decision-making around natural resources through including different knowledge forms, existing local institutions and customary procedures (Armitage, 2005, p.703). Overall, CBNRM is assumed to seize challenges around contested resource use and facilitate sustainable development (IPCC, 2022; Ostrom, 1990; Suhardiman, Nicol and Mapedza, 2017). Such approaches play an important role in

resource governance of MKWR. Around the year 2000, Water Resource Users Associations (WRUAs) were first established here for community-based water governance (CBWG)¹. WRUAs are, in essence, voluntary member associations for water conflict resolution and participatory management of water resources (Republic of Kenya, 2016, sec. 29(2)). Following a new constitution in 2010, the so-called devolution of the Kenyan political system has restructured responsibilities and transformed stakeholder constellations (McCord et al., 2017; Ngigi and Busolo, 2019). This has had profound implications for the Kenyan water sector in general and for WRUAs in particular.

1.1 Research Problem and Approach

Based on the described characteristics of the research area and on the debates around CBNRM approaches, several research problems around CBWG in MKWR are identified:

First, community-based (CB) resource governance approaches are often quoted as a panacea to the multiple and simultaneous crises around unsustainable resource use, despite often ambiguous outcomes (Blaikie, 2006; Robinson et al., 2021). Promoting participatory governance as a one size fits all approach overlooks socially and spatially differentiated needs, cultural- and knowledge systems, and heterogeneous visions by treating communities as uniform entities (Armitage, 2005; Richards and Syallow, 2018). This can lead to adverse outcomes of CB governance, e.g., through exacerbation of existing power asymmetries (IPCC, 2022, p.659). The latter is especially interesting for MKWR, where power constellations are transforming through processes like devolution and LUC. Parts of the thesis thus scrutinize socio-environmental transformations and power relations as well as nuanced social processes around participation and exclusion in water governance.

Second, different perceptions and subjectivities, that shape water governance and related competition and conflict, represent another research problem relevant to this study (Lanari et al., 2018; Mwaura et al., 2020). In MKWR, this is especially problematic

¹ The term community-based water governance (CBWG) is used in this study to describe a branch within the CBNRM approach that focuses on participatory governance of water resources specifically.

and visible in debates on responsibilities, exclusions, and perceived inequalities around water governance (Dell'Angelo et al., 2016). Additionally, these debates and processes, and water-related challenges in general, produce multiple uncertainties and are at the same time shaped by these uncertainties (Scoones and Stirling, 2020). Thus, another facet of the research problem is the interaction of (perceived) water-related challenges and linked uncertainties with CBWG.

Third, WRUAs have to navigate between conflict lines around rapid land use transformations and unsustainable water use practices (Bond, 2014; Hall, Scoones and Tsikata, 2015), socially and spatially unequal water access (Gichuki and Liniger, 2001; Lanari et al., 2018), as well as around political restructuring (McCord et al., 2017). Thus, WRUAs are exposed to a multitude of challenges which they appear to manage quite differently (Dell'Angelo et al., 2016; Ifejika Speranza et al., 2018). Especially the different approaches, capacities and vulnerabilities within WRUA's water governance are investigated in this thesis by comparing two case studies.

To analyze the complex socio-hydrological environment of MKWR, that entails political contestations and -transformations across multiple scales, this thesis applies a Political Ecology approach with particular emphasis on the hydrosocial cycle (Boelens et al., 2016; Bryant, 1998; Swyngedouw, 2004, 2009). Specifically, this approach assumes material and social aspects of and around water resources to be in a cyclical co-constitutive process and calls for jointly addressing these intertwined thematic areas (Boelens, 2014; Linton and Budds, 2014; Loftus, 2015). Moreover, a focus on governmentalities, i.e. modes of governance, informed by different worldviews, paradigms, and visions, helps carving out the rather covert aspects around power relations that characterize water governance in MKWR (Ahlborg and Nightingale, 2018). The thesis is undergirded by a scalar approach to analyze how socio-natural processes are entangled and operating across multiple and dynamic scales (Green, 2016). These conceptual underpinnings are complemented by an explorative methodological approach that consists of semi-structured qualitative interviews, field visits, informal discussions, and participant observations (Dunn, 2021; Watson, 2021). A qualitative content analysis (QCA) of the empirical data focused on thematic linkages in interview statements from different groups as well as on the case study of Likii- and Nanyuki WRUA.

A considerable amount of academic studies describes the multiple water-related problems and socio-environmental transformations in MKWR (e.g., Bond, 2014; Lesrima, Nyamasyo and Kiemo, 2021; Liniger et al., 2005; McCord et al., 2017; Ulrich et al., 2012). Also, advantages and shortcomings of WRUAs have been investigated in the Kenyan context (e.g., Dell'Angelo et al., 2016; Ifejika Speranza et al., 2018; Kiteme and Gikonyo, 2002; Richards and Syallow, 2018). However, an in-depth literature review and discussions with Kenyan research partners revealed a number of scholarly gaps: 1) the importance of different perceptions and claims around water-related challenges, 2) the reciprocal relationship between land use dynamics, devolution, and water governance, 3) transforming hydrosocial power relations that shape and reconfigure water governance in MKWR, and 4) the remarkable differences between specific WRUAs concerning their capacities, management success/-failure, and professionalization. Thus, an overarching interest of the thesis is to investigate power relations, ambiguities, challenges, and innovations in water governance through a multi-perspective hydrosocial lens.

1.2 Research Questions and Structure

The research gaps, together with the described research problems (chapter 1.1), build the basis for the formulation of the following main research question:

How is community-based water governance in Mount Kenya West Region embedded into land use dynamics, power constellations, and multiple uncertainties?

With “community-based water governance”, this question mainly refers to WRUAs but also to alternative CB governance mechanisms. Spatially, the question focuses on the region West of Mount Kenya (chapter 2.1) and specifically on the case study in Likii- and Nanyuki river WRUAs. The word “embedded” implies investigating the multi-directional and often reciprocal relations between CBWG and land use dynamics, power constellations, and uncertainties. This implicitly also refers to the hydrosocial conceptual frame (chapter 3). Addressing “land use dynamics” mostly refers to the recent so-called land rush, and generally to LUC that affects water governance in MKWR. Through the focus on “power constellations”, this study scrutinizes the social and political dynamics (e.g., around devolution) and inequalities within, between, and

around WRUAs. Lastly, the importance of multiple, differently perceived challenges and underlying “uncertainties” for water governance in MKWR is explored.

The rather broadly formulated main research question is apportioned into the following three sub-research questions (SRQs) that guide and structure this study:

SRQ 1: What are (perceived) water-related challenges and uncertainties in MKWR and how do they interact with community-based water governance?

SRQ 2: How do past, current, and anticipated land use dynamics (re-)configure water governance in MKWR?

SRQ 3: How do transforming power constellations and water governance interact in the hydrosocial environment of MKWR?

SRQ 1 focuses on water-related challenges and uncertainties around CBWG, and specifically on underlying narratives and subjective views. The aim is to carve out the multiple reciprocal linkages between (perceived) water-related challenges and CBWG (chapters 2.1, 5.1, 6.1, 6.4).

SRQ 2 addresses LUC as a cross-cutting issue in water governance. The objective is to contextualize water governance in MKWR against multi-temporal and cross-scalar land use dynamics in the region. Furthermore, through SRQ 2 it is investigated how these land use dynamics shape and reconfigure water governance in different ways (chapters 2.2, 5.2, 6.2).

SRQ 3 focuses on dynamically changing power relations in the context of different processes like devolution and LUC. Ultimately, through this question I aspire to analyze how the multiple dimensions of power relations interact in a co-constitutive way with CBWG. The socio-political processes that produce ambiguous outcomes of unequal participation and exclusion in and around WRUAs, are of special interest (chapters 2.3, 5.3, 5.4, 6.3).

To address these questions, the thesis is structured as follows: Under chapter 2, findings from literature review on the study region are presented. Chapter 2.1 introduces main features of MKWR. Its historical and recent land use dynamics are described in chapter 2.2. Chapters 2.3 and 2.3.1 present policy reforms and stakeholders of the Kenyan water sector. Chapter 2.3.2 defines and introduces WRUAs. Chapter 3 presents the theoretical frame of this study. A conceptual definition of governmentality and power is given in chapter 3.1. The umbrella concept of PE is explained in chapter 3.2, before chapter 3.3 defines the hydrosocial cycle and the

related scales concept. Chapters 4.1 and 4.2 outline the research design, work flow and methods. A critical appraisal (chapter 4.3) reflects on positionality and ethics in the research process. Chapters 5.1, 5.2, and 5.3 present findings from field research, related to the three SRQs. Chapter 5.4 describes findings on differences and commonalities, best-practices, and challenges of the case study WRUAs. The discussion in chapter 6 brings together field research results (chapter 5) and literature review (chapter 2), and links these to the theoretical concepts (chapter 3). Chapter 6.1 discusses how diverging challenge perceptions contribute to a contested hydrosocial environment. Chapter 6.2 examines how land use dynamics and -inequalities shape CBWG and vice versa. Chapter 6.3 discusses transforming power constellations in and around WRUAs before chapter 6.4 evaluates ways towards resilient CBWG. Chapters 6.1, 6.2, and 6.3 include interim conclusions on the respective theme. Chapter 7 concludes on the three SRQs and the main research question, before sketching a thematic- and research outlook.

2 Setting the Scene – Water Governance & Land Use Dynamics in the Mount Kenya West Region

2.1 Mount Kenya West Region – Characteristics & Issues at Stake

Mount Kenya West Region (MKWR) – the study area of this research – is highly dynamic and heterogeneous, both in terms of social and climatic characteristics. The region is also the incubator of the first WRUAs in Kenya (Kiteme and Gikonyo, 2002) and thus a role model for CBWG. These aspects, together with rapid transformative developments and multi-level inequalities and conflicts single out MKWR as an interesting study area in Kenya.

MKWR is located on the lee-ward, western slopes of Mount Kenya and spans across the counties of Nyeri, Laikipia, and Meru. Mount Kenya constitutes the largest water catchment (> 1.25 million ha) out of the country's five water towers, with existential importance to vast areas, especially to the drier north (Mulwa, Li and Fangninou, 2021, p.4). The biggest and administratively most important city of MKWR is Nanyuki. MKWR cannot be demarcated with exact geographical boundaries, as the denomination was

chosen specifically for this study to include all study sites². Hydrologically, the region forms part of the Upper Ewaso Ng'iro North River Basin – the largest river catchment of Kenya, stretching to the west and north of Mount Kenya – which best approximates a spatial delineation of MKWR (Figure 1; Kiteme and Gikonyo, 2002). The river basin comprises a variety of distinct eco-climatological zones with a steep gradient from Mount Kenya (5,199 m.a.s.l.) over the Laikipia plateau to the Samburu lowlands (~900 m.a.s.l.) further to the west and north-west. Within a few dozens of kilometers, the landscape changes from the nival-alpine zone over moorland, tropical mountain forest and semi-humid zones to semi-arid and arid areas (Figure 2; Speranza et al. 2018).

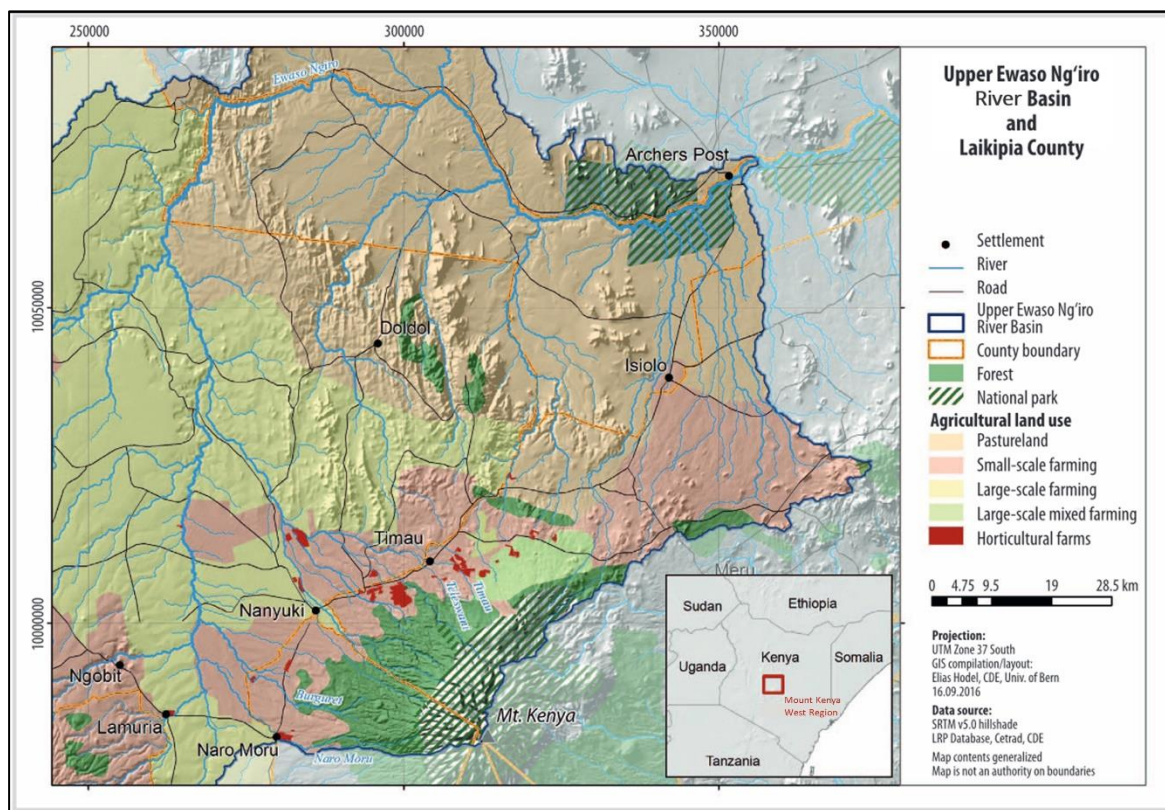


Figure 1: Land use map of the Upper Ewaso Ng'iro North River Basin, which approximates best a delineation of MKWR

Source: Adapted from Lanari et al., 2018, p.115

² Defining MKWR as the study area of this thesis resulted from recommendations by local research partners and interviewees. MKWR includes the wider region around Ewaso Ng'iro North basin, as the selected WRUAs, field visit-, and interview sites are located across county- and hydro-meteorological boundaries. This rather flexible definition of the research area includes the regional context and surrounding development processes in which the Likii and Nanyuki WRUAs are embedded.

The main characterizing feature for this zoning is thus the decline in annual precipitation following the altitude gradient, from over 1000 mm/year closer to the mountain to around 300-500 mm/year towards Laikipia plateau and further to the north-west (Figure 12 in Annex 7; Kiteme and Gikonyo, 2002; Njuguna, Kiteme and Peter, 2014). Over the course of the year, rainfall mainly occurs during two periods, the long rains around March to May/June and short rains around October and November. This results in temporally varying river runoffs. However, the region experiences less reliable seasonal precipitation and more frequent droughts (Dell'Angelo *et al.*, 2016; Ulrich *et al.*, 2012). This was experienced during the field research stay, when the long rains almost completely failed for the second year in a row. Such changes in precipitation are projected to further increase due to climate change (Ulrich *et al.*, 2012). However, observed significant decreases in the regional rivers' runoff are mainly attributed to human activities, such as increased abstractions for intensified



Figure 2: In MKWR, the arid- to semi-arid Samburu lowlands (left) and semi-humid zones closer to Mount Kenya (right) are spatially proximate (<50 km), yet characterized by very different land uses. The picture on the left shows pastoralists, the picture on the right shows a large-scale commercial flower farm

Source: Own photos, 2022

farming and general changes in land use practices (ibid.; IPCC, 2022, p.564; chapters 5.1 & 6.1). Notably, 88-93 % of households in the region depend on rivers as their primary water source by the end of the dry seasons (Ifejika Speranza *et al.*, 2018, p.194). This, together with the described variabilities and pressures on water resources contributes to increased tensions and conflict (ibid.). Moreover, MKWR constitutes part of the upstream areas of Ewaso Ng'iro river basin, where 60-95 % of available river water gets abstracted. This water use pattern has significant impacts on downstream communities and on (potential) conflict scenarios (Lanari *et al.*, 2018, p.115f.). Generally, water-related conflicts in MKWR and adjacent areas have been steadily increasing and affecting many water users (Lesrima, Nyamasyo and Karatu, 2021, p.270f.).

The highlands west of Mount Kenya are also characterized by high population growth rates since Kenyan independence in 1963, mainly due to the influx of people from other regions of the country. However, population densities in the region are unequally distributed, ranging from over 1,000 persons/km² around the semi-humid zones to around 20 persons/km² on the drier Laikipia plateau (Njuguna, Kiteme and Peter, 2014, p.7). Alongside this, a rapid intensification and commercialization of rain-fed and irrigated agriculture can be observed since the 1990s, putting more pressure on water resources (chapters 5.2 & 6.2; Bond, 2014; Gichuki, Kihara and Ndung'u, 2000). The resulting change of land use (chapters 2.2 & 5.2) combined with multi-layered struggles over unequal water access, catchment degradation, and climate change impacts makes MKWR a highly dynamic and contested hydrosocial environment (Gichuki and Liniger, 2001; Lanari *et al.*, 2018; Lesrima, Nyamasyo and Karatu, 2021). Additionally, the region faces conflict among ethnic groups and recurring food insecurity of vulnerable people, especially towards the drier north of MKWR, the so-called ASAL (Arid and Semi-Arid Lands) (Ulrich *et al.*, 2012).

2.2 From Historic Land Use to the Recent “Land Rush”

As described above, MKWR constitutes a highly dynamic and transforming landscape with significant population growth. This, in connection to a rapid change in land tenure and land use, has spawned notions around a recently happening *land rush* (Bond, 2014; Hall, Scoones and Tsikata, 2015; Letai, 2018). To understand these latest developments that impact water governance, a brief history of land use dynamics in

MKWR is necessary.

For the transformation of land tenure in the region, 1901 marked an important turning point under British colonial rule, as divestment of public land was allowed. Subsequently, Maasai, who used to live on the Laikipia plateau to the west of Mount Kenya, had to move towards the drier north. Furthermore, in 1904 and 1913, official resettlement to the Maasai Mara region commenced, as colonialists established the so-called *white highlands* on the plateau (Bond, 2014; McCord *et al.*, 2017). It was only in 1938 that the *Native Trust Land Ordinance* was established for designating indigenous lands. This marked an important milestone for enhancing precarious indigenous land rights which are still an issue today.

After Kenya's independence in 1963, especially Laikipia, and thus large parts of MKWR, experienced population growth above national average (up to 4.7 % annually). At the same time, vast proportions of previously unused- or ranch land was sub-divided and/or transferred into agricultural use, accompanied by increasing water use (chapter 5.2; Bond, 2014; McCord *et al.*, 2017). Other land parcels were left idle as speculative investment areas and yet other land parcels were acquired by Kenyan political elites or given to landless Kikuyu (Letai and Lind, 2013; McCord *et al.*, 2017). This happened under the *Settlement Transfer Fund Scheme* and effects of this can be seen even today. For instance, in Laikipia, less than 50 people own around 40 % of the counties' land. Thus, pastoralists experience difficulties on their traditional migration routes as this private land is often fenced (chapter 5.2; Bond, 2014, p.123; Letai, 2018).

Especially from the 1990s onwards, the region experienced major transformations of agricultural land use as evermore commercial, large-scale horticultures were established (Figure 1). Since then, the growing population and increasing numbers of large-scale investors and horticultures contributed significantly to the recent land rush in MKWR (Figure 3; Bond, 2014; Lanari *et al.*, 2018).

In addition to population growth, LUC and related conflict also occur due to immigration of pastoral groups in search of grazing pasture and water. Understanding pressures on pastoral livelihoods in the context of the described land rush (chapters 5.2, 6.2, 6.3)

requires cognizance of the aforementioned historical proceedings of LUC.

Today, MKWR represents a highly contested space where – based on historical transformations – different interests around land tenure between pastoralists, small-



Figure 3: Signs indicating that land is (not) for sale are omnipresent in MKWR under the recent land rush. The picture on the right is also an example for unused land that is fenced-off

Source: Own photos, 2022

and large-scale farmers, conservationists, investors, and others continue to clash. Moreover, ethnicity plays an important role in Kenyan land and resource politics, which further complicates land conflict constellations through exclusionary political practices, power asymmetries and competing claims on land (Lynch, 2006). The unequal distribution of land, and thus also of water resources, represents an unresolved issue. Even after constitutional reforms on land policy in 2012, the distribution of land remains influenced by historical injustices and market-driven fragmentation (chapter 5.2; Manji, 2014, p.126). As a result, repeated violent conflict emerges, as seen with ranch invasions by pastoralists between 2013 and 2017 or with clashes between ethnical groups during drought at the time of field research for this thesis (Letai, 2018; Letai and Lind, 2013).

Overall, the observed persistent fragmentation and speculation around land (chapters

5.2 & 6.2), together with prolonged droughts and unresolved pastoral land tenure issues continues to aggravate challenges and conflict around the *land use-water nexus* (Letai and Lind, 2013). As such contested land use is in most cases connected to access to and governance of water resources, WRUAs could be an important forum for mediating these tensions. Thus, land use (change) constitutes a cross-cutting issue of this work (chapters 5.2 & 6.2).

2.3 Kenyan Water Policy and Devolution

For understanding how WRUAs came into being, briefly describing the intertwined evolution of water policy and devolution in Kenya since the early 2000s is imperative.

The Water Act 2002

With the Water Act 2002 (cf. Republic of Kenya, 2002), governance of water in Kenya moved away from centralization towards a polycentric approach, notably rather initiated by the national government than gradually evolving from bottom-up over time. Until today, Kenya's water sector exemplifies an exceptional combination of top-down and bottom-up mechanisms (Baldwin *et al.*, 2018). The Water Act 2002 was the first comprehensive water sector reform since 1972 and aimed at polycentralizing the sector, clarifying mandates and coordination, and revising financing. At the same time, the Act also entailed regulatory weaknesses that were partly addressed in the 2016 Water Act (Nyanchaga, 2016, p.529, 578). Polycentricity implies "multiple, autonomous decision centers that have overlapping authority over geographic areas, policy areas or aspects of governance" (Baldwin *et al.*, 2018, p.214). In Kenya, these partly overlapping decision-making centers are *Community Water Projects* (CWP; often members of WRUAs), the WRUAs, and the *Water Resources Authority* (WRA). This, including coordination among agencies and stakeholders, distinguishes polycentralization from decentralization, which is why the term polycentricity is used subsequently for the devolved Kenyan governance system (McCord *et al.*, 2017, p.636f.). However, overlapping mandates in a polycentric system can produce challenges of accountability (chapters 5.1, 6.1, 6.3).

Through polycentralization, the formation of WRUAs as local decision-making bodies in CBWG and participation of the private sector were enabled (Nyanchaga, 2016, p.65, 521). Furthermore, the 2002 Act shifted water service provision from the national level

to 91 local water service providers and generally reconfigured water management through restructuring institutions and responsibilities (Figure 4; Njora and Yilmaz, 2021; Nyanchaga, 2016, p.60). Objectives and potential benefits of a polycentral system are enhanced participation, coordination, innovation, knowledge co-production, and decision-making on multiple spatial and bureaucratic scales (IPCC, 2022, p.658; McCord *et al.*, 2017).

Devolution

With the 2010 constitution of Kenya, devolution of the political system from centralized politics to 47 counties with extensive authority was initiated (Cheeseman, Lynch and Willis, 2016). Devolution was, and still remains, a popular concept that mainly aims at overcoming (ethnic) conflict through a more inclusive, participatory approach, involving marginalized communities through political representation on the county level. Simultaneously, insufficient funding from the national government, corruption, and continued conflict persist (Cheeseman, Lynch and Willis, 2016). Dittmann & Ogolla (2023, p.7f.) argue that re-scaling through devolution even further politicized and fragmented resource governance and that elite capture may increase (chapter 6.3). Overall, devolution has far-reaching implications through reconfiguring power constellations (*ibid.*). Thus, it also significantly restructured water governance in Kenya and influenced the relations between local water projects, WRUAs, county-, and national government, as can be seen in the 2016 Water Act.

The Water Act 2016

The 2016 Water Act revised the Act from 2002 and forms the basis of today's water governance in Kenya. This new Act further engendered devolution of water management and mandates to the new administrative unit of the 47 Kenyan counties (Njora and Yilmaz, 2021; Republic of Kenya, 2016, p.92, 94). Moreover, many entities formed in 2002 were transitioned into successor institutions. For instance, the *Water Resources Management Authority* (WRMA) became the *Water Resources Authority* (WRA) (Republic of Kenya, 2016, p.88-90). Additionally, the 2016 Water Act – like the wider development agenda *Vision 2030* of Kenya – aims at further enhancing participation in resource governance (GoK, 2007; Republic of Kenya, 2016). This strengthening of CBNRM can increase accountability, legitimacy, adaptability, and

trust in resource governance (IPCC, 2022, p.658; Richards and Syallow, 2018). Even as a polycentric system entails advantages, such as different levels of conflict resolution (Baldwin *et al.*, 2018), this research found a variety of challenges regarding power constellations, funding, degradation, and others (chapters 5.1 & 5.4.2).

2.3.1 Overview of Water Actors

This paragraph outlines the principal water actors on national, county, and local level. Due to the multitude of stakeholders, only a selection of those relevant to the case study are described below and visualized in Figure 4.

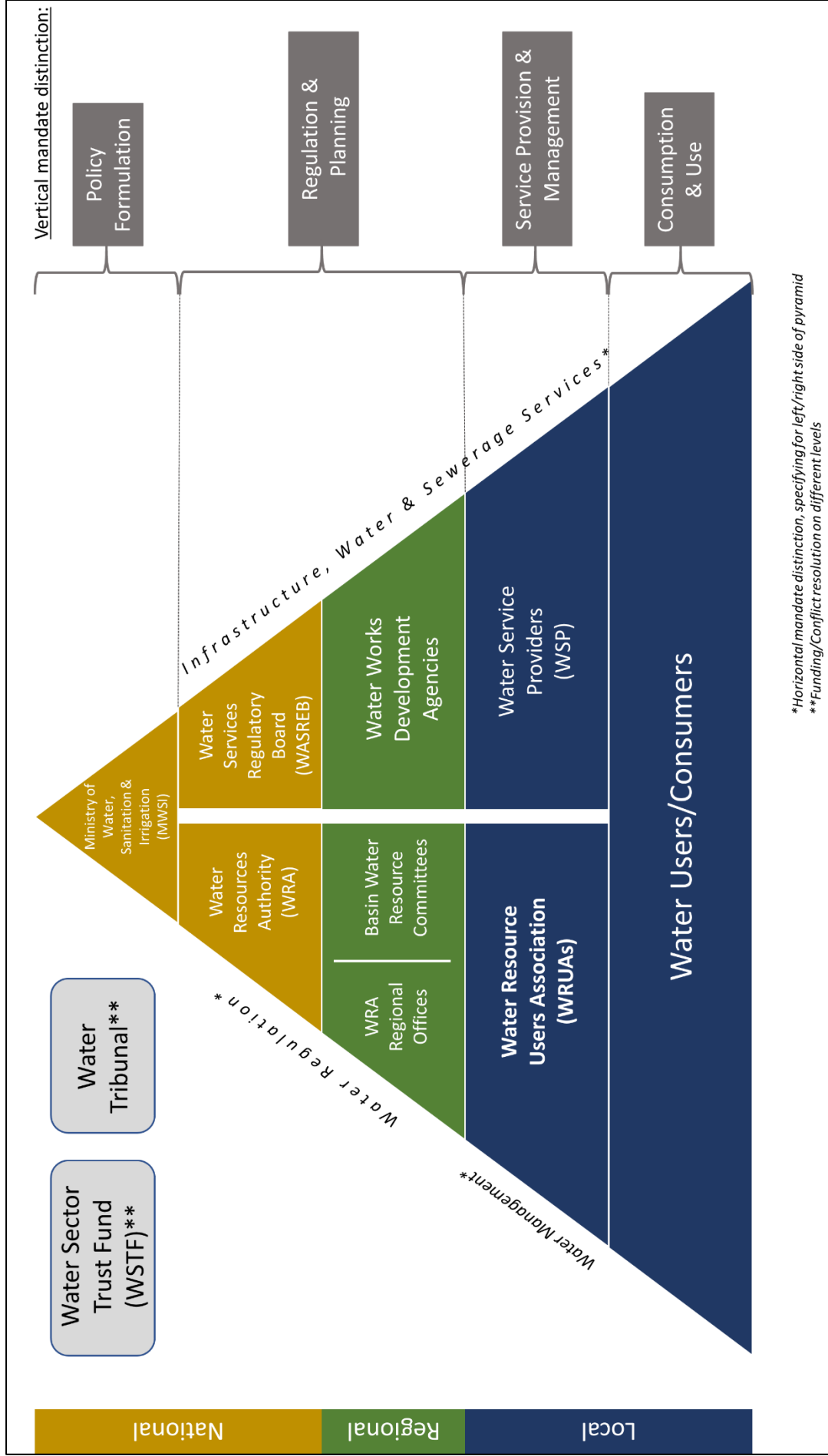


Figure 4: Schematic depiction of Kenyan water sector stakeholders/agencies and mandates after the 2016 Water Act

Source: Own graph, based on Mulwa, Li and Fangninou, 2021, p.9

Since the reforms through the Water Acts 2002 and 2016, the Kenyan water sector is compartmentalized into two dimensions. Spatially, into local, regional, and national level actors, and thematically, into water resource management and water service provision (Figure 4). Overarching are the *Ministry of Water, Sanitation and Irrigation* (MWSI) as the water policy-making and coordinating body and the *Water Sector Trust Fund* (WSTF) for financing of the water and sanitation sector, especially in underserved or rural areas (Njora and Yilmaz, 2021; Nyanchaga, 2016; Republic of Kenya, 2016, p.72f.). Moreover, broader disputes – e.g., on WRA decisions – are resolved through the *Water Tribunal*, whereas local conflict resolution works through the WRUAs (Republic of Kenya, 2016, p.76).

Water management & Water service provision

The WRA acts on national and regional level through their headquarters and the regional offices, respectively. The WRA is responsible for regulatory aspects, such as the approval and monitoring of water permits or the establishment of WRUAs (Mulwa, Li and Fangninou, 2021; Republic of Kenya, 2016, p.19, 72). The *Basin Water Resource Committees* work on the regional level to advise WRA on water management issues. There is an important distinction of mandates, with WRA on the national and regional *regulatory* side and the WRUAs being responsible for water *management* on the sub-catchment local level. WRUAs are comprised of *Community Water Projects* (CWP) and other water users (chapter 2.3.2; Republic of Kenya, 2016, p.28). Especially regarding water allocation, monitoring and sanctioning of water permit use, as well as conflict resolution, the WRA, the WRUAs and the CWPs have in parts deliberately overlapping functions (Baldwin *et al.*, 2018, p.217).

On the water services side, the *Water Services Regulatory Board* (WASREB) works at the national level on ensuring fulfilment of water users' service rights and interests (Republic of Kenya, 2016, p.50). Water service providers are responsible for local water and sanitation services and established by the county governments (*ibid.*, p.55; Figure 4).

Concerning the water users, the study region includes a potpourri of water actors, as observed during field work. Main groups are commercial horticultures, small-scale farmers, and conservancies (Figure 1 in chapter 2.1). Not to be neglected are

“informal” water users³ from different backgrounds that pose a major challenge to the described formalized water management (chapter 5.1 & 5.4.2; Ifejika Speranza *et al.*, 2018). Overall, actor constellations and hierarchies are not as clearly ordered as this descriptive paragraph and Figure 4 suggest, but are in reality a lot messier and include multiple stakeholders beyond the formalized mandate structures (Green, 2016).

2.3.2 Water Resource Users Associations and Case Study Sites

At the end of the 20th century, first experimentations with CBWG for conflict resolution and alleviating unequal water access emerged at sub-catchment level as a blueprint for the first WRUAs in Kenya (Gichuki and Liniger, 2001; Kiteme and Gikonyo, 2002). In the 2002 Water Act, the WRMA (later WRA) was mandated to facilitate the set-up of WRUAs. Today, WRUAs exist in all major watersheds of Kenya (McCord *et al.*, 2017; Richards and Syallow, 2018). Section 29 (2) of the 2016 Water Act defines a WRUA as “a community based association for collaborative management of water resources and resolution of conflicts concerning the use of water resources” (Republic of Kenya, 2016, p.28; Figure 4 in chapter 2.3.1). The underlying principle inscribed in this definition is to create holistic upstream-downstream awareness among water users (McCord *et al.*, 2017). Moreover, WRUAs aim at achieving local ownership of and hence accountability towards water resource management as a crucial element of CBNRM (Obeng-Odoom, 2012). Achieving this is crucial, as self-interest-oriented water use often leads to problems ascribed to the *tragedy of the commons*⁴ (Mwaura *et al.*, 2020).

Generally, WRUAs manage⁵ and coordinate local water allocation to a significant extent. They confer with the WRA on water permit applications for a certain fee-based water allowance, which is then decided upon by WRA (Baldwin *et al.*, 2018). Around 70 % of water inside WRUAs is used domestically and roughly 23 % for commercial

³ In this study, *informal/illegal water user* refers to river water abstractors without an abstraction permit, as defined in the Water Act 2016 (cf. Republic of Kenya, 2016).

⁴ *Tragedy of the commons* describes a problem inherent to common pool resources, where individuals tend to consume the good (e.g. water) in a way which subsequently disadvantages everyone. For more details see Mwaura *et al.* (2020) and Hardin (1968).

⁵ The Water Act 2016 defines water management – the mandate of WRUAs – as “the development, augmentation, conservation or protection of a water resource” (Republic of Kenya, 2016, p.10).

purposes (Ifejika Speranza *et al.*, 2018, p.201). During droughts, WRUAs can impose and monitor water rationing schedules among members (Figure 13 in Annex 7; chapter 5.4.1). In case of non-compliance, they can (financially) sanction unpermitted use and mediate conflicts among WRUA members (Baldwin *et al.*, 2018; McCord *et al.*, 2017). WRUAs consist of large-scale water users (e.g., horticultures) and water projects (CWPs) as members. However, becoming a WRUA member is fully voluntary (chapter 5.4.2). The CWPs are irrigation infrastructure projects with individual members. Many of these CWPs already existed before establishment of the WRUAs in 2002 (McCord *et al.*, 2017). Financially, WRUAs obtain membership fees, and money from the WSTF, the county government, and through third-party donor funds. However, the WRUA membership fee is a contentious issue as some cannot afford it and thus remain outside the WRUAs, categorized as “illegal” users (chapter 5.4.2; Ifejika Speranza *et al.*, 2018; Ulrich *et al.*, 2012). Moreover, depending on members’ engagement and third-party funding, performance differs remarkably among WRUAs (chapter 5.4; McCord *et al.*, 2017).

The main guideline for the work and objective of each WRUA is their *Sub-Catchment Management Plan* (Nyanchaga, 2016), the creation of which is often supported by Non-Governmental Organizations (NGOs) or training institutes like CETRAD (Center for Training and Integrated Research in ASAL Development; chapter 4.1). Nevertheless, these plans and the rather pre-defined institutional setup of WRUAs can be influenced by donor interests and requirements of government agencies. This leads to debates around the grass-root nature of WRUAs, with some even describing their institutional frame – at least partly – as top-down oriented (Richards and Syallow, 2018, p.10f.). An evaluation of best practices as well as WRUA-specific challenges is presented in chapters 5.4.1 and 5.4.2.

Likii & Nanyuki WRUA

In the Likii and Nanyuki river sub-catchments, two of the first water users associations of Kenya (later formalized as WRUAs) were established in 1999 and 2000, respectively. The major motivation was the resolution of upstream-downstream conflict and enhancing equitable water access (Kiteme and Gikonyo, 2002; McCord *et al.*, 2017). Likii WRUA sub-catchment encompasses 184 km², whereas Nanyuki WRUA includes 74 km² (Njuguna, Kiteme and Peter, 2014, p.9). The two sub-catchment areas

stretch across different eco-climatological zones, from humid mountain forest to semi-arid savannah around the confluence of Nanyuki and Likii rivers (Figure 5). Both WRUA areas mainly consist of forest land, followed by moorland, grassland, crops, and settlements (Njuguna, Kiteme and Peter, 2014, p.92, 98). As was highlighted in discussions with CETRAD experts, a sharp increase of river water abstractors in the two sub-catchments is observed (chapters 5.1 & 5.2). A major difference between the two WRUAs is that Likii WRUA entails more large-scale commercial horticultures and the water supplier NAWASCO (Nanyuki Water and Sanitation Company), in addition to the CWP within its sub-catchment (*Likii WRUA field visit, 25.04.22*). Implications of this, together with different management challenges and -best-practices in the two WRUAs are introduced in chapter 5.4.

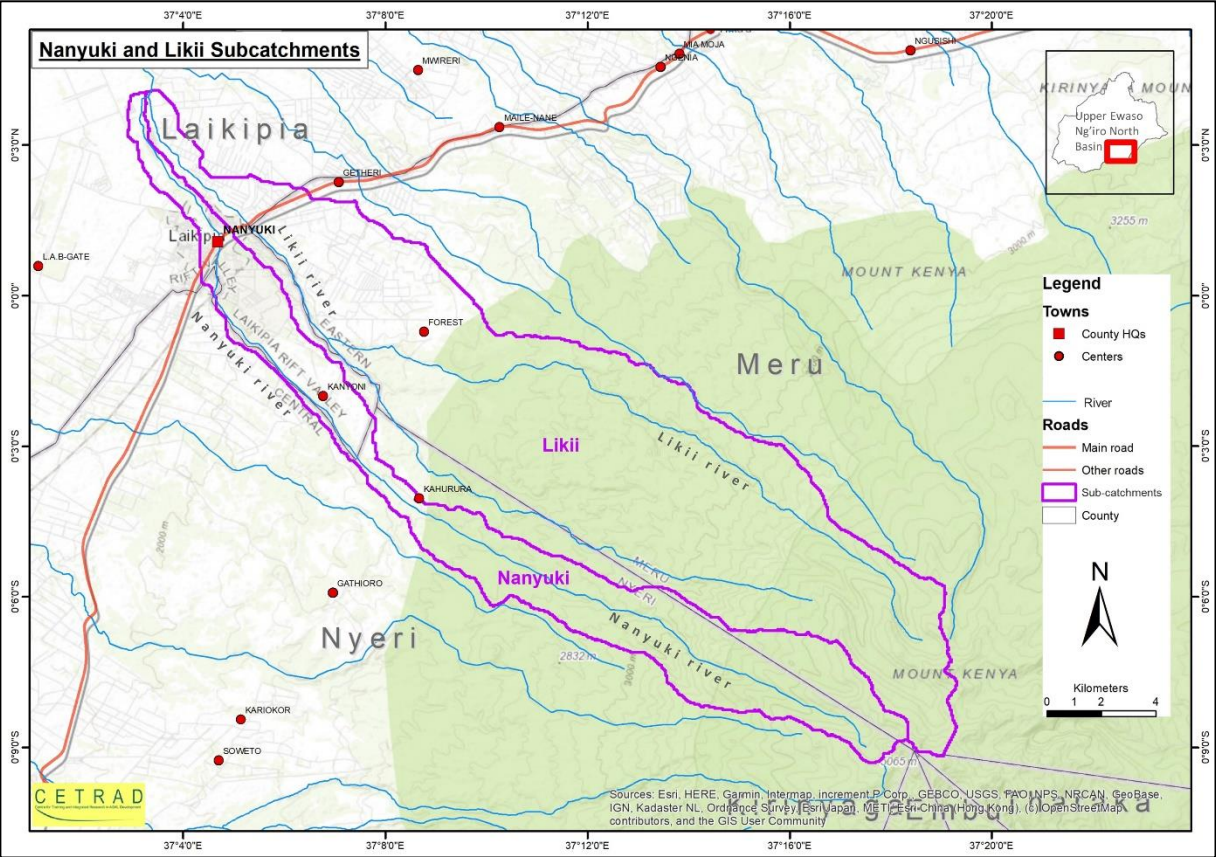


Figure 5: Map of Nanyuki and Likii WRUA sub-catchments

Source: CETRAD map by Lee Muthuri, 2022

3 Theoretical Perspective: Linking Water and Society

The following chapters outline the conceptual foundation of this research. First, a general introduction to governance and governmentality and to power

conceptualizations around resources is given (chapter 3.1). Second, the overarching theoretical frame of Political Ecology (PE) is defined and its usefulness for analyzing politicized natural resource struggles described (chapter 3.2). This links to chapter 3.3 which further particularizes the PE basis towards a hydrosocial cycle lens and a focus on socially constructed scales. Thus, chapter 3.3 brings together governance- and power aspects within a PE of water.

3.1 Resource Governance and Power Relations

The term governance – used throughout this work – includes formal and informal actors and practices on different scales (chapter 3.3), e.g., around use and allocation of a resource. This is summarized in the following holistic definition:

“governance refers to the effort to establish, reaffirm or change formal and informal institutions at all scales to negotiate relationships, resolve social conflicts and realise mutual gains. [...] Governance does not only include establishing institutions such as laws or policies, but also their implementation, enforcement and monitoring” (IPCC, 2019, p.687).

CB governance, specifically, can be described as a “grass-roots territorialization [which] is [...] a struggled process that builds on and re-creates mutual dependency through cooperation and the mobilization of its parts towards a common resource control objective” (Boelens et al., 2016, p.5).

To get a deeper understanding of underlying socio-political processes, strategies and power relations, the focus on resource governance is undergirded by the Foucaultian concept of governmentality. Specifically, this focuses on “how the rule of nature is conditioned by changes in scientific knowledge as well as other developments in social practice” (Wang, 2015, p.329). An example of this could be infrastructural regulations of river runoff through dams, based on a social paradigm shift towards prioritizing technocratic-scientific knowledge. Thus, governmentality emphasizes the importance of social phenomena and rationales behind resource governance (ibid., p.319). Moreover, “the analytic of governmentality [can] be used to examine how practices of rule articulate elements of government, sovereignty, and discipline” (Li, 2007, p.12). Thus, a governmentality lens enables to uncover rationales, objectives, means, and outcomes within a certain (development) intervention (ibid., p.61). It further enables multi-stakeholder analyses as a governmentality perspective scrutinizes governance

beyond state control (Ahlborg and Nightingale, 2018). Furthermore, through a governmentality lens, power is not only seen as directly exercised but rather covertly influencing attitudes and mentalities through hegemonic practices (Robertson, 2015, p.464). Consequently, resulting territorializations and dominant discourses around governance shape identities and power relations (Boelens et al., 2016). Moreover, governmentality examines historically situated rationales, power relations, and different modes of governing in order to understand how governance transforms contested spaces and vice versa (Ahlborg and Nightingale, 2018; Li, 2007, p.27). In PE contexts (chapter 3.2), governmentality is often also referred to under the term environmentality which “questions the state-centred approach and [...] rejects conventional distinctions such as nature-culture, the neutrality of expertise and technology, or belief in the ‘sacredness’ of wilderness” (Wang, 2015, p.322).

Due to Kenyan political devolution, analyzing – though not exclusively – state-nature relations and how national- and local-level interact, is crucial:

“the state is present and invested in nearly all settings, and is reproduced in part through the actions and subject-making of resource managers. [...] [Thus,] we can not only more completely understand the nature of socio-environmental change, environmental justice, and marginalization, but we can point effectively toward the governmental levers of change” (Robertson, 2015, p.465).

Hence, such non-deterministic, multi-scalar approaches focusing on the interrelatedness of actors and practices around resources, build the foundation of moving away from a government focus towards a governance approach. This enables to analyze the complexities in and around water management in the WRUAs (chapters 6.1 & 6.3).

The partial focus of the thesis on power in CBWG can contribute a promising perspective as “[t]he physical environment and its management is a ‘manifestation of power relations” (Robertson, 2015, p.460). More specifically, it is “the control of water [that] produces certain types of social power relations and structures of governance” (Linton and Budds, 2014, p.175). Additionally, focusing on power relations, politics, and spatio-temporal dynamics is a key interest of this research as “the devolution of power in CBNRM is essentially scalar and inescapably political” (Green, 2016, p.97). Constant socio-environmental interactions produce power constellations that importantly shape and reconfigure agency and structures in natural resource

governance. Especially the link between access and exclusion in power constellations fosters an understanding of resource governance going beyond material aspects (Ahlborg and Nightingale, 2018; Forsyth, 2004, p.266). It is thus power asymmetries and resulting inclusions as well as marginalization that are of crucial interest to this study (Bryant, 1998).

Hence, a conceptual foundation of power in PE is required. Power can be defined as a personal attribute, a resource, or in a relational way (co-constituted by social interaction and non-human structures) (Ahlborg and Nightingale, 2018). It is argued, that the latter as an inherently dynamic power conception beyond individual agency is appropriate for socio-environmental analysis around resource governance:

“when power is understood as a relational, productive force that generates contradictory effects within the same actions, we are able to show how resource governance processes can empower and create new relations of domination at the same time” (Ahlborg and Nightingale, 2018, p.382).

Power is thus constantly (re-)produced through the interaction of social and non-human aspects and is as such never static over time (ibid.). Hence, for this case study it is crucial to look into how power relations are embedded in social practices as well as material and institutional attributes of CBWG in Kenya. This focus on power relations also enables a better understanding of case-specific social complexities as opposed to over-simplistic cause-effect studies, especially in African contexts (Ndlovu-Gatsheni, Seesemann and Vogt-William, 2022). However, power in governance systems is not easily discernible regarding its spatial component and attributability to certain stakeholders (Allen, 2009). Defining power in a relational way is often connected to the term constitutive power. This implies a more comprehensive Foucaultian understanding of power as detached from individual agency and rather being inherent in networks, materiality, discourses, and symbology, thus shaping and being shaped by social practices and society (Ahlborg and Nightingale, 2018). Nevertheless, parts of more systemic power notions can be useful and are included in this research for incorporating historical (re-)structuration and the situated capacity of stakeholders to act. Based on this, power is not seen as exercised by individuals but can rather emerge from interaction between stakeholders, nature, and material aspects (ibid.). This framing of power is interwoven with the applied scales perspective (chapter 3.3) of this work: “power emerges from multi-scalar relational networks that

transcend and circumscribe individual exercises of power” (ibid., p.388; see Green, 2016). However, the resulting power relations can have ambiguous outcomes as both, hierarchies and authority can be re-iterated and resistance and empowerment from below enabled (Ahlborg and Nightingale, 2018). Concerning water governance, power can be manifested through socio-political territorializations along with exclusionary practices under a certain governmentality (Boelens et al., 2016). In such hydrosocial territories, power, knowledge, and governance are inextricably linked:

“hydrosocial territories can be seen as constituting a politics of truth which legitimates certain water knowledges, practices and governance forms and discredits others. [...] The ways these inform the shaping of particular water artefacts, rules, rights and organizational structures – concentrates on the issue of how to align local users and livelihoods to the imagined multi-scalar water-power hierarchies” (ibid., p.7).

According to Ahlborg & Nightingale (2018, p. 391f.), analysis of power relations in resource governance can be located in three areas: 1) constitutive power around ontologies and knowledge production; 2) combined constitutive and situated agency power around access and entitlements within a resource system; and 3) power-related outcomes of changes in everyday lives. The general importance of power in water governance also becomes clear within the hydrosocial cycle (chapter 3.3).

3.2 Political Ecology and Natural Resource Governance

This research is guided by a social-constructivist perspective for analyzing contested socio-environmental dynamics in MKWR. Political Ecology (PE) as an umbrella term for various theories is, inter alia, interested in struggles over access to and distribution of natural resources. It therein focuses on how ecological issues and environmental change relate to socio-political aspects around power, participation, and justice (Bryant, 1998; Neo and Pow, 2015, p.402; Rodríguez-Labajos and Martínez-Alier, 2015). The social-constructivist view of PE assumes that “social beings necessarily produce nature; nature becomes a socio-physical process infused with political power and cultural meaning” (Swyngedouw, 2004, p.132). Other authors define PE as “the attempt to understand the political sources, conditions and ramifications of environmental change” (Bryant, 1992, p.13 cited in Batterbury, 2015, p.27). Consequently, the PE conceptual frame of this thesis starts from the premise that

environmental issues are intrinsically political and that social interaction and nature are co-constitutive, ever dynamic elements of politicized environments (Ahlborg and Nightingale, 2018; Bryant, 1998). This also entails a non-deterministic approach to causes, processes, and outcomes of resource struggles (Loftus, 2015). Additionally, explanations of contested environmental settings must not solely focus on socio-political aspects, but adopt a wider view on structural (e.g., neo-liberal, capitalist system) and agency aspects in resource governance (Forsyth, 2004, p.266-268). Methodologically, PE enables applying a range of possible (mixed) research methods from natural and social sciences (Reuber, 2012, p.144; Zimmerer, 2015). Hence, the choice of data collection and -analysis methods of this work (chapter 4.1) is oriented accordingly and is consistent with the conceptual underpinning of the thesis.

Through PE, the analysis of natural resource systems focuses on struggles over control of and access to resources while emphasizing the essential role that power and different scales play (chapter 3.3; Green, 2016). To this end, PE lends an important conceptual contribution for socio-environmental studies around natural resources, as it

“combines the concerns of ecology and a broadly defined political economy. Together this encompasses the constantly shifting dialectic between society and land-based resources, and also within classes and groups within society itself” (Blaikie & Brookfield, 1987, p.17 cited in Neo and Pow, 2015, p.402).

As resource governance in Kenya got transformed towards CBNRM, the analysis of social and spatial transformations and their implications for power relations is a guiding thread of this PE-based research. Blaikie (2006) hereto emphasizes the importance of PE approaches for a critical analysis of outcomes and social realities in CBNRM specifically.

PE also argues for considering material struggles as well as contestations around meaning and symbolic aspects in socio-environments (Bryant, 1998). This can enhance understanding social complexities around knowledge asymmetries, discourses and normativity. Furthermore, it helps uncovering social constructions

around scarcity⁶, environmental conflict, and crisis by overcoming environmentally deterministic pre-assumptions (Barnett, 2000; Boelens, 2014; Homer-Dixon, 2010, p.178). In the tradition of PE in Global South contexts, this study further aims at understanding the (historical) local complexities and inequalities instead of deploying neo-Malthusian simplifications (Bryant, 1998). Main emphasis in this research, however, is put on actors, power relations, and contested resource use and not as much on discourses and symbology, as in other strains of PE scholarship (Rodríguez-Labajos and Martínez-Alier, 2015).

Critically examining overt and covert social aspects through a PE frame is crucial, as governance issues and social inequalities are often root causes of resource-related crises (Johnston, 2003; Loftus, 2015). Through this, environmental (in)justice, scarcity, conflict, marginalization, and other issues of resource governance in politicized environments can be best approximated (Bryant, 1998; Forsyth, 2004; Loftus, 2015; Swyngedouw, 2009).

3.3 Political Ecology of Scale & the Hydrosocial Cycle

This sub-chapter first introduces the scales concept of PE which undergirds the hydrosocial cycle theory (second paragraph). Both aspects help to further narrow down the described general PE focus towards a deeper theoretical approach to water resource governance.

Political Ecology of Scale

Socio-natural processes are entangled across spatio-temporal scales, hence calling for a multi-scalar resource governance approach (Bryant, 1998; Reuber, 2012, p.147). A Political Ecology of Scales sets the basis for socio-natural concepts such as the hydrosocial cycle (see below) and is reflected in the design of this research (chapter 4.1). Scalar conceptualizations focus on how social practices and power constellations around access to and control over resources produce and transform social scales.

⁶ This means that resource scarcity is often politically instrumentalized and framed differently among social groups for reaching certain goals. The study by Sasidevan and Santha (2018) exemplifies how such socially constructed scarcities of water mediate transformations.

Socially constructed scales⁷ are constantly transformed through these struggles around resource governance (Green, 2016). Thus, a scalar approach complements the other concepts of governance, governmentality (chapter 3.1) and of the hydrosocial cycle. Specifically, it enables analyzing how natural processes, power, agency, and social scaling processes are intertwined and interact in resource governance (Neumann, 2015, p.476, 482f.). Moreover, a scales approach promotes a non-deterministic, multi-directional view on causalities, as it assumes underlying social processes to transcend across scales – which are themselves dynamic and socially constructed (ibid., p.477). This latter aspect distinguishes scales from levels, which refer to ‘classical’ spatial and administrative categorizations (e.g., regional, national, global). As Swyngedouw (2004, p.133) highlights, scales and power relations are inseparably linked:

“scalar configurations [are] the outcome of socio-spatial processes that regulate and organise social power relations. As a geographical construction, scales become arenas around which socio-spatial power choreographies are enacted and performed”

Hence, a focus on power (chapter 3.1) is related to scalar concepts in resource governance as a vital component for analysis, as “space is socially constructed, and scales are created through the compartmentalization of this space according to power systems” (Green, 2016, p.89). Consequently, socially constructed scales are also linked to “a dialectical approach toward nature-society relations” (Neumann, 2015, p.483) such as entails the hydrosocial cycle. It is thus crucial to investigate how scalar reconfigurations of the Kenyan devolution relate to dynamics in power relations around CBWG.

The hydrosocial cycle

The theoretical approach of the hydrosocial cycle, based on the work of Linton and Budds (2014), is suitable for addressing interactions between water environments and

⁷ A scales approach assumes for instance that spatial units like “regional” or “national” are never clearly delineable and isolated but are always the product of social constructions and spatial imaginaries (see Ahlborg & Nightingale, 2018; Green, 2016). Hence, supposedly trans-national actors like flower farms in MKWR are also embedded in local scales of resource struggles.

society and can be attributed to PE scholarship. The concept is based on the hydrological cycle and fuses it with socio-political aspects. Its fundamental assumption and aim are as follows:

“[the concept focuses on] socio-natural process[es] by which water and society make and remake each other over space and time. [...] [This] offers analytical insights into the social construction and production of water, the ways by which it is made known, and the power relations that are embedded in hydrosocial change” (Linton and Budds, 2014, p.170).

Thus, the hydrosocial cycle brings together the foci on power relations and socially constructed scales, deployed in this research. Furthermore, it promotes understanding water as not unilaterally shaped by water governance, but itself constituting social relations and practices around governance (ibid., p.171). An example of the latter could be the symbolic-religious value of water and how this shapes social practices or rituals along a river. Furthermore, this theoretical approach offers innovative conceptions of water spaces (e.g., on socio-natures (Swyngedouw, 2004, 2009) or hydrosocial territories (chapter 3.1; Boelens et al., 2016)) and on how diverging spatial imaginations around water governance collide. The hydrosocial cycle, like PE in general, aims at overcoming natural- and geo-deterministic assumptions, such as that physical and climatic properties of a water body condition societal outcomes. It thus enables understanding socio-natural interactions and their multi-directional complexities from different perspectives (Linton and Budds, 2014).

In particular, the hydrosocial cycle describes a cyclical co-constitution of material and socio-political as well as discursive properties of water, including questions around authority and legitimacy (Figure 6; Boelens, 2014; Boelens et al., 2016). In this context, interventions in a water regime – as in the case of MKWR – can lead to social change and vice versa (Linton and Budds, 2014). Another example is the commodification of water as an economic good. This can result in material access restrictions and socially exclusionary, material interventions in a water system, undermining the status of water as a public good and thus transforming its social meaning (Swyngedouw, 2009). Such processes relate to identity formation around resource governance, exclusionary mechanisms and “othering”, that are key concerns of the hydrosocial cycle (Boelens, 2014). The hydrosocial cycle is, moreover, particularly useful for addressing power relations around water issues. Here, the concept speaks of socio-natural hybrids, in

which the components of water, nature, and power are reciprocally interlinked, thus also going beyond nature-society dichotomies and unidirectional causal explanations (Boelens et al., 2016; Linton and Budds, 2014; Swyngedouw, 2009). These power-laden interdependencies are often additionally consolidated or reconfigured by certain (discursive) representations and symbolizations (Swyngedouw, 2009). Moreover, concerning power constellations, the importance of different modes of knowledge production and their asymmetric or even exclusionary application is relevant within the hydrosocial cycle (Boelens et al., 2016; Richards and Syallow, 2018).

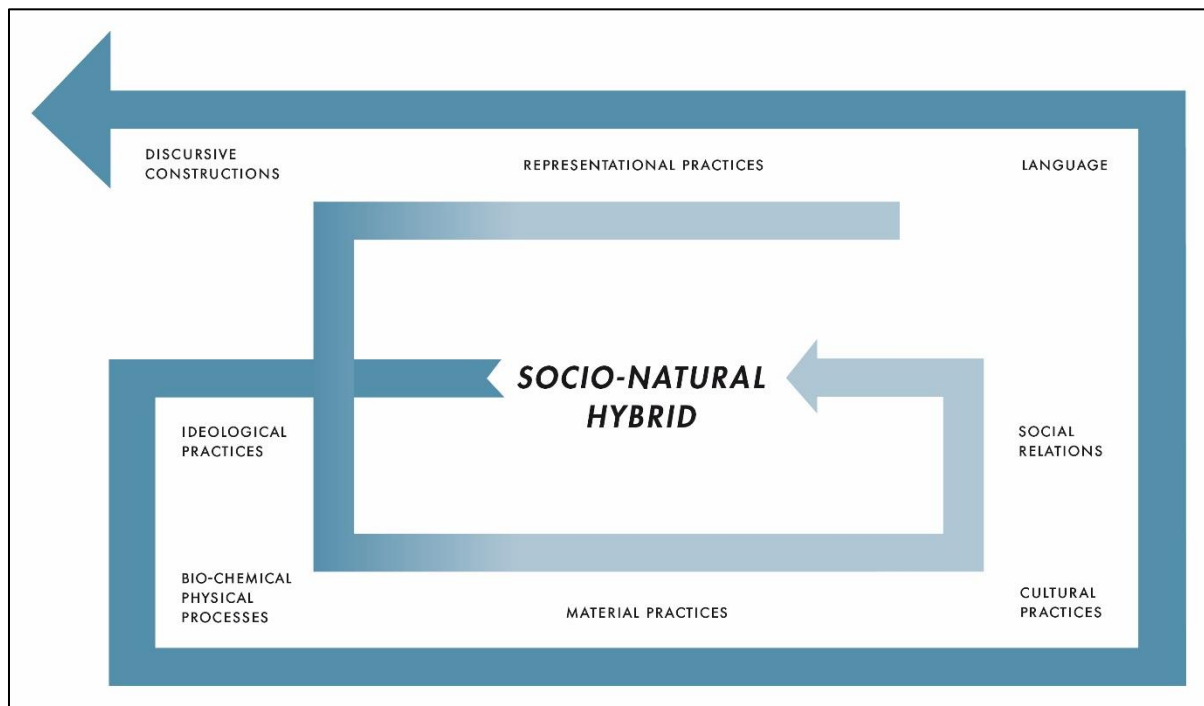


Figure 6: The material and non-material aspects around water that shape socio-natural hybrids (e.g., MKWR) and at the same time emerge from these, constituting a hydrosocial cycle

Source: Own graph, based on Linton & Budds, 2014, p.174; Layout: Leonie Schmidt

Overall, the hydrosocial cycle is particularly well suited for this study, as several of the described socio-political aspects of the water cycle are clearly evident around CBWG in MKWR (chapter 6.3). As one objective of this work is to critically examine (transforming) power relations among water actors, the hydrosocial cycle offers a promising perspective. It aims at untangling water, identities, and worldviews and deconstructs naturalizations of hierarchies and inequalities (Boelens, 2014; Loftus,

2015). This is specifically appealing in relation to the governmentalities concept (chapter 3.1).

In sum, from the perspective of the hydrosocial cycle, water is not grasped as a uniform material substance, but as a product of dynamic water-society relations and of the contextualized embedding in these (Boelens, 2014; Linton and Budds, 2014). Hence, the approach can be seen as an important contribution to look at water resources from an integrative governance perspective beyond purely technocratic views (Ahlborg and Nightingale, 2018; Boelens, 2014). Moreover, it can be used to critically analyze power asymmetries, disparities, and socially differentiated vulnerabilities in the water context, which makes it particularly appealing for this research.

Overall, employing a PE approach that combines a governmentality and scales perspective with the hydrosocial cycle concept, guides especially the discussion of results (chapter 6). This comprehensive conceptual combination also facilitates a critical and multi-perspective view throughout the research process.

4 Methodology

This chapter outlines the research design (chapter 4.1) and subsequent steps of selecting topic and study area, choosing appropriate data collection and -analysis procedures (chapter 4.2). Moreover, limitations to the research approach and positionality aspects are scrutinized in chapter 4.3.

4.1 Research Design

The research design of this thesis builds up around a qualitative case study for analyzing complexities and nuances of socio-natural interactions in a contested development setting. More precisely, a case study design is chosen to “produce deep, concrete explanations of social phenomena that are attentive to a variety of contextual influences at various scales” (Baxter, 2021, p.123). The main emphasis is put on the extensive empirical data from field research (chapters 5 & 6) with theoretical concepts and literature review as supportive underpinnings. In a post-positivist manner, this research aims to go beyond objectivity and generalizability by acquiring an in-depth understanding and by uncovering situated knowledges through explorative, transparent, and coherent methodologies (Kuckartz and Rädiker, 2022, p.32). Main quality criteria applied to data collection and analysis are thus reliability, authenticity,

confirmability, and credibility (Kuckartz and Rädiker, 2022, p.237; Mansvelt and Berg, 2021, p.391). An explorative qualitative approach further supports capturing individual subjectivities and experiences and how social interactions co-constitute socio-environmental spaces (Lamnek and Krell, 2016; Mattissek, 2013). Additionally, the research approach is essentially open towards new ideas and reflections of research partners and -participants and thus remained flexible to adjustments of the research agenda and for incorporating unexpected findings. Non-standardized, semi-structured interviews were chosen as the main method within this approach (chapter 4.2; Kuckartz and Rädiker, 2022, p.20; Lamnek and Krell, 2016, p.33).

Local experts and researchers – mostly from CETRAD⁸ – were frequently consulted for collaboratively refining research questions, identifying relevant themes and adapting research procedures to the respective socio-political situation in Kenya. Thus, the research process is shaped and conducted jointly with local researchers and stakeholders who have a thorough understanding of the regional context. This collaborative research approach is also adopted in view of ethical considerations (chapter 4.3; Mama, 2007; Ndlovu-Gatsheni, Seesemann and Vogt-William, 2022).

Regarding data analysis, the research design follows a circular qualitative hermeneutical approach. This means that empirical data (mostly interview transcripts) were analyzed after acquiring foreknowledge, e.g., from literature. In consecutive steps, making sense of the transcripts and their in-depth analysis were furthered through continuous and contextual literature review and discussions with research partners (Kuckartz and Rädiker, 2022, p.24f.).

The overarching conceptual frame of PE (chapter 3.2) significantly shaped the research design, so that conceptual lens and methods form a coherent basis. The applied concepts encourage combined methodological approaches, which is why different data collection and -analysis methods are employed (chapter 4.2).

⁸ CETRAD (Nanyuki, Kenya; <https://new.cetrad.org/>) supervised and supported the field research of this thesis during a stay from 06.03.-16.05.2022. Frequent consultations with CETRAD researchers facilitated planning of field activities, identifying relevant themes, cross-checking interview guides, establishing trusted contacts, and advising on security issues. CETRAD is a long-standing partner of the Collaborative Research Center “*Future Rural Africa*” to which I was affiliated.

4.2 Work Flow: Literature Review, Data Collection & Analysis

This chapter outlines the workflow of the thesis (Figure 14 in Annex 7), including characteristics of the principal methods applied.

Preparation and initial phase of field research

A continuous in-depth literature review accompanied the whole research process for designing and contextualizing field research. In the initial phase, a preliminary literature review helped identifying potential themes, study areas, and relevant research gaps. The existing collaboration with CETRAD predestined choosing a study area within their localities of long-standing experience. Drafting a research proposal and discussions with the supervisors of the thesis supported to narrow down fields of interest, formulating research problems and eliciting a field research agenda. This first thematic orientation together with conceptual literature explorations defined potential field research methods.

The initial phase in Kenya was characterized by several exploratory discussions with researchers and development specialists from Kenyan universities, NGOs, and CETRAD. This was crucial for assessing initial insights from literature, re-orienting envisioned foci of research, and identifying exact case study sites according to recommendations on relevancy and feasibility. This exploratory approach enabled refinement of research problems in the initial phase and thus promoted an open and dynamic procedure to account for social complexities (Lamnek and Krell, 2016). Subsequently, a list of potential research participants was created and contacts established.

Semi-structured interviews

The main proportion of time was consumed by drafting guiding questions and conducting a total of 17 recorded in-depth interviews⁹ and 22 informal (group) discussions and interviews during field visits. Non-standardized, semi-structured qualitative interviews were chosen for addressing the research questions (chapter 1.2),

⁹ ~ 11 hours and 57 minutes recorded and transcribed material in total.

in line with the conceptual foundation (chapter 3; Dunn, 2021, p.149; Kuckartz and Rädiker, 2022, p.20). These explorative key-informant¹⁰ (KI) interviews proved useful for obtaining a multi-perspective and contextualized insight into social complexities, individual subjectivities, and the diversity of views around CBWG (Döringer, 2021; Dunn, 2021, p.149; Linton and Budds, 2014). For capturing the different perspectives and to account for political sensitivity, the problem-centered interview guides were adapted and refined throughout, together with local partners. Furthermore, interviews were structured beginning with an introduction, followed by open, narrative questions and subsequently narrowing down the specificity of questions to the expertise of the interviewee (Annex 3 & 4). As is typical for problem-centered qualitative interviews, deductive (based on prior insights/concepts) and inductive questions (open/exploratory) were combined (Döringer, 2021; Lamnek and Krell, 2016, p.361). It is acknowledged that semi-structured, problem-centered interviews require a more active role of the researcher in loosely guiding the conversation and at the same time grant considerable flexibility for spontaneously adapting the interviewing process to the respective situation (Dunn, 2021, p.158). Most interviews were recorded for subsequent transcription and a more detailed analysis, even though recording itself influences the atmosphere through formalization and potentially making interviewees more cautious (Dunn, 2021, p.167). Interviews were taking place in very different settings, from ministry headquarters over restaurants to locations inside farmland and along the rivers. This also required constant reflection and adjustment of interviewing techniques, depending on the respective context and social situation. Furthermore, building and maintaining trust through transparency, adequate language and support by local partners remained a key task throughout the process (ibid., p.163). This was of crucial importance in the light of (political) tensions in the research area (chapter 4.3) and required careful consideration of recent incidents and political sensitivity.

¹⁰ The term *key-informant* is used for all interviewees instead of hierarchizing different knowledges into *experts* and *non-experts*. Thus, all interviewees are considered to have contributed insights that are *key* for this research, irrespective of their profession, educational background or other features.

Site visits and observations

In parallel to (semi-)formal interviews, a number of field visits and on-site observations were performed. Moreover, several field trips with CETRAD researchers gave important contextual insights into the region, and recent as well as anticipated developments.

Additionally, two transect walks/rides together with WRUA river scouts along Nanyuki and Likii river were conducted (Figure 5 in chapter 2.3.2). This enabled insights into different zones of the study area and the respective water governance issues at stake and helped to acquire a holistic comprehension on sub-catchment level. During these transect walks, several informal discussions with informal river abstractors, farmers, and pastoralists spontaneously emerged, which substantially complemented data from more formal, in-depth interviews. Furthermore, following informal water abstractors on their daily work of abstracting and selling water to settlements without piped water access, supported grasping social complexities, vulnerabilities, and coping strategies in the contested waterscapes of MKWR. The transect walks and following water abstractors in their work can be attributed to methods of participatory observation, even though in this case, it was more of a *participant* observation. This also enabled seeing many of the issues raised during interviews with my own eyes and getting a feeling for their implications, the nuanced social complexities and the surrounding atmosphere. Moreover, such close observational methods enhanced a situated understanding through building a relationship to research partners and complemented findings from other data collection approaches (Watson, 2021, p.143).

All these field research methods were constantly accompanied by elements of monitoring, evaluation, accountability, and learning (MEAL) procedures. This is a typical approach in development and humanitarian projects and helps to ensure quality and continuous reflection for enhancements in the work with marginalized and affected communities (cf. Care International, 2022). In the case of my research, this meant: 1) monitoring progress and success of the field research activities, 2) evaluating experiences and findings with CETRAD researchers, 3) maximizing accountability towards research partners through transparency and feedback mechanisms, and 4) incorporating feedback, success- and failure experiences into working procedures as a continuous and reciprocal learning together with research participants and -partners.

Qualitative Content Analysis

Shortly after the research stay in Kenya, recorded interviews were transcribed and field work notes digitalized. Subsequently, empirical data were analyzed using *MAXQDA* software and methods attributed to qualitative content analysis (QCA). QCA can be defined as a methodologically sound and systematic analysis, e.g., of interview transcripts, that considers explicit and covert textual/linguistic information (Kuckartz and Rädiker, 2022, p.39). Categorization – a crucial step of QCA, guided by the research questions – was accomplished through inductive and deductive coding for organizing and consequently analyzing interviews and observations (Dunn, 2021, p.173; Kuckartz, 2019, p.183f.). For the coding system, first, deductive codes based on theories and prior knowledge were created and subsequently refined and complemented through in-vivo, inductive codes, based on the empirical material itself (Kuckartz, 2019, p.184; Kuckartz and Rädiker, 2022, p.102f.). The categorization into a coding system (Annex 6) generally helps to identify similarities and themes. The coded material was then analyzed qualitatively, quantitatively-descriptive, and visually with several *MAXQDA* tools, such as *Code Statistics*, *Complex Code Configuration Analysis* and *Code Relations Matrix*. The above typical QCA procedure is a cyclical process and open to adaptations for enhancing a meaningful understanding of data (Kuckartz, 2019, p.187). Data analysis and the writing process were continuously accompanied by further literature review that can help slightly alleviating the subjective biases of the researcher through triangulation (Mattissek, 2013, p.140; Stratford and Bradshaw, 2021, p.102). Additionally, preliminary chapters and results were reviewed by research partners and colleagues.

4.3 Critical Appraisal: Positionality & Limitations

I acknowledge that as a researcher I do not have an objective perspective but am entangled in power relations and subjective views which necessitates critical appraisal. As a white, male, middle class member of a higher education institution in Germany, I am in a privileged situation and not personally affected by the situation and especially the hardship that some of my research participants experience. My position vis-à-vis research participants and underlying power asymmetries – e.g., between Global North and Global South – affect research experiences and knowledge production (Catungal and Dowling, 2021, p.21). Even though my aim is to overcome insider-outsider

dichotomies through the described methods and local partnerships, during some field visits this distinction was still noticeable. Also, as I just lived in the research area for three months, I am far from fully grasping the psychological and physical burdens as well as the overall insecurities that people in MKWR face. This may also affect my interpretation of results as well as behavior of research participants towards myself. An example of the latter is that despite interviews always being preceded by a thorough introduction of myself, of my research and its implications, I was sometimes perceived and treated as a potential donor representative who could advance “development”. This may have resulted in observations that disproportionally showcased needs and (financial) obstacles in water governance or generally in social situations that were overshadowed by certain expectations. This demonstrated the need for further clarification and transparent communication. In some instances, perceptions of my role granted access to high level government offices and shielded flower farms, in other situations access was restricted or denied. This shows the crucial importance of continuous critical reflexivity (e.g., of discourses producing expectations for tangible benefits from research) and especially of my own positionality and how it affects all stages of the research process (Sultana, 2007). In view of this, reciprocal cooperation with local partners like CETRAD is essential. Generally speaking, research and knowledge production cannot be immune to inequalities, historical relationships, power relations, and social differentiation. Thus, critical reflexivity is key for constantly reflecting and making transparent my situatedness within power relations while it does *not* aim at eliminating the researcher’s influence (Catungal and Dowling, 2021, p.25). In this ambition, note-taking of observations and emotions in a field work diary and frequent discussions with local experts from CETRAD before and after field visits proved greatly conducive.

Additionally, being aware of cultural differences and potentially resulting misunderstandings, supported by a reciprocal relationship to local partners, constituted an important prerequisite and learning experience during field research (Gergan and Smith, 2021, p.51). Concerning language, all recorded interviews were conducted in English and thus neither the mother tongue of the researcher nor of most participants, potentially resulting in loss of information. Hence, potential linguistic and cultural misunderstandings were minimized through continuous checking and feedback from CETRAD research partners. As it is important to consider *ex post* implications of the

research around knowledge dissemination, -applicability, and -accessibility (ibid., p.55), consultations with research partners and -participants also aimed at fostering long-term cooperation, e.g., with my research department¹¹ at the University of Bonn. The selection of research participants is another facet that requires critical evaluation. For this thesis, a mix of techniques was deployed, e.g., snowball/chain sampling, criterion sampling (selecting participants based on certain criteria), and opportunistic sampling (adapting selection flexibly to unexpected opportunities) (Stratford and Bradshaw, 2021, p.100). As useful as this mixed, spontaneous approach was, this unintentionally resulted in a male-dominated list of interviewees (especially of those in higher management/government positions; Annex 1) which I consider as an important limitation for transferability of results. Moreover, as subsequent QCA and coding of data are interpretative methods, subjectivity and pre-assumptions of the researcher together with selectivity can result in loss of information or distortion (Kuckartz, 2019).

These reflexivity aspects are accompanied by ethical research considerations. An example for this is the transparent communication with research participants concerning their consent and on aims and limitations of the project. This is crucial regarding the objective of avoiding harmful consequences for people involved (Catungal and Dowling, 2021, p.29). As the case study area represents such a politicized and sometimes even violent space with diverging interests and claims around water, I decided to anonymize all research participants and transcripts. Another ethical consideration revolves around the described power asymmetries surrounding knowledge production. These call for approaches that include African voices and research institutions and consider the vast implications of (colonial) history in African contexts through a decolonial lens (Mama, 2007; Ndlovu-Gatsheni, Seesemann and Vogt-William, 2022; Sultana, 2007). Thus, “to consider the coloniality of knowledge production processes, alongside the power relations involved in determining who has the epistemic authority” (Ndlovu-Gatsheni, Seesemann and Vogt-William, 2022, p.86) is a first step towards a much-needed epistemological shift. This was addressed as

¹¹ Department of Development Geography

effectively as possible through embedding the research in the existing University of Bonn – CETRAD cooperation frame and agreeing on *mutual* support efforts¹². Such reciprocal relationships are essential for abolishing one-sided, extractive practices without lasting cooperation in Global South contexts (Catungal and Dowling, 2021, p.23; Ndlovu-Gatsheni, Seesemann and Vogt-William, 2022). Another ethical consideration concerns stereotypical depictions, especially in African case studies that often highlight failures of development within ahistoric analyses (Ndlovu-Gatsheni, Seesemann and Vogt-William, 2022). Hence, including the colonial historicity of my case study and focusing on WRUAs as innovative approaches of water governance marks an important effort in countering this trend. However, interviewees were often also keen to highlight the challenges and shortcomings. Thus, the foci of this thesis were mostly developed based on empirical data and observations rather than pre-determined beforehand. This is why both, best practices and obstacles are analyzed.

To sum up, critical reflexivity within an approach that includes multi-faceted, situated knowledges is a crucial element of ethical research (Sultana, 2007). As power relations and positionalities are never static, research ethics need constant reconsideration throughout the working process, as “ethical research is produced through negotiated spaces and practices of reflexivity that is critical about issues of positionality and power relations at multiple scales” (ibid., p.375). Overall, the whole research process including its design and choice of methods have crucial ethical implications as they are framed by our worldviews and identities. Thus, as Mama (2007, p.23) summarizes, “ethical scholarship is socially responsible scholarship that supports freedom, not scholarship that is free from social responsibility”.

Digression: Research during multiple crises

During the 10-weeks field research stay, multiple crises and difficulties occurred in and around MKWR. First, presidential election campaigns commenced, with many mass gatherings and a politically tense atmosphere, especially in view of the 2007/08 post-

¹² As described, CETRAD offered valuable support throughout field work. To make this relationship more balanced, I contributed unpaid working support for daily CETRAD tasks as an intern.

election violence in Kenya (Dittmann and Ogolla, 2023). As it was recommended to stay away from election campaign events, planning of field visits at times became difficult. Partly in connection to this and mainly due to a severe drought in the Kenyan ASAL, violent conflict repeatedly emerged in or nearby selected research locations. Especially clashes between pastoralists around Archers Post and Isiolo (Figure 1 in chapter 2.1) made long-term planning of field visits impossible and required accompaniment by locally trusted people. At times, research in these areas was completely impossible and planned field trips in cooperation with CETRAD were cancelled due to security constraints. Moreover, for around four weeks, the region experienced a severe fuel shortage due to the state government failing to pay agreed subsidies to oil companies. This caused a long period during which almost all appointments were cancelled and only places within walking distance from Nanyuki could be reached. Additionally, during the first half of the stay, the failing rainy season had local effects in and around Nanyuki, leading to frequent water rationing. As this was also experienced first-hand by myself, it opened a new perspective on doing research on water-related issues as someone who never experienced water shortage himself. Even though I always remained in the privileged position of having excellent local advisors and not experiencing life-threatening situations myself, these crises still complicated the research process significantly and lead to numerous moments of frustration when conduct of my work was beyond my or research partners' control. As highlighted by many local people, the situation in the research area during my stay was a continuous and ubiquitous state of exception, thus possibly distorting some findings or (emotionalized) perceptions. However, feeling emotionally engaged during research – as experienced by myself at several instances – can also open up new avenues of a critically reflected and ethically responsible research process (Lund, 2012, p.101). Hence, these research experiences also gave an intense and close insight into the topic, enabled grasping the interconnectedness of water issues and triggered discussions with research partners, including reflective thoughts on positionality and own privileges.

5 Results – Challenges & Opportunities for Community-Based Water Governance

The following subchapters present results from the three-months field research in Kenya. Chapter 5.1 focuses on the interaction of water-related challenges and water governance and is thus related to the first sub-research question (SRQ 1, chapter 1.2). Findings on the relation of water governance with LUC are described in chapter 5.2 (SRQ 2). Linked to SRQ 3, chapter 5.3 presents results on transforming power relations in and around water governance. In chapter 5.4, case study-specific findings from Likii and Nanyuki WRUA are described, specifically on challenges and best practices. Special attention in this section is given to varying governance performances and other differences as well as similarities between the two WRUAs. These chapters are based on a QCA of interview transcripts and field notes in *MAXQDA* (chapter 4.2).

5.1 Current & Anticipated Challenges for Water Governance

Interviews and field visits demonstrated a vast array of challenges around water governance in the region, which have been categorized as depicted in the Code System (under code *Water governance challenges* in Annex 6). Some of these challenges are tangible and observable (e.g., degradation), whereas others are subjective and implicit. For the most frequently mentioned challenges and those that directly refer to the research questions, a more detailed description of findings is given, whereas other challenges are presented superficially due to the limited scope of this thesis. Overall, most frequently mentioned in interviews were challenges around *Degradation & Unsustainable practices*¹³ (97 coded segments), followed by *Political-institutional challenges & Overlapping mandates* (74 segments) and *Climate Change & -variability* (68 segments).

Degradation and unsustainable practices

Under this category, interviewees especially stressed the importance of anthropogenic attributions to water-related challenges: “The most important problems are man-made

¹³ Sub-section names in the result chapters are adopted from the *MAXQDA* codesystem for easier traceability.

which has [...] [contributed to] the natural problems” (KI4, sec¹⁴. 6)¹⁵. Degradation is repeatedly denoted as human-induced and secondarily exacerbated by climate change effects (chapter 6.1). Especially regarding more extensive farming and influx of population, human agency as the principal driver of catchment degradation is highlighted in most interviews. More specifically, interviewees foregrounded over-abstraction of water as a key problem. However, views on *who* is over-abstracting were remarkably divergent (chapter 6.1). Some blamed mostly commercial horticultures for it (e.g., KI2), others referred to unpermitted abstractors (e.g., KI16) and yet others to the growing number of small-scale farmers (e.g., KI4). All interviewees agreed that the growing number of all three groups impede sustainable water governance. Concerning agriculture, some noted that there are also effective countermeasures, like storing flood water and deploying drip irrigation (e.g., KI5 & KI14). Furthermore, over-abstraction was often seen as closely related to upstream-downstream conflict (e.g., KI1, KI8; chapters 5.3 & 6.3).

Encroachment of protected (riparian) zones and ecosystems is another frequently noted unsustainable practice (e.g., KI6, KI10, KI17-1). This was remarkably often described as linked to increasing small-scale farming activities (e.g., KI11) and to population growth/-influx in MKWR: “The greatest challenge that we have is the population growth and this population needs to find a livelihood. The land that we have, the arable land is not also growing the same level. So, people are encroaching into water towers” (KI17-1, sec. 3; chapter 6.1). Deforestation was quoted as another major degrading activity related to these trends (e.g., KI9, KI10). Also, overgrazing by pastoralists was said to have degrading and eroding effects and to be connected to increased conflict in MKWR sub-catchments (e.g., KI1, KI2, KI9). Moreover, sand harvesting and water pollution are other quoted degradation issues (e.g., KI6, KI8, KI11). An important unsustainable activity with yet highly uncertain effects on water resources seems to be the increased (illegal) drilling and use of boreholes, as highlighted in this quote from a local researcher: “We think that we have such a great

¹⁴ Sec. = section number in corresponding interview transcript (Annex 3; on extra CD). Excerpts from interview transcripts around all *directly* quoted passages are compiled in Annex 2.

¹⁵ KI = Key-informant

groundwater potential but maybe in the future we find out that we don't even have that groundwater" (KI16, sec. 6). An already observable trend related to this is a drastic decrease of borehole yields in the whole region (KI3, KI12, KI16).

Political-institutional challenges & Overlapping mandates

This second-most coded challenge category is located in the political frame and institutionalization of Kenyan water governance. Thus, such challenges were often articulated in relation to devolution and water sector reforms (chapter 2.3). Overlapping and unclear mandates were stated as a major challenge for water governance in almost all interviews. It was criticized that some agencies or actors do not stick to or are not even aware of their (newly) assigned roles after devolution. This repeatedly leads to conflict (KI3 & KI17-1), interferences (KI3 & KI4), weak monitoring (KI2), and generally to a chaotic system with too many actors involved (KI8, KI15, KI16). A chief ministerial officer summarized this as follows: „from a management and governance perspective, there are too many hands in the jar...it gets a bit confusing“ (KI8, sec. 18). At the same time, these institutional ambiguities were claimed to facilitate corruption (KI2) and to create erroneous expectations of water users that are not fulfilled (KI1). Moreover, competition over responsibilities, e.g., around monitoring, between WRUAs and government agencies was said to emerge from such unclear and overlapping mandate structures (KI4, KI8, KI16). This is also related to insufficient communication and coordination among water sector stakeholders, as a government official stated: „I think there is overlap in some instances because there are different laws managing the water sector and we work in silos“ (KI17-1, sec. 16).

Connected to overlapping mandates is the problem, that ownership and responsibility of water resources in Kenya often remains unclear (e.g., KI3, KI4, KI8, KI16). Thus, especially water users are often not aware of mandates and especially of resource stewardship (KI4 & KI16):

“if everyone owns this resource and feels that it is their responsibility to guard this resource, then we could not have major problems. [...] But sometimes you find that the communities don't own the resource. [unintelligible] [They say] ‘this water belongs to government, this water is for WRA’. They don't believe it is their water” (KI4, sec. 16).

This awareness deficiency was also seen as related to modes of governance and exclusion from them. Some interviewees stated that a formalization process of water governance in Kenya is leading to state interventions that often ignore (KI1, KI2, KI6; chapters 6.3 & 6.4) or even jeopardize (KI2, sec. 60) traditional or alternative, well-working governance forms.

Lack of funding and of operational support to WRUAs from government agencies (mostly the WRA) are other challenges, closely linked to devolution of mandates and responsibilities (e.g., KI2, KI6, KI8, KI10; chapters 5.4.2 & 6.1). This is shown by the following statement of a WRUA platform coordinator:

“unfortunately, all the WRUAs they are not getting any support from the government, the operational cost, that is very, very important. They have been recognizing the law in 2016 Water Act. But nothing has gone towards now them being operational [...] they are doing a very important job [...] but nobody pays them. So, you'll find voluntary people helping them to do that” (KI3, sec. 26).

Especially WRUA officials complained that they have to take over former government tasks in water governance but lacking capacities and funding support: “for any activity we require finances. [...] even now we are told that we are working on voluntary basis. So, that makes our work hard [...] we have all those challenges because we don't have finances” (KI10, sec. 34). Remarkably often, WRA was criticized by WRUA officials for delegating work without providing adequate support (e.g., KI4, KI8, KI10). An interviewed WRA official confirms these funding- and support challenges for the WRUAs and attributes these to drastically decreased funding from the Water Sector Trust Fund (WSTF) after around 2015/16 (KI7, sec. 6-8). This trend was also confirmed by several CETRAD researchers during discussions. Interestingly, the WRUAs seem to have very different relationships to the government:

“there are WRUAs that are doing so well with the WRA, [...] WRA goes there every month, collects water fees and they know, this is WRA. But there are WRUAs, WRUA members that [...] don't really see WRA as part of them but they see WRA as police. When they see they are coming, they run away” (KI16, sec. 16).

Yet, another challenge regarding politics is the political volatility and how changing governments affect CBWG to the detriment of continuity in agendas and planning, as a ministry officer stated (KI8, sec. 16). Related to this, spatial demarcations of

mandated water governance areas often overlap (e.g., administrative county boundaries for ministries vs. hydrological sub-catchment boundaries for WRUAs) and have changed over time, which further complicates mandates and responsibilities (KI8, sec. 36-38).

Overall, a *complex code configuration analysis* in *MAXQDA* confirmed that these political-institutional challenges and mandate overlaps are closely connected to water policy reforms and especially to political restructuring around devolution in Kenya (chapter 6.3). This *MAXQDA* analysis also showed that these political-institutional challenges are closely related to issues around insufficient accountability.

Climate change & -variability

Interestingly, despite clear notions in all interviews on the predominantly anthropogenic influence on water challenges, climate change effects remain the third most-often stated concern (chapter 6.1). Related to this is the frequently stated lack of awareness around climate change and its (anticipated) impacts on water governance in MKWR (e.g., KI2, KI3, KI13). Almost all interviewees expressed concerns around deviating and failing rainy seasons and decreased runoff from melting glaciers that together contribute to water scarcity. This was said to have dramatically changed local rivers' runoff characteristics from perennial to seasonal rivers, especially during the recent two decades (KI12). Moreover, (future) uncertainties around climate change impacts on the waterscape of MKWR become evident, adding another layer to described uncertainties around groundwater (KI3, KI4, KI7, KI13).

Environmental changes around water systems are also said to change livelihood practices and related land use (chapter 5.2; KI1, KI2, KI17-1). Specifically, a shift from rain-fed- to irrigated agriculture due to amplified seasonal variability was said to increase water demand and thus further complicates equitable water allocation (Figure 15 in Annex 7; e.g., KI4 & KI10; chapter 6.3). Moreover, many interviewees quoted short-term coping mechanisms, like installing water storage as main strategies to deal with changing climate conditions (chapter 6.4; KI8). Especially large water users like the flower farms were found to switch increasingly to groundwater extraction from boreholes – despite the described uncertainties – as an alternative to less reliable river runoff (KI12). The overall relation of climate change-induced shifts in water availability to LUC was also a major concern for the national government, as a National Land

Commission (NLC) official remarked (KI17-1).

Many interviewees generally agreed that climate change and increased hydro-meteorological variability accentuate and trigger tensions and conflict among water users (KI1, KI2, KI15). Such conflicts frequently emerge especially between pastoralists as they have to migrate into other than their traditional grazing areas (e.g., KI1 & KI2; chapter 4.3). Furthermore, tensions are increasing as during the more frequent droughts in the region, illegal river abstractions become more widespread (Figure 16 in Annex 7; e.g., KI16; own participant observations, 13.03. & 31.03.22 at Nanyuki river). Notably, some interview passages and especially informal discussions indicated that some people perceive themselves as passive victims to climate change or that climate change is among the most important causes for water scarcity in MKWR (field visits Nanyuki river, 28.04.22 & Likii river, 29.04.22; KI2, KI5, KI14). These narratives are critically discussed in chapter 6.1.

Overall, however, the majority of interviewees stated clearly that these climate-related challenges are secondary and mostly exacerbate the principal problems of direct anthropogenic interferences with the local environment (e.g., KI2, KI4, KI8, KI15, KI16).

Population dynamics

Population dynamics and recent trends are closely connected to LUC in MKWR. Thus, challenges related to these themes are described here only in brevity and in more detail in chapter 5.2. Several interviewees highlighted the challenges for water governance arising from above-average population growth due to a recent influx from other regions in MKWR (chapter 2.1; e.g., KI3, KI5, KI14, KI17-2). An NLC official even identified this as the major current challenge: “I think the biggest issue is [...] population pressure. So that you see, there is a lot of encroachment and also a lot of fragmentation of our land“ (KI17-2, sec. 8). This connection of population influx and degradation through encroachment of ecosystems is seen to adversely impact water bodies and governance (KI5, KI8, KI17-2). As a local researcher pointed out, these population trends in MKWR took off especially since Kenyan devolution started around 2010 (KI16). Several informants saw these population trends as a key explanation for increased water consumption in the region. An abstraction survey by Likii WRUA confirmed a sharp increase of river water abstractors (KI11). Concurrently, the local water supplier NAWASCO forecasts an expected increase of daily water use within

their area from today roughly 17,000-18,000 m³/day to around 40,000 m³/day by the year 2030 (KI14). This already pushes them to explore alternative water sourcing areas in the *Aberdares* mountain range (south-west of MKWR) for their supply network (KI8 & KI14). An official of Nanyuki WRUA even attributed the drying-up of the river to population growth: “our river Nanyuki dried up and it was the first time for that river to dry since we know it. [...] It dried up because the population has grown tremendously“ (KI10, sec. 10). However, as another interviewee highlighted, such explanations often tend to be neo-Malthusian and thus oversimplifying the socio-natural complexities behind water scarcity, which requires critical discussion (chapter 6.1; KI6).

In sum, this chapter demonstrates how interconnected multi-scalar water governance challenges are. Interestingly, a meta-analysis of transcripts showed that the majority of challenges were described by informants who are not involved in the WRUAs. The interviewed WRUA officials remarkably seldom mentioned challenges. Moreover, none of the three interviewed WRUA officials raised power asymmetries as a problem (chapter 5.3). As many governance challenges, like informal water use, were mostly attributed to Nanyuki WRUA (chapters 5.4 & 5.4.2), it was interesting to see that particularly their chairman (KI10) spoke most openly and frequently about these challenges within the group of interviewed WRUA officials.

5.2 Land Use Change and Water Governance

Many of the aforementioned challenges closely relate to LUC and are thus only partly covered in chapter 5.1. This sub-chapter presents findings on recent and anticipated land use dynamics and how they relate to water governance in MKWR.

Recent land rush & fragmentation of land

Concerning the recent land rush, findings from literature (chapter 2.2) and interview statements align well. Various interviewees stated that recently, acquisitions of and investments in land are increasing drastically in MKWR (e.g., KI2, KI4, KI12, KI16; Figure 3 in chapter 2.2). This leads to amplified competition over land-based resources. Especially, traditional pastoral migration routes are fragmented, as acquired land parcels are often fenced-off (KI2). This, together with prolonged droughts, leads to more pastoralists moving into other areas which is especially observable in the mountain forests around Mount Kenya as of late (Figure 7). As a result, conflicts among pastoral groups and local farmers occur (KI2, KI4, KI7, KI9; own observations; chapter 5.1).



Figure 7: Pastoralists drive their livestock herds more frequently into the forests of Mount Kenya during drought in the lowlands

Source: Own photo, 2022

The linkages between the land rush in MKWR, (upstream-downstream) conflict, and pastoral livelihood changes show the negative consequences of these LUC for water governance and clearly indicate that especially pastoralists are adversely affected by these land use trends (e.g., KI1, KI2, KI8, KI15). Recent land investments were attributed partly to the availability of high potential agricultural land in MKWR as in contrast to more densely populated districts around Nairobi (KI12 & KI16). Land acquisitions were also seen as contributing to the described encroachment of protected river zones (chapter 5.1; KI2 & KI17-2). As land parcels for sale are mostly sub-divided for higher profits – sometimes to plots smaller than $\frac{1}{8}$ of an acre – landscapes are increasingly fragmented, which was considered to complicate water governance throughout the interviews. This trend can be observed since Kenyan

independence and especially since devolution (e.g., KI16; chapter 2.2). Land fragmentation is also closely related to the described population trends in the region (chapter 5.1).

In the land rush debate, agricultural land transformations also form a crucial part. Agricultural production in MKWR was generally seen as drastically increasing, both small-scale and commercial large-scale (e.g., KI2, KI3, KI8, KI12; Figure 1 in chapter 2.1). However, statements of informants diverged sharply concerning the impact of these two agricultural farming types on water governance, which is discussed in more detail in chapter 6.1. The land use change-water nexus becomes especially evident around these agricultural trends, as subdivisions often occur on previously unused- or ranch land that is then transformed, for instance, into irrigated agricultural plots. This has considerably contributed to increased water use, which was seen as an overarching result of LUC (KI3, KI10, KI15). This demonstrates the close linkage of LUC with water governance issues.

Anticipated LUC and the importance of land- & water use planning

LUC was generally anticipated to further increase pressure on water resources (e.g., KI1 & KI2). For instance, future climatic changes were expected to increase competition over land and water resources in MKWR through amplifying various LUC processes, like around increasing irrigated agriculture (KI2; chapter 5.1; Figure 15 in Annex 7). Furthermore, large-scale development schemes like LAPSSSET¹⁶ and generally national development visions were expected to contribute to evictions of disadvantaged groups without secure land tenure and to push them to migrate towards Mount Kenya (Figure 7; KI1 & KI2). Another important dynamic regarding anticipated developments are the increasing speculations around land deals (e.g., KI2 & KI3). These often provoke conflicts as much of this land is fenced-off but left idle (chapter 5.1). Another interesting component of these land speculations is that investors seem to be especially interested in acquiring land with direct water access (KI3), thus adding

¹⁶ The *Lamu Port South Sudan Ethiopia Transport* corridor is a multi-project infrastructure development scheme. It partly lies or is envisioned in MKWR in northern Laikipia and bordering areas with Isiolo, Samburu, and Marsabit counties, among others. For more details see Müller-Mahn, Mkuu and Kioko (2021).

another layer of complexity to WRUAs' water governance.

Furthermore, a CETRAD governance expert saw contradicting and overlapping Kenyan policies on land- and water resources, that engender regulatory confusion, as another problem: "we have several acts governing one thing which for real becomes a challenge" (KI16, sec. 12). Especially WRUAs' influence in governing land use dynamics seems to be impaired by this. Hence, they were perceived as handicapped when it comes to dealing with LUC (KI15 & KI16).

As all interviewees agreed that land use dynamics in MKWR shape and challenge water governance in multiple ways, also potential solutions were often seen in the field of land governance and -policy (e.g., KI2, KI15, KI17-2). Several informants stated that through addressing land issues and planning, many other issues (e.g., around water) could be tackled effectively, as land use (change) constitutes a cross-cutting element in current and anticipated challenges (e.g., KI2 & KI15). Specifically, interviewees called for more participatory land use planning to complement CBWG and highlighted the importance of "county spatial plans" for jointly alleviating land- and resource-based problems (KI2, KI4, KI16, KI17-1). An official from the NLC stated, that there is some change observable towards such thematically comprehensive policies as for instance, the national land use policy also integrates water issues (KI17-1). However, it was seen as problematic that land- and resource governance are regularly affected by the volatility of surrounding politics, depending on regional and national government development priorities and -visions (KI2). This often complicates long-term planning and sustainable project cycles, as a government official confirmed (KI8). Informants not only talked about potential future strategies around land, but also about already existing solutions. For instance, around Mount Kenya, many farmers and pastoralists developed informal cooperation mechanisms, such as farmers letting pastoralists use their land for grazing in exchange for certain products (KI2). In view of this, the importance of government support without dominating negotiations was stressed: „The government should be an enabler. [...] Such that they create room for communities to do dialogue" (KI2, sec. 60). However, another informant stated that government actors should intervene more proactively in case of land use conflicts (KI3). The debate on the states' role is scrutinized in chapter 6.1.

Overall, a *MAXQDA code relation analysis* proved noticeable links between recent

LUC and population dynamics, land fragmentation, environmental degradation, and conflict in MKWR, which shows the importance of considering LUC in CBWG contexts.

5.3 Power Relations Inside and Around WRUAs

Analyzing power relations gives important insights into the social dynamics and contentions around water governance in MKWR. Notwithstanding, they are also among the most subjective and perceptual issues and it is therefore challenging to get a comprehensive overview on them. Hence, the aim of this chapter is to outline a selection of recurring issues around power asymmetries and -dynamics for understanding how WRUAs' work is embedded in social complexity and subjectivity. Power relations between water agencies and WRUAs were already described in chapter 5.1 (i.e. challenges of overlapping mandates) and are thus here not included again.

Upstream-downstream relations

The transformation of power constellations was perceived as a serious challenge to sustainable and inclusive CBWG (e.g., KI1, KI2, KI5, KI8, KI16). Especially upstream-downstream asymmetries were often quoted as an unfair socio-spatial differentiation of water accessibility and -use that contributes to conflict (e.g., KI1, KI2, KI6, KI12; chapter 5.1): “a lot of water is tapped by the upstream users. So, the downstream users really have little water [...]. [T]hat's why you'll always have conflicts, that's why you'll always have communities fighting each other” (KI1, sec. 18). There seems to be a consensus that recent development trends upstream around Mount Kenya negatively affect water availability in the lowlands. Hence, the upstream-downstream issue is essentially also a political problem around development agendas. However, around upstream-downstream water use asymmetries, the described “blame game” was evident once more (KI8, sec. 54; chapter 5.1). Water users downstream often tended to see commercial and large-scale horticultures as more powerful, especially concerning their influence in some of the WRUAs (KI1, KI2, KI8; CETRAD expert discussion, 17.10.22). Moreover, increasing numbers of unpermitted water abstractors together with the described rapid surge of irrigated small-scale farming upstream are considered to reconfigure hydrosocial relations, mostly to the detriment of downstream water users (KI2, KI5, KI8, KI12). From these results, it becomes clear that overall,

unequal upstream-downstream power relations are dynamically changing in the context of described land use- and development processes. For more detailed findings on different facets of upstream-downstream water struggles, see chapters 5.1, 6.1 & 6.3.

Power asymmetries inside and around WRUAs

Some interviewees were concerned about a small number of powerful stakeholders and elites that are able to influence agenda-setting and decision-making inside WRUAs (KI2 & KI3). Informants saw the “big players”, i.e., the commercial horticulture farms and other companies, as especially influential within WRUAs, as they crucially support professionalization, for instance, of Likii WRUA (KI3; chapter 5.4). Another issue revolves around representation in the WRUAs, as explained by a WRUA network coordinator: “if it is a community water project, they [CWPs] are represented [as one] in that WRUA. And then you find an individual farm is one [...] is regarded as one, which is very wrong in terms of representation of the number of people. So that is skewed in a way” (KI3, sec. 40). A flower farm water manager, however, stated quite the opposite, perceiving small farmers and the CWPs to be relatively more powerful, as they represent the majority of WRUA members (KI13, sec. 20,22-24). Overall, asymmetric relations were not only seen among water users but essentially also within the management level of some WRUAs, thus crucially limiting accountability and transparency of WRUAs (e.g., KI3 & KI16). Nanyuki WRUA was repeatedly stated as an example of such issues (e.g., KI3 & KI4; chapter 5.4.2). In general, unequal gender representation within WRUAs’ management boards constitutes an important limitation (KI6, sec. 12).

Concerning relations between WRUA members and non-members in the respective sub-catchment, some perceived WRUA members as possessing a relatively better power position with regard to participation and water access (e.g., KI13). This was seen as related to the marginalization and exclusion of some groups (e.g., indigenous pastoralists) from water governance vis-à-vis WRUA members, large landowners and commercial horticultures (KI1, KI2, KI15). The following quote by an NGO officer summarizes this view: “I would really describe it [CBWG] as non-inclusive. Because it's a key structure where key-decisions are made. [...] [C]ommunities that are affected have minimal representation in the key committees” (KI1, sec. 10). This was also

repeatedly raised during informal discussions with Samburu pastoralists during community visits. Another dimension of unequal relations between WRUA members and non-members crystallized around the perceived unfair relation between paying WRUA members and unpermitted, non-member abstractors, anchored in the voluntary setup of WRUAs. This is exemplified by a quote from a flower farm manager whose firm is a WRUA member:

“people who [are] users of the river but they are not members of the WRUA. [...] that for us we feel like we are paying a burden for somebody else. Because the small pump users usually abstract [...] more than what we abstract during a day. Because we have a defined limit on the permit” (KI13, sec. 20).

The importance of small-scale, unpermitted abstractors was also highlighted in several CETRAD expert debates and is further described in chapter 5.2 and critically evaluated in chapter 6.1.

Overall, a *code relations matrix* in MAXQDA showed that *power asymmetries* and *power relations inside WRUAs* are remarkably often coded together at the same transcript segment (25 overlapping passages). This highlights the importance of scrutinizing the above issues around power asymmetries within WRUAs. At the same time, WRUAs and informal community negotiation mechanisms were said to help alleviate conflict and mistrust emerging from broader (upstream-downstream) power asymmetries (e.g., KI1 & KI5). This was also supported by findings on the importance of WRUAs for aligning power relations and facilitating conflict resolution (chapter 5.4.1). Moreover, WRUA monitoring and project approval competencies have had important influence on transforming power relations as even non-members can be reported to WRA in order to sanction unpermitted water use (KI11). Nevertheless, this chapter shows how contentious power relations inside WRUAs and in upstream-downstream systems shape water governance and vice versa (chapter 6.3). Detailed findings on power relations in the case study WRUAs are presented below.

5.4 Likii & Nanyuki WRUA – Neighboring, yet “two different worlds”

This chapter analyzes differences and commonalities between Likii and Nanyuki WRUA before describing best practices and WRUA-specific challenges in the sub-chapters. Throughout interviews and field visits, the differences in management

performance and professionalization between the two WRUAs became obvious (e.g., KI3, KI4, KI9, KI14). Especially Likii WRUA was often stated as an exemplary association regarding participation, professionalization, and transparent as well as proactive leadership (e.g., KI3 & KI4). Nanyuki WRUA seems to be rather the opposite case, as many named management issues, elite capture, and corruption, among others, as considerable challenges to the WRUAs' success (KI3, KI4, KI5, KI7, KI10). A water governance specialist from an NGO highlighted especially these management-related challenges in Nanyuki WRUA:

„Nanyuki [WRUA] is like a one-man show, Nanyuki is poorly managed because it has a very poor leadership, [...] I don't think they are democratic because the decision is made by a few elites or a few opinionated people who have power and control within the WRUA. [...] They do not have motivation to move, they are lagging behind because of the conflicts they have” (KI4, sec. 38).

Even though Nanyuki WRUA was among the first WRUAs in Kenya and used to constitute a role model for the setup of new associations (KI10), the described issues seem to have considerably impaired operations and acquaintance of new project funds. This resulted in some water users abandoning the WRUA or not even becoming members in the first place (KI4). The coordinator of a WRUA network platform highlighted the exemplary role that Likii WRUA fulfills while – according to him - „the Nanyuki WRUA is nothing, it's a joke” (KI3, sec. 42). Despite notions of commercial farms having too much control in decision-making of Likii WRUA (KI3, sec. 44 & 46), various interviewees – including officials from both WRUAs (KI9 & KI10) – emphasized that the two associations are quite contrary. According to a WRUA specialist, looking at the two WRUAs “is like comparing heaven and hell. Likii [WRUA] is heaven, Nanyuki [WRUA] is hell” (KI4, sec. 36) or „It's like day and night. Likii is well-structured and organized” (KI14, sec. 30) as another informant coined it. Thus, these case studies prove helpful in acquiring a differentiated view on inter- and intra-WRUA differences. With these differences in view, some called for more knowledge exchange and capacity transfer between the WRUAs for alleviating such diverging sub-catchment management performances (KI7). However, funding and government support for this was said to be lacking and WRUA exchange platforms sometimes not (yet) functional (KI11). This leads to many WRUAs „[m]ostly [...] working in isolation” from each other, as the Likii WRUA manager described (KI11, sec. 32). Hence, the Nanyuki- and Likii

WRUA case demonstrates the need for joint and collaborative efforts in the WRUA sector in Kenya (chapter 6.4). Nevertheless, comprehensive water rationing schemes (Figure 13 in Annex 7) during drought and river use monitoring through scouts are mechanisms that are adopted equally in both WRUAs and were reported to work generally well (KI9, KI10, KI11).

Especially the differences between the two neighboring WRUAs were the basis for recurring tensions and accusations. Here, the Likii WRUA chairman complained about a spill-over effect of problems from the Nanyuki river catchment into Likii sub-catchment (KI9). Conversely, the chairman and the river scout of Nanyuki WRUA accused Likii WRUA of not monitoring and controlling their river enough (KI10; field visit with Nanyuki river scout, 28.04.22). As with the described broader challenges, tendencies towards a blame game between Nanyuki and Likii WRUA were evident.

5.4.1 WRUA Best-Practices

As described in chapter 2.3.2, WRUAs take over important tasks in Kenyan water governance in the face of multiple pressures. Best practices of WRUAs in terms of management procedures, water infrastructure support, awareness-creation, participation, conflict resolution, and adaptation are presented below.

WRUA management practices & Enhanced water infrastructure

An advantage of WRUAs are their clear rules on abstraction – especially during drought – which enhance transparency among water users (KI12). Especially commercial farms are strictly regulated through water intakes that only allow river water use during flood flow to decrease pressure on these waterbodies and to enhance upstream-downstream equity (Figure 8; KI5 & KI12). Particularly WRUA officials and

flower farm managers frequently highlighted this minimized river dependency of the big farms, as they are still often blamed first when rivers fall dry (chapter 5.2).



Figure 8: One of several water storage reservoirs (~50,000 m³ capacity) inside a commercial flower farm in MKWR during the dry season

Source: Own photo, 2022



Figure 9: A river water intake for CWPs inside Nanyuki WRUA

Source: Own photo, 2022

Also, the water consumption of member CWPs inside WRUAs can be regulated and monitored effectively through common river water intakes (Figure 9), which most WRUAs have (KI9, KI11, field visit Nanyuki WRUA scout, 28.04.22). In general, it was often quoted that WRUAs have considerable competencies that enable them to effectively engage in monitoring activities on sub-catchment level and to report illegal use and non-compliance to WRA for sanctioning (KI9 & KI11). As a result, WRUAs have a positive effect on decreasing illegal water activities together

with WRA, based on cross-institutional information sharing (KI12).

Many interviews and informal discussions with small-scale farmers inside the WRUAs showcased enhanced water infrastructure and -accessibility for WRUA members. This was seen as related to WRUAs' success in securing funding and new projects with donors (KI14, Nanyuki WRUA scout field visit, 28.04.22; Likii WRUA field visit, 25.04.22; R4D conference field trip, 04.05.22). These infrastructural advancements were especially reported around drip irrigation and water storage (see below).

Accountability, awareness & conflict resolution

Although often not a material outcome, increased accountability and awareness around water resources among WRUA members was highlighted as a key achievement (Figure 10; e.g., KI3, KI10, KI11, KI13). Water use permits and their surveillance by WRUAs were said to make water users more aware of the (shared) value of the resource, incentivize saving water and to support transparency among



Figure 10: A warning sign inside Likii WRUA to raise awareness for river protection

Source: Own photo, 2022

water users (KI9 & KI13).

This is aligned with educational offers by WRUAs on consequences of water use and on more efficient water use techniques (KI11), thus crucially supporting upstream-downstream awareness.

The rationing schemes inside WRUAs during dry-spells are an important element of this and were highly accepted among WRUA members (Figure 13 in Annex 7; KI7, KI10, KI11). Especially WRUA officials seemed aware of basin-wide consequences of upstream water use and WRUAs' influence on that, as exemplified by the following quote of the Likii WRUA manager: "we are enforcing that rationing program and making sure that we have enough water flowing to meet the ecological demands even



Figure 11: A degraded riparian zone under protection for rehabilitation inside Nanyuki WRUA

Source: Own photo, 2022

downstream. If the members fail to do that, we're likely to be faced with a bigger crisis, like [with] the downstream users" (KI11, sec. 12). As WRUAs normally employ river scouts who frequently patrol along rivers and talk to people, awareness is created through them on the importance of ecological limits and of catchment protection (Figure 11; KI9, KI10; field visit Nanyuki WRUA scout, 28.04.22 & Likii WRUA field visit, 29.04.22).

Conflict resolution as a key task of WRUAs was linked to the above regulation- and transparency measures. Especially commercial farmers and WRUA officials quoted advancements in this field as transparency on water use increased, mostly in Likii WRUA (KI3, KI10, KI12). This was summarized by a flower farm manager:

"through the WRUA, we have been able to [...] take care of the river and [...] solve water conflicts [...]. And through that we are kind of able to continue getting our water from the river in an amicable way where everyone also is involved and at the end of the day the conflicts about water are very, very much reduced" (KI5, sec. 22).

Nevertheless, mostly small-scale farmers were sceptic on progress in this regard and pointed out persisting conflicts between water users (e.g., Likii WRUA field visit, 25.04.22).

Enhanced participation & cooperation

In the frame of Kenyan devolution, enhancing participation is a key priority (chapter 2.3) that seems to be facilitated by WRUAs through various means. One is through the management committee of a WRUA, which normally includes members from all river zones of the sub-catchment, thus ensuring better representation in decision-making (KI10). Another means is the involvement of communities in the planning and design of water projects through participatory needs assessments (KI11). This is giving many water users a feeling of being heard through the WRUAs (KI5, KI7, various field visits). Together with increasing awareness, this ultimately fosters identification with the WRUA and the water resources, leading to more effective water governance (chapter 6.4; KI14). However, the quality of participation seems to differ among the case study WRUAs, as Likii WRUA was described as being much more democratic and participatory in its procedures than Nanyuki WRUA (KI4 & KI5).

WRUAs, as collective user associations were seen to also catalyze cooperation efforts

in water governance (e.g., KI3, KI9, KI10, KI11, KI12). One cooperation dimension is between different WRUAs as some of them work together in so-called *regional clusters* for knowledge exchange – e.g., for consulting on coherent water rationing schemes during drought (Figure 13 in Annex 7; KI3 & KI9). Moreover, WRUAs also seem to fulfill their bridging function between government agencies like WRA and local water users in both directions (KI13; Figure 4 in chapter 2.3.1). Especially a WRA representative and WRUA officials highlighted the strong collaborations between WRA and WRUAs on information sharing, operations, and sanctioning (KI7, KI9, KI13) – despite critique on this from other informants (e.g., KI3; chapter 5.1). The WRA official even saw WRUAs as their “eyes on the ground” (KI7, sec. 12). Importantly, WRUAs also effectively advance cooperation with donor agencies and NGOs, which facilitates the implementation of water projects and training sites (e.g., KI9).

Adaptation to water-related challenges

In the face of the multiplicity of challenges, WRUAs also offer important mechanisms for mitigating risks and increasing resilience in CBWG (e.g., KI1, KI3, KI4, KI7). Here, the WRUAs give priority to rainwater- and groundwater harvesting and storage for drier periods, as mentioned by all sides (Figure 8). Additionally, the transition to highly efficient drip-irrigation agriculture is supported by WRUAs as well as agricultural education through innovative model farming projects (KI4, KI7, KI11, KI14). However, not many water users seem to be able to afford such technical enhancements of their water infrastructure, as was discussed with informal water abstractors. On another note, as a long-term measure, WRUAs contribute to ecosystem restoration and -protection measures that aim to enhance water availability (KI1, KI3, various field visits). Another innovation for adapting to increased uncertainties is the establishment of river early warning systems in some WRUAs (KI7 & KI11):

“the WRUAs have moved from just crying that there is drought. When they find the levels in the rivers are going low, they give some [...] alert [...]. They inform the people that now, when it rains, [...] that this is the time to store water for use during the [drier times]” (KI7, sec. 50).

Overall, WRUAs thus seem to crucially contribute to reducing water-related vulnerabilities and encourage future-oriented measures in CBWG. Especially Likii WRUA was often stated as an example of the described WRUA best-practices and

project successes (e.g., KI3, KI4, KI5). Related to participatory and transparent governance, Likii WRUA seems to perform remarkably well, thus also leading to strong identification and commitment of members within the WRUA and to decreased inter-user conflict (KI3 & KI5; chapter 6.4). These impressions were supported by findings from the *MAXQDA* analysis, showing that Nanyuki WRUA was coded together with best-practice codes at only 12 text segments, while Likii WRUA showed 40 intersecting code segments.

5.4.2 WRUA-specific Challenges

Chapter 5.1 described overarching challenges around water governance, while chapters 5.2 and 5.3 introduced issues concerning land use transformation and power relations. Building on these previous findings, this chapter describes the most important WRUA-specific challenges.

Lacking WRUA capacity and monitoring deficiencies

Throughout the interviews, the inability of WRUAs to fulfill their mandated tasks due to lacking capacity and insufficient funding was denounced from all sides. This was perceived as resulting in insufficient monitoring of water abstractions and non-compliance of water users (e.g., KI1, KI2, KI3, KI10). Especially insufficient government support was said to adversely affect WRUA capacities (KI2, KI3, KI10). Interviewees thus often highlighted the need for more trainings and financial support to WRUAs by the state (e.g., KI10 & KI11) which is illustrated by this statement: “for the WRUAs there is lack of capacity. Because they are poorly funded. So, they have no capacity to be able even to monitor the river” (KI2, sec. 18). The inability to properly monitor rivers was especially highlighted regarding Nanyuki WRUA (KI4 & KI10). As observed in the field, this facilitates unpermitted abstractions along Nanyuki river (Figure 16 in Annex 7), which was said to be less strictly controlled than Likii river (participant observation Nanyuki river, 13.03.22 & KI9). Thus, lacking WRUA capacity and insufficient funding seems to strongly correlate with the inability to curb illegal abstractions and environmental degradation (KI2 & KI4). Overall, WRUAs were hence seen to be dependent on external donor/NGO funding and training support to compensate for inadequate state assistance (KI4; NGO field visit in Kajjado, 10.05.22). Trainings from NGOs and institutes, like CETRAD, to the WRUAs thus often focus on

basic capacity building and raising awareness on their mandates and responsibilities within the Kenyan water sector (KI15 & KI16). However, not only WRUAs are to be scrutinized regarding lacking capacities as some noted that also state authorities like WRA are overwhelmed concerning enforcement and sanctioning of unauthorized activities (KI3, KI8, KI16).

WRUA funding & Voluntary membership

As mentioned, lacking WRUA capacity is closely linked to funding issues. Even though WRUAs have extensive competencies based on Kenyan water policy (chapter 2.3.2), a combination of insufficient funding and their voluntary membership setup renders many WRUAs to not be fully operational in their daily tasks (KI3, KI4, KI6, KI16). Some interviewees highlighted that state-funding of WRUAs through the WSTF remarkably decreased since the 2016 Water Act and that some WRUAs did not get any funding due to the lack of successful water projects (KI3, KI7, KI8). A WRA official described the resulting vicious circle around WRUA funding and -activities as follows: „it started very well but after some time, the resources coming from the Trust Fund went...the funding was greatly reduced, such that very few WRUAs would receive resources. So, now they would not implement their activities” (KI7, sec. 6). Especially Nanyuki WRUA did not receive major funding in recent years, thus not being able to realize water projects, which again decreases chances of WSTF funding (KI4; Nanyuki WRUA field visit, 28.04.22). Consequently, in interviews, Nanyuki WRUA officials and scouts complained more about insufficient funding and resulting management challenges than Likii WRUA staff. Notably, interviewed government officials were the ones that most emphatically raised the issue of decreased state funding of the Kenyan water sector in general and of WRUAs in particular (KI7 & KI8). A result of insufficient WRUA funding seems to be the increasing reliance of WRUAs on profit-oriented commercial members – with problematic outcomes regarding power relations (chapter 5.3; KI3). Related to described capacity issues, the voluntariness of WRUA membership was another debated issue. Interviewees called for a clearer definition of WRUA membership and raising awareness on its benefits (KI6, KI7, KI16), while some pointed out that voluntary commitment is not enough at all: „we have [...] one very important gap and if you look at the way a WRUA is described, it is [...] a voluntary association. That kills everything. [...] So, somebody who is a riparian farmer can refuse to become

a member of a WRUA” (KI3, sec. 30). Even though WRUAs entail various benefits and innovations for water governance, findings show that their outreach and abilities are clearly limited through funding-, capacity-, and membership issues.

Illegal water abstractions

As almost all interviewees and especially the WRUA officials highlighted, illegal activities pose a major challenge to the achievement of WRUA objectives. This was directly connected to the described weak monitoring and enforcement capacities of WRUAs and WRA, respectively (KI2 & KI8). Especially increased small-scale irrigated farming as part of the recent land rush constitutes a large proportion of unpermitted water use inside WRUA areas (KI3 & KI4; chapter 5.2). Another contributing factor is the lacking awareness of upstream-downstream consequences of unregulated water abstractions (KI6). A WRA official described the incorporation of such water users into the WRUAs as a key challenge under the voluntary membership frame but could not showcase any state strategy to tackle this (KI7). However, the issue is more complex than people simply refusing to be paying WRUA members or refusing to have a permit, as for the latter a 90 days water storage and land titles need to be proved (KI10). Many of the informally interviewed unpermitted abstractors explained that they cannot afford to fulfill these regulatory requirements by WRA for obtaining a permit and that even as some of them want to become WRUA members and obtain a permission, they are not able to do so (participant observation and field visits, 31.03.22). Despite sanctions, they stated that they will keep abstracting illegally as their abstraction- and water selling business remains lucrative and as permit and WRUA membership fees are too high for them to afford. During field visits and interviews, it became clear that unpermitted abstractions are especially concerning inside Nanyuki WRUA and even more so during dry spells, when river levels are already low (KI16). A very problematic issue, fueling these abstraction businesses, is the fact that some households and even entire town districts are not connected to piped water systems, thus relying on these informal water deliveries (participant observation and field visits, 31.03.22). Hence, informal water use in MKWR was also seen by informants as a political problem of exclusion and unequal development (chapter 6.3). Overall, unpermitted activities around water seem to persistently undermine WRUA activities, albeit to varying extent

between the WRUA sub-catchments. This problem partly links to corruption and elite capture, which is described below.

Corruption & Elite capture

Interviewees from all sides highlighted that underlying corruption adversely affects governance processes in Kenya and water governance in particular (e.g., KI2, KI3, KI5, KI7, KI10). The described informal activities were said to be facilitated through corruption, as responsible persons in water governance know about it: “they shared a few coins and things like that. So, someone is looking aside as all these things are happening” (KI8, sec. 28; cf. KI8 & KI16). Moreover, it was also linked to the lack of financial resources of WRUAs. Specifically, the resulting poorly paid or unpaid positions inside WRUAs were said to incentivize corrupt practices for additional income of individuals (KI3). Generally, the financially weak position of WRUAs seems to open doors for dependency on powerful members and (political) elites, and thus for corruption (KI1; chapter 5.3). According to a WRUA platform coordinator, this was the case in the early stages of Likii WRUA (KI3) and is nowadays especially a problem in the chronically underfunded Nanyuki WRUA, as several informants pointed out (e.g., KI3, KI4, KI5, KI7). Moreover, also communities inside the WRUAs were said to often face the problem of elite capture as a few powerful community members dominate internal decision-making and representation in the WRUA (KI2). Thus, the question of *who* is represented in WRUAs through the community projects is important. Confirming the cross-scalar aspects of corruption and elite capture, several informants stated that it is not only entailed in communities and WRUAs, but also in government agencies (e.g., KI2, KI3, KI7, KI16).

6 Discussion – Governing Water in a Transforming Hydrosocial Space

In the following chapters, a selection of most important findings from field research (chapter 5) is discussed together with insights from literature and linked to the conceptual frame (chapter 3; Figure 14 in Annex 7). The first three discussion chapters are aligned with the SRQs (chapter 1.2) and include corresponding interim conclusions. In chapter 6.4, potential ways forward for CBWG within the hydrosocial arena of MKWR are discussed.

6.1 Diverging Perceptions on Water Governance Challenges

Literature review and interview analysis showed that WRUAs are embedded into a variety of interrelated socio-environmental challenges. Especially challenges related to population dynamics, LUC and land fragmentation are significantly shaping and transforming WRUA operations (e.g., KI2, KI3, KI12; Letai and Lind, 2013; Mwaura *et al.*, 2020). These dynamics and underlying societal- and political processes increase pressure on water resources and thus compromise (future) water security (KI2, KI8; Bond, 2014). This shows that socio-political processes and physical-environmental changes are co-constitutive of MKWR as a hydrosocial territory (Boelens *et al.*, 2016; Loftus, 2015). Moreover, these challenges are influential on multiple scales (chapter 3.3). This finding is especially important as scalar constellations of water struggles have been transforming since Kenyan devolution (chapter 6.3; Dittmann and Ogolla, 2023; Green, 2016; McCord *et al.*, 2017). Even though best-practices of WRUAs (chapter 5.4.1) are partly in line with recommended water-related adaptations in mountain regions (IPCC, 2022, p.2284) and contribute to alleviating some of the challenges through participatory governance tools, the lack of WRUAs' capacity, insufficient funding and loosely defined membership of water users weaken their ability to tackle these challenges (KI3, KI4, KI10; Ifejika Speranza *et al.*, 2018; Mwaura *et al.*, 2020; Ngigi and Busolo, 2019). Subsequently, some more specific thematic areas of water challenges are discussed.

Climatic influences are described throughout interviews as exacerbating other water-related challenges in the region (e.g., KI3, KI5, KI8). However, a perceptual divide crystallizes regarding the impact of climatic changes on water issues in MKWR. While most interviewees acknowledged local human practices, like over-abstraction, as the main problem, a *complex code configuration analysis* showed that many interviewees linked *climate change & -variability* with *water scarcity*, thus making the impression of externalizing root causes of water issues. Related explanations around water scarcity often tend to be environmentally-deterministic and can obstruct critical engagement with underlying power asymmetries (Loftus, 2015, p.351). Furthermore, repeated notions of water users and communities seeing themselves as (passive) victims to climate change emerged around this debate (KI2, KI5, KI14; chapter 5.1). This obscures local anthropogenic harmful practices and neglects opportunities for mitigation and adaptation. A local researcher explains this as follows:

“They [communities] say 'climate change is an act of god.' So, there is nothing they are able to do [...]. So, awareness-raising is one of the biggest issues we need to do. To embrace communities that this is as a result of human activities, [...] of our persistent use of land and the emissions that are causing all these problems” (KI2, sec. 66).

The described perceptions around climate change can hinder progress towards more sustainable water use practices and thus also influence material outcomes of water governance. Such “climatizations” of explaining resource scarcity issues are problematic as they overlook the multitude of socially complex factors and tend to employ simplistic and environmentally deterministic explanations that fit certain socio-political narratives (Daoust and Selby, 2022). Even as studies indicate that MKWR is adversely impacted by climate change through less frequent seasonal rainfalls (Dell’Angelo *et al.*, 2016; Kogo, Kumar and Koech, 2021), the attributability of water problems to this aspect remains a debated issue and requires further investigation. In chapters 5.1 and 5.2, various water governance challenges in relation to population dynamics and LUC in MKWR were described. Population growth and -influx in MKWR was often highlighted in interviews as “the biggest issue” (KI17-2, sec. 8), with many other challenges like degradation, over-abstraction and ultimately water scarcity as consequences of this (e.g., KI3, KI4, KI8, KI10). However, causal linkages from population dynamics to resource scarcity require critical scrutiny, as they risk reiterating neo-Malthusian arguments (KI6, sec. 24). Such arguments are an over-simplification of environmental struggles and especially often deployed in African contexts (Daoust and Selby, 2022, p.24). Here, the *Global South Political Ecology* frame of this thesis is once more helpful for uncovering such linear and over-simplistic reasoning that was occasionally observed in discussions and interviews (Bryant, 1998; Loftus, 2015). This is also where the *hydrosocial cycle* contributes valuable perspectives as it criticizes unidirectional causations around water. From this point of view, challenges around LUC and population dynamics in MKWR and related discourses can be seen as in a cyclical and co-constitutive relationship with WRUAs’ water governance (Figure 6 in chapter 3.3; Linton and Budds, 2014; Swyngedouw, 2009).

The relationship between government agencies and WRUAs is another field of challenges where disruptions manifest. The repeatedly mentioned problem of

insufficient funding and subsequent capacity issues of WRUAs (chapters 5.1 & 5.4.2) seems to constitute a downward spiral. As a WRA official admitted, governmental WRUA funding through the WSTF went down from around 2015/2016 (KI7, sec. 6-8), importantly compromising their ability to fulfill water management mandates (e.g., KI10). Discussions with CETRAD scientists and literature review confirmed this and linked decreased WSTF funding of water governance with the overall deteriorating economic situation of Kenya. Interestingly, as acquiring continuous WSTF funding requires successful water projects of WRUAs, there seems to be a multilayered vicious cycle of decreased funding of the water sector, lacking WRUA capacity, and fewer (successful) water projects by the WRUAs (CETRAD discussions, 06.05. & 17.10.22; Ifejika Speranza *et al.*, 2018; Mwaura *et al.*, 2020; Njora and Yilmaz, 2021). Around funding and WRUA-state relations, there is an additional perceptual divide around how much support a WRUA should receive from the state and yet, how independent it should be as a self-governed CB initiative (KI6; Richards and Syallow, 2018). Thus, the role of WRUAs and their relation to state agencies is subject to different perspectives, social realities, and perceptions. This influences governance processes and -visions and is thus constitutive of struggles between different *governmentalities* of water, especially against the background of transformations of the Kenyan water sector (chapter 2.3; KI4, KI6, Ahlborg and Nightingale, 2018; Boelens, 2014; Li, 2007). An example from this case study is that WRUA managers and -members sometimes did not see themselves as the new owners of the water resources after devolution but as dependent on government agencies' support. This is especially evident in the case of Nanyuki WRUA (KI10, sec. 40).

In general, the observed "blame game" around water insecurities (chapters 5.1, 5.3 & 5.4) is an overarching facet worth discussing. Such contested and diverging claims and narratives can be seen as a manifestation of clashing subjectivities and perceptions around water use in MKWR (Ifejika Speranza *et al.*, 2018; Mwaura *et al.*, 2020). In the tradition of a PE perspective, these diverging views and individual explanations are of special importance for grasping underlying social processes of CBWG (Johnston, 2003). Uncovering these clashing subjectivities also helps exploring water scarcity issues in MKWR beyond described environmentally deterministic explanations that see water insecurity as a linear and direct outcome of hydro-meteorological conditions (Loftus, 2015). Overall, the majority of challenges around

water governance can be attributed to a multiplicity of social processes and -transformations across scales and stakeholders. In particular, however, it was interesting to see that pastoral groups are often said to be most adversely affected from upstream use and resulting water scarcity while simultaneously being blamed for invading WRUAs' waterscapes (e.g., KI2, KI14). This shows that integrating mobile communities, like pastoralists, into CBWG constitutes a major unresolved challenge as "their transitory use of a large area of the landscape represents a scalar mismatch with the governance system" (Green, 2016, p.93). Exclusion of pastoralists is in general described as one of the major CBNRM shortcomings (Robinson *et al.*, 2021). Most interviewees and literature were quite clear that pastoralists are pre-eminently most vulnerable to land use- and water dynamics and *not* the main drivers of these issues (chapter 2.2; KI1, KI2, field visits to Samburu community, 17.04.22; Bond, 2014; Letai, 2011; Letai and Lind, 2013). Another striking ambiguity of the "blame game" around water scarcity revolved around agriculture in MKWR (chapter 5.2). One side – mostly small-scale farmers and members of the CWP – attributed water scarcity issues to increased commercial farming in the area (e.g., KI2, KI12; Likii WRUA field visit, 29.04.22). The majority of interviewees – mostly WRUA officials, WRUA experts and CETRAD researchers – and the study of Lanari *et al.* (2018) saw the tremendous increase in small-scale farming as the main contributor to water scarcity (KI3, KI4, KI8, KI11; discussion with CETRAD director, 17.10.22; Lanari *et al.*, 2018, p.120-123). As observed during flower farm visits, commercial farms have invested massively into more efficient drip irrigation and water storage from boreholes and rainwater harvesting (Figure 2 in chapter 2.1 & Figure 8 in chapter 5.4.1), thus making themselves mostly independent of river abstractions (field visits, 08.04. & 26.04.22; KI5, KI12, KI13). This was also described by Lanari *et al.* (2018, p.120): "river abstractions by commercial horticulture farms have likely contributed less to the depletion of [...] rivers than initially assumed". Interestingly, the transition to minimal water consumption from rivers by commercial farms seems essentially driven by WRUA regulations. These are restricting large farms (through special river intakes) to only abstract water above a certain flood-flow level of the river (KI5 & KI12; flower farm field visits, 08.04. & 26.04.22). A WRUA platform coordinator further explained that roughly 85 % of all river water abstractions in the region are from small-scale farms (KI3, sec. 68). Thus, most of the evidence suggests that rather an uncontrolled spread of small-scale farming with

inefficient river water irrigation presents the major cumulative contribution to water scarcity and resulting upstream-downstream conflicts (KI4, KI5, KI11, KI12; discussion with CETRAD director, 17.10.22). Even as direct river water dependency of large horticultures seems to have decreased, the overall transformation of farming practices (small- and large-scale) and its effect on water resources remains a contentious issue. This, together with uncertainties around increased groundwater use, requires additional research. Linked to the conceptual frame of this research, the described debate exemplified once more that water governance is embedded in powerful social interactions and that water scarcity discourses are often in parts socially constructed. As observed, these discourses are thus sometimes less about actual scarcity (chapter 3.2; Bond, 2014; Sasidevan and Santha, 2018), but rather an expression of underlying socio-spatial conflict lines around perceived inequalities in water resource struggles.

Interim conclusion

The diverging claims and perceptions around water-related challenges offered valuable insights into how hydrological and social processes continuously interact in (re-)shaping governance in MKWR (SRQ 1, chapter 1.2; Linton and Budds, 2014; Swyngedouw, 2009). Conflicting notions around water challenges are an expression of continuous power plays around identity, roles on differently perceived scales, and hierarchies (KI3, KI8; Boelens, 2014; Neumann, 2015; Swyngedouw, 2004). The externalization of some water-related issues to climatic variabilities or to certain other stakeholders as well as strategically employing narratives around water scarcity are important social practices in the politicized hydrosocial environment of MKWR (Bond, 2014; Bryant, 1998). This also shows that major contention emerges specifically around divergent *perceptions* of inequality in the region (Dell'Angelo *et al.*, 2016, p.103). Moreover, the described contention around WRUA funding is found to be part of a bigger problem around devolution of power and responsibilities in the Kenyan water sector. The interviews confirmed that lacking WRUA capacity and funding can be attributed to the devolution of responsibilities to WRUAs without providing necessary support for this transition (e.g. KI3, KI15; Dittmann and Ogolla, 2023; Ngigi and Busolo, 2019). It seems that this restructuring process has created confusion and dispute around new mandates, roles, and responsibilities (chapters 2.3, 5.1 & 6.3). Especially the empowerment of local- and regional-scale actors in decision-making

and their extended responsibilities are not always accompanied by sufficient funding, awareness-creation, and capacity-building (e.g., KI3, KI10, KI15; Cheeseman, Lynch and Willis, 2016; Green, 2016). The restructuring of mandates and roles through devolution thus forms the basis for subsequent perceptual divides around scales of responsibility and – as I argue – ultimately for divergent recriminations around water-related challenges. Overall, differently perceived roles, divergent blames over water issues, and uncertainties around future challenges translate into conflicting practices and thus shape the heterogeneous waterscapes around WRUAs.

6.2 The Land Question: Decisive for Successful Water Governance?

The described land use dynamics in MKWR (chapters 2.2 & 5.2) affect both sub-catchments of Likii- and Nanyuki WRUA (Figure 5 in chapter 2.3.2), wherein especially the ongoing land rush causes socio-environmental transformations on various scales. As became clear from interviews, land fragmentation through sub-division of land parcels for sale is a major problem. This is closely linked to watershed degradation and generally obstructs effective CBWG (chapter 5.2; KI2, KI4, KI17-2; Letai and Lind, 2013; Ondigo, Kebwaro and Kavoo, 2018). These LUC dynamics and associated increased pressure on land- and water resources can be seen as constitutive elements of MKWR as a contested water governance space (chapter 6.1). More specifically, water governance in MKWR in the context of LUC forms a highly dynamic land-water-society hybrid. This hybrid – as conceptualized by the *hydrosocial cycle* – is embedded into circular processes and practices of environmental- and land use change, transformations of social relations (e.g., inside WRUAs), and discursive constructions around development visions in MKWR (Figure 6 in chapter 3.3; Boelens, 2014; Letai, 2018; Linton and Budds, 2014). The majority of interviewees saw LUC and related societal transformations as decisive for the success of water governance. Hence, I argue that WRUA operations are transformed and shaped by these land use processes, and vice versa, WRUA management practices can also influence land use practices within the sub-catchments. An example of the latter are WRUA's efforts in protecting riverbanks from encroachment through fencing-off these areas and creating awareness on harmful land use practices (Figure 10 & 11 in chapter 5.4.1); KI11, field visits Nanyuki & Likii WRUA, 13.03.22 & 25.04.22).

Another observation on LUC and water governance is the change of agricultural practices. As described, much of the newly sub-divided land that was either idle or rain-fed agricultural land before, is now transformed into irrigated farming areas (chapters 2.1 & 5.2; Mwaura *et al.*, 2020). This is an example of how a local scale transformation of land- and water use practices can have cross-scalar implications beyond clearly defined administrative levels: It leads to an impairment of downstream- and groundwater availability and an exaggeration of socially differentiated water access asymmetries (chapters 3.3 & 5.2; KI1, KI2, KI12; Green, 2016; IPCC, 2022, p.556; Lanari *et al.*, 2018; Ulrich *et al.*, 2012). Another example of cross-scalar LUC linkages are commercial flower farms as local scale water users that are embedded in national and global value chains. Their increasing presence in MKWR has not only shaped local WRUAs but also regional scale perceptions around water scarcity, as seen in downstream pastoral communities (KI2; field visit to Samburu community, 17.04.22; Lanari *et al.*, 2018). Overall, water users downstream (i.e. mostly pastoralists) tend to be disadvantaged through decreasing water availability while upstream users are often beneficiaries of the described land use trends (Bond, 2014; Lesrima, Nyamasyo and Kiemo, 2021; Letai, 2014). These LUC-related challenges concerning altered water use practices, however, seem to affect WRUAs differently. As chapters 5.1 and 5.4.2 showed, especially Nanyuki WRUA struggles with dynamically transforming land use actor constellations when it comes to monitoring and protecting its sub-catchment (KI4, field visits Nanyuki WRUA, 13.03. & 28.04.22). Overall, current and anticipated land use dynamics and resulting continuously increasing pressure on water resources are a major strain of concern. Especially anticipated LUC and altered water use practices constitute an important source of uncertainty around water governance (e.g., KI3, KI16; Ondigo, Kebwaro and Kavoo, 2018; Scoones and Stirling, 2020). Specifically, increased groundwater abstractions from changed farming practices and other LUC pose severe future uncertainties and challenges (chapter 5.1), which is important as groundwater contributions often cushion low-runoff periods of rivers (IPCC, 2022, p.2280). Further, potentially adverse transformations of local scale water governance through national scale development visions, like the LAPSSET corridor (chapter 5.2), show once more that LUC and water-related challenges are entangled across spatial and temporal scales. With this in view, the importance of land use planning as a cross-cutting approach to mitigate land- and

resource-based degradation and related conflicts is evident (KI15, KI16, KI17-1; Land use planning conference, 04.05.22). An NLC official summarized this as follows: “many people have not seen the importance of planning. People want to see how they can provide for water but they have not seen the link and the value of land use planning in safeguarding the water resources” (KI17-1, sec. 35). Thus, water challenges related to land use dynamics in MKWR were seen to be tackled most effectively through a holistic planning approach. This needs to be complemented by awareness-creation across scales among stakeholder groups on the land use-water governance nexus and on (spatially decoupled) implications of land use practices for water availability (KI17-1; discussion with CETRAD director, 17.10.22). Still, different *governmentalities* based on certain development- and future visions are especially salient in these land use planning processes and subject to volatile political agendas (Li, 2007). This was exemplified by divergent views between strengthening the states’ role in land use planning (KI3, KI17-1) versus allowing for more independent processes of CB land governance (KI2). These underlying land use *governmentalities* ultimately also shape and transform water governance and surrounding social processes of participation and exclusion (Ahlborg and Nightingale, 2018; Li, 2007; Robertson, 2015).

Interim conclusion

LUC is essentially driven by socio-political dynamics in MKWR and at the same time transforms hydrosocial relations. Historical-colonial as well as recent and anticipated LUC processes are altogether shaping and reconfiguring water governance (e.g., KI2; Kiteme and Gikonyo, 2002; Lesrima, Nyamasyo and Kiemo, 2021; Letai and Lind, 2013). Through LUC and surrounding political processes like devolution, scalar conceptions of the region are transformed. This restructuring, together with historical land injustices, contributes to water struggles around responsibilities and development visions in which WRUA operations are embedded (chapters 5.2 & 6.3; Bassett, 2017; Cheeseman, Lynch and Willis, 2016). The analyzed case study WRUAs both seem to lack the capacity to keep track of land- and water use dynamics within their sub-catchments (e.g., KI2, KI10, Nanyuki and Likii WRUA field visits, 28.04. & 29.04.22). Likii and Nanyuki WRUA are two very distinct cases in this regard. Especially Nanyuki WRUA seemed overwhelmed in governing illegal use and degradation related to LUC (chapters 5.1 & 5.4.2). While frequent river monitoring and water abstractor inventories

are important WRUA tools to counter this problem, a comprehensive, political framework to govern the transforming land-water nexus is lacking (KI16, KI17-1; Boone, 2012; Manji, 2014).

Overall, LUC dynamics as a cross-cutting issue around Mount Kenya are decisive for hydrosocial governance trajectories (chapter 5.2). Referring to SRQ 2, especially LUC related to intensified irrigated agriculture and LUC that amplify upstream-downstream inequalities reconfigure WRUAs' water governance. Simultaneously, these LUC are conditioned by human-induced water scarcity and water governance practices. Hence, the relation of land use dynamics to CBWG materializes in a circular and ever dynamic land-water-society metabolism (chapter 3.3; Linton and Budds, 2014, p.174; Swyngedouw, 2004).

6.3 Transforming Power Relations in a Polycentric Governance System

From chapters 2.3 and 5.3, it becomes clear that CBWG is embedded in dynamic hydrosocial actor- and power constellations in MKWR. Kenyan devolution (chapter 2.3) and restructurations of the water sector through the 2002 and 2016 Water Acts significantly transformed power relations around water (Cheeseman, Lynch and Willis, 2016; McCord *et al.*, 2017). This was informed by a *governmentality* targeting the localization of decision-making, ownership, and management of water resources (Baldwin *et al.*, 2018; Ngigi and Busolo, 2019; Wang, 2015). Devolution and a changing resource *governmentality* also restructured scalar configurations of actors and their roles and responsibilities. Conflicting mandate perceptions of water actors showed how this restructuring process produced contested spheres of interaction and responsibilities in water governance across scales. This consequently advantaged some groups while adversely affecting others (chapters 3.1 & 5.3; Green, 2016, p.97). Based on interviews and literature, I argue that especially county governments and WRUA members are better off in the restructured water space of MKWR, while people outside the WRUAs and those with insecure land tenure, i.e. mainly pastoralists downstream, are disadvantaged (chapters 5.3 & 5.4.2; e.g., KI1, KI2; Cheeseman, Lynch and Willis, 2016; Letai and Lind, 2013; Richards and Syallow, 2018). The formalization and devolution of water governance through WRUAs is compromising on the involvement of non-members and especially of poor people in their sub-catchments

(Blaikie, 2006; Richards, 2019; field visit Likii WRUA, 29.04.22). The study by Mwaura *et al.* (2021, p.8-10) hereto found that poverty rates among those outside the WRUAs are remarkably higher than those of WRUA members. Overall, winners and losers are not produced on clearly distinguishable levels but within a socially complex local-to-regional scalar hybrid. Water users that are lacking financial resources and land rights to fulfill membership- or permit requirements are often denounced as “illegal users”. This is very problematic, as such discursive categorizations within the hydrosocial arena of MKWR reinforce constitutive power asymmetries between two classes: “formal” and “illegal” water users (e.g., KI7, KI11, KI16; Ahlborg and Nightingale, 2018, p.388). These persistent power asymmetries inside WRUA sub-catchments severely challenge a functional CBWG (Dell’Angelo *et al.*, 2016, p.111-113).

However, WRUAs also yield considerable success stories regarding power relations through enhancing water access and achieving more equal water distribution among member groups. Especially river monitoring and transparent water rationing schemes inside the WRUAs (Figure 13 in Annex 7) reportedly contribute to harmonizing inequalities and thus effectively mitigate water user conflicts (KI5, KI9, KI11, KI12; Lanari *et al.*, 2018; Richards and Syallow, 2018). Even though empirical evidence shows persisting power asymmetries, WRUAs are important institutions for enhancing participation in water management and giving members the opportunity to voice concerns and ideas. Together with catalyzing coordination of water use and creating awareness, this crucially contributes to harmonizing power relations in CBWG (KI3, KI5, KI7, KI9, KI12; Baldwin *et al.*, 2018; McCord *et al.*, 2017).

Linking to the conceptual frame of the thesis, the establishment of WRUAs can be seen as a powerful hydrosocial territorialization that legitimates and encourages specific knowledge forms and practices (Boelens *et al.*, 2016). This can be problematic, as Kenyan devolution and establishment of WRUAs are mainly driven by state actors, while many WRUAs are persistently dependent on government support (chapter 6.1). Not only asymmetric knowledge production but also elite capture are power-related problems of some WRUAs and CBNRM in general (Blaikie, 2006; Richards and Syallow, 2018). Thus, through (de-)legitimizations of certain knowledges and practices, WRUAs condition power relations and social systems that influence access to and exclusion from water resources within the *hydrosocial cycle* (Boelens,

2014; Boelens *et al.*, 2016; Linton and Budds, 2014). Asymmetric knowledge prioritization is generally a problem of many CBNRM projects:

“local knowledge has not been able to negotiate on an equal basis with official scientific knowledge, but has instead been shaped by what is offered by outsiders, who make strategic choices about which ‘local knowledge’ is heard and conformable to their scientifically given environmental goal” (Blaikie, 2006, p.1944).

A concrete example for the power-laden prioritization of certain knowledges is that WRUA officials mentioned almost exclusively technical solutions to the described water governance challenges (e.g., KI9 & KI10). Such discourses – especially around upstream-downstream water problems – are questionable as root causes of described water issues are socially far more complex and require socio-political strategies beyond technocratic paradigms. Moreover, the interplay between power around knowledge and situated agency power in access and entitlements to water resources produces contradictory outcomes regarding empowerment and exclusion of communities (see first paragraph of this chapter; Ahlborg and Nightingale, 2018, p.391f.; KI2, KI6, KI16). However, *the community* in CBNRM is a constructed homogenization that risks overlooking complex social constellations and heterogeneous perspectives, values, and visions of participatory governance (Armitage, 2005; Richards and Syallow, 2018; Robinson *et al.*, 2021). Blaikie (2006, p.1955) summarized this critique on CB governance: “it is in the implementation of CBNRM that communities characterized by wide social and environmental variability seem to be regularized, reduced, manualized, replicated, and inserted into program targets”. Besides homogenization of communities, also the resource in question is often defined unidimensional in CBNRM (Blaikie, 2006). The *hydrosocial cycle* picks up on this line of thought, as the concept considers the importance of different values and cultural meanings around water (Linton and Budds, 2014). Thus, the homogeneous baseline design of WRUAs in Kenya seems to partly disregard social complexities and -nuances inside sub-catchments. Dell’ Angelo *et al.* (2016, p.111) hereto remark that “the move to more participatory water governance [might] have replaced one institutionally locked-in system with another”. Conceptual homogenizations in CBNRM, alongside intra-group inequalities and marginalization might also partly explain the persistence of multi-dimensional exclusionary and socially

asymmetric practices in CBWG (Blaikie, 2006; Dell'Angelo *et al.*, 2016).

Another facet of transforming power constellations revolves around LUC and the described related dynamics in water governance (chapter 6.2). Especially resulting upstream-downstream water use asymmetries can be seen as a manifestation of unequal power relations, with disadvantaged groups, like indigenous pastoralists, standing in between conventional administrative units of national, county- and regional levels. Such human-induced upstream-downstream water-related power inequalities further pose elevated conflict potential and are often exacerbated by climate change (Bond, 2014; Catley, Lind and Scoones, 2013; Green, 2016; IPCC, 2022, p.2280). Upstream-downstream asymmetries within the LUC scenario of MKWR are an example of how power is (re-)produced in socio-natural interactions and how it is placed in networks (e.g., WRUAs), materiality (e.g., unequally distributed water infrastructures) and (development) discourses (Ahlborg and Nightingale, 2018). As these upstream-downstream power asymmetries around changes in water- and land use are linked to political development agendas, I argue that potential solutions need to be elaborated on higher political levels, in addition to WRUAs. In this effort, it is important that state actors incorporate locally working informal and traditional *governmentalities* – like from pastoral communities – and that institutional and mandate structures are disentangled and simplified (KI2, sec. 60; Kogo, Kumar and Koech, 2021; Richards and Syallow, 2018; chapter 5.1).

Interim conclusion

Through a multi-perspective and critical approach, this chapter illustrated how dynamic power constellations across scales are shaping water governance and vice versa (SRQ 3). The establishment of WRUAs as well as the broader devolution of power marked a transformation towards localized resource governance in Kenya. In this chapter, as well as in chapters 5.3 and 6.2, it became obvious that scalar reconfigurations of governance, together with transformative change of land- and water use imply a restructuring of hydrosocial relations (Dittmann and Ogolla, 2023; McCord *et al.*, 2017). Issues around upstream-downstream asymmetries, power relations inside and between WRUAs, and conflicting mandates reveal the importance of political transformations through devolution and the 2002 and 2016 Water Act for reconfiguring power constellations (KI4, KI6, KI16; Ahlborg and Nightingale, 2018;

Bond, 2014; Loftus, 2015). This hydro-political reorientation seems to empower water decision-making and -management on sub-catchment- and county scales, while cross-scalar inequalities persist (e.g., KI2 & KI16; Dell'Angelo *et al.*, 2016). Based on the empirical findings, I argue that unequal relations are problematic 1) inside WRUAs, 2) in upstream-downstream constellations, and 3) between WRUA members on the one side, and non-members as well as unpermitted users on the other side. Moreover, the cases of Nanyuki and Likii WRUA (chapter 5.4) showcased that also between WRUAs, remarkable relative power differences and resulting distinct governance capacities and -performances emerge. Nevertheless, WRUAs alleviate upstream-downstream water user conflicts through awareness-creation, supporting efficient water use, and coordinating CWP to sustain sufficient river runoff (KI3, KI11, KI13; Ifejika Speranza *et al.*, 2018; Jawuoro *et al.*, 2017; Kiteme and Gikonyo, 2002; McCord *et al.*, 2017). In the context of amplified hydrosocial inequalities on multiple scales, WRUAs are embedded in a circular process of being shaped through these power-related challenges (chapters 5.3 & 5.4.2) and at the same time forging and reconfiguring power relations themselves (SRQ 3, chapter 1.2; KI3, KI5, KI11; Mwaura *et al.*, 2020; Richards and Syallow, 2018). Thus, even though WRUAs have partly harmonized hydrosocial inequalities, conversely, they are themselves shaped and modified by power-laden constellations and processes.

6.4 Moving from “the same every year” towards Resilient Governance?

Many of the described water governance challenges in MKWR are cyclically occurring with similar, repeated efforts to counter them (KI8). When interviewees were asked on potential solutions, many stated technical and rather short-term coping strategies, like increasing water storage capacity (e.g., KI5, KI10, KI12; chapter 6.3). However, I argue that such technocratic *governmentalities* are often socially exclusive and do not address the anthropogenic root causes of water issues in MKWR. Loftus (2015, p.351) hereto critically notes:

“The surprising ability of the rich to be able to access water supplies when the poor are unable is portrayed as a technical issue, to be solved through engineering solutions rather than through a transformation of the choreographies of power out of which such unjust distributions emerge”.

The prioritization of technical measures in WRUAs is especially contradictory in the light of one original objective of CBNRM approaches to overcome western-led, technocratic paradigms in resource governance (Armitage, 2005, p.703). Hence, more transformative adaptations of livelihoods, unsustainable water- and land use practices and of broader political agendas are needed to tackle these social inequalities for achieving resilient¹⁷ water resource governance (KI1, KI2, KI9, KI14; Kogo, Kumar and Koech, 2021). Overall, inclusive knowledge production is a crucial field of action for incorporating existing local and traditional governance mechanisms and most affected and vulnerable people into CBWG (IPCC, 2022, p.658; Richards and Syallow, 2018). As the above example of technocratic solutions and knowledge shows, I argue that certain knowledge prioritizations and resulting (de-)legitimizations around water governance remain important fields for critical inquiry. As one panelist at the Humanitarian Congress in Berlin coined it in her speech, “people closest to the problem often are also closest to their solution” (Humanitarian Congress Berlin (own conference notes), 13.10.22). The interviews and field visits showed that this is especially true for CBWG and related land use planning in the transforming landscape around Mount Kenya (chapter 6.2).

Securing and enhancing financial sustainability of WRUAs, as well as capacity-building are other urgently needed measures (KI7, KI10; Richards and Syallow, 2018; Ulrich *et al.*, 2012). The funding aspect is especially important, as this affects operational capability of WRUAs and, at the same time, their dependency on powerful members and external donors. Hence, secured and reliable funding can prevent elite capture and corruption in WRUAs (KI7, discussion with CETRAD director, 17.10.22; Njora and Yilmaz, 2021; Richards and Syallow, 2018, p.1). Interestingly, interviewed government officials from the ministry or the WRA especially highlighted the need for increasing state-funding to WRUAs (e.g., KI7 & KI8). Furthermore, enhanced capacity-building measures can support WRUAs and other institutions to fulfill the vast array of devolved

¹⁷ *Resilience* is understood as reorganizing under certain pressures in a way that overcomes the *status quo* and aims at *building back better*. The IPCC defines such transformative resilience as “The capacity of social, economic and environmental systems to cope with a hazardous [...] trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation” (IPCC, 2019, p.44).

governance mandates and responsibilities.

Another crucial field of action for more resilient water governance is around coordination and cooperation between government agencies, WRUAs, and water users. Only if efforts are combined and if institutions enable learning from each other, then water governance can be enhanced and transformed to better accommodate the multiplicity of hydrosocial challenges (chapter 5.4; KI3, KI7; Baldwin *et al.*, 2018; IPCC, 2022, p.659; McCord *et al.*, 2017). As shown with the case study, especially the cooperative learning among WRUAs needs to be promoted (KI7). Existing WRUA network platforms and information-sharing, as well as coordination between WRUAs and WRA (chapter 5.4.1), are promising approaches.

The analysis further showed that the success of WRUAs determines members' personal identification with the association. During field visits, successful WRUAs like Likii made the impression of having more committed and engaged members as they were more aware of WRUA membership benefits (KI5, KI7, KI8). The contrasting performance between Likii- and Nanyuki WRUA showed that members' engagement together with a pro-active, innovative and motivated management appear to be essential ingredients for the success of WRUA operations (KI4, KI6, KI12, KI13). This needs to be complemented by strengthening government efforts to align different policies (especially land use- and water policies), planning procedures, and knowledges within the land-water-society nexus (KI17-1). Through this, better coordination among water institutions and -actors across scales could be enabled.

Furthermore, awareness-creation on different scales and across social groups is found to be a cross-cutting potential future improvement for water governance. Specifically, persistent upstream-downstream asymmetries in water availability and vulnerability highlight the need for substantial awareness of how water use and LUC upstream affects downstream communities (KI2, KI6; Gichuki and Liniger, 2001; McCord *et al.*, 2017). Moreover, accountability in the context of newly assigned mandates after devolution and especially on local/WRUA ownership of water resources needs to be assured (KI3, KI8, KI16; Mwaura *et al.*, 2021; Obeng-Odoom, 2012). This can help to increase accountability on water resources, alleviate negative effects from overlapping mandates, and moderate the described "blame game" around water challenges. However, the following quote from a WRUA chairman exemplifies that some WRUAs don't see themselves as the new owners of the resource after devolution but that they

rather have the impression of executing government tasks: “right now, we are the people on the ground on their [government] behalf. And you see they need to support us fully because it is *their* work that we are doing” (KI10, sec. 40, *own emphasis*). The quote shows that the essential vision of what constitutes bottom-up CB mechanisms has not been translated adequately to some actors and institutions. This is linked to the task of creating awareness on what WRUAs do and potential benefits of membership (like measurable positive effects of WRUA membership on household welfare (Mwaura *et al.*, 2020, p.17)). This would also incentivize more communities to become members and thus can alleviate challenges arising from the voluntary setup of WRUAs (chapter 5.4.2). Awareness-creation methods in general and incorporating early warning data into decision-making specifically – as seen in Likii WRUA – are important means for shifting from reactive to anticipatory and resilient water governance (KI7, KI17-1, CETRAD field visit, 27.04.22). Moreover, awareness-creation in water governance can enhance stakeholders’ understanding of water-related uncertainties – e.g., around groundwater in MKWR (chapter 5.1) – as *not* being an external factor but rather embedded into social practices (Scoones and Stirling, 2020). As opposed to errant assumptions that uncertainties can be eliminated, this helps integrating uncertainties as an inherent part of socio-environmental constellations into resilient and anticipatory water governance. The integration of uncertainties into the governance design, together with strengthening adaptive capacities to tackle changing socio-environmental conditions are key determinants for successful CBWG (Armitage, 2005). Overall, this chapter shows various potential areas for transformative change towards a resilient water governance that is better prepared, inclusive and flexible to accommodate the diverse hydrosocial realities of MKWR.

7 Conclusion

The main research question “***How is community-based water governance in MKWR embedded into land use dynamics, power constellations, and multiple uncertainties?***” served as a guiding thread for this thesis. The three SRQs thematically apportioned the main question into foci on 1) (perceived) water governance challenges (chapters 2.1, 5.1, 5.4.2 & 6.1), 2) the interaction of land use

dynamics with water governance (chapters 2.2, 5.2 & 6.2), and 3) transforming hydrosocial power relations in MKWR (chapters 2.3, 5.3, 5.4 & 6.3).

The conceptual approach of a multi-scalar *hydrosocial cycle* perspective within an overarching frame of PE proved conducive for addressing these research areas. It enabled a multi-perspective, non-deterministic, and critical view to uncover social complexities, dynamic power relations, and multi-dimensional struggles around participation and exclusion in water governance (Ahlborg and Nightingale, 2018; Bond, 2014; Linton and Budds, 2014; Loftus, 2015). This crucially supported understanding reciprocal linkages between changing socio-political conditions, LUC, and perceptual divides around water governance in MKWR. Regarding the identified research gaps on WRUAs embeddedness in socio-political land use- and power dynamics, perceptual divides, and on inter-WRUA differences (chapter 1.1), this open-ended approach enabled a nuanced analysis and valuable insights. The critical social-constructivist lens encouraged an in-depth and contextual exploration of interview material to uncover simplistic, linear, and environmentally deterministic explanations and claims in water resource struggles (Bryant, 1998; Johnston, 2003). Especially in debates on challenges to water governance (chapters 5.1 & 6.1), this conceptual perspective contributed to a comprehensive analysis. Furthermore, a *scaled* approach to analyzing hydrosocial constellations shed light on the social construction of space, power, and agency in the transforming Kenyan water sector (Green, 2016; Neumann, 2015). Specifically, dynamics and transformations through devolution and LUC were approached by means of a scalar lens. Lastly, the focus on underlying *governmentalities* enabled understanding the multiplicity of rationales, knowledges, and future visions within CBWG (Ahlborg and Nightingale, 2018; Li, 2007; Wang, 2015). Thus, especially the heterogeneous social negotiation processes and governance modes between WRUAs were highlighted (chapters 2.3.2, 5.4, 6.4). However, the PE frame of this thesis also entailed limitations, as the institutional restructurations of the water sector could not be fully explained from this perspective and would require more specialized concepts around policy-making and institutional analysis.

The application of qualitative key-informant interviews, participant observations, and field visits proved to be useful methods for translating the conceptual ambitions into research practice (chapters 4.1 & 4.2). However, my own positionality has inevitably

impacted the research design, data collection (e.g., conduct of interviewees towards myself), and interpretation of results (chapter 4.3). Thus, presented research findings must be seen as shaped by different subjectivities of and social relations between research participants, -partners, and myself (Catungal and Dowling, 2021; Sultana, 2007).

Regarding the first SRQ “***What are (perceived) water-related challenges and uncertainties in MKWR and how do they interact with community-based water governance?***”, the analysis showed that water governance is shaped by multi-layered challenges from different fields (chapters 5.1, 5.4.2, and 6.1):

One overarching concern is watershed degradation and unsustainable water use practices (chapter 5.1). Results demonstrate that these challenges are inextricably linked to anthropogenic activities in MKWR and especially to LUC (chapter 5.2). More specifically, increasing numbers of river water abstractions from informal- and small-scale farming activities are found to most severely challenge WRUAs and basin-wide water governance (KI4, KI11; Lesrima, Nyamasyo and Kiemo, 2021; Ulrich *et al.*, 2012). Thus, population dynamics and LUC in MKWR – especially since Kenyan devolution – are closely linked to unsustainable water use. However, the identified “blame game” on responsibilities demonstrates how subjective perceptions, claims, and narratives are co-constitutive factors of hydrosocial struggles in and around WRUAs (KI2 & KI8; Bond, 2014; Mwaura *et al.*, 2020; Figure 6 in chapter 3.3). Perceptual and discursive divides interact with water governance in the region – specifically around WRUA operations and upstream-downstream relations. They are thus a component in the contested hydrosocial space of MKWR around material- and discursive struggles. The *hydrosocial cycle* focus proved especially useful to illustrate how degradation, LUC, and water scarcity interact with water governance in “a socio-natural process by which water and society make and remake each other over space and time” (Linton and Budds, 2014, p.170).

The political-institutional frame of CBWG proved as another challenge interacting with water governance. Especially overlapping and unclear mandates in the restructured Kenyan water sector were identified to impair awareness, clarification of responsibilities, and local stewardship of water (chapters 5.1 & 6.3). I argue that these problematic outcomes of scalar reconfigurations after devolution can be linked to

divergent (challenge) perceptions. This has very concrete implications for WRUAs, as their capacity to act essentially builds on awareness and commitment of members and management alike (Gichuki and Liniger, 2001; McCord *et al.*, 2017). Moreover, insufficient government funding and capacity support were found to adversely impact WRUAs, especially as they are mandated to fulfill various new tasks and responsibilities after devolution (chapter 5.4.2; KI2, KI3, KI10; Ifejika Speranza *et al.*, 2018; Njora and Yilmaz, 2021). Here, different underlying *governmentalities* revolve around the desired relationship between WRUAs and the Kenyan state (chapter 6.1). Moreover, climate change debates are often seen as strategically employed for externalizing water problems that are first and foremost caused by local- and regional-scale anthropogenic practices (KI10; Bond, 2014). Nevertheless, climate change-induced variabilities, together with increasing groundwater use, crystallized as major uncertainties that interact with water governance. As a result, WRUAs and water users often employ technocratic solutions (such as water storage tanks to cope with these uncertainties and challenges. This can impede tackling socio-political root causes, create social exclusions, and can ultimately hinder adaptive and resilient CBWG. I argue that the partially one-sided knowledge prioritization exhibits dominant modes of knowledge production and underlying *governmentalities* in the WRUAs. This is especially problematic as CBNRM approaches originally emerged from the very *critique* of western techno-scientific paradigms in resource management (Armitage, 2005, p.703).

Overall, WRUAs interact remarkably different with these challenges (chapters 5.4 & 5.4.2). Issues around technocratic knowledge prioritization and ecosystem degradation were found in both case study WRUAs of Likii and Nanyuki. However, Nanyuki WRUA is much more affected by funding- and capacity-related challenges as well as unpermitted water abstractions, and generally shows a considerably lower degree of professionalization. I conclude that such inter-WRUA differences are determined by commitment and transparency of the WRUA management, awareness and sense of resource ownership among members, and thus overall, how the WRUA interacts with multiple challenges.

Generally, addressing water governance challenges helped scrutinize how social, political, economic, environmental, and discursive factors co-constitute a socio-natural and contested space in which WRUAs are entangled (Boelens *et al.*, 2016; Linton and

Budds, 2014; Swyngedouw, 2004, 2009). The case study and overall findings illustrated that various, multi-scalar challenges interact with CBWG mostly through surrounding debates, perceptions, and blames, albeit differently among WRUAs. Tackling these challenges requires a holistic approach that considers the profound and inextricable socio-natural relations and inequalities in the land-water-society nexus of MKWR.

The second SRQ “***How do past, current, and anticipated land use dynamics (re-)configure water governance in MKWR?***” addresses a cross-cutting aspect around water in the region. Chapters 2.2 and 5.2 show that historical LUC and land inequalities still influence current land debates in MKWR (KI2; Letai and Lind, 2013; Ulrich *et al.*, 2012). However, especially *recent* land use dynamics around the described land rush are found to reconfigure water governance in important ways (chapters 5.2 & 6.2). Most notably are skyrocketing land acquisitions since Kenyan devolution, alongside sub-divisions and fragmentation of land (KI2, KI4, KI16). Based on interviews and literature, I argue that this is problematic for water governance in three ways: 1) formerly often idle land is converted into irrigated small-scale agricultural plots, 2) river ecosystem integrity is compromised through encroachment of protected zones under intensified land use, and 3) groups without secure land tenure (i.e. mostly pastoralists) are disadvantaged by fragmented grazing areas and migration routes (KI1, KI2, KI17-1; Letai, 2018; Letai and Lind, 2013; McCord *et al.*, 2017; Ulrich *et al.*, 2012). Especially upstream LUC reconfigure water governance and surrounding social constellations across scales, from local WRUA transformations to regional upstream-downstream asymmetries. In general, LUC and related water availability issues disproportionately disadvantage pastoralists. The marginalization of pastoralists appeared as a red thread throughout the thematic areas of water governance (e.g., upstream-downstream asymmetries, degradation, climate change effects). Pastoralists’ mobility reveals a scalar mis-match with the CBNRM system (Green, 2016; Robinson *et al.*, 2021). Overall, this shows that different *governmentalities* clash around land use and water governance and that pastoralists are yet to be effectively integrated into CBWG (KI1, KI2, field visit Samburu community, 17.04.22; Letai and Lind, 2013).

Moreover, switching from rain-fed to irrigated small-scale agriculture as a response to

enhanced seasonal water scarcity further increases water demand and thus constitutes a hydrosocial *vicious cycle* concerning competition over water resources. Regarding SRQ 2, especially recent land use dynamics appear to overwhelm WRUA monitoring- and adaptive capacities (chapter 5.4.2; Blaikie, 2006; Dell'Angelo *et al.*, 2016). Nevertheless, these LUC challenges have also brought about innovative governance mechanisms like river scouting, and incentivized data-driven decision-making and early drought detection systems (chapter 5.4.1). Furthermore, also anticipated land use trends based on (national) development visions and projects influence water governance through driving speculative land acquisitions and socio-economic transformations in MKWR.

Overall, LUC as a cross-cutting issue (re-)configures CBWG through dynamic changes in water actor constellations, water demand, and water use-related conflicts and inequalities. Simultaneously, water governance through WRUAs also shapes land use processes in MKWR, e.g., through fencing-off protection zones along rivers. I conclude that WRUAs are reciprocally linked with multi-scalar processes and transformations around LUC and thus operate in an ever-dynamic land-water-society nexus.

The third SRQ “***How do transforming power constellations and water governance interact in the hydrosocial environment of MKWR?***” was approached by investigating several dimensions of participation and exclusion. Water sector reforms, devolution, and LUC have fundamentally reconfigured scales, responsibilities and power relations, generally strengthening CB governance through WRUAs in a polycentralized system (Baldwin *et al.*, 2018; McCord *et al.*, 2017). Especially WRUA members profited from enhanced water access, conflict resolution, and participation in decision-making on sub-catchment level (KI4, KI14, KI16; Ifejika Speranza *et al.*, 2018; Mwaura *et al.*, 2021). WRUAs are further seen to overall alleviate (perceived) power asymmetries among members (chapters 5.3 & 6.3). However, asymmetric knowledge production and -prioritization (as explained with technocratic paradigms) are exemplary for power asymmetries inside WRUAs that closely relate to dominant *governmentalities*. This ultimately conditions participation and exclusion in the hydrosocial territories of WRUAs (Boelens *et al.*, 2016; Swyngedouw, 2004). Moreover, significant upstream-downstream inequalities persist and many water users who cannot afford membership and/or an abstraction permit are caught in a vicious

cycle of exclusion from CBWG (Dell'Angelo *et al.*, 2016, p.113). Incorporation of these water users and of downstream pastoralists alongside the underlying problem of homogenous conceptualizations of “*the local*” and “*the community*” in CBNRM are unresolved issues (Armitage, 2005; Robinson *et al.*, 2021). Moreover, an asymmetric dependency relationship was discovered between WRUAs and (county) government agencies. Interviews showed that the Kenyan water sector remains relatively hierarchical and that water users and WRUA officials feel dependent on state agencies (KI2, KI10; chapter 6.3; McCord *et al.*, 2017). Concerning this, lacking accountability and ownership in the case of Nanyuki WRUA showcased that essential paradigms of devolved water governance are yet to be fully translated.

Through the analysis related to SRQ 3, I aimed at carving out the ways in which power and resource governance interact. Specifically, I argue that participation in and exclusion from CBWG in MKWR crystallize around three dimensions: 1) *spatially* (e.g., upstream vs. downstream), 2) *socially* (e.g., pastoralists, landless, and poor vs. WRUA members and commercial water users), and 3) *politically* (WRUAs and county government agencies vs. non-formalized governance systems and -actors (e.g., of ethnic minorities)). As shown in this summary and in chapter 6.3, transforming power relations interact with water governance in multiple ways and especially WRUAs are reciprocally intertwined with these. Overarchingly, the question of *water governance by, with, and for whom?* requires further critical scrutiny in some instances.

The above discussion of the SRQs summarizes the contribution of this thesis to research on how the overarching themes of (perceived) water-related challenges, LUC, and power relations are intertwined with CBWG in MKWR. Based on this, the following conclusions can be drawn regarding the main research question “***How is community-based water governance in MKWR embedded into land use dynamics, power constellations, and multiple uncertainties?***”:

Altogether, CBWG is reciprocally entangled in socio-natural conditions and transformations in three major areas: 1) land use dynamics, transformed water use practices and magnifying upstream-downstream water- and development asymmetries, 2) transforming cross-scalar power constellations in a devolved water sector and in divergently professionalized WRUAs, and 3) uncertainties and contention around attribution of challenges and responsibilities. Socio-political restructurations, (perceived) inequalities, and WRUA governance mechanisms in all three thematic

areas are co-constitutive of MKWR as a contentious and dynamic hydrosocial space. The Kenyan WRUA model is an overall innovative and progressive governance scheme that strengthens local-scale decision-making, participation, and ownership around water resources in many instances (chapter 5.4.1). However, as political-institutional challenges crystallized as key limitations, institutional strengthening and capacity support of WRUAs are needed. This is crucial for facilitating cooperative learning, awareness-creation, and coordination among stakeholders and institutions. Moreover, the social complexities, multiple current crises and uncertainties, as well as political dynamics together call for prioritizing anticipatory- and inclusionary-, instead of reactive- and technocratic mechanisms in CBWG. As the PE focus of the research helped carving out, such efforts need to be complemented by broader political strategies. These need to align science, policy, and planning to account for profound, socially complex and cross-scalar inequalities, exclusions, and transformations within the land-water-society nexus.

Lastly, several potential avenues for future research in this field can be sketched, based on observations from this thesis. Methodologically, mixed qualitative-quantitative approaches could offer valuable insights for assessing blames related to water scarcity. For instance, qualitatively recorded claims and perceptions could be complemented by time-series landcover change analyses through remote sensing. Additionally, acquiring more interviews from each group of interviewees could facilitate identifying patterns and relations around perceptions and help carve out inter-group differences in several thematic areas. Overall, translating the vast scientific evidence on CBWG into socially inclusive and innovative land use planning and policy is an overarching task for scientists and practitioners alike. Further, scientific knowledge in this field does not only require *vertical* translation across administrative scales and institutions but also *horizontal* dissemination, e.g., across social groups of water users within sub-catchments.

Thematically, future research should scrutinize the ways in which intersectionality of different water user groups relates to participation in and exclusion from CBWG. This is a crucial field of investigation and action as meaningful CB governance especially requires the inclusion of most affected and vulnerable groups (IPCC, 2022, p.28, 658). Moreover, changes in agricultural land use practices, both small-scale and large-scale, necessitate closer investigation regarding uncertainties over increasing groundwater

use. In general, socially asymmetric effects of land- and water use transformations and related contentions around livelihoods and future visions could be enriching foci for research in the hydrosocial environment of MKWR.

References

- Ahlborg, H. and Nightingale, A.J. (2018) 'Theorizing power in political ecology: the where of power in resource governance projects', *Journal of Political Ecology* (25), pp. 381–401.
- Allen, J. (2009) 'Three spaces of power: territory, networks, plus a topological twist in the tale of domination and authority', *Journal of Power*, 2(2), pp. 197–212.
- Armitage, D. (2005) 'Adaptive capacity and community-based natural resource management', *Environmental management*, 35(6), pp. 703–715.
- Baldwin, E. *et al.* (2018) 'Collective action in a polycentric water governance system', *Environmental Policy and Governance*, 28(4), pp. 212–222. doi: 10.1002/eet.1810
- Barnett, J. (2000) 'Destabilizing the environment—conflict thesis', *Review of International Studies*, 26(2), pp. 271–288.
- Bassett, E.M. (2017) 'The challenge of reforming land governance in Kenya under the 2010 Constitution', *The Journal of Modern African Studies*, 55(4), pp. 537–566.
- Batterbury, S. (2015) 'Doing political ecology inside and outside the academy', in Bryant, R.L. (ed.) *The international handbook of political ecology*. Cheltenham: Edward Elgar Publishing, pp. 27–43.
- Baxter, J. (2021) 'Case Studies in Qualitative Research', in Hay, I. and Cope, M. (eds.) *Qualitative research methods in human geography*. Don Mills, Ontario, Canada: Oxford University Press, pp. 109–124.
- BBC (2022) 'East Africa hit by drought, yet Kenya's Lake Turkana is flooding', *BBC*, 18 October. Available at: <https://www.bbc.com/news/world-africa-63278497> (Accessed: 27 November 2022).
- Blaikie, P. (2006) 'Is small really beautiful? Community-based natural resource management in Malawi and Botswana', *World development*, 34(11), pp. 1942–1957.
- Boelens, R. (2014) 'Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands', *Geoforum*, 57, pp. 234–247.
- Boelens, R. *et al.* (2016) 'Hydrosocial territories: a political ecology perspective', *WATER INTERNATIONAL*, 41(1), pp. 1–14. doi: 10.1080/02508060.2016.1134898

-
- Bond, J. (2014) 'A holistic approach to natural resource conflict: The case of Laikipia County, Kenya', *Journal of Rural Studies*, 34, pp. 117–127.
- Boone, C. (2012) 'Land conflict and distributive politics in Kenya', *African Studies Review*, 55(1), pp. 75–103.
- Bryant, R.L. (1998) 'Power, knowledge and political ecology in the third world: a review', *Progress in physical geography*, 22(1), pp. 79–94.
- Care International (2022) *MEAL*. Available at: <https://www.careemergencytoolkit.org/meal/> (Accessed: 27 November 2022).
- Catley, A., Lind, J. and Scoones, I. (eds.) (2013) *Pastoralism and Development in Africa: Dynamic change at the margins*. London: Routledge Taylor & Francis Group.
- Catungal, J.P. and Dowling, R. (2021) 'Power, Subjectivity, and Ethics in Qualitative Research', in Hay, I. and Cope, M. (eds.) *Qualitative research methods in human geography*. Don Mills, Ontario, Canada: Oxford University Press, pp. 18–39.
- Cheeseman, N., Lynch, G. and Willis, J. (2016) 'Decentralisation in Kenya: the governance of governors', *The Journal of Modern African Studies*, 54(1), pp. 1–35.
- Daoust, G. and Selby, J. (2022) 'Understanding the Politics of Climate Security Policy Discourse: The Case of the Lake Chad Basin', *Geopolitics*, pp. 1–38. doi: 10.1080/14650045.2021.2014821
- Dell'Angelo, J. *et al.* (2016) 'Community water governance on Mount Kenya: an assessment based on Ostrom's design principles of natural resource management', *Mountain Research and Development*, 36(1), pp. 102–115.
- Dittmann, J. and Ogolla, A. (2023) [forthcoming] 'Devolution of governance and the politics of fishery at Lake Naivasha, Kenya', in Kuiper, G., Kioko, E. and Bollig, M. (eds.) *Agricultural intensification and resource conflicts: Social dynamics in the Lake Naivasha Basin*.
- Döringer, S. (2021) 'The problem-centred expert interview'. Combining qualitative interviewing approaches for investigating implicit expert knowledge', *International Journal of Social Research Methodology*, 24(3), pp. 265–278.
- Dunn, K. (2021) 'Engaging Interviews', in Hay, I. and Cope, M. (eds.) *Qualitative research methods in human geography*. Don Mills, Ontario, Canada: Oxford University Press, pp. 148–185.

-
- Forsyth, T. (2004) *Critical political ecology: the politics of environmental science*. London: Routledge.
- Gergan, M. and Smith, S. (2021) 'Reaching Out: Cross-cultural Research', in Hay, I. and Cope, M. (eds.) *Qualitative research methods in human geography*. Don Mills, Ontario, Canada: Oxford University Press, pp. 40–59.
- Gichuki, F.N., Kihara, J. and Ndung'u, J. (2000) *Farming Methods, Crop water Use and Conservation technologies: Water Users Association Support Initiative*.
- Gichuki, F.N. and Liniger, H.P. (2001) *Water Users Association Support Initiative: An overview*. Working Paper (Water Users Association Support Initiative).
- GoK [Government of Kenya] (2007) *Kenya Vision 2030: The popular version*. Available at: <http://www.vision2030.go.ke/wp-content/uploads/2018/05/Vision-2030-Popular-Version.pdf> (Accessed: 27 November 2022).
- Green, K.E. (2016) 'A political ecology of scaling: Struggles over power, land and authority', *Geoforum*, 74, pp. 88–97.
- Hall, R., Scoones, I. and Tsikata, D. (2015) *Africa's land rush: Rural livelihoods & agrarian change*, vol. 42, Boydell & Brewer.
- Hardin, G. (1968) 'The tragedy of the commons: the population problem has no technical solution; it requires a fundamental extension in morality', *Science*, 162(3859), pp. 1243–1248.
- Homer-Dixon, T.F. (2010) *Environment, scarcity, and violence*: Princeton University Press.
- Ifejika Speranza, C. *et al.* (2018) 'Community-based water development projects, their effectiveness, and options for improvement: lessons from Laikipia, Kenya', *African geographical review*, 37(3), pp. 192–210. doi: 10.1080/19376812.2016.1253485
- IPCC (2019) 'Annex I: Glossary', in H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. (ed.) *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*. Cambridge, UK, pp. 677–702.
- IPCC (2022) *Climate Change 2022: Impacts, Adaptation, and Vulnerability: Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK and New York, NY, USA.

-
- Jawuoro, S.O. *et al.* (2017) 'Organization and Performance of Water Resource Users' Associations in the Southern Rangelands of Kenya', *Tropical and Subtropical Agroecosystems*, 20(3), pp. 401–411.
- Johnston, B.R. (2003) 'The Political Ecology of Water: An Introduction', *Capitalism Nature Socialism*, 14(3), pp. 73–90. doi: 10.1080/10455750308565535
- Kiteme, B.P. and Gikonyo, J. (2002) 'Preventing and Resolving Water Use Conflicts in the Mount Kenya Highland–Lowland System through Water Users' Associations', *Mountain Research and Development*, 22(4), pp. 332–337.
- Kogo, B.K., Kumar, L. and Koech, R. (2021) 'Climate change and variability in Kenya: a review of impacts on agriculture and food security', *Environment, Development and Sustainability*, 23(1), pp. 23–43.
- Kuckartz, U. (2019) 'Qualitative text analysis: A systematic approach', in Kaiser, G. and Presmeg, N. (eds.) *Compendium for early career researchers in mathematics education*. (ICME-13 Monographs): Springer, Cham, pp. 181–197.
- Kuckartz, U. and Rädiker, S. (2022) *Qualitative Inhaltsanalyse. Methoden, Praxis, Computerunterstützung: Grundlagentexte Methoden*. 5th edn. Weinheim: Beltz Juventa.
- Lamnek, S. and Krell, C. (2016) *Qualitative Sozialforschung: Mit Online-Materialien*. 6th edn. Weinheim: Beltz.
- Lanari, N. *et al.* (2018) 'The impact of commercial horticulture on river water resources in the Upper Ewaso Ng'iro River Basin, Kenya', *Mountain Research and Development*, 38(2), pp. 114–124.
- Lesrima, S., Nyamasyo, G. and Karatu, K. (2021) 'Constraints in Water Access in Laikipia County, Case of Ewaso Ng'iro River Basin in Kenya', *East African Journal of Science, Technology and Innovation*, 2(2).
- Lesrima, S., Nyamasyo, G. and Kiemo, K. (2021) 'Unresolved Water Conflicts by Water Sector Institutions in Ewaso Ng'iro North River Sub-Basin, Kenya', *Journal of Applied Sciences and Environmental Management*, 25(2), pp. 269–275.
- Letai, J. (2011) *Land deals in Kenya: The genesis of land deals in Kenya and its implication on pastoral livelihoods-a case study of Laikipia District, 2011*. *International Conference on Global Land Grabbing*. Brighton, UK.
- Letai, J. (2014) 'Kenya's land reform agenda: pastoralism within the current land debate', *Policy Brief-Future Agricultures* (73). Available at: <https://>

-
- assets.publishing.service.gov.uk/media/57a089ceed915d3cfd000438/Policy_Brief_073.pdf (Accessed: 27 November 2022).
- Letai, J. (2018) *The Laikipia Land Question: A Bombshell or a Case of Historical Exclusion*, ECHO East Africa Pastoralist Symposium. Pastoralist Policy Research, Advocacy & Resource Tenure, Nanyuki. 6 March. Available at: <https://www.echocommunity.org/resources/5de592ea-d2c0-49e9-a192-25dae4b3f043> (Accessed: 27 November 2022).
- Letai, J. and Lind, J. (2013) 'Squeezed from all sides: changing resource tenure and pastoralist innovation on the Laikipia Plateau, Kenya', in Catley, A., Lind, J. and Scoones, I. (eds.) *Pastoralism and Development in Africa: Dynamic change at the margins*. London: Routledge Taylor & Francis Group, pp. 164–176.
- Li, T.M. (2007) *The will to improve: Governmentality, development, and the practice of politics*. Durham: Duke University Press.
- Liniger, H. et al. (2005) 'Assessing and Managing Scarce Tropical Mountain Water Resources', *Mountain Research and Development*, 25(2), 163–173, 11. doi: 10.1659/0276-4741(2005)025[0163:AAMSTM]2.0.CO;2
- Linton, J. and Budds, J. (2014) 'The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water', *Geoforum*, 57, pp. 170–180.
- Loftus, A. (2015) 'Water (in) security: securing the right to water', *The Geographical Journal*, 181(4), pp. 350–356.
- Lund, R. (2012) 'Researching crisis—recognizing the unsettling experience of emotions', *Emotion, Space and Society*, 5(2), pp. 94–102.
- Lynch, G. (2006) 'Negotiating ethnicity: Identity politics in contemporary Kenya', *Review of African political economy*, 33(107), pp. 49–65.
- Mama, A. (2007) 'Is it ethical to study Africa? Preliminary thoughts on scholarship and freedom', *African Studies Review*, 50(1), pp. 1–26.
- Manji, A. (2014) 'The politics of land reform in Kenya 2012', *African Studies Review*, 57(1), pp. 115–130.
- Mansvelt, J. and Berg, L.D. (2021) 'Constructing Meaningful Geographical Knowledges, Writing Qualitative Geographies', in Hay, I. and Cope, M. (eds.) *Qualitative research methods in human geography*. Don Mills, Ontario, Canada: Oxford University Press, pp. 376–397.

-
- Mattissek, A. (2013) *Methoden der empirischen Humangeographie*. 2nd edn. (Das geographische Seminar). Braunschweig: Westermann.
- McCord, P. *et al.* (2017) 'Polycentric transformation in Kenyan water governance: A dynamic analysis of institutional and social-ecological change', *Policy Studies Journal*, 45(4), pp. 633–658.
- Müller-Mahn, D., Mkutu, K. and Kioko, E. (2021) 'Megaprojects—mega failures? The politics of aspiration and the transformation of rural Kenya', *The European Journal of Development Research*, 33(4), pp. 1069–1090.
- Mulwa, F., Li, Z. and Fangninou, F.F. (2021) 'Water Scarcity in Kenya: Current Status, Challenges and Future Solutions', *Open Access Library Journal*, 8(1), pp. 1–15. doi: 10.4236/oalib.1107096
- Mwaura, S.N. *et al.* (2020) 'Impact of water-related collective action on rural household welfare in the Upper Ewaso Ng'iro North Catchment Area: The application of the endogenous switching regression', *Cogent Food & Agriculture*, 6(1), pp. 1–22.
- Mwaura, S.N. *et al.* (2021) 'The impacts of community-based water development projects on rural poverty among small-holder farmers: Evidence from the Ewaso Ng'iro North Catchment Area, Kenya', *Cogent Economics & Finance*, 9(1), pp. 1–21. doi: 10.1080/23322039.2021.1882763
- Ndlovu-Gatsheni, S.J., Seesemann, R. and Vogt-William, C. (2022) 'African Studies in Distress: German Scholarship on Africa and the Neglected Challenge of Decoloniality', *Africa Spectrum*, 57(1), pp. 83–100.
- Neo, H. and Pow, C.P. (2015) 'Eco-cities and the promise of socio-environmental justice', in Bryant, R.L. (ed.) *The international handbook of political ecology*. Cheltenham: Edward Elgar Publishing, pp. 401–416.
- Neumann, R.P. (2015) 'Political ecology of scale', in Bryant, R.L. (ed.) *The international handbook of political ecology*. Cheltenham: Edward Elgar Publishing, pp. 475–486.
- Ngigi, S. and Busolo, D.N. (2019) 'Devolution in Kenya: the good, the bad and the ugly', *Public Policy and Administration Research*, 9(6), pp. 9–21.
- Njora, B. and Yilmaz, H. (2021) 'Evaluation of Water Accessibility, Distribution, Water Use Policies and Management in Kenya', *International Journal of Water Management and Diplomacy*, 1(3), pp. 1–14.

-
- Njuguna, E.C., Kiteme, B. and Peter, E. (2014) *Sub Catchment Directory For Upper Ewaso Ngiro River Basin*.
- Nyanchaga, E.N. (2016) *History of Water Supply and Governance in Kenya (1895-2005) Lessons and Futures*. Tampere: Tampere University Press.
- Obeng-Odoom, F. (2012) 'Beyond access to water', *Development in Practice*, 22(8), pp. 1135–1146. doi: 10.1080/09614524.2012.714744
- Ondigo, D.A., Kebwaro, J. and Kavoo, A.M. (2018) 'Water resources and management under increasing urban demography: A Kenyan perspective—A review', *Journal of Water Resource and Protection*, 10, pp. 919–938. doi: 10.4236/jwarp.2018.109054
- Ostrom, E. (1990) *Governing the commons: The evolution of institutions for collective action*: Cambridge University Press.
- Republic of Kenya (2002) *The Water Act*. Available at: https://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/Kenya_water%20act_EN.pdf (Accessed: 27 November 2022).
- Republic of Kenya (2016) *The Water Act*. Available at: <https://wasreb.go.ke/downloads/Water%20Act%202016.pdf> (Accessed: 27 November 2022).
- Reuber, P. (2012) *Politische Geographie*. Paderborn: Schöningh.
- Richards, N. (2019) 'Water Users Associations in Tanzania: Local Governance for Whom?' *Water*, 11(10), pp. 1–16. doi: 10.3390/w11102178
- Richards, N. and Syallow, D. (2018) 'Water resources users associations in the Mara Basin, Kenya: Pitfalls and opportunities for community based natural resources management', *Frontiers in Environmental Science*, 6(138), pp. 1–14. doi: 10.3389/fenvs.2018.00138
- Robertson, M. (2015) 'Environmental Governance - Political ecology and the state', in Perreault, T.A., Bridge, G. and McCarthy, J. (eds.) *The Routledge handbook of political ecology*. (Routledge Handbooks Online). Abingdon: Routledge, pp. 457–466.
- Robinson, L.W. et al. (2021) 'The Challenges of Community-Based Natural Resource Management in Pastoral Rangelands', *Society & Natural Resources*, 34(9), pp. 1213–1231. doi: 10.1080/08941920.2021.1946629
- Rodríguez-Labajos, B. and Martínez-Alier, J. (2015) 'Political ecology of water conflicts', *Wiley WIREs Water*, 2(5), pp. 537–558.

-
- Sasidevan, D. and Santha, S.D. (2018) 'The social construction of water scarcity: An exploratory study along the "Bharathapuzha" in Kerala', *Glocalism: Journal of Culture, Politics and Innovation*, 3, pp. 1–22. doi: 10.12893/gjcpi.2018.3.6
- Scoones, I. and Stirling, A. (2020) 'Uncertainty and the politics of transformation', in Scoones, I. and Stirling, A. (eds.) *The Politics of Uncertainty: Challenges of Transformation*. London, New York: Routledge Taylor & Francis Group, pp. 1–30.
- Stratford, E. and Bradshaw, M. (2021) 'Rigorous and Trustworthy: Qualitative Research Design', in Hay, I. and Cope, M. (eds.) *Qualitative research methods in human geography*. Don Mills, Ontario, Canada: Oxford University Press, pp. 92–106.
- Suhardiman, D., Nicol, A. and Mapedza, E. (eds.) (2017) *Water governance and collective action, Multi-scale Actions*. London, New York: Routledge.
- Sultana, F. (2007) 'Reflexivity, positionality and participatory ethics: Negotiating fieldwork dilemmas in international research', *ACME: An international journal for critical geographies*, 6(3), pp. 374–385.
- Swyngedouw, E. (2004) 'Scaled geographies: Nature, place, and the politics of scale', *Scale and geographic inquiry: Nature, society, and method*, 2004, pp. 129–153.
- Swyngedouw, E. (2009) 'The political economy and political ecology of the hydro-social cycle', *Journal of Contemporary Water Research & Education*, 142(1), pp. 56–60.
- Ulrich, A. (2011) *Laikipia Smallholders in rural Kenya and the problems they face*. Heidelberg. Available at: <http://docrepo.wlrc-ken.org/xmlui/bitstream/handle/123456789/68/Laikipia%20Smallholders%20in%20rural%20Kenya%20and%20the%20problems%20they%20face.pdf?sequence=3&isAllowed=y> (Accessed: 27 November 2022).
- Ulrich, A. *et al.* (2012) 'Small-scale farming in semi-arid areas: Livelihood dynamics between 1997 and 2010 in Laikipia, Kenya', *Journal of Rural Studies*, 28(3), pp. 241–251.
- UN OCHA (2022) *Horn of Africa Regional Updates*. Available at: <https://www.unocha.org/horn> (Accessed: 27 November 2022).

- Wang, T.-J. (2015) 'Green governmentality', in Bryant, R.L. (ed.) *The international handbook of political ecology*. Cheltenham: Edward Elgar Publishing, pp. 318–331.
- Watson, A. (2021) "Placing" Participant Observation', in Hay, I. and Cope, M. (eds.) *Qualitative research methods in human geography*. Don Mills, Ontario, Canada: Oxford University Press, pp. 125–147.
- Wiesmann, U., Gichuki, F. N., Kiteme, B. P., & Liniger, H. (2000) 'Mitigating conflicts over scarce water resources in the highland-lowland system of Mount Kenya'. *Mountain Research and Development*, 20(1), pp. 10–15.
- Zimmerer, K.S. (2015) 'Methods and Environmental Science in Political Ecology', in Perreault, T.A., Bridge, G. and McCarthy, J. (eds.) *The Routledge handbook of political ecology*. (Routledge Handbooks Online). Abingdon: Routledge, pp. 150–168.

Annexes

Annex 1: List of Interviews

Overview of key-informant interviews and their characteristics

Interview code/Informant	Gender & Age of interviewee	Occupation of interviewee	Interview date	Recorded interview duration (h:min:sec)	Interview location
KI1	Male, ~40 yrs.	Senior Program Officer at indigenous land rights and governance NGO	21.03.2022	0:23:04	NGO-office, Nanyuki, Kenya
KI2	Male, ~50 yrs.	Senior researcher & NGO expert on land use conflicts & land rights; Farmer	28.03.2022	0:49:01	Restaurant, Nanyuki, Kenya
KI3	Male, ~60 yrs.	Coordinator of a WRUA network platform	04.04.2022	0:53:00	Network Head-Office, Nanyuki, Kenya
KI4	Female, ~30 yrs.	Water & Development Professional at an NGO	05.04.2022	0:57:42	At workspace of informant, Nanyuki, Kenya
KI5	Male, ~40 yrs.	Flower farm manager	08.04.2022	0:22:30	Flower farm office inside Likii sub-catchment, Kenya
KI6	Female, ~35 yrs.	Community-based water development expert & researcher at international development organization	08.04.2022	0:40:40	Online via Zoom (Nanyuki, Kenya & Dar es Salaam, Tanzania)
KI7	Male, ~45-50 yrs.	Employee at Water Resources Authority (WRA)	13.04.2022	1:09:35	Nanyuki, Kenya

KI18	Female, ~40 yrs.	Employee at Ministry of Water, Environment and Natural Resources, County Government of Laikipia	22.04.2022	0:38:32	Nanyuki, Kenya
KI19	Male, ~50 yrs.	Chairman of Likii WRUA	22.04.2022	1:02:25 (partly translated by CETRAD assistant)	CETRAD office, Nanyuki, Kenya
KI10	Male, ~50 yrs.	Chairman of Nanyuki WRUA	22.04.2022	1:01:15 (partly translated by CETRAD assistant)	CETRAD office, Nanyuki, Kenya
KI11	Male, ~30 yrs.	Manager of Likii WRUA	25.04.2022	0:53:45	Likii WRUA office, nearby Nanyuki, Kenya
KI12	Male, ~45 yrs.	Water & Irrigation manager of a flower farm	26.04.2022	0:36:23	Flower farm nearby Mathagi town, Ontulili sub-catchment, Kenya
KI13	Male, ~50 yrs.	Manager at a Kenyan land investment company	26.04.2022	0:14:57	Nearby Mathagi town, Ontulili sub-catchment, Kenya
KI14	Male, ~50-60 yrs.	Manager at NAWASCO (Nanyuki Water and Sanitation Company)	26.04.2022	0:29:50	NAWASCO office, Nanyuki, Kenya
KI15	Male, ~40-45 yrs.	Executive Director & Technical Coordinator at a resource conflict NGO	05.05.2022	0:26:01	The Aberdare Country Club, R4D conference, Nyeri, Kenya
KI16	Female, ~35 yrs.	Researcher & Community Development Officer at CETRAD	06.05.2022	0:48:02	CETRAD office, Nanyuki, Kenya
KI17	KI17-1: Female, ~50 yrs.; KI17-2: Male, ~35 yrs.	Manager (KI17-1); Researcher (KI17-2) at National Land Commission (NLC)	11.05.2022	0:30:42	NLC head office, Nairobi, Kenya

Source: Own table, 2022

Annex 2: Interview Transcript Excerpts around Citations

To give contextual information of interview passages directly quoted in the main text of this thesis, corresponding transcript excerpts around these citations are provided below. The excerpts are sorted by interview. On the left of each excerpt, the respective section numbers are indicated. The directly cited passages are highlighted in bold.

Interview KI1

Section no.	Interview content
9	JW: [...] As you just talked about these institutions involved I would be very interested to hear from you: How do you perceive the power structures around water governance and around decision-making of water? Would you say there is asymmetries in power and people were not involved in all these water governance structures? How would you describe the power constellations?
10	KI1: In a nutshell I would really describe it as non-inclusive. Because it's a key structure where key-decisions are made. So, you'll find that the communities that are affected have minimal representation in the key committees. If you look at the general structure, be it at the government level, be it at the national level, even the small committees of WRUAs and others, you'll find that those communities have suffered the most, those that have minimal access to water.

17	JW: And...I'm also interested in how the land use changes in Laikipia have to do with water and water-related problems. You already talked about deforestation for example and charcoal production. How would you generally describe the relation of landuse changes and water governance and the access to water?
18	KI1: You'll really find that the existing structures are key, because [...] in registered community lands we have the water committees, we have the grazing committees and other committees that help in the management and governance of land and natural resources. These are some of the key structures that play a fundamental role on the management of water and natural resources. So [...] for the people in Laikipia, in Samburu or in Isiolo, the main river they use here is river Ewaso Ng'iro. So, you'll find that a lot of water is tapped by the upstream users. So, the downstream users really have little water flowing downstream. And that's why you'll always have conflicts, that's why you'll always have communities fighting each other.

Interview KI2

16	KI2: What WRA is currently doing in this drought, whenever the river dries, they move up and try to remove all those big machines and everybody...because there is a lot of illegal abstraction [...]. But the problem is enforcement of the law. And sometimes to be very honest, devolution between the officers of WRA and
----	--

those who are abstracting the water, they don't want to really come out in the open. So, at some point, corruption is an issue which leads to poor water governance.

17 **JW:** You mean in the government agencies or also inside for example the WRUAs?

18 **KI2:** Even inside the WRUAs. But **for the WRUAs there is lack of capacity. Because they are poorly funded. So, they have no capacity to be able even to monitor the river.**

59 **JW:** [...] You said that the state in most cases not really appropriately handles these resource governance issues and that the communities sometimes do better on their own. What do you think should the role of the state be? And what is it not in the moment in resource and water governance?

60 **KI2:** I think in my view the government exists to provide services to the people [...]. What government needs to do is to appreciate the role communities can play in negotiating for themselves sometimes without interfering. Because a lot of the time, state comes in to intervene and jeopardizes existing relationships. If for example, the government comes in [unintelligible], and they come to create tension, so for me the state should provide a lever for pastoral communities to negotiate for themselves. **The government should be an enabler. So, they should not be a hindrance, they should be an enabler. Such that they create room for communities to do dialogue.** [They will thus put in] an element of first understanding the root cause of those problems. Then comes in as a facilitator to reduce those conflicts. Other than coming in, using forces short-term and sometimes it's unsuccessful. It only creates enmities among the existing communities.

65 **JW:** Ok. So, just as a last question, from your expertise and from all that you know what is going on here, what do you personally see would be most important adaptation and preparedness steps for the communities for the future challenges here? [...]

66 **KI2:** One of the things is awareness-raising. There is very little capacity or understanding of rural communities on the effects of climate change. [...] When we asked communities 'what do you think it is?'. **They say 'climate change is an act of god.' So, there is nothing they are able to do as far as it's concerned. So, awareness- raising is one of the biggest issues we need to do. To embrace communities that this is as a result of human activities, this is as a result of our persistent use of land and the emissions that are causing all these problems.** So, awareness-raising is a very, very important tool. The other thing is putting in measures that can help these people cushion themselves of the effects of drought and climate change. Particularly [solar-powering boreholes].

Interview KI3

25 **JW:** Yeah, that's a huge issue [...]. Coming to the WRUAs in more detail as I told you I'm very interested in how the WRUAs also work here. I'm especially interested in the Likii and the Nanyuki WRUA. What can you tell me about their management or governance structures and how do they compare, these two WRUAs?

26 **KI3:** Ok, let me go straight generally on the WRUAs. The WRUAs in this region are the oldest and they were formed because of the need, of conflict. So, you have the oldest WRUAs which were done 1996/97 and they were ahead of even the government. So, when the government came with the water act 2002 they were already ahead. And this was forced by the circumstances to be able to come together and manage the water resources at the grass-roots earlier. Now...so, **unfortunately, all the WRUAs they are not getting any support from the government, the operational cost, that is very, very important. They have been recognizing the law in 2016 water act. But nothing has gone towards now them being operational in terms of...yes, they are doing a very important job [...] but nobody pays them. So, you'll find voluntary people helping them to do that today.**

29 **JW:** And I heard especially about the Likii and the Nanyuki WRUA that they are quite differently managed...

30 **KI3:** Yeah, I will give you the whole story of it. [...] Now, during the seven WRUAs I was telling you we did pilot on, we realized that the ones that are supported by commercial farmers, they do very well. Because those commercial farmers also have input in terms of governance. And they also give financial support. So, you'll

find most of the [...], the ones that have been supported by commercial farmers they are far much ahead of everybody else. Because those commercial farmers are members of the WRUA and they know the importance of management and governance, they are able to push them to achieve some of those things. So, the catalyst has been somebody else who knows about governance issues. Now talking about Nanyuki and the Likii [WRUAs], **we have two or one very important gap and if you look at the way a WRUA is described, it is...in the act is a voluntary association. That kills everything. Voluntary. So, somebody who is a riparian farmer can refuse to become a member of a WRUA, ya?** So, what we've been doing as [a WRUA platform], is to ensure and to entrench that anybody using that water must be a member although the law says 'voluntary'.

39 **JW:** But how the WRUAs then in such case that there is a powerful actor, also in the management, how do the WRUAs ensure that also the less powerful - for example small-holder farmers - have a say in the decision-making process?

40 **KI3:** The way for example they are elected, we have the various organizations. For example, **if it is a community water project, they are represented in that WRUA. And then you find an individual farm is one [...] is regarded as one, which is very wrong in terms of representation of the number of people. So that is skewed in a way.** And this brings a bit of a problem in terms of...but that can also be addressed in terms of...if we have a [...] strong manager that knows exactly what...who has the capacity, then he can be able to diffuse some of those excesses that we see.

41 **JW:** And you would say, that is the case in Likii but not in the Nanyuki WRUA?

42 **KI3:** No, **the Nanyuki WRUA is nothing, it's a joke.**

Interview KI4

14 **KI4:** we [can] have sub-basin platforms and then we have sub-catchment platforms, which maybe are formed by several WRUAs.

15 **JW:** But this is like what you would wish for? It is not existing at the moment?

16 **KI4:** It is not existing, this is what I would wish for. And to bring all these people who are beneficiaries [of water] together on a common ground on a table to discuss issues affecting them and how they can improve and alleviate them from a grass-root level, it should be bottom-up. [...] You from your own small effort, your small resources, you are limited you know, what can you do to resolve this

problem? [...] And if everyone owns this resource and feels that it is their responsibility to guard this resource, then we could not have major problems. Because you own it. But sometimes you find that the communities don't own the resource. [unintelligible] [They say] 'this water belongs to government, this water is for WRA'. They don't believe it is their water [...].

35 **JW:** Which actors have a say, which actors are less influential when it comes to water in these two [WRUAs]?

36 **KI4:** So, in that context, sorry to say, but it is like comparing heaven and hell. **Likii [WRUA] is heaven, Nanyuki [WRUA] is hell.** What I'm trying to say is, [Likii] WRUA is a properly governed WRUA. It has the right leadership in place, has systems, has processes, has a good team. Because it takes a good team for success in an organization to be realized. And they have grown in their harvesting stage which is [unintelligible]. In WRUAs we have four stages, there is planting, that is the initial stand, there is seeding, there is maturing, and now harvesting. In harvesting this is where you are self...you are sustainable by your own, you are self-sufficient [...]. So Likii WRUA is in stage four which is harvesting, they have an office, I think they have resources, I think they have a car or a motorbike [...] and they have been successful in projects and [...] they have the discipline in water management and efficient water rules. And there is in decision-making, there is democracy. So Likii WRUA is democratic and the views of everyone is being put into consideration.

37 **JW:** So, also the less powerful you would say...there are no big power differences within the WRUA? But in Nanyuki that's different?

38 **KI4:** In Likii, there is equity, there is fairness, there is integration of gender into leadership, gender and youth into leadership and management aspects. Even participation, there is fair participation, equitable participation of youth and women. And decision-making, all these people are involved in decision-making. When you come to Nanyuki [WRUA], **Nanyuki is like a one-man show, Nanyuki is poorly managed because it has a very poor leadership, so many politics in the WRUA and I don't think they are democratic because the decision is made by a few elites or a few opinionated people who have power and control within the WRUA. [...]** They do not have motivation to move, they are lagging behind because of the conflicts they have, so they have been having conflicts for a very long time, the governance conflict. [...] The conflict of power [...] you know, if the management is in crisis of power, means you're running, moving very slowly because you're not working as a team. And

at Likii they work like a team and here [in Nanyuki] they don't work like a team. So, you find that they are inefficient, enforcement is inefficient [...].

Interview KI5

19 **JW:** And what are the main benefits or advantages for you being a member of the WRUA for the farm here?

20 **KI5:** I think for us here it's like, ok, if we approaching [sic] the government, that is the WRA, we are able to go through the WRUA, because will be listened to more than us.

21 **JW:** So, it gives you a voice?

22 **KI5:** Yeah, it gives us a voice. It's also...the Likii WRUA is also a lobby group for the use of the water from the Likii river. So at least if there is any issue, the Likii WRUA management comes in to ensure that everything is handled in the right way. So that is how we see it but also the benefit is **through the WRUA, we have been able to plant trees in the community, take care of the river and through that, solve water conflicts actually. And through that we are kind of able to continue getting our water from the river in an amicable way where everyone also is involved and at the end of the day the conflicts about water are very, very much reduced.**

Interview KI7

5 **JW:** Inside the WRUAs you mean?

6 **KI7:** Yes, because what happens is that the leaders would think that this is an opportunity for them to access resources and then use for their [unintelligible]. So, you find they would come and then...like we have some cases where the officials would get tanks, storage tanks [...] [the WRUA management level] they would get tanks which are supposed to be distributed to let's say schools, disadvantaged farmers or poor members of the community, such that it would improve the issue of water access. But when they get, now they want to make sure to get those tanks to their friends [...] to their families. Now you'll find that becomes a major problem because you know the concept of ensuring access to water will not be achieved. [...] So the capacity for them to manage the business of the WRUA is one major challenge. The other one which is a challenge is, you know when WRUAs were formed under the plan on how to carry out activities to solve water resource management issues [...] what they were expecting was,

they would continuously receive resources from Kenya water sector trust fund. But at the beginning **it started very well but after some time, the resources coming from the trust fund went...the funding was greatly reduced, such that very few WRUAs would receive resources. So now they would not implement their activities** in the sub-catchment management plans. So then, that sort of brought their moral down and then you find for them to pick up again...

7 **JW:** And when was this decrease especially happening [...]?

8 **KI7:** I think maybe after 2015 there about, 2015/2016.

12 **KI7:** We wanted to ensure that the business that the WRUAs do...like they comment on application for water permits, and then those comments help us to make a decision on the application. Because it's they are accepting that a new abstractor is coming in. So, we are giving them a voice so they can say [...] we cannot have another abstractor [...]. And also, **they are like our eyes on the ground**, such that nobody would be drilling a borehole because they live in the neighborhood and they would even report to us [...].

49 **JW:** So, how do generally the people which are not model farmers [...], can you see any changes in their practices?

50 **KI7:** Yeah, there are also farmers who have now changed. Yes, that is all over. In the past [...] they would cut a channel and direct water into their farms but now they are using piped system[s] to get water from the rivers to their place. Then in the past they would just use [unintelligible] pipe to water their plant, but now a good number now have adopted drip irrigation or sprinkler irrigation which is more efficient. Then also, [...] **the WRUAs have moved from just crying that there is drought. When they find the levels in the rivers are going low, they give some [...] alert [...]. They inform the people that now, when it rains, they tell the people that this is the time to store water for use during the [drier times].**

Interview KI8

17 **JW:** That might also create confusion in the WRUAs, right? Concerning who is responsible, 'who should we turn to'...

18 **KI8:** ...who is responsible? Exactly! And but it's a confusion on one end and they are also kind of spoiled [unintelligible] on the other end. They have more than

one option when it comes to support, which isn't such a bad thing, but **from a management and governance perspective, there are too many hands in the jar...it gets a bit confusing.**

27 **JW:** And also, something concerning this devolution process after the 2016 Water Act and the new constitution? [...] Would you see any enhancement to this process?

28 **KI8:** Devolution has its benefits for sure because there are some places which for the longest time are never reached because all resources were being held up in Nairobi at national treasury. [...] I think legislation is something that can be improved. We started with Water Act of 2002, then moved to 2016 with its improvements, so I think it's still a work in progress. [...] But corruption. We have people farming up until the river banks [...]. We have people farming within the...up in the mountains [...]. And all this is because you know people have been given levy [?] because **they shared a few coins and things like that. So, someone is looking aside as all these things are happening.** And that's me, I know [...] but I can't handle an entire county [laughs]. So, stakeholders need to be a bit more clear on their mandate and be strengthened with resources and we need to find a way to curb corruption.

53 **JW:** [...] to sum up, you would say the most important drivers or actors in this process are private actors who acquire small pieces of land here and not so much for example the big farms or the commercialized horticultures?

54 **KI8:** I wouldn't have a direct comment on the flower farms. I think that one is still a bit of a **blame game** going on. I haven't seen facts to confirm that what is going on in the flower farm is affecting people downstream. There have been accusations of chemicals and what not being released into the systems, but I haven't seen data to verify that just yet. [...] But it can't be ruled out. I think really some of the contribution is from the small-holder farmers because their agricultural practices aren't the most effective or optimal.

Interview KI10

9 **JW:** [...] What do you see are the biggest challenges or problems now but also in the future around water here?

10 **KI10:** It's water scarcity, the rain problem. Because like now, this dry season, **our river Nanyuki dried up and it was the first time for that river to dry since we know it. So, that is how severe the situation is. [...] It dried up because the population has grown tremendously.** Right now, in the dry spell, we have a water rationing program that we are supposed to follow with our members.

33 **JW:** And as this is 20 years back, how is the situation now? Are you still a lot in cooperation with other WRUAs?

34 **KI10:** We are in cooperation but before there is a time that the government and the donor countries used to support WRUAs a lot. But of late [?] there is not that support [sic]. And, you see the problem, [...] **for any activity we require finances. And the problem with the act that created the WRUAs [...] even now we are told that we are working on voluntary basis. So, that makes our work hard because like now [...] we have the scouts that we normally use to enforce [...] the scouts need to be given allowances, so we have all those challenges because we don't have finances.** So, when you are handicapped it is even harder for you to go to another WRUA [...]. So, we have [...] financial challenges.

37 **JW:** And how is your cooperation and exchange with the state agencies or the government agencies? How would you describe that? [...]

38 **KI10:** Ok, let me say that Nanyuki river has an advantage because we are right in the Laikipia county headquarter because it passes through Nanyuki town [...]. So, every state office is here and very close. And in fact, we work very well with them because if I have a problem, I call their office [unintelligible]. We are very close with them but for Nanyuki WRUA we work very well with the state agencies.

39 **LM (assistant):** What about WRA?

40 **KI10:** [unintelligible] but what we need to have from WRA is support through WRA. Because **right now, we are the people on the ground on their behalf. And you see they need to support us fully because it is their work that we are doing.**

Interview KI11

10 **KI11:** So, we work very closely in collaboration with all the stakeholders, that is the water resource authority [WRA], the area administration as well, and we

enforce that rationing program to the fullest. We make sure that for the projects that we have as well as for the commercial members, you're only allowed, let's say two days in a week. [...] that we are able to retain the environmental flow.

11 **JW:** And people accept that?

12 **KI11:** Sometimes there could be some resistance, yes. But with the right enforcement we can tell you that we try our best, we try our best to enforce it and we don't look at it whether people are going to accept it or not. Ours is just to make sure that **we are enforcing that rationing program and making sure that we have enough water flowing to meet the ecological demands even downstream. If the members fail to do that, we're likely to be faced with a bigger crisis, like the downstream users [...].** Whenever we are having a dry season, your permit is set aside because your permit is given subject to the flow.

31 **JW:** How would you describe the cooperation or the exchange between WRUAs? [...] Is there any exchange or frequent cooperation going on or would you say the WRUAs are rather working for themselves?

32 **KI11:** I think from the time I've been here, we normally, we may not have that very many interactions with them. Because for us as Likii river you are charged with the mandate that you are just managing Likii river. [...] The only thing that you can be able to collaborate on, is whenever we have some funding opportunities. [...] [describes bigger policy goals like general reforestation that goes beyond catchment level]. **Mostly we are working in isolation**, but if we have some areas of collaboration [...] we can be able to share that but at the moment I can tell you that we are not really into doing so much, like so many collaborations. [...] But if we have some joint projects that revolves around the basin area protection, then that means we have to bring on board every particular WRUA that falls in this area.

Interview KI13

19 **JW:** So, you're speaking about getting people on board. So, you would say there is still a lot of problems that people are not members of the WRUA or would you also see problems inside the WRUA?

20 **KI13:** Not necessarily inside the WRUA, but **people who will be users of the river but they are not members of the WRUA. [...]** that for us we feel like we

are paying a burden for somebody else. Because the small pump users usually abstract, sometimes abstract more than what we abstract during a day. Because we have a defined limit on the permit that says a 1,000 cubic meters per day.

Interview KI14

25	JW: So, you mean there is an imbalance between the WRUAs?
26	KI14: Not imbalance, it's not imbalance. It's level of...
27	JW: ...professionalization?
28	KI14: ...correct!
29	JW: [...] about Likii and Nanyuki WRUA, many people told me they are very differently managed...
30	KI14: ...yeah, it's like day and night. It's like day and night. Likii is well-structured and organized. [...]

Interview KI16

5	JW: And actually, many stakeholders told me that their boreholes are decreasing in yield, so they have to dig deeper and deeper and there is less water coming now than some years ago. So, they said, their main strategy for the future will rather be rain water and flood water harvesting to not so much rely on ground water levels which might be decreasing...
6	KI16: Yeah, in that I totally agree with you. And that's another challenge that comes up because of that. And the challenge is the challenge of corruption and the challenge of just non-compliance. You don't follow the law, you just do your own things. For example, [...] corruption, because you find that within the law two boreholes are not supposed to be near to each other. More so if they are using water from the same aquifer. [...] The law sort of tries to regulate the number of boreholes that are supposed to be done at a particular area and the basis is the aquifer. But now you find that there are many areas where one borehole is just adjacent to another borehole [...] due to really low enforcement. So that is also another challenge [...] to ground water which in the coming years, just like Nairobi, Nairobi already has a challenge with ground water. In the coming years, it can be a challenge, it can be a very big challenge. We think that we have

such a great groundwater potential but maybe in the future we find out that we don't even have that groundwater.

11 **JW:** But which both come from the same government and that is still not resolved until today so that causes a lot of confusion in the water usage, where it's okay and where it's not?

12 **KI16:** Yes, totally, totally! So, that is a confusion that the agriculture guys will say 'we are up for food security, why can't you allow people to grow on the bank?'. But the water people will be like 'growing on the bank will lead to pollution'. [...] So **we have several acts governing one thing which for real becomes a challenge**. But, as much as this is there that we have several acts governing the same resource, when it comes to water and water management, then we follow the Water Act 2016 [...], whereby each and every stakeholder and each and every person has their own mandates in water service provision or water resource management. So, you'll find that, yes, I agree, probably capacity building is not 100%. People need to be trained, and awareness created and sensitized on different laws [unintelligible].

Interview KI17-1 & KI17-2

2 **JW:** [...] What do you consider currently but also for the future the biggest challenges around land use, around land use changes and in connection to water resources especially?

3 **KI17-1:** **The greatest challenge that we have is the population growth and this population needs to find a livelihood. The land that we have, the arable land is not also growing the same level. So, people are encroaching into water towers.** That's why some of the forests are being encroached [unintelligible]. You also find some wetlands that are being encroached on, people are doing developments there. Then we also have urbanization trends. And our gazetted urban centers are growing their boundaries.

6 **JW:** Yes, this is also an issue the WRUAs take care of partly, right? The, for example, restoration of river banks and stuff?

7 **KI17-1:** Yes.

8 **KI17-2:** To add to what the director said, basically **I think the biggest issue is that issue of population pressure. So that you see, there is a lot of**

encroachment and also a lot of fragmentation of our land [unintelligible]. The issue I think is management and governance. [...] So, we have a bit of a weakness in terms of existing governance frameworks [unintelligible] that need to be harmonized so that we have a proper management and governance of our water resources.

15 **JW:** And you think these mandates are very clear-cut or do you also see overlapping mandates or points where you would say 'agencies are sometimes overlapping and the coordination could be better between the responsible agencies'?

16 **KI17-1:** Yes, **I think there is overlap in some instances because there are different laws managing the water sector and we work in silos.** [unintelligible] If you visit the water agency for example, you find many of them are not aware of the national land use policy. That's why now our responsibility is to go and sensitize them.

34 **JW:** I think with this I already took a bit over 20 minutes, so I think I'm good and you informed me very well, so thank you very much! If you have anything to add, feel free, on this topic of landuse changes and water. But if you think you have said the most important...

35 **KI17-1:** I think what I would say last, **many people have not seen the importance of planning. People want to see how they can provide for water but they have not seen the link and the value of landuse planning in safeguarding the water resources** and the depletable other resources that are on land.

Annex 3: Interview Transcripts

The full transcripts of all 17 recorded interviews are provided on a CD attached to the hardcopy. In agreement with the supervisors of the thesis, short sections of interviews that are off-topic have not been transcribed and are replaced with "[...]".

Annex 4: Exemplary Interview Guideline

Example of guiding questions for a semi-structured interview with a government official

[Before interview] Background information on interviewee:

Date, time, place of interview:

Introduce myself, explain aim of my study, explain how data is used and disclose data protection & confidentiality procedures, ask for recording permission (if appropriate)

Question category	Question/Answer
Water-related challenges	<ol style="list-style-type: none"> 1. Can you briefly explain the work & mandate of your agency in relation to water governance and the WRUAs? 2. What do you consider the biggest challenges/pressures now and in future around water governance & -accessibility in the region?
	[Answer]
WRUAs	<ol style="list-style-type: none"> 3. How is coordination between the WRUAs and your agency happening and do you see problems around decision-making or mandates? 4. Do you see any challenges concerning power asymmetries between water users? Or: how would you describe power constellations around water governance (especially around WRUAs)? 5. Which major institutional improvements in water governance would you see as needed or suggest for the future?
	[Answer]
Community role in water governance and conflicts	<ol style="list-style-type: none"> 6. How are communities outside official governance mechanisms included in water governance and decision-making? 7. What coping & adaptation strategies can you observe in local communities and by WRUAs concerning water scarcity, landuse conflicts or future challenges? 8. How does your agency adapt to expected future changes & challenges?

	[Answer]
Land use change (optional)	9. What recent landuse change and -trends can you observe in the region and how does this relate to water governance/-access?
	[Answer]
Closing questions	10. Is there anything else you want to mention or any further remarks? Something I might have missed addressing that you want to talk about? 11. Do you know about other people who would want to talk to me/do you have a recommendation for further interview contacts? “Thank you for your time!”
	[Answer]

[After interview] Note recording time; Take observation notes in field note book of atmosphere, remarkable incidents/experiences; Other thoughts

Annex 5: Exemplary Full Interview Transcript

Interview KI11

Interview participants & Abbreviations: Johannes Wild (**JW**); Key-Informant 11 (**KI11**)

Occupation, gender & approx. age of interviewee(s): Manager of Likii WRUA; male; ~30 y.

Interview date: 25.04.2022

Interview location: Nearby Nanyuki

Duration of recording (h:min:sec): 0:53:45

1	JW: [...] Maybe you can briefly explain again what exactly your role as a manager of the [Likii] WRUA is about? [...]
2	KI11: [...] I think I will start with you...maybe with a brief background of the association [...]. It's a community-based organization, not for profit, which was formed back in the

	<p>year 2002. And this a membership organization. We have a membership base of 14 members, nine community water projects and five commercial members. So, we cover a stretch of 46 km [...]. So, our mandate actually is to promote sustainable use of the water resource as well as making sure that we are at the forefront in terms of conservation efforts within the catchment. We always try our best to make sure that our rivers are protected, we cover a lot of thematic areas, we try as much as possible to work around...trying to minimize the issue of pollution, that happens a lot. And we believe that with right collaboration, with the right energy and bringing people on board, we can be able to make sure that we are able to have improved water quality and improved water quantity which can be able to provide some socio-economic benefits to our members. So basically, that is Likii WRUA. [...] As a manager here I'm chaired with the responsibility number one, of communication. [...] Like what I mentioned to you earlier, about the rationing program, it's up to you to make sure that you're giving some early warning to the members around just to make sure that they are able to store water in advance and enable to avoid a lot of crises that might come up.</p>
3	<p>JW: So, you're mostly in touch with the members like inside the WRUA or also outside the WRUA?</p>
4	<p>KI11: Outside, the big priority first is with the registered members that we have and these people, they are members of the communities around and what happens, ours, we focus a lot on the members that we have and we believe that the moment we give information to these members, it trickles down now to the community members around. And that information at the end of the day gets to them. So, ours is to make sure that whoever is a registered member in the WRUA, we are really trying our best to make sure that we give that information. [...] And beyond that, I'm charged with the responsibility of mobilizing the resources for the association. Number one, through proposal writing, we just have to make sure that we are able to conduct a need assessment to the community members around [...] and then we can be able to align whatever proposal we are writing, with the needs of the community members. We are also charged with the responsibility [...] that the annual subscription that is payable to the association by all the members, [...] to make sure that I'm able to collect that money and also accounting for it as well in a very transparent member, to make sure that the members have a feel that there is value for whatever they are paying. [...]</p>
5	<p>JW: Just a clarifying question: When you're speaking of the members, you speak of these projects [...] or also about individual people?</p>
6	<p>KI11: So, what happens [...], the categories of membership: we have the community projects, we have the commercial members and we have the individual members who</p>

	<p>may be drawn by virtue that they are riparian land owners. [...] That is because you're abstracting water directly from the river and that means you should also be able to support the conservation efforts that the WRUA is also really much into. [...] Number two is [...] to coordinate the water usage. And I will do that basically by making sure, we have some intakes where these particular community projects are drawing their water as well as the commercial members. I'm charged with the responsibility [...] that we are able to collect the meter readings, just to determine the actual volume the project is taking and trying to examine whether they are complying to the permit conditions. [...] through that, we are able to support them, that they are not penalized. [...] So ours is to keep advising the community members, trying to give them information, ' if you go beyond your permit, if you over-abstract, this is the implication that it has on you'. [...] we have to make sure our members, they are really complying to the permit conditions that are issued.</p>
7	<p>JW: And how do you make sure that the water allocation of these allowances are equally distributed among stakeholders in your WRUA? [...] Like how do you decide who gets how much water?</p>
8	<p>KI11: Alright, so basically what happens, whenever you're applying for a permit, remember you're applying as a group. And if you're applying to it as a group, you've already assessed your water demand. [...] That is what will form the basis for the permit conditions and for the allocation of whatever you are going to get. [...] So a permit will be based on the number of people that you serve [...] it is based also on the production capacity of the river [...]. Once we receive that particular request, you'll be able to involve the authority and try to understand, if we allocate that amount, how is it likely to impact on the water flow. [...] We're trying to make sure that whatever now is permitted, is within the limits that can be accommodated.</p>
9	<p>JW: And what do you do in case of drought? [...]</p>
10	<p>KI11: So, what happens, whenever we are having a dry season, number one, we develop a rationing program and whenever [we have] a rationing program we normally tell people 'your permit is subject to the flow'. Therefore, you cannot go for abstracting water even if you have a permit during the dry season. [...] So we work very closely in collaboration with all the stakeholders, that is the water resource authority [WRA], the area administration as well, and we enforce that rationing program to the fullest. We make sure that for the projects that we have as well as for the commercial members, you're only allowed, let's say two days in a week. [...] that we are able to retain the environmental flow.</p>

11	JW: And people accept that?
12	KI11: Sometimes there could be some resistance, yes. But with the right enforcement we can tell you that we try our best, we try our best to enforce it and we don't look at it whether people are going to accept it or not. Ours is just to make sure that we are enforcing that rationing program and making sure that we have enough water flowing to meet the ecological demands even downstream. If the members fail to do that, we're likely to be faced with a bigger crisis, like the downstream users [...]. Whenever we are having a dry season, your permit is set aside because your permit is given subject to the flow. [...] So the issue comes when you totally closed the water but you have some pump owners here that are also pumping [unintelligible] from the river. So, what we do is to make sure that we are working very closely with the scouts. [...] And we also engage with the WRA so that if you are caught, your machine, your pumping machine is confiscated. [...]
13	JW: I heard from some water users [...], that what they have to pay when they are getting caught is not enough to stop them from illegally abstracting water. Is that true you would say? [...]
14	KI11: I think it happens. You see sometimes it will depend maybe with whoever is enforcing. [...] Let's say now, [...] we tend to put up some very punitive measures. For Likii WRUA [...] if you're caught failing to comply with the rationing program, the fine is 20.000 Kenya Shilling [~165 €] and you are disconnected from abstracting water for a whole month. [...] [We have to bring in these riparian land owners so that we know whom to contact if they abstract during the dry season]. We have someone that we can hold accountable and that person is someone now, that we are going to penalize now. [...]
15	JW: So, you can also penalize people who are not members?
16	KI11: Yes, we can be able to do that [...] through the authority [...] [WRA].
17	JW: [...] You told me that you consider population growth and the increased human water use but also climate change as main problems. Do you see any other big challenges or problems now or in the future? [...]
18	KI11: I think the main other thing that we feel for Likii river [...] is the way our intakes are distributed. Sometimes it is a big challenge [...] to maintain that flow. That is the 30% that I was talking about. [...] What we are thinking of is the issue of a common intake. [...] And then it will become for us so easy if we will be able to have a common intake. It means that we can be able to control the amount of water that has been allocated to these abstractors. [...]

19	JW: [...] and you said right now the allocation plan is not anymore for the current situation, right?
20	KI11: Yeah, Yeah. For the allocation plans - as I was saying - you see, we did an abstraction survey recently [...] to form the basis of our water allocation plan. And you realize [...] that the number of abstractors has really grown. And that means, the kind of allocation plan we need now to put up in place, should be able to be based on the current abstraction. [...]
21	JW: With this you also already describe a solution to this problem, right?
22	KI11: Yes, yes. The only problem we are having right now is the challenge of the issue of the members sometimes, feeling also to adhere to the directions that you are giving. [...] So, I also think to some extent we also need to do a lot of sensitization to the members as well [...] and make sure that they are also part of the effort we are carrying out. So, I think we have a challenge on that and the members also need to understand it. [...] We also need to increase the number of scouts. [...]
23	JW: So, it's about monitoring on the one hand but also raising the awareness. And I'm also interested a bit in the context of all of this: what landuse changes can you observe here in the region, currently and also historically and how has that to do with water? [...]
24	KI11: [Laughing] For the landuse, I may not be really having some really good information on that [he just came here recently].
25	JW: That's ok, that's ok. [...] And a bit more deeper into the WRUA [...], how would you describe the power constellations within the WRUA but also outside the WRUA between actors around water? [...]
26	KI11: So, for the management of the water resource, actually the WRUAs are the ones that are recognized even by law. So, you see that WRUAs are anchored in the water act 2016 [...]. So, the management of the water resource, I feel like WRUAs have a really big say and even if we are to go even deeper into terms of the groundwater, even before you drill a borehole, the first place you are supposed to get an approval, is at the WRUA level. So, the WRUA...yes, we collaborate a lot with the [WRA] because initially you realize that the water resource authority was called the water resource management authority. But now the management bit was pushed back now to the association. [...] The issues to do legislation [...], with enforcement, that is done now by the [WRA]. But anything to do with the management of the resource, is now at the WRUA level.

27	JW: But do you have the feeling that this relation is going well? Is your contact with WRA going good or would you say there is also sometimes an overlap in mandates for example or conflicting mandates?
28	KI11: So, what happens, we normally sign a [MoU] with the [WRA] and whenever we are signing a [MoU], we have like a very clear guidelines on the areas that we are supposed to be operating. Ours is on management, theirs is on the enforcement, the authority part. So, we feel like we don't have a lot of conflicting issues around them. [...] They have also understood and they are giving the right respect that the WRUA deserves, so that anything that concerns the management, is done by the WRUAs. [...] So we feel like we have some very clear-set functions, that are actually separate from what the authorities are doing. So, I think from my point of view, I feel like we have no conflict with them. [...]
29	JW: And inside your WRUA, like between the community water projects, do you have the feeling...or are people feeling, they are on equal eyes or is it...is there issues about different involvements in decision-making for example?
30	KI11: So, for the community level, those people...the community reserve, they also have a feeling that there is a very nice working relationship between the community projects because you know how it operates is that the community projects will always contact the association if they have any issue. And then the association will even have a better bargaining power whenever there is an issue, for example with the authority. [...] the community projects, making sure that they are involved in every decision-making is very critical. [...] The water user fees is currently at 50 cents [0,5 KES] per cubic meter. And the proposal that we are having was to raise that amount to 5 Kenya shillings. So, you can imagine, that is an increment of a 1000%. [...] And what happened is that people like the [...] MKEWP [Mount Kenya Ewaso Water Partnership] group, they came in, they had to petition the parliament and we have actually managed to have that stopped at the moment. And the reason was, there was no participation. And if you're not able to involve the common user, because at the end of the day, whoever is going to foot that bill, is going to be the community members. So, if you're failing to involve the community members, then it means that what happens is that you cannot be able to do that until you involve them sufficiently and let them participate in it [...]. MKEWP [...] they went all the way up to the parliament, and the rates have not been changed up to now. And it's because of the efforts that are being put by these lobbying and advocacy groups. And I can tell you, the power belongs to the people because at the end of the day, until we have these people, the community members, approve it and the issue of affordability being also addressed, then we can never have such proposals

	being implemented. So, I feel, participation is very key. [...] Every step, they [users] are given the information that is needed and they can understand what are the implications that come around all these new rules. So, I feel, participation should never be overlooked at all.
31	JW: Yeah, very important point, that's the essence of your work I think. How would you describe the cooperation or the exchange between WRUAs? [...] Is there any exchange or frequent cooperation going on or would you say the WRUAs are rather working for themselves?
32	KI11: I think from the time I've been here, we normally, we may not have that very many interactions with them. Because for us as Likii river you are charged with the mandate that you are just managing Likii river. [...] The only thing that you can be able to collaborate on, is whenever we have some funding opportunities. [...] [describes bigger policy goals like general reforestation that goes beyond catchment level]. Mostly we are working in isolation, but if we have some areas of collaboration [...] we can be able to share that but at the moment I can tell you that we are not really into doing so much, like so many collaborations. [...] But if we have some joint projects that revolves around the basin area protection, then that means we have to bring on board every particular WRUA that falls in this area. [...] We have another forum that is in the process of being formed, called the Kenya national association of WRUAs. This is supposed to bring on board all the WRUAs in Kenya as well. [...] It is not yet formed and they are also having some challenges with the legislation as well. [...] It is for more collaboration and for the bigger picture of what WRUAs are doing. So, yes, I would say to some extent there are lots of efforts that are being done to make sure we are working very closely, but at the moment I can tell you, you have to just first execute the money that you have within your area of jurisdiction.
33	JW: That's very important news to me. Ok very good, one more question on the WRUAs specifically: Would you wish for any institutional improvements in this whole process of water governance here in the region? [...]
34	KI11: Great. I think number one, I think WRUAs, number one, they are really struggling with the issue of finances. And as you have heard, the issue of the management of the water resource was now shifted back to the WRUAs. And that means we also incur some cost as well. So, the main recommendation I would give, is to make sure that we have some allocation like from the national government to support the WRUAs. [...] So, what we want is very simple: let's say the [WRA], they are collecting the water user fees from the community members, the proposal that we want is just for them to plow back at least some certain percentage of that money to support the operations of the WRUA.

	<p>[...] That means the WRUAs can be empowered, they can have a bigger say in the way they are working and we are not asking for a lot of money and we have shown that WRUAs also keep up being accountable and managing the finances in a very more efficient way [sic]. [...] Let the national government understand that we have WRUAs in place and if only they are given the right resources, we can be able to even protect our riparian land. [...] We've realized that our riparian land has been degraded to a point that [...] if this was to continue for the next two, three, four years, then in the next decade that we are likely to enter, then we'll be having a very big challenge with that rivers. [...] The other thing I would suggest also [...], we want to have a representation also in the national government. [...]</p>
35	JW: And MKEWP is not something like this?
36	KI11: So, for MKEWP, yes, we can, we can do it through them. But the problem we are facing, it is also replicated in so many other areas. So, until we have that figure, it's easier as a WRUA, because it is recognized in the law, to also put a lot of pressure maybe to the government and make them understand that this is what we require and this is what should be prioritized whenever we have the allocation of the budget. [...]
37	JW: Very important point. [...] How can you see that water users are adapting to these challenges or how are you as a WRUA adapting to these challenges, also to future challenges? [...]
38	KI11: So, what happens, number one is that most of the projects that we have and the households that we are serving, they are moving towards smart agriculture and you find people now are adopting drip technology whenever they are farming. [...] You'll find initially, people just used to do dams and they never considered the issue of dam liners so that they are able to retain water during the dry season. [...] They also really invested in water storage. [...] And some also are moving towards the ground water. [...] Those are some of the ways our members are trying to adapt to the current situation and with that one, if only we can insist on the issue of water storage, which is very key, that means that our members can be able to have enough water to use during the dry season. [...] So, I think the issue is the issue of the storage, how do we make our people store water enough and how do we make sure, the farming practices they are adopting are water efficient and that they can even be able to do some recycling. [...] Assuming you have installed a meter in your place, in your household level, then it means you are going to be charged on the actual volume that you are using. So, it means our people will have to adopt some very efficient ways of using their water just to make sure that their cost also hasn't gone up as much. So, I think it is the issue of farming practices they are adopting and the issue of storage as well as shifting to the groundwater.

39	JW: Very, very interesting insight. I think with this you have answered super well all my questions that I have for now. [...] Thank you very, very much!
-----------	--

Annex 6: *MAXQDA* Codesystem

Total number of coded text segments from transcripts: **2,053**

Code names	No. of coded segments
Water Governance	7
WRUAs	67
WRUA best-practices	8
Good governance & Securing funding	29
Accountability & Awareness	31
Enhanced participation	19
Conflict resolution	10
(Institutional) Cooperation	37
Increasing leverage	9
Transformations inside WRUAs	64
Nanyuki WRUA	58
Likii WRUA	72
Water policies	46
Devolution	19
Power relations	20
Power relations between water agencies & WRUAs	44
Power relations between WRUAs	17
Power relations inside WRUAs	74
Upstream-Downstream relations	25
Water governance challenges	33

Fragmentation of land	20
Lack of (WRUA) capacity	39
Marginalization/Exclusion	27
Accountability	39
Water scarcity	42
Conflict	40
Power asymmetries	47
Funding	36
Illegal activities	42
Voluntariness of WRUA membership	23
Political-institutional challenges & Overlapping mandates	74
Enforcement & Monitoring	39
Corruption & Elite capture	29
Population trends & -movements	47
Degradation & Unsustainable practices	97
Climate Change & -variability	68
Uncertainties	54
Suggested improvements & Future of water governance	13
Informal/alternative governance mechanisms	20
Strengthen enforcement & monitoring	11
Clarification/Transparency on mandates	16
Diversifying water sources & Technical solutions	20
Awareness-raising, education & capacity-building	32
Funding & Membership of WRUAs	19
Adaptation of water governance practices	98
Landuse change	55
Recent land rush	47
Future/Anticipated landuse	21

Landuse conflict	27
Landuse planning & -policy	35
Relation of landuse and water governance	63
Usefulness of hydrosocial approach	4
Important citations	120

Source: Own table, created with MAXQDA2020

Annex 7: Additional Figures

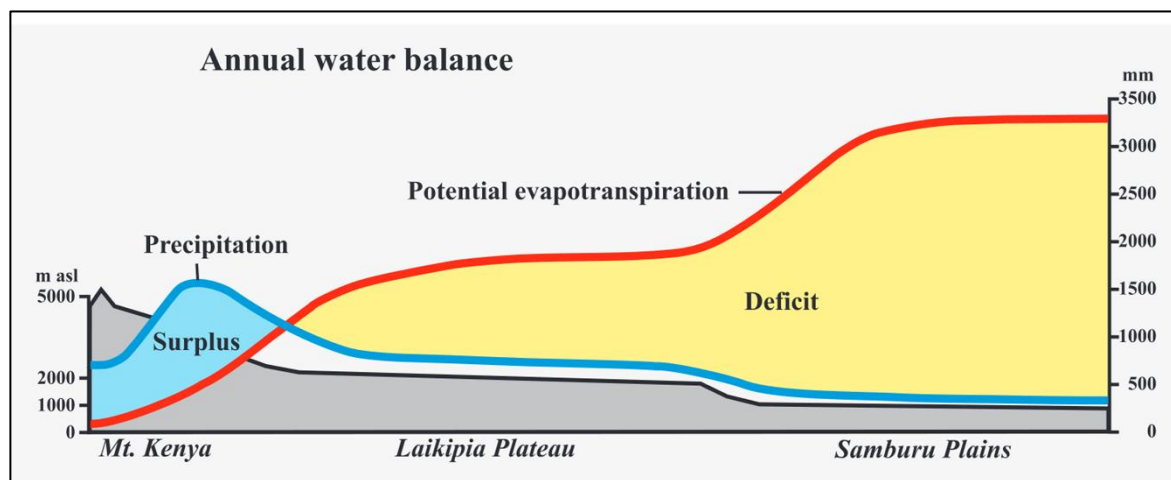
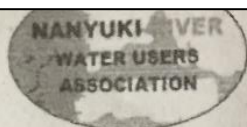


Figure 12: Transect through MKWR, depicting differences in average annual water balance

Source: Wiesmann et al., 2000, p.11



NANYUKI RIVER WATER USERS ASSOCIATION
P.O. BOX 3187 – 10400 NANYUKI
MOBILE: 0722909552

WATER RATIONING PROGRAM 2019

DAY	DATE	PROJECT	OPEN TIME	CLOSE TIME	HRS
MON	28/1/2019	MWEA-B	7 AM	7 AM	24
TUE	29/1/2019	KAGA	7 AM	7 AM	24
WED	30/1/2019	RUAI	7 AM	7 AM	24
THUR	31/1/2019	HUKU	7 AM	7 AM	24
FRI	1/2/2019	MAKA	7 AM	7 AM	24
SAT	2/2/2019	PRISON/INDIVIDUALS	7 AM	7 AM	24
SUN	3/2/2019	CLOSED	7 AM	7 AM	24
MON	4/2/2019	MWEA-B	7 AM	7 AM	24
TUE	5/2/2019	KAGA	7 AM	7 AM	24
WED	6/2/2019	RUAI	7 AM	7 AM	24
THUR	7/2/2019	HUKU	7 AM	7 AM	24
FRI	8/2/2019	MAKA	7 AM	7 AM	24
SAT	9/2/2019	PRISON/INDIVIDUALS	7 AM	7 AM	24
SUN	10/2/2019	CLOSED	7 AM	7 AM	24
MON	11/2/2019	MWEA-B	7 AM	7 AM	24
TUE	12/2/2019	KAGA	7 AM	7 AM	24
WED	13/2/2019	RUAI	7 AM	7 AM	24
THUR	14/2/2019	HUKU	7 AM	7 AM	24
FRI	15/2/2019	MAKA	7 AM	7 AM	24
SAT	16/2/2019	PRISON/INDIVIDUALS	7 AM	7 AM	24
SUN	17/2/2019	CLOSED	7 AM	7 AM	24
MON	18/2/2019	MWEA-B	7 AM	7 AM	24
TUE	19/2/2019	KAGA	7 AM	7 AM	24
WED	20/2/2019	RUAI	7 AM	7 AM	24
THUR	21/2/2019	HUKU	7 AM	7 AM	24
FRI	22/2/2019	MAKA	7 AM	7 AM	24
SAT	23/2/2019	PRISON/INDIVIDUALS	7 AM	7 AM	24
SUN	24/2/2019	CLOSED	7 AM	7 AM	24
MON	25/2/2019	MWEA-B	7 AM	7 AM	24
TUE	26/2/2019	KAGA	7 AM	7 AM	24
WED	27/2/2019	RUAI	7 AM	7 AM	24
THUR	28/2/2019	MAKA	7 AM	7 AM	24

Figure 13: Water rationing scheme among member CWP inside Nanyuki WRUA

Source: Own photo, 2022



Figure 15: Many shops in MKWR (here: Nanyuki) sell equipment for irrigated agriculture as the latter increases significantly in MKWR

Source: Own photo, 2022



**Figure 16: Eroded riverbanks at Nanyuki river during drought
nearby informal abstraction points**

Source: Own photo, 2022