Water Shortages at Water Abundant Bodies – The Impacts of Forced Economic Upgrading on Resource Related Conflicts around Lake Naivasha from a global to local perspective

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Abstract

Recent years have seen unprecedented pressure from numerous water users with different interests in Lake Naivasha basin, the only freshwater lake in the Great Rift Valley of Kenya. This pressure on water source results to water shortage, unsustainable resources management practices, poor water quality, and emergence of conflicts between institutions and users. However, there is a knowledge gap and paucity of information on sustainable water resource use and management strategies in Lake Naivasha basin. This study, therefore, aims to provide research evidence on why the local population constantly experience water shortages, and in what ways resource stakeholders interact and play in the conflict dynamic, and ultimately propose a better water resource use and management approaches. Drawing on field assessments, individual interviews, focus group discussion, and secondary literature reviews, this paper illustrates how both local, national and multi-national stakeholders contribute to the water shortage and resources induced conflicts. Results indicate that unclear local institutional structures, fragmented land use activities and ownership, a feeling of marginalization by the local population all exacerbated by effects of extreme climate events are the main drivers of water shortage and conflicts. Comprehensive policy framework and enforcement of existing regulations will ensure there is sustainable water access, reduce conflicts and enhance sustainable management of water resource and use of the lake.

Keywords: Human Activities, Water Resource Management, Water Availability, Stakeholder Analysis

Introduction

Lake Naivasha is the second-largest freshwater lake in Kenya, and its wetlands are a renowned Ramsar site of international importance (Ramsar 2014; Vestoep 2015). In the last decade, the lake basin has continued to experience a rapid increase in horticultural and floricultural industry, tourism facilities and other commercial activities with impacts on the use and management of the lake's water resources (Becht 2007; Harper et al. 2011; Awange et al. 2013). Being a semi-arid area, the operation of these commercial industries though it is economically and socially important put great strain on this shared freshwater resource (Otian'ga-Owiti and Oswe 2007; Musota 2008; Jong 2011; Kuhn et al. 2014). Ogada et al (2017) therewith asserts that water shortages have led to conflicts between water users, damage to local ecosystem and let to poor environmental reputation in Lake Naivasha basin.

The imbalance between water availability, access and demand is therefore increasing due to both natural and anthropogenic factors. The lake and its surrounding areas are fragile ecosystems with increasing threats from irrigated agriculture, water abstraction, fast-growing Naivasha town, and human population growth throughout the basin. While the focus of this study is on water shortage and related conflicts, a number of previous studies discuss the potential human impact on lake ecosystems, challenges in ecology and water managements (e.g. Harper et al. 1990; Becht and Harper 2002; Crona and Bodin 2006; Hahn et al. 2006; Newman and Dale 2007; Provan and Kenis 2007; Harper et al. 2011; Verstoep 2015). Other studies have also focused on the problems of water quality, fluctuation of water levels and competition of water resources within the study areas (Kitaka et al.

2002; Ndungu 2014). According to Carolina (2002) Lake Naivasha basin is of high economic and political importance to Kenya. The basin presents a wide variety of economic activities based around the water sources, with many different stakeholders often competing for the water resources. A study on turning conflicts into co-existence around Lake Naivasha basin has also been carried out, e.g. by Kioko (2016) who argued that various actors utilize diverse networks of relationships as adaptive responses to conflicts and socio-political dynamics at the local level. Ogada et al. (2017) reported that better governance and managing of water resources require collaborative stakeholder networks in Lake Naivasha basin. Further, their study argues that even though the Kenyan government and its agencies seem to command higher influence and interest in water resource management, the presence of influential and central stakeholders from non-government sectors plays a key role in strengthening partnership in a governance environment with multiple sectors, complex issues and competing interests. Interactions in the basin are guided by stakeholders' interest and sphere of influence, which have both promoted participations in implementing a collaborative water governance framework.

All these discussions therefore point to the need for a more in-depth analysis on water shortage and water related conflicts within the lake basin, in an attempt to explore sustainable solutions for water resource management for Lake Naivasha basin. Because of the scramble to derive economic benefits among the competing users and uses on one the hand, and the desire to protect the basin from degradation and ensure its sustainability on the other, there is need to identify multiple stakeholder's interactions, and how to devise better water resources management strategies for the Lake basin. Differing interests in regard to the use of the natural resources and influences in decision-making processes challenges the relationship between the actors found around the lake. With the arrival of foremost economic actors around the basin in the 1980s, conflictual tensions over the use and access to the basin's resources increased. This conflictual behavior contributed to inequality, generated instability and put additional stress on the relationship between the different actors.

Using stakeholder analysis and conflict analysis, this article identifies and analyzes the main stakeholders living, working and influencing processes around Lake Naivasha, based on their interests but also their power to influence decision-making processes. Therefore, the paper asks the question how water governance schemes contribute to low-key water related conflict dynamics between primarily local actors at Lake Naivasha basin. The article proceeds as follows: In the next section, we will describe Lake Naivasha and its surrounding area. After discussing the theoretical frameworks of stakeholder analysis and conflict analysis, we will review the used methodology and data collection. Afterwards, we will discuss the impacts of water shortages on water related conflicts. In the final section, we will present some strategies for reducing water shortages and summarize our findings.

Lake Naivasha basin

Lake Naivasha in central Kenya (Fig.1) is situated in the Eastern Africa Rift Valley at an altitude of 1890m above the sea level and it is surrounded by Game Parks in the North and two National Parks in South. It lies at altitude 00 46' and longitude 36 22' E. It is the only fresh water lake in the rift valley and is fed by the main input Malewa river that account for 80% of the lakes discharge and Gilgil river which account for approximately 10% of the total discharge into the lake (Higgins 2005). It is a small, shallow fresh water lake and is covering a surface area of roughly 160km^2 (see Kundu et al 2010). It is the only fresh water lake in the eastern rift valley. Historically, Lake Naivasha basin is a Maasai grazing region and the main industry was fishing and farming till 30 years ago. Nowadays, it is a significant economic resource due to its social and economic importance, including for horticultural production, geothermal power generation and tourism (Becht et al. 2006; Mulatu et al. 2015; Van Oel et al., 2013;

Willy et al. 2014). The lake is of international importance, having been declared a Ramsar site in 1995, and is thus protected under the International Convention on Wetlands (Ramsar, 2011).

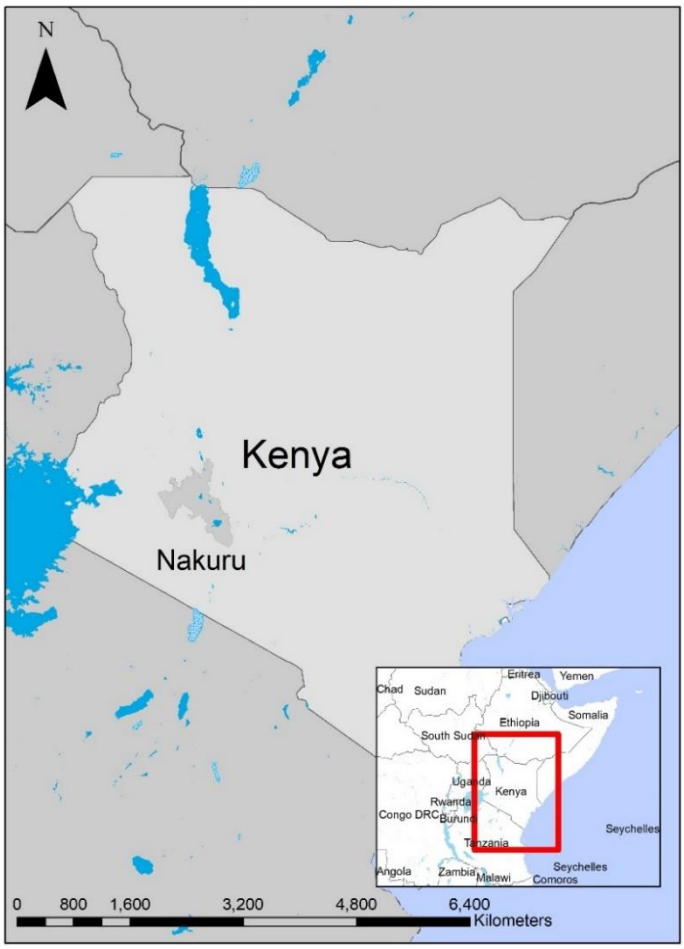

Fig 1: Study area in Nakuru county, Lake Naivasha, Nairobi (World map source: Arc GIS, 2019)

The climate is humid to sub-humid in the Highlands and semi-arid in the Rift Valley. The mean monthly maximum temperature ranges between 24.6°C to 28.3°C, and a mean monthly minimum temperature between 6.8°C and 8.0°C. The average annual rainfall ranges from about 800mm in Kinangop plateau to about 300mm in the rift floor. The rainy seasons are typically from April to May (sometimes June) and October to November. The April-May rainy season is the main rainy period, known as the 'long rains', while the 'short rains' occur during October-November. Over the last 50 years, the water levels of Lake Naivasha varied considerably. The Global Water Surface Explorer maps the location and temporal water distribution of global water surfaces for the last 32 years (Global Water Surface 2019). The Global Water Surface shows that between 2000 and 2010 water levels of Lake Naivasha diminished considerably. In 2002 and 2003 and again in 2008 and 2009 so far, the driest period hit the area around the lake using data from the drought monitor of the Standardized Precipitation Evapotranspiration Index (SPEI). The Standardised Precipitation Evapotranspiration

Index (SPEI) is a drought index based on climatic data and offers almost real-time information about drought conditions on a global scale. It is particularly suitable for determining the duration and magnitude of drought conditions with respect to normal conditions (SPEI 2019).

During the mentioned drought period, the lake's size reduced by one sixth from 160km^2 to roughly 130km^2 (Ibid). After the major drought in 2009, the water levels increased and in 2018 the water levels of the Lake are at its highest levels ever (Ibid). Whereas the arid north of Kenya has been hit by a severe drought since 2010 onwards due to global climate change, the impacts of climate change in Lake Naivasha basin foremost impacts on the seasonal variability, i.e. changes and duration of dry and rainy seasons are becoming more unpredictable nowadays. Changing rainfall patterns over the last 32 years have caused increased and unpredictable fluctuations in both ground water levels and the lake's water tables with knock-on consequences for the water quality but also for the various water users (Vivekananda 2015). The figures of the SPEI indicate that the effects of global climate change do not always result in prolonged droughts. Thus, not only prolonged droughts but also seasonal floods can further complicate the situation and increase the vulnerability of different actor's dependent on products deriving from natural resources surrounding water bodies. Local residents agreed, that Lake Naivasha's water quality has deteriorated over the last decades due to e.g. deforestation and over-farming activities at its shore lines but also in the upper water catchments (Ibid).

Lake Naivasha basin hosts plenty of different population groups. Originally being a Maasai grazing pastoralist area with mostly farming and fishing activities, nowadays various economic actors and population groups can be found around the lake. Among the tourism sector, the horticulture industry arrived around Lake Naivasha at the end of the 1980s and flourished since then. Sufficient water levels within Lake Naivasha and in the upper catchments, good climatic conditions, the availability of cheap labour and access to Nairobi International Airport are key ingredients of national but also international flower companies moving to the lake's shorelines and dominating this area (Becht/Odada/Higgins 2005).

Therefore, a number of economic activities can be observed around the lake, including the traditional ones of farming, pastoralism and fishing, but also more advanced economic activities including tourism, horticulture but also industrial sites covering geothermal and power generation companies. Therefore, since the beginning of 2000, Naivasha town and its surroundings experienced a population explosion. Villagers and local residents assume that the population is nowadays ten times higher than in 2000 with more than 1.000.000 people sharing the space and resources surrounding Lake Naivasha. Reasons for this include foremost the offering of labour to unskilled workers by the flower farms and hotels. As a result, the population composition as well as how these different actors are located around the lake changed (Fig. 2). There are two broader groups sharing the space and resources around Lake Naivasha nowadays: on the one hand, farmers, pastoralists, fishermen and descendants of white residents; on the other hand, multi-national flower companies and national hotel owners. According to villagers, the increasing economic activities around the lake reduced the number of public water

access points from more than 100 to only 14. This forced most residents to move away from the lake to one of four informal settlements in the wider surroundings.

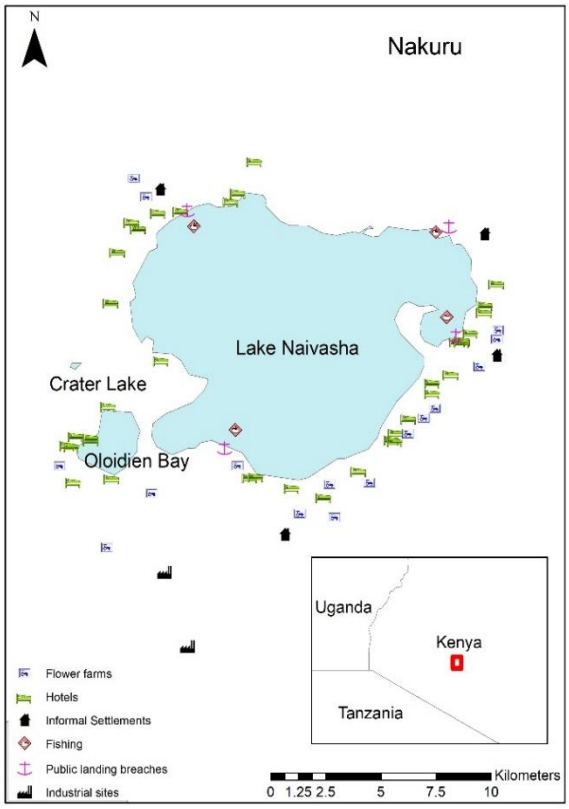

Fig 2: Study area Lake Naivasha, Actor Mapping (World map source: Arc GIS, 2019)

Moreover, the offer of cheap labour and economic benefits by the Nairobi government (e.g. tax free cultivation and trade in the first years) can be viewed as ingredients of the still booming horticulture industry around the lake's shorelines (Becht/Odada/Higgins 2005). Besides the horticulture industry, the tourism sector as well as other industrial sites (geo-thermal companies or power plants) arrived around Lake Naivasha favoured by the national political elites. These companies add tensions to the land and water situation as they abstract plenty of water from the lake via pipes as well as they are located directly at the lake's shorelines closing access routes for villagers to fetch water directly from the lake (Harper et al 2011). Industrial sites are located primarily at the south-west of the lake within Hell's Gate National Park. The power plants inside Hell's Gate helped to generate almost 50% of Kenya's electricity in 2015, with an increasing tendency. Furthermore, these plants also generate roughly 35% of the country's hydropower. One the one hand, this energy is used to provide households in urban areas in Kenya with electricity, but on the other hand it is used to provide the flower farms with energy as the steam warms greenhouses and generates electricity for the horticultural farms.

Conceptual Framework

Stakeholders Analysis framework

Stakeholder Analysis (SA) is suitable to analyze stakeholder's social action and structural characteristics taking into consideration their interests and interactions in a given setting (Ogada et al 2017). The roots of SA lie within political economy but it is also an efficient tool to map natural resource policies and governance processes. In particular it proved to be successful in settings that are characterized by multiple stakeholders, multiple objectives and multiple interests (see Grimble/Wellard 1997; Yang 2014; Ogada et al 2017). Because natural resource management typically deals with multiple stakeholders and often conflictive interests, Stakeholder Analysis is a useful framework discussing water shortages and conflict dynamics. Resource governance can be defined as "a partnership in which government agencies, local communities and resource users, non-governmental and other stakeholders negotiate, as appropriate to each context, the authority and responsibility for the management of a specific area or set of resources" (Ogada et al 2017: 271). Based on that definition, it is a holistic approach getting an understanding of a system, assessing how the system changes by identifying the key actors or stakeholders and critically evaluate their respective interests in that system regarding a certain topic (Grimble/Wellard 1997). Originally, the term interest was used in an economic sense to measure a gain or loss towards a specific utility or welfare received (Ibid) However analyzing stakeholders' interests within the setting of natural resource governance, interests are also "based on action orientation, adhered to by individuals or groups, and they designate the benefits the individual of group can receive from [a] certain object (Ogada et al 2017: 278). Because interests cannot be measured directly, the way stakeholders behave and what they do regarding natural resources is used as an indicator to determine their level of interests in the natural resource and the governance process respectively (Ibid).

As SA can usefully be applied to natural resource governance it is not only to define the stakeholders and their interests respectively, but to also make a fundamental division between those who affect natural resource governance and those who are affected by a decision or action concerning natural resource management (Reed et al 2009). This essential differentiation into two groups might not be absolute, however, stakeholders can further be categorized according to their relative influence and importance in governance processes. Whereas importance is defined as the needs and interests that are the priorities of aid, influence "refers to the power certain stakeholders have over the success of a project" (Grimble/Wellard 1997: 176). Considering the stakeholders involved regarding their interests, influence and importance, they can be classified into four categories: key players, context settlers, subjects and crowd (see Grimble/Wellard 1997; Eden/Ackermann 1998; De Lopez 2001; Fig. 3). Key Players have both high interest and high influence and thus, they have an essential role in natural resource management (Reed et al 2009; Ogada et al 2017). Context Settlers are defined as those having low interest despite being highly influential. Because of their importance in governance processes, they cannot be ignored, and hence, they should be monitored and managed (Ibid). Subjects have high interests but lack influence. Mostly, they are key to every process even though they lack the ability to produce an impact. By definition they are supportive. In order to increase their influence, they should form alliances with other stakeholders (Ibid). Actors in the Crowd have neither influence nor interest. Therefore, there is little need to consider them in much detail unless they are changing their interest or influence regarding the topic over time. By then, their impact should be considered (Ibid).

Due to this complex web of interests as well as trade-offs between the different interacting stakeholders within the natural resource management schemes, conflictive interests and therewith conflicts are likely to erupt. Whereas trade-offs relate to a single decision-maker or one decision-making group, conflicts always erupt between at least two individuals or stakeholder groups (Grimble/Wellard 1997).

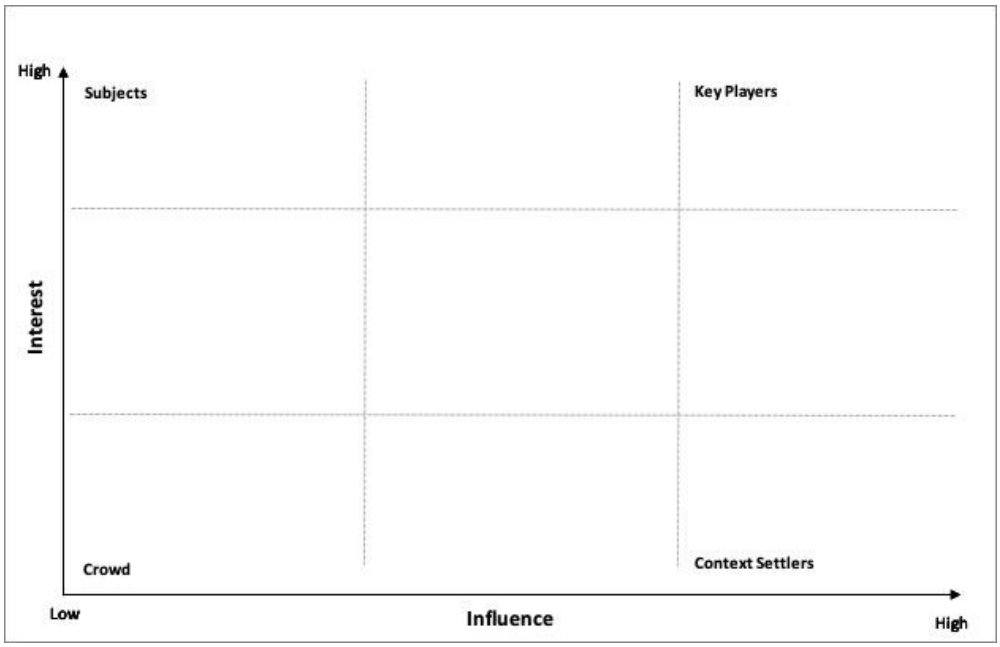

Fig 3: Stakeholder Matrix (The Author, based on Grimble/Wellard 1997)

Conflict Analysis framework

Conflict Analysis is a supportive tool to understand why some actors turn to cooperative behaviour while others are more conflictive. There is a large amount of literature analysing conflicts and defining conflict (see e.g. Fisher et al. 2000; Kriesberg 2007; Ramsbotham et al. 2011; Bercovitch et al. 2013). The Conflict Sensitivity Consortium (2012) defines conflict analysis as "a structured process of analysis to understand conflict, focusing on the conflict profile, the actors involved and their perspectives, the structural and proximate causes and the dynamics of how these elements interact" (Conflict Sensitivity Consortium 2012: 4). The literature on conflict analysis is diverse, however there is some agreement on the core concepts to describe conflicts: profile, actors, causes, dynamics, triggers and scenarios.

Being able to formulate the conflict profile, the overarching question guiding this indicator is *What is the context shaping the conflict?* (Fisher et al. 2000). Analysing the conflict profile, one points to the history of the conflict, including previous death tolls, used methods of violence, or analysing where the conflict took place and who was targeted. To understand the root causes of the conflict profile, furthermore, the role political, economic, social and environmental institutions play and how the latter structures the conflict profile is taking into consideration as well (Mason/Rychard 2005).

For a detailed understanding of the relationship of the actors in conflict, a differentiation between the actors on different levels of decision-making should be made. On the national level of decision-

making, the main actors involved are usually national governments, ministries or groups among them. On the local level, individual citizens and community groups are the main actors of interest (Ramsbotham et al. 2011). To understand the control of power between the actors vis-à-vis the conflict, the actors' position, interests, concerns, hopes and/or fears are analysed. This is helpful on the one hand to deduce the power relations as well as to relate the actors to each other. Based on the aforementioned, one is able to conclude on possible conflict trends, and to set out the strategic balance between the actors, including conflictual, cooperative or business relationships (Fisher et al. 2000; Newmann/Richmond 2006).

Drawing on the identification of the profile and actors of a conflict, in a next step, the underlying motives and causes present themselves. The underlying issues of conflicts are complex and multi-causal and therefore it is key to distinguish between different types of causes, influencing factors and outcomes on all relevant levels of decision-making. The most frequent differentiation is between structural and proximate causes of a conflict. While structural causes are long-term or strategic causes which are built on norms, structures and policies within a political and social system, proximate causes are more recent ones and change quickly (Berdal/Keen 1997). They can accentuate structural causes and therefore lead to an escalation of a violent conflict. Lastly, as conflicts develop over time it is important to adopt a chronological, contextual and dynamic approach when analysing a conflict. Hence, it is inevitable to consider the outcomes as well as the conflict causes (Woodward 2007).

The dynamics of a conflict result from the description and interaction of the already mentioned indicators (Fig. 4). Paying attention to the dynamics helps to understand whether, why and how the conflict is escalating, intensifying, decreasing or spreading. Mapping the conflict dynamics is an approach allowing to focus on latent as well as manifest violence and being able to identify potential outbreaks of violence. Mapping the overall conflict is a method "of presenting a structured analysis of a particular conflict at a particular moment in time" (Ramsbotham et al 2011: 89). Based on the forgoing analysis, the conflict is represented geographically by placing the actors in relation to the problem and conveying the relationship between the actors geographically. It gives a greater insight into the motivations of the different parties and might help to explain why some misunderstandings or misperceptions between the actors emerge. The dynamic setting of the conflict mapping allows to reflect on the conflict dynamics also within changing situations. A conflict mapping also portrays how the actors and their relations to each other are placed within the overall conflict setting (location of the conflict). The map and the analysis thereof allow to differentiate structural from actor-oriented factors by synthesizing system and actor approaches (Mason/Rychard 2005; Ramsbotham et al 2011).

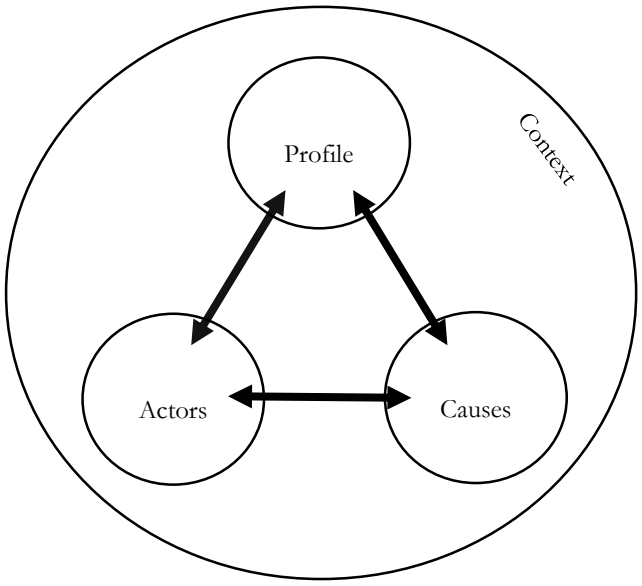

Fig 4 Visulaising the conflict dynamics (Adapted from FEWER et al. 2004: 2)

Merging Stakeholder Analysis and Conflict Analysis, the eruptions of conflicts depend on the impact of external stressors on the actors' feasibility to achieve their goals. Thus, very powerful actors are able to withstand the impacts of political or socio-economic changes or adverse impacts of other actors "within the limit of their own capability and sensitivity" (Scheffran/Link/Schilling 2012:114). Thus, conflict varies in the actor's goals, spatial signature, their reliance upon physical geographies and their adaptive capacity to respond to socio-economic changes the actor's find themselves placed within.

Given the development of the aforementioned concepts, both can be applied not only to ecology but also to environmental-human risks and interactions (Ibid). Risk is commonly understood as the outcome of the relationship between the likelihood of an event to happen and its general impact on the society (Scheffran et al 2012). A relevant risk in this study refers to conflicts between local actors originating from a human induced water shortage. Conflict for the purpose of this study emerges between at least two actors who fail to achieve their goals and to manage their differences to tolerable levels due to incompatible interests.

Data Collection and Analysis

Data Collection

Study approach

The aim of the undertaken study is to identify the main actors located around Lake Naivasha as well as to what extent the actors contribute to water shortages around the Lake. Based on the first aim, we have been furthermore interested in how and why these actors turn to conflictual and violent

behaviour. Using Stakeholder Analysis our aim was to classify the main actors around Lake Naivasha into the aforementioned four categories and draw conclusions about visible and subliminal conflict dynamics. Therefore, the main data collection method is based on qualitative and interpretative social research (see Rosenthal 2018). Qualitative and interpretative social research combines multiple forms of interviews and field research (Ibid). The aim is to describe the world from the perspectives of the actors and to "study complex social actions and practices in everyday situations" (Ibid:15). Prior to fieldwork, extensive literature reviews on the natural resource-conflict nexus were conducted. Thereafter, participatory research within the lake basin and interviews have been the main method for data collection. Applying the data collection to the theoretical framework of Stakeholder and Conflict Analysis, we followed a five step approach to analysis of the received data (see Reed et al 2009): (I) Stakeholders around Lake Naivasha were identified and how they contribute on the environmental situation at Lake Naivasha, (II) the stakeholders have been categorized; (III) information was collected via interviews and observations and analysed; (IV) the relationship between the stakeholders were investigated and put into an "interest-influence" matrix and a network; and (V) a conflict analysis of the primary stakeholders in conflict was drawn.

Literature Review

A review on the literature on the natural resources – conflict nexus reveals that adequate investigations on the causal path of the nexus have so far been obstructed by theoretical and empirically divides. A number of studies discuss the potential links between natural resources, climate change and violent conflict (e.g. Scheffran et al 2012a; Theisen et al 2013; Ide/Scheffran 2014; Hsiang/Burke 2014; Ide et al 2016; Ide 2017; Theisen 2017). The causal path of the investigated nexus is still unclear and the extent of the effect of climate change on violent conflict is heavily discussed, especially in regions that are highly vulnerable and exposed to the effects of climate change (see Seter et al 2016; Ide/Schilling et al 2014). According to the Intergovernmental Panel on Climate Change (IPCC) countries and regions increasingly face the risk of being vulnerable to climate change and therewith to experience violent conflict if, they are (I) exposed to climate change, (II) sensitive to climate change, and (III) their adaptive capacity to respond to the first two components is low (IPCC 2007). Hence, the geographical focus of studies linking the magnitude of natural resources, climate change and conflict in Africa is mostly concentrated on areas which experience resource shortages and conflicts most time of the year (e.g. Schilling et al 2012; Maystadt 2015; Almer et al 2017; Solomon et al 2018), e.g. the Turkana Region in Kenya, the Kenyan-Ugandan border region Karamoja as well as the Ilemi Triangle (Kenya-Ethiopia-South Sudan).

The debate on the natural resource, climate change and conflict nexus is dominated by three perspectives. The environmental security literature (Homer-Dixon 1994/1999; Gleditsch 1998; Theisen 2008) of the 1990s is linking environmental change, resource degradation, scarcity and violent conflict. The scholars draw attention to the devastating impacts of climate change and population pressure on human security and political (in)stability especially in countries of the Global South (Dalby 2008; Camill 2010; Davis et al 2015; O´Brian/Barnett 2013). In course of the growing interest in global climate change and its political and societal impacts, this academic debate has been reviewed and revived (Hsiang et al 2013; Ide 2017). Whereas quantitative studies focus strongly on causal linkages on the global and national level of decision making (see Detges 2014; Scheffran et al 2012a; Maystadt et al 2015; Ide 2017), qualitative studies untie the relationship between climate-resource and conflict

on the local level (see Scheffran et al 2012a; Schilling et al 2012; Seter et al 2016; Ide 2017). Second, political ecology (Blaikie/Brookfield 1987; Peluso/Watts 2001; WBGU 2008; Scheffran et al 2014) argues that the influences of the international political economy as well as geopolitics has to be included in the analysis. The scholars stress that violence and conflict are site-specific phenomena which are mostly rooted in local histories and the political, institutional and social context (Peluso/Watts 2001). Third, scholars investigate through sophisticated models the relationship between resource wealth, governance structures and conflict (see Auty 1993/2004; Le Billion 2001; WBGU 2008; Mildner et al 2011; IPCC 2014). Whereas the resource curse literature explores the potential negative impacts of resource wealth on the socio-economic development, the institutions and the social stability of countries (Le Billion 2001), Mildner et al stress the importance of rent-seeking behaviour and corruption on resource distribution on violent and conflictual behaviour (Mildner et al 2011).

Frequently, the supposed link between environmental scarcity and political conflict is exemplified also in the debate over water. Whereas in the media there are only condensed statements about the connection between water scarcity and conflict and popular science already predicts 'climate wars' (Welzer 2012) or 'water wars' (Dinar et al 2011), the link between these two components is inadequately understood to this day. Existing studies can broadly be separated into two groups: studies focusing on water shortages and inter-state conflicts and those focusing on water shortages and intrastate conflict. Studies find increasingly support for the argument that water scarcity provides the impetus for cooperation when the water bodies are shared by at least two countries (Ibid). According to the Transboundary Freshwater Dispute Database there is evidence that conflicts over shared water resources are decreasing and at the same time international water agreements have been increasing over the last decade (Carius et al. 2004; Transboundary Freshwater Dispute Database 2019). Studies on water shortages, water governance and intrastate conflict primarily focus on geographical areas which are classified of being either in a state of water stress or water scarcity due to the climatic conditions (e.g. Toset et al 2000; Hogdson 2016; Kummu et al 2016; Pekel et al 2016; Damkjaer/Taylor 2017). These studies conclude that '[u]nusually dry conditions trigger small-scale conflict by intensifying the competition for water' (Almer et al 2017: 202). Water conflicts in especially arid regions involve competing groups of pastoralists, farmers and villagers due to their different interests over the use of water (Ibid). In 2012 for example, extensive violence over water was observed in the north of Kenya resulting in the death of more than one hundred people (see Gleick/Heberger 2014).

Even though temperature increases and changing rainfall variabilities are inevitable variables explaining the resource-conflict nexus, water is a contested economic resource and therefore the implications of political, economic and social circumstances intensify the resource situation (Nsubuga et al 2014). Conflicts over water bodies are therefore not necessarily only caused by a lack of water, but can also be the result of poor water governance structures (Kabote/John 2017). Political corruption (Transparency International 2018), low GDP per capita, population increases (World Bank 2018) and an unsustainable handling of the resources destabilizes countries and intensifies the countries vulnerability to experience water-related conflicts. These potentially destabilizing factors are indicators pointing to a correlation between water shortages and conflict also in water abundant areas. Therefore, several studies illustrate (e.g. Scheffran et al 2014; Schilling et al 2014) how longer droughts resulting from global climate change in combination with other socio-economic activities has fuelled

violent conflict as water levels of water bodies decreased. The spiral of violence between different pastoralist groups but also between farmers and pastoralists is due to a variety of factors, including environmental degradation, loss of access to land but also due to political infrastructure projects, e.g. the construction of oil pipelines in the north of Kenya (Scheffran et al 2014). The Kenyan economy and its citizens' livelihoods still rely heavily on agricultural sectors. The arid and semi-arid areas in the northern and eastern parts of Kenya are inhabited by pastoralists (Theisen 2012). Apart from these socio-economic activities, it is out of question that water and pasture are necessary for the survival especially for residents in rural areas. In these areas farming and fishing is for many people the main source of income. Thus, these population groups are reliable on water for livestock keeping, rain-fed pasture but also on water for domestic use (Njiru 2012). As these people do not have an alternative source of income, they are especially vulnerable in case of prolonged droughts or floods.

Key informant interviews

Following the literature review, a five-week qualitative field research was conducted in Kenya and Uganda and especially around Lake Naivasha. Prior to the research trip, three informal phone interviews have been conducted getting an understanding of the situation on the ground as well as to gather information about the main topics of interest. The field research in Kenya in July and August 2018 consisted of 20 expert interviews from different international, national and non-governmental organization in Nairobi and Naivasha. Experts were interviewed using a semi-structured questionnaire to gather the research objects while leaving room for the interviewees to talk about other topics they consider to be relevant affecting their daily livelihoods. The undertaken 16 interviews in Nairobi have been formal and took place in English. The remaining four expert interviews took place in Naivasha. Furthermore, we have been able to participate at a local stakeholder meeting of different actors working within sub-national resource management. The information received were more informal but allowed us to gain relevant insights into sub-national and local resource governance schemes and national decision-making processes. It further provided important insights who makes the final decisions when it comes to resource governance and how this relates to cooperative and non-cooperative behaviour between the different stakeholders involved. The interviews were successful for obtaining useful and relevant information. Even though some questions touched potentially sensitive issues, including the use of chemicals, our impression was that the respondents were not reluctant to discuss such issues.

Group Discussions and Observations

Besides expert interviews, the field research also involved six community member interviews living around the lake sites. Contrary to the expert interviews, the community interviews have not been structured and were conducted in Swahili translated into English simultaneously by a local research assistant. This open method gave the community members the opportunity to talk about issues they find most pressing as they threaten their everyday survival. Moreso, these types of interview allowed them to talk about topics they consider to be relevant affecting their daily livelihoods. The aim of the group discussions and observations was to obtain insights on levels of input into decision-making and on the importance of villagers and farmers' engagement in water and other environmental diversification schemes. Observations and community interviews were used to get an overall impression of the lake and its surroundings as well as to understand the organization of water distribution and allocation to the variety of actors. The used approaches were helpful to understand

the complexity of the water organization to the actors living around the lake sites but also to do a mapping of the area and to show where the actors and economic sites are located (see Fig 2).

Limitations

However, the study has also limitations. Whilst the information included was triangulated with desk research, additional interviews and observations, it was not always possible to validate the statements made by the interviewees. Furthermore, our results are based on a small sample of interviews and a first observation of the lake sites. Hence, the conclusions drawn from this study are location specific and preliminary and cannot be generalized as they need further examination. Furthermore, preliminary results only include national and local actors. The role of international actors is only assumed drawing conclusions from the information gathered throughout the interviews and observations but so far without further validation. The study was designed to identify the different actors most affected by water shortages compared to those contributing to water shortages and to get an understanding of the type of conflictual behaviour actors turn to.

Results and Discussions

Stakeholders interactions and analysis

The analytical strategy adopted in this study i.e. defining priorities for what to analyse and why, and what to do with the data (Yin 2003) was guided by the Stakeholder Analysis. Hence, the main stakeholders were identified, using desk research, expert as well as community interviews and observations. These identified stakeholders were then classified into four different groups found on both local and national levels of decision-making: political actors (national), economic actors (national), resource users (local) and NGOs (local). International NGOs are excluded as their focus is foremost on Nairobi as well as the arid areas of Kenya in the North of the country. Thus, so far they have little interest and little influence in decision-making processes at Lake Naivasha basin.

Political Actors (national)	**Resource Users (local)**
Government of Kenya	Pastoralist Groups
County Government Nakuru	Fishing Community
Ministry of Environment, Water and Natural Resources	Farming Community
	Villagers at Lake Naivasha and in the upper catchments
Department of Water	
	NGOs (local)
Economic Actors (national)	Lake Naivasha Riparian Association
Flower Farms	Lake Naivasha Water Resource Users Association
Hotels	Community Forest Association
Geo-thermal industries	
Power Plants	

Table 1: Stakeholders at Lake Naivasha basin and their categories

In recognition of the identified stakeholder groups, the conducted interviews and observations have been used to identify the interests of the stakeholders concerning the water resources at Lake Naivasha. Whereas political actors are foremost interested in an economic development of the area in

order to increase the Kenyan GDP as well as the export and tourism sector, economic actors primarily are interested in a preferential access to the lake's resources to pursue their economic business. Local resource users have different interests regarding the land and water resources around Lake Naivasha. On the one hand, pastoralists use land and water for watering and grazing their cattle, farmers on the other hand need land to pursue their agricultural business and to water the fields. Fishermen are interested in free access routes to the Lake's shorelines and villagers need water and land for everyday live activities, including e.g. cooking, drinking, washing.

Equally to interests, influence cannot be determined directly. The stakeholders' influence in water

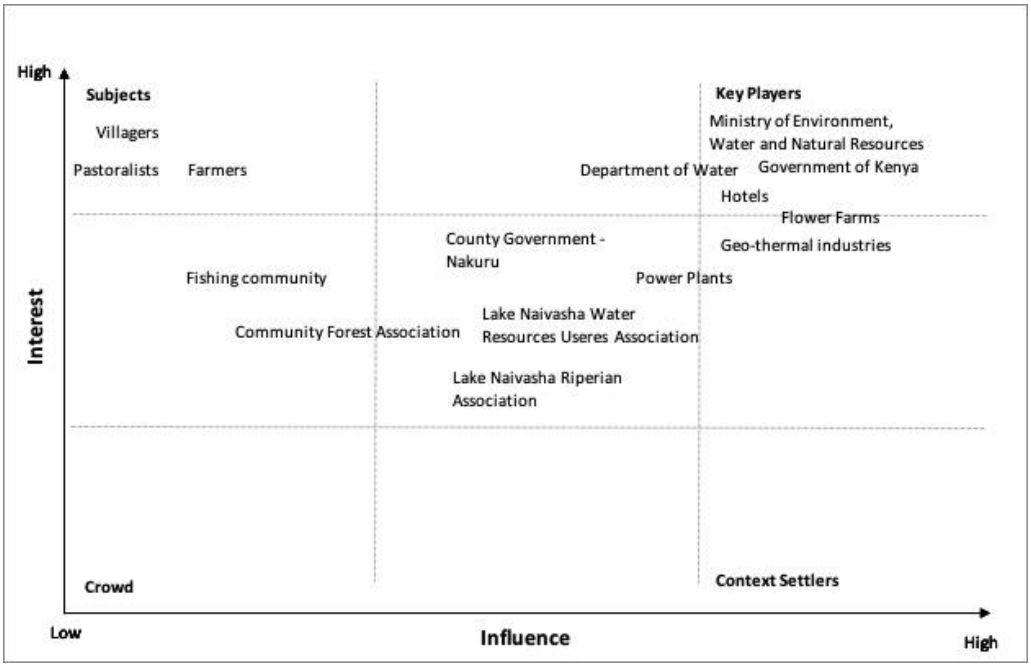

Table 2: Interest-influence" matrix of stakeholders at Lake Naivasha basin (The Authors based on Reed et al 2009)

governance processes was identified by their statutory role in water management processes, their length of involvement in water management processes, and their existing rights to water as a resource within Lake Naivasha basin.

The majority of political actors, excluded the County Government Nakuru, have high influence. Their functions are in drafting, formulating, regulating, coordinating, and implementing water policies and strategies. Moreover, it is on them to decide about the allocation of land around the basin to the different stakeholders. Even though Nakuru County Government was formally given more influence over decision-making processes directly concerning governance processes due to devolution, it still lacks the necessary structures and resources for an adequate water resource management. In addition to the political actors, also economic actors are highly influential in the area. due to their contribution to the economic development of the basin area but also the country in general. They are further in control over the resources as well as they improve the livelihood of the local resource users by offering labor to the villagers. The economic actors' high interest is also driven by economic gains. Local non-governmental organizations are foremost classified as having semi influence and semi interest. This is due to their given responsibility by the national authorities to supervise and coordinate matters related to the environment as well as to oversee the implementation of policies relating to the environment. The attempts by these local political actors and NGOs to acquire control over political actions

concerning environmental management processes have failed. Their semi-interest is rooted in the fact that their capacities to initiate own natural resource processes is low and furthermore the basin still experiences environmental and water quality degradations despite efforts to counteract these trends. Nevertheless, they are interested in the sustainability of the resources as well as to benefit from the resources for the local actors and to increase production and income from the water use. The local resource users rely on the basin's resources to manage a sustainable way of life, but their influence regarding natural resources governance processes is close to zero. Based on the method of Stakeholder Analysis and taking into consideration the iterative process, the analysis allowed to classify the four stakeholder groups in an "interest-influence" matrix. This matrix displays the groups' attributes and inter-relationships (Table 2).

Analysis of the Conflict relationship

Using data from the interviews on the strategies of resource procurement, resource access principles and every-day life routines, sources of dispute and dispute settlement, we identified conflict interrelationship between local resource users is the highest. Visualizing the conflict dynamics, a network was drawn (Fig.5) linking the local actors to the observed conflictual tensions and the identified main environmental aspects contributing to water shortages and therewith the eruption of water conflicts. The ties indicate a direct relationship between the actors, the conflictual behavior and the environmental impacts on the water situation. The different nod shapes and colors represent the different categories of stakeholders. The ticker the nods, the stronger the ties between the different actors. The numbers represent a higher frequency of the mentioned and observed relationships. While the network is almost cohesively held together, some nods are isolated from the main group. The isolation implies that there is a low connectedness to the other nods of reference. While the lines refer to a direct relationship between the different points of reference and conflictual behavior due between the stakeholders have already taken place, isolated nods so far only play an indirect role for the outbreak of conflicts but nevertheless have been identified as potential future avenues of conflictual behavior as they contribute on the decrease of the environmental and water situation respectively.

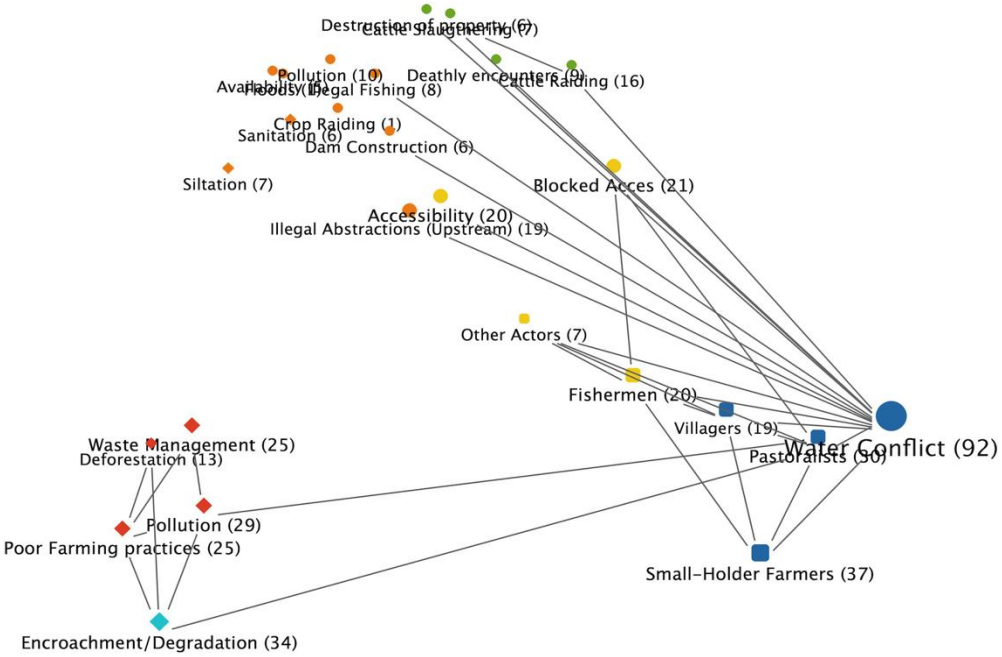

Fig 5: Stakeholder-(Water) Conflict – Environmental Impact Network (The Authors 2019)

Merging Stakeholder Analysis and Conflict Analysis, the Stakeholder-Conflict Network (see Fig. 5) shows that local low-key conflicts between local resource users result foremost from water pollution, land encroachment, upstream deforestation, unsustainable farming activities, overuse of chemicals, and increased pressure on the water access points. These low-key conflicts arise due to conflictive interests in regards to the use of water. The conflicts are understood as sabotaging the livelihoods of the other actors living around the lake. For instance, farmers construct fences around their land to stop pastoralists from grazing their cattle. Fishermen protect their landing beaches by setting up provisional fences or by night guards in order to prevent farmers and villagers from accessing water and encroaching on their land. Moreover, more forceful actions between pastoralists, farmers and fishermen include cattle raiding and the destruction of fishing boats or agricultural land. Recently, cattle are slaughtered or people get even killed when trying to access the lake's landing beaches (ACLED 2018). More recently, however, the limited access to water basins and unavailable or unaffordable water infrastructure become major drivers of these conflicts. Until now, these conflicts have not escalated into full-blown rebellions, riots or even armed conflicts.

Even though the conflict dynamics manifest themselves so far between local resource users, stakeholder analysis posits that political and economic actors exacerbate these conflictive interests and therefore indirectly influence local resource users' conflicts. Due the political actors' interest in increasing national economic activities and economic development and upgrading, governmental actors support the companies' economic activities. Among others, the Kenyan flower industry is the third largest in the world and among the top drivers of the Kenyan economy. The flower production in this basin contributed over 70 % to Kenyan flower exports (earning US$ 400 million in foreign exchange per year) (KNBS 2018). Furthermore, in 2017, the floriculture industry contributed about US$ 180 million to the basin's local economy (Ibid 2018). Because of its picturesque setting, Lake Naivasha is among the top tourist hotspots in Kenya. The tourism sector contributed directly almost 10 % to the country's GDP in 2017. Therewith, contributions retrieved from tourism are among the top six accounting for Kenyan GDP (WTTC 2018). The political actors' interest in economic stakeholders is portrayed by e.g. granting national and international companies a preferential access to land around the Lake to pursue their businesses. Thereby, economic actors are given the permission to turn public land into private land, granting them tax reductions or a preferential access to the national market. National but also international economic actors' interest are guided by the will to acquire the necessary resources to shape the economy for their own benefit. In the case of Lake Naivasha basin, international companies need land and water to grow flowers as well as fertile soil and semi-arid clime. National economic companies use the picturesque setting of the Lake to follow tourism.

Because Kenya's political system concentrates power in the hands of the president and his political cronies, the influence of the political stakeholders is high and therefore their influence on local and sub-national resource governance exacerbates economic inequalities. Even though, land and water in Lake Naivasha basin are essential to the livelihood of the majority of its residents, local resource users have the least influence and therefore suffer the most. However almost all local actors held national and international economic companies as well as the national political elites accountable for their experienced water shortages, strikingly, local populations challenge the investors through non-violent protest as some residents of the informal settlements are employed at the farms and hotels. While they demonstrate against the companies for the right to access former public landing beaches and water

access points, national and international actors turn a blind eye onto these conflicts. Merging Stakeholder and Conflict Analysis, conflicts occur both at the micro level and between levels. Whereas the micro-level conflicts between local resource users are visible, in-between level conflicts are so far subliminal.

Natural resources, thereby foremost water in the case of Lake Naivasha, is less the reason for conflicts than a trigger that finally leads to confrontational behaviour. Taking into consideration the conflict context, farmers, fishermen, and pastoralists perceive themselves to be over a longer period of time politically, economically and socially marginalized and forgotten by the political elite. Hence, these are the root causes and structural factors of low-key conflicts and disputes. A badly implemented water governance scheme, or the lack thereof, for the local actors reduces their capabilities to adapt to the changed socio-economic system which precipitated low-key conflicts between them. Consequently, the link between human induced water shortages and low-key conflicts is likely to happen in those situations where political institutions and governance structures are either missing, have failed or are weak. Thus, political stakeholders are not able or so far unwilling to increase the influence of farmers, fishermen, pastoralists and villagers to adapt to the socio-economic changes taking place around Lake Naivasha. Therefore, the preliminary findings point to a potential 'institutional failure-conflict' nexus. Our preliminary findings also suggest that environmental changes due to climate change only indirectly impact on the water situation in the area surrounding Lake Naivasha.

Strategies for reducing water shortage and conflicts

Whereas the earlier chapters have examined how different stakeholder groups are affected by and contribute to water shortages within Lake Naivasha basin and therewith are prone to experience water induced conflicts, this part of the paper builds on strategies of how water induced conflicts can be reduced. The previous analysis revealed that conflictive behavior due to water has two distinct but inseparable features: (I) water supply and (II) water accessibility. While water supply corresponds to the withdrawal of water either from the surface, sub-surface or from another sources, water accessibility relates to transporting the water from a source and rendering it available for an indented use – both in quantity and in quality (UNESCO 2019). However, as we have shown in the foregoing discussion, an even-handed access to and supply of water sources is substantially dependent on political institutions and its political and economic decision-makers on a national but also sub-national level as well as the interests and influences of international and national stakeholders. Pathing the way towards a better water resource management in Lake Naivasha and therewith decreasing water induced conflicts, we propose two strategies.

As at Lake Naivasha basin local, national and international stakeholders are interrelated, first, a multi-level-governance approach is a necessary precondition to achieve political, economic, but also environmental aims. Especially local NGOs and Nakuru county should be given more responsibility formulating, implementing and monitoring decision-making processes concerning Lake Naivasha basin. For local NGOs and subnational actors to be capable of acting, they need to be equipped financially better as well already existing laws regarding a sustainable and equal handling of water resources need to be implemented and put into action. Especially in the case of Lake Naivasha, international and domestic economic companies influence governance processes whereas often needed reforms regarding the water sector are hindered or governed in an unequally way concerning all stakeholders. Therefore, to reduce water induced conflicts around Lake Naivasha basin, a more

active, free and meaningful participation of all water resource users is inevitable. A good water and natural resource governance approach is aimed at including responsibility, transparency, equity and efficiency but needs to be overall community oriented. It further includes sanctions in case the laws are not followed as well as to held all stakeholders accountable in case of natural resource and policy mismanagement.

Second, local resource users need to be empowered to take action improving their own water situation to decrease their vulnerability. In the case of Lake Naivasha, most local resource users reside within one of four informal settlements within the closer Lake surroundings. However, these settlements lack basic amenities including water infrastructure for fetching clean and safe water but also lack sanitary facilities. As the instalment of water services are often costly, a group-oriented approach covering the three main local resource users' groups will enable them to construct a water infrastructure serving all their priorities and simultaneously reducing the costs for all of them. Furthermore, a better cooperative resource sharing would benefit from a more advanced communication infrastructure between the different resource users' groups. Hence, a community-centered approach also includes regularly held meetings to bring all local stakeholders together providing them with trainings and workshops on a sustainable way using natural resources also in times of unpredictable weather changes but also to increase confidence between the different resource users. In order to stop inter communal conflicts regarding water and other natural resources, it is not enough to bring together only local resource users. To increase local low-key conflict prevention and resolution mechanisms traditional institutions but also peace meetings facilitated by NGOs and government actors need to be promoted. A failure to mitigate the already existing conflicts and to remain with the current status quo will further add fuel to the fire and increases the vulnerability of the affected communities and might lead in the near future to a regional destabilization.

Conclusion

This study has shown at there are a variety of stakeholders in Lake Naivasha dealing with natural resources. Applying stakeholder analysis, we investigated via an interest-influence matrix the complexity of diverse social, political and economic relations and dimensions between the identified stakeholders. The dominant role of governmental institutions points to their pivotal role in regulating, supervising, planning and coordinating natural resource governance despite the advanced devolution process. While economic actors are granted with a preferential access to the basin's resources to pursue their business and therewith contribute to the development of the Kenyan economy, local resource users who dependent on the natural resources for their survival are affected most by water shortages despite their high interest in the basin's resource. Adopting conflict analysis and conflict mapping, we were able to show how and why different local resource users turn to conflictual behaviour within their own stakeholder group.

The list of relevant conflict promoting factors is numerous and reaches from political, economic and social marginalization of farmers, fishermen, local communities and pastoralists, to the unavailability of proper education, population pressure and high levels of poverty up to an unclear landownership system and the uneven availability of small arms. Water-related conflicts in the basin occur in many forms, including dispute over access to water and control over its distribution. However, access, especially denied and blocked access to water basins, as well as the unavailability of water infrastructures seem to play a central role. Man-made water shortages combined with the insufficient water governance schemes on the available resources have two effects: Firstly, due to the increased

pressure, the involved actors often turn to illegal activities of farming and fishing, illegal accessing of landing sites or illegal dam constructions and water abstractions at the upper water catchments. Secondly, especially during dry seasons or prolonged droughts, violent means of cattle raiding, the forced destruction of fishing boats and agricultural land as well as the construction of (electric) fences around water wells or water valleys are used to secure and make use of the limited water resources available. Moreover, the non-existence of sufficient water storage and water recycling systems seems to lead to underlying conflict tensions between the different communities and actors. In the last section we identified possible avenues for reducing future conflicts erupting over the use of water.

As we demonstrated in this article, this perspective focuses on conflictive interests between investors, the government, and the different local population. Whereas the economic and political actors' resilience and adaptive capacity to cope with the economic transformation is high, the local actor's low adaptive capacity is rooted in a complexity of factors including ineffective institutional and governance structures, lacking access to education services to escape from poverty and to increase employment opportunities, increasing population pressure, and an unclear landownership system further add to their vulnerability. The problematic water situation for the people living around Lake Naivasha thus has a social, economic and political side. Overall, preliminary findings suggest that foremost the commercialization and the unstainable handling of water as well as ineffective government structures are the main causes for the high vulnerability of these local actors.

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