

TRENDS AND MANAGEMENT OF WATER RELATED CONFLICTS IN THE UPPER EWASO NYIRO, NORTH RIVER SUB-BASIN OF KENYA

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ABSTRACT

Water conflicts in the Upper Ewaso Nyiro north river sub-basin have huge impact on the livelihoods of the communities AND necessitating the need for a resolution for sustainable use and for peaceful co-existence of water users. The Theory of Access, Game Theory informed the study. Data was collected using primary and secondary sources. Primary data collection tools were structured questionnaires, key informant interviews, focus group discussions and transect walks. Descriptive statistics were used for quantitative data analysis and summative content analysis was applied for qualitative data analysis. Results show that 66.7% and 49.4% of downstream and upstream households respectively confirm the presence of water related conflicts in the sub-basin. The results further show that 60.7% of the households mention conflicts as seasonal while 26.6% state water related conflicts as unpredictable. The findings profile a trend where experienced water conflicts are related to water scarcity. The study further established that 32.6% of the households indicated increased tensions, animosity, quarrels, hostile verbal exchanges, fighting and loss of property as the major manifestation of water conflicts, 31.3% indicated tensions and animosity while 16.9% indicate fighting and loss of property. 23.7% of reports were made to faith-based organizations while 19.5% reported to Water Resources Users Associations. The study established that 43.5% of the conflicts were reported to provincial administration as the authority in conflict management. Finally, the rule of law in water and environmental

management should be main-streamed at all levels from water users to institutions mandated to oversee enforcement.

Key Words: *water resources, upper Ewaso Nyiro, water users, conflicts*

INTRODUCTION

According to statistics from the UN (2014) the continent of Africa is considered as the driest continent with arid and semi-arid areas covering up to 60% of the continent. The demand for fresh water is estimated to rise by 40% in African states and this will cause a lot of conflict in Trans boundary basins by 2030 (FAO, 2009; Rahman, 2013). In spite of the fact that majority of Africans (80%) live in rural areas, only 37% have access to safe water sources (WHO, 2013). Additionally, a study conducted in Tanzania revealed the existence of water conflicts especially during the dry seasons which have been prolonged by activities such poor land management practices, population growth and increase in small holders' irrigation projects (Huggins, 2000; Okpara, et al 2015). According to the findings of Huggins (2000), this conflict ranges from legal disputes to violent confrontations and destruction of property between various communities of water users.

A study by Ngigi (2006) showed that lack of adequate water has been cited as one OF the main challenges that hinder areas in arid and semi-arid lands from achieving high economic development. Because of water scarcity, areas such as Laikipia County continue to experience persistent conflicts over water sources as various water users seek to access and use the existing water supply (Ngigi, 2006). Many river basins in the arid and semi-arid parts of the world are experiencing water scarcity due to water consumption by agriculture resulting in conflicts between upstream and downstream, conflicts between water users, and degradation of the natural ecosystems (Peng, et al., 2014).

Rapidly increasing water demand combined with supply constraints is widely believed to raise the risk of violence over scarce water resources (Bernauer and Böhmelt, 2014; Okpara, et al., 2015). According to Gichuki (2002) water scarcity and conflicts are inseparable because of the link between water resources and livelihood activities attached therefore, lack of adequate water lead to high competition and resultants conflict over use of available water sources. Other social problems such as social inequity, marginalization and lack of source of livelihood that does not dependent on water and land further aggravate the conflicts over water resources (Meyer, et al., 2016). The increasing conflicts for water resources between upstream and downstream regions appeal to chronological insight across the world (Zhou, et al., 2019; Bernauer and Böhmelt, 2014).

Access to water resource in Ewaso Nyiro North River Basin has been contentious for a very long time (Didier et al., 2011; Gichuki, 2002). Many actors, which include pastoralists, farmers, ranchers and agro-pastoralists, mushrooming urban centers, increase in commercial horticulture puts pressure on use of water resources (Bond, 2014). Every party claims the rights to access and ownership to the ever-decreasing water (Zhou, et al., 2019; Bond, 2014). This competition for water results to numerous conflicts, which have led to some of the

farmers resorting to, armed guard to protect their activities (Didier et al., 2011). According to Mwangi (2012) conflicts are related to competition for scarce resources and marginalization of minorities, on many occasions, communities use violence to attempt to regain possession of lost rights or secure access to other land resources.

Stakeholder perception on inequity in water allocation and consumption is according to Bond (2014) a trigger to latent conflicts over water access among multiplicity of water users. While agriculturalists claim titled property rights to land and pastoralists claim unfettered access to grazing and water, ranchers owning wildlife conservancies claim priority access rights over water for their bigger contribution to tourism economy (Bond, 2014). Water users lack coordinated system for sustainable use of water resource in the sub-basin. Given rapid population growth and large-scale commercial horticultural development, climate change in the context of devolution under a new Constitution of Kenya conflicts have persisted over water access (Ogotu, et al., 2014). Resources as the cause of conflict, therefore, came under the scrutiny of academics, conflict analysts and media outlets for their influence in many contemporary wars (Mahlakeng, 2015). Conflicts over water access, use and management happen between and among large-scale farmers, small-scale farmers, farmers and ranchers, pastoralists, small-scale enterprises in urban centers, and wildlife (Gichuki 2002). This study examines perceptions of equity, governance and seeks to find causes for unresolved conflicts mentioned in this introduction.

The ineffectiveness of these institutions is manifested in complaints over unauthorized, illegal and unequal water abstraction and is seen as promoting competition leading to water related conflicts impacting mainly on downstream Laikipia County (Kiteme et al., 2008; Gichuki, 2002). In spite of elaborate policies over the last four decades, lack of coordinated system for sustainable use of water resource by all players in the basin leading to conflict is reported among large-scale ranchers downstream and large-scale farmers upstream (Bond, 2014). Cases of inequalities in access and use of water have also been reported between large-scale commercial farmers and small-scale farmers, farmers and pastoralists, between farmers, pastoralists and wildlife leading to conflicts (Bond, 2014; Kiteme et al., 2008; Gichuki, 2002). Conflicts over access, use and management in the in the Upper Ewaso Nyiro river sub-basin impacts negatively on economic development which depend on water (Bond, 2014). The purpose of this paper was to assess the presence, causes and trends of water related conflicts in the Upper Ewaso Nyiro North River sub-basin and how these are managed for sustainable use and for peaceful co-existence of water users.

THEORETICAL FRAMEWORK

This study was informed by THE a theory of access (Ribot and Peluso 2003) and game theory (Forgó, 2004; Dinar, A., and Hogarth, M. (2015). According to Ribot and Peluso (2003) several mechanisms help us understand conflict caused by access to natural resources. Rights-based access mechanisms include permission to property ownership. The proponents of this argue that access to resources is a clear factor shaping the conflict because it looks at the rights through land ownership. Game theory on other hand describes, “strategic decision

making in which people must cooperate to gain since the loss of one is the net gain of the other (Von Newman, 1944). The study analyzed water access, use and management through the lenses of access theory. The theory is relevant because it fronts the argument to expand conceptualizations of access beyond rights-based approaches to consider a larger array of institutions, social and political-economic” (Peluso and Ribot, 2003). The theory guided the study in assessing whether communities within the study area have equal rights in access, use and management of water resources or whether some users have more rights, which they exploit to the detriment of other users. This theory was relevant in analyzing the relationship between accesses to water, use and management by various users is bound to cause conflict since competition makes individuals or society focus on self-interest. Dinar and Hogarth (2015) argues that both in its non-cooperative (NCGT) and cooperative (CGT) forms, game theory has been central in its contribution to the analysis of important aspects related to water resources.

The study adopted game theory, in assessing existence of collaborative efforts in water resources access, use and management within the study area and the impact of management systems and structures adopted on occurrence of conflicts. Jhavar et al., (2018), Bhagabati and Kawasaki (2014) and Hui, Lund and Madani (2016) also applied game theory as a tool for dispute management in shared resource utilization. The author highlighted that cooperation reduces the disputes among various users of shared resources. Petersen-Perlman, et al., (2017) also used game theory in assessing the trans boundary water conflicts and found that use of cooperation in management of water conflict has gained much awareness.

EMPIRICAL REVIEW

Okpara et al., (2015) found that conflict is a probable outcome only in locations that are already challenged by a multitude of other context-specific factors besides resource scarcity. In the Lake Chad context, the likelihood of scarcity-driven conflict depends on whether vulnerability increases or decreases in the face of a declining water supply. Warurii, (2015) study is based on inter-ethnic conflicts: trends, causes, effects and interventions in Rumuruti Division of Laikipia County, Kenya found that competition for socio-economic resources among and between communities ranked high as a main cause of inter-ethnic conflicts in Rumuruti Division of Laikipia County. This suggests that water may not be the only cause of conflict but can act as trigger to awaken latent discontents, some of them historical in nature, within communities.

Muigua (2014) in a study on natural resources and conflict management in East Africa established that the current framework has not been efficient in resolving conflicts and suggest a need to develop a new approach to conflict management. Yang and Cai (2014) studied practice and strategies for managing water conflicts between human and ecosystems in Canada. Conflicts over fresh water are of increasing concern between human beings and ecosystems across the world. Due to increasingly intensive disturbances by human beings in many river basins, great potential damages and risks are believed to be associated with indigenous ecosystems. A cascade of adverse impacts on water quality and quantity, river

regime and hydraulic features has occurred, leading to many effects upon ecosystems. Managing conflicts over water resources between human beings and ecosystems are thus of great significance in many watersheds across the worlds.

A study by Opiyo et al., (2012) focused on drought-induced conflicts over grazing resources and their study-analyzed a number of factors that spark and aggravate conflicts in the Arid Semi-arid Lands of Northwestern Kenya. The research established a number of factors include competition among water users, persistent droughts, lack of strong institutions to manage equitable water use, political differences and biased property rights over water governance led to conflicts. The study however was not specific on the water use practices and their effect on conflicts among upstream and downstream users. A study by Pandey (2011) focused on understanding patterns of water conflicts: social and political variables. The study reports that conflicts over resources, particularly over water, are couched in different dimensions of politics. Pandey (2011) argued that there is a need to deconstruct the social dimension of water usage and the politics behind its sharing at all levels. The study however, does not mention how politics can be shaped in management of the water conflicts and implementation of existing laws to mitigate the conflicts, the gaps that the current study sought to address.

Mahlakeng (2015) analyzed environmental conflicts: the case of the Nile River basin. The study argues that, given the reduced outputs due to population growth, degradation and depletion of the Nile and its uneven distribution, the fierce competition over the already finite water resources increases the potential for an inter-riparian conflict in the Nile basin. Mahlakeng (2015) points out that solutions to water conflicts should be addressed from the bilateral perspective without giving attention to local solutions as suggested by game theory and Ostrom 8 principles (Ostrom 1990). Similarly, Le Meur, et al (2006) carried out a research on conflict over access to land and water resources within Sub-Saharan Dry Lands. The objective was to help national decision-makers and international development agencies to formulate policies and prioritizing their action for an improved sustainable use of the land and water resources, while resolving conflicts among the different users. The study findings showed the acuteness of local and regional conflicts, often labeled as “ethnic” without further empirical exploration, were deemed to be linked to competing access to increasingly scarce natural resources, land, water or mining products. Le Meur, et al (2006) like Warurii (2015), focused on water conflicts through lenses of ethnicity however the study area is a settlement area consisting of many ethnic groups and therefore issues of ethnicity in water conflict is latent and may not always be the primary cause.

A study by Wiesmann, et al., (2000) on mitigating conflicts over scarce water resources in the highland-lowland system of Mount Kenya found that developments in the area have set the stage for increasing conflicts over water resources. They further noted that water is becoming ever scarcer, especially in the dry areas of the Laikipia Plateau and the Samburu Plains to the north and west of the mountain. The Sub-basin under study is occupied by four sub-counties with the two Laikipia sub-counties depending entirely on water from the other three. The Wiesmann study was conducted before the setup of county governments that now play a

significant role in water governance. The current study will establish effectiveness of water institutions under devolved units in management of water related conflicts under the constitution 2010 (Republic of Kenya, 2010).

MATERIALS AND METHOD

The study area was Upper Ewaso Nyiro North River Sub-Basin which is about 2,175 Km² situated within Nanyuki sub-region (4,232 Km²). It is one of the five sub regions (Isiolo, Mandera, Marsabit, Nanyuki, Rumuruti) that form the greater Ewaso Ny'iro North River Basin (210,000 Km²). Upper Ewaso Nyiro North River Basin is one of the six Kenya's river basins. The study area is traversed by several rivers starting from Naro Moru river to Timau river whose source is the foot zones of Mt. Kenya with only river Moyok originating from the Aberdare ranges. According to the last population census (Republic of Kenya 2009) there are 242,201 people residing here. Pastoralism is the main means of livelihood in the lower regions while crop and dairy farming taking place within the humid regions on the slopes of Mt. Kenya including the Aberdares. Nanyuki town is the headquarters of Laikipia County and is situated within the study area. This study adopted descriptive survey research design since it aimed at studying conditions or events that have already occurred and exist and for this study. The design is also useful in describing the characteristics of a large population, making use of large samples and making the results statistically significant even when analyzing multiple variables. The design also allows many questions to be asked about a given topic giving considerable flexibility to the analysis. Furthermore, the design allows use of various methods of data collection such as questionnaire and interview methods and making use of standardized questions where reliability of the items is determined. The target population of the study were households within northwestern part of Mt. Kenya covering adjacent Sub-Counties of Buuri in Meru County, Kieni of Nyeri County, Laikipia East and Laikipia North of Laikipia County. This study used simple random sampling technique to select a sample of 384 calculated using a formula for a large population recommended by Mugenda and Mugenda (2003) and Gay (1981). The study utilized both primary and secondary data. Primary data was collected through structured questionnaires, interviews, and focused group discussions. Data collection was done with the assistance of a mobile-based georeferenced data management system named K-MACHO. The collected information was saved in the phone and sent to an online database via Internet. The study relied on Key Informant Interviews (KII) to bring out relevant information particularly the technical and institutional, administrative and legislative ones about the study topic and area. Focus group discussions (FGDs) were conducted to gather additional information on accessibility to water and related conflicts. Transect drives and walks were carried out to observe how Water Resources Users Associations, Water Projects intakes operate. Descriptive statistics were used for quantitative data analysis (SPSS version 23) and summative content analysis was applied for qualitative data analysis.

RESULTS AND DISCUSSIONS

Prevalence of Water conflicts

The study findings presented in Figure 1 showed that 66.7% and 49.4% of downstream and upstream households respectively agree on the presence of water related conflicts in the study area. The study noted that high water demand in the region has exacerbated water related conflicts between water users within Upper Ewaso Nyiro North River Sub-Basin.

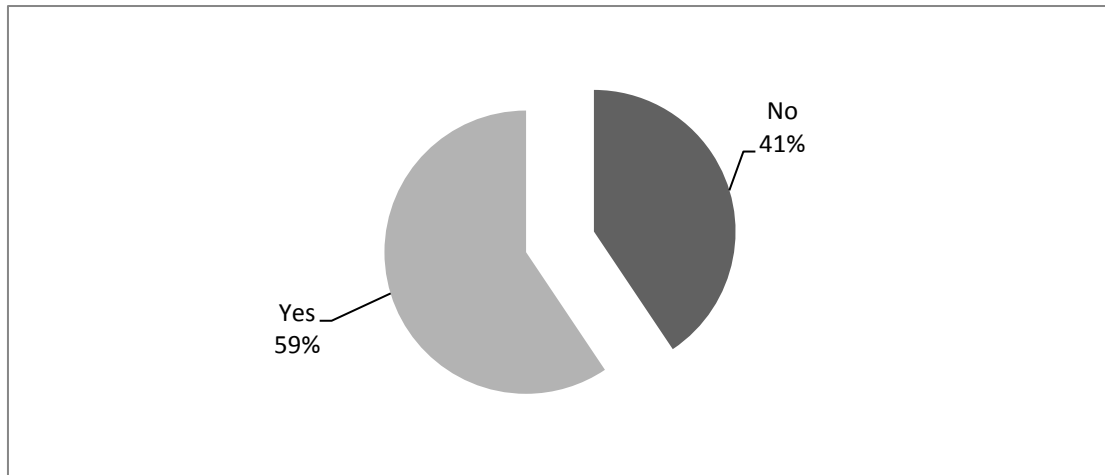


Figure 1: Existence of Water Conflicts

Table 1: Existence of Water Conflicts up stream and down stream

Water Conflicts Existence	Downstream	Upstream
No	33.3	50.6
Yes	66.7	49.4
Total	100	100

The results in this section in Figure 2 indicated that water conflicts in the study regions were seasonal as indicated large percent of the households while other indicated that water conflicts were unpredictable. The findings implied that water conflicts experienced a trend similar to water scarcity or water access by majority of the water users.

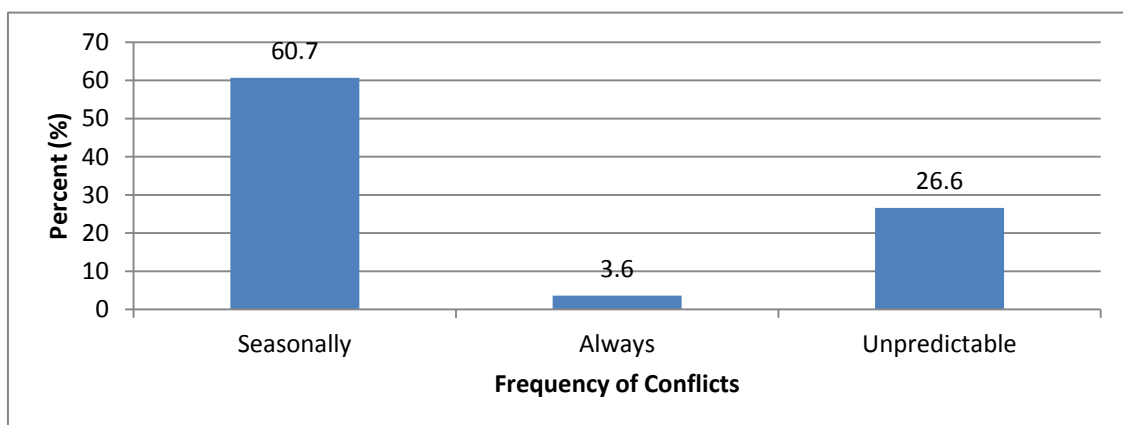


Figure 2: Frequency of Water Conflicts

The respondents were asked how conflicts change overtime from 1970 to 2015. The results shown in Figure 3 show a steady increase in water related conflicts within the study area. The increasing trends in water conflicts could be explained partly by climate change resulting to reduce river flow in rivers. Population and water demands have also been increasing due to economic growth leading to conflicts.

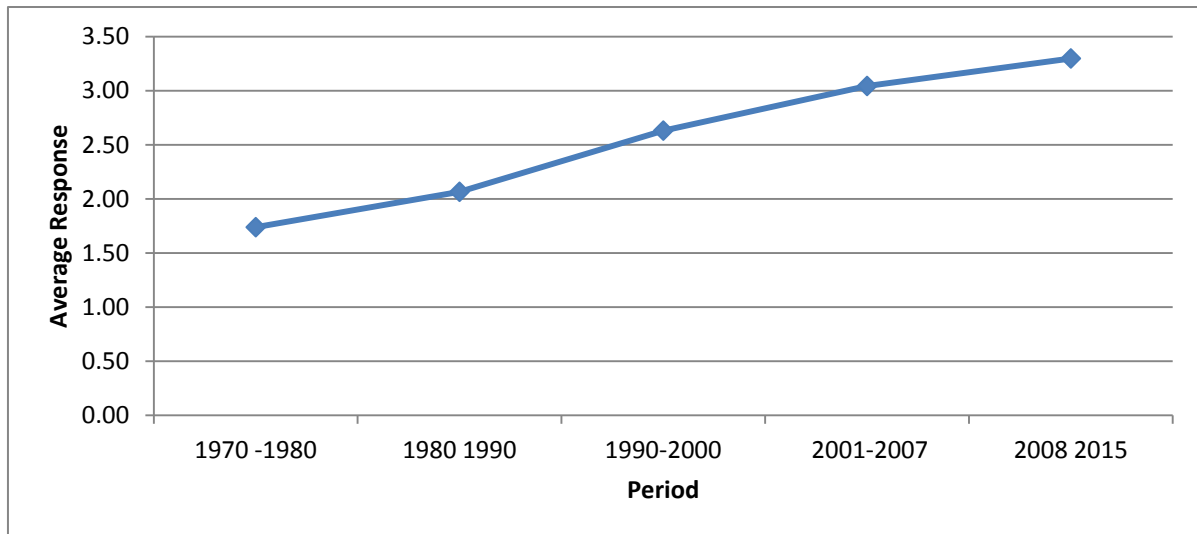


Figure 3: Trends in Water Conflicts Perception by Respondents

According to the results obtained from FGDs, years in which the conflicts were intense are 1984, 1994 and 2015 to 2017 due to water scarcity and prolonged droughts. Increased demand for water due to population growth was also a factor in conflicts during droughts experienced between 2015 and 2017 as this was the period intense conflicts prevailed between pastoralists and ranchers with pastoralists encroaching on ranches to access pasture and water for their livestock.

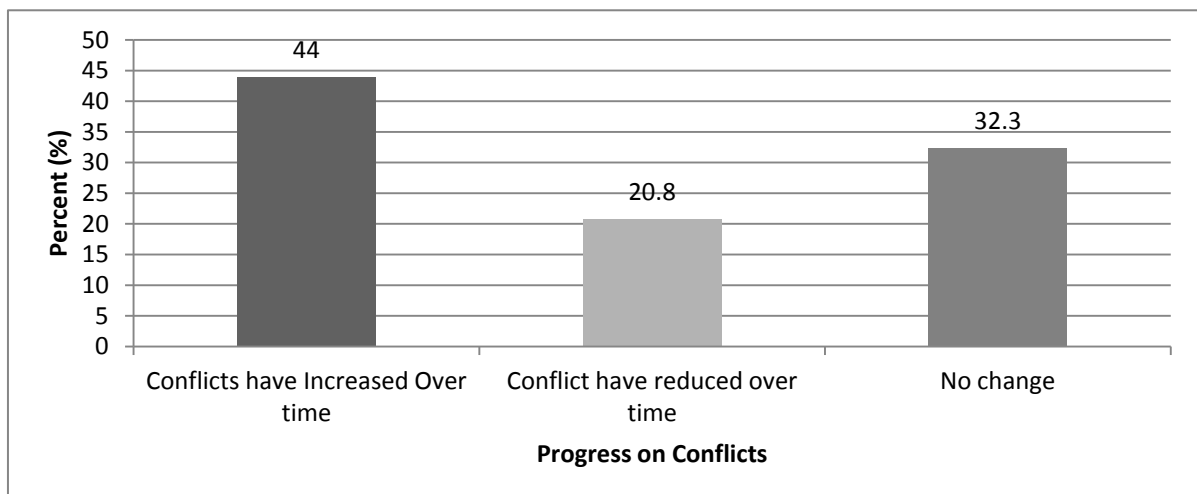


Figure 4: Progress of Water Conflicts over Time

The respondents were further asked to indicate how water conflicts manifested between water users in the study area. The results presented in Figure 5 indicate 32.6% of the households

citing tensions, animosity, quarrels, verbal exchanges, fighting and loss of property as the major forms of water conflicts, 31.3% indicate tensions and animosity while 16.9% indicate fighting and loss of property.

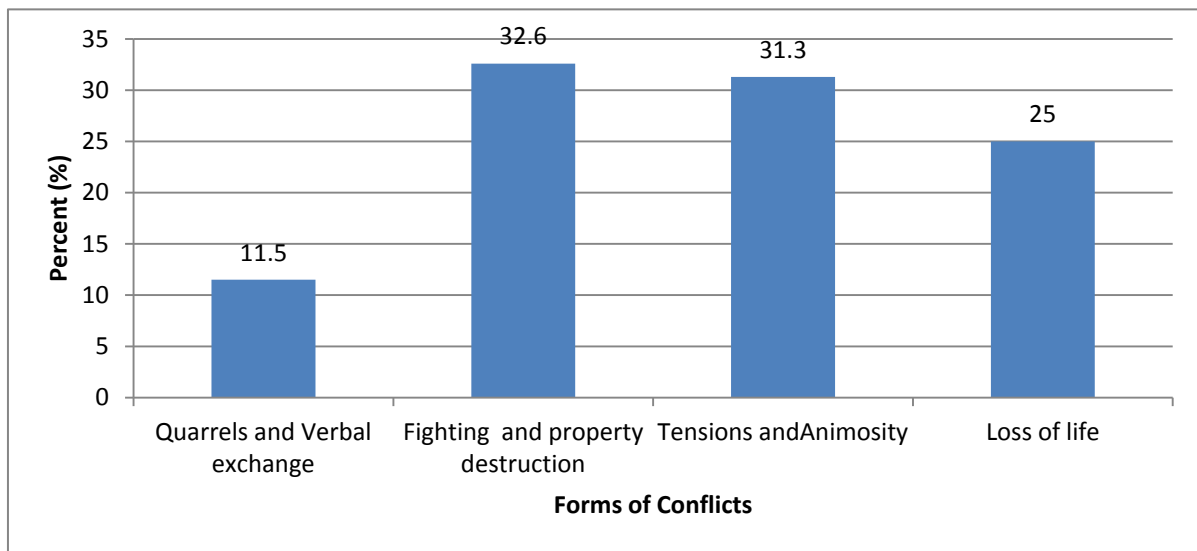


Figure 5: Forms of Water Conflicts

Causes of Water Conflicts

Some of the activities the study established as the source of water conflicts include unsanctioned abstraction and illegal water abstraction, which was mentioned by 54.2% of the respondents followed by lack of proper water management authority as shown in Figure 6.

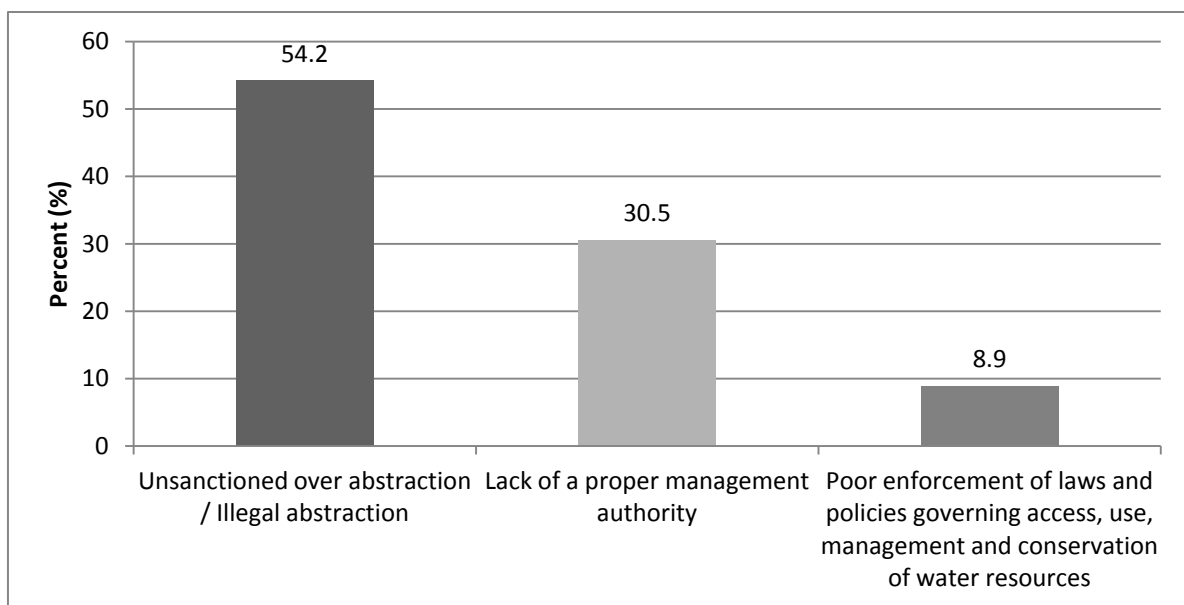


Figure 6: Activities that Cause Water Conflicts

The key informants revealed that water conflicts between large-scale farmers and other users was because of the former over abstracting water, withholding water upstream such that water does not reach them downstream. Encroachment on riparian areas and pollution of

potable water was mentioned as some of the causes of water scarcity. According to revelations by some key informant’s politics played a role intensifying conflicts related to water resources when some leaders incite their community members to block migrant pastoralists from downstream zone from accessing water. This action and corruption within the leadership of those entrusted with water allocation often fuels conflicts especially during dry seasons.

Management of Water Conflicts

Figure 7 shows that majority of the respondents indicate that 43.5% of the conflicts are reported to Provincial Administrations, followed by 23.7% made to faith-based organizations and 19.5% reported to Water Resources Users Associations. The results further show that majority of water users still trust Provincial Administration a security arm of National government to handle water related issues with arbitration between feuding parties.

Involvement of Water Resources Users Associations (WRUAs) in resolving water conflicts was cited previously by other researchers as effective grassroots structures for handling water user conflicts in the study area (Kiteme et al., 2008. This study findings, however, does not confirm this assertion conclusively partly because of conflict of interest of large-scale farmers some of whom share executive membership in the same WRUAs, the same users they compete with on unequal basis over water sharing. Access theory confirms the use of position of influence and capital offering advantage to those in elite positions to gain advantageous access to benefit from resources (Ribot and Peluso, 2003).

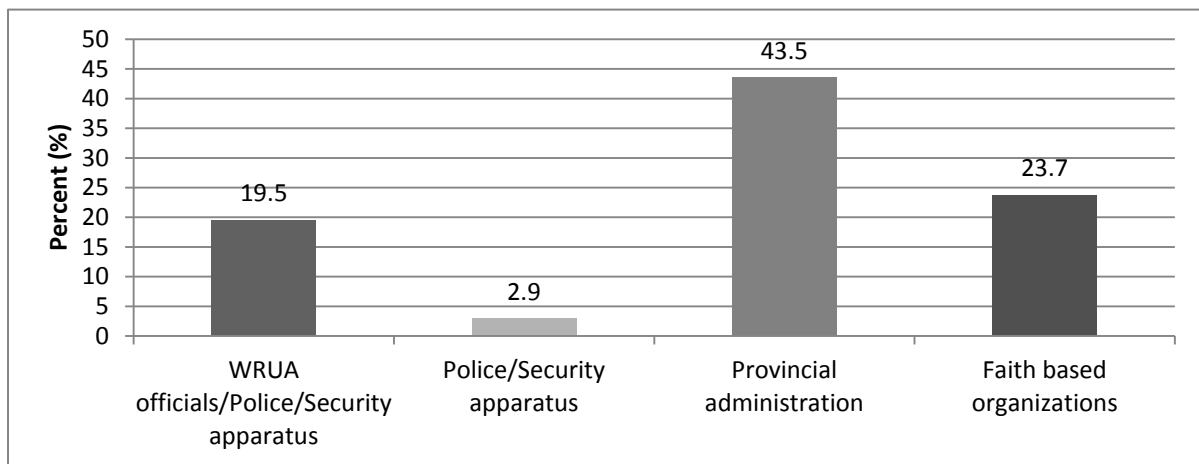


Figure 7: Institutions Where Conflicts on water is reported

The findings in Figure 8 show majority (78%) of the respondents expressed confidence in the capacity and ability of institutions to deal with the conflicts.

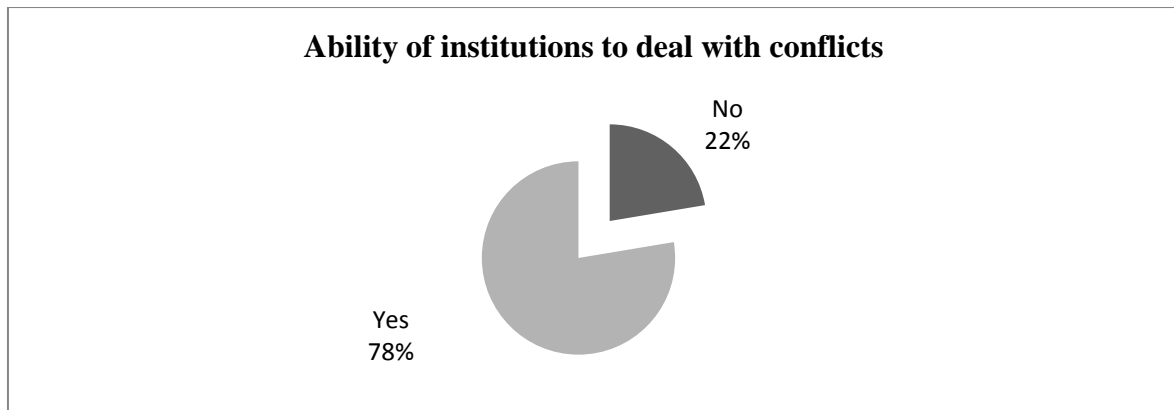


Figure 8: Ability to Deal with the Conflicts by Institutions

The study findings in Figure 9 show that 37% of the respondents indicate that water conflicts were arbitrated between the feuding parties, 20.1% sought legal redress, and 15.6% send warnings to culprits while 12.5% indicate that rule breakers in water conflicts were arrested. The findings suggest that there is no universal way of solving water conflicts. The findings also show that water users tend to trust various institutions to handle water related conflicts.

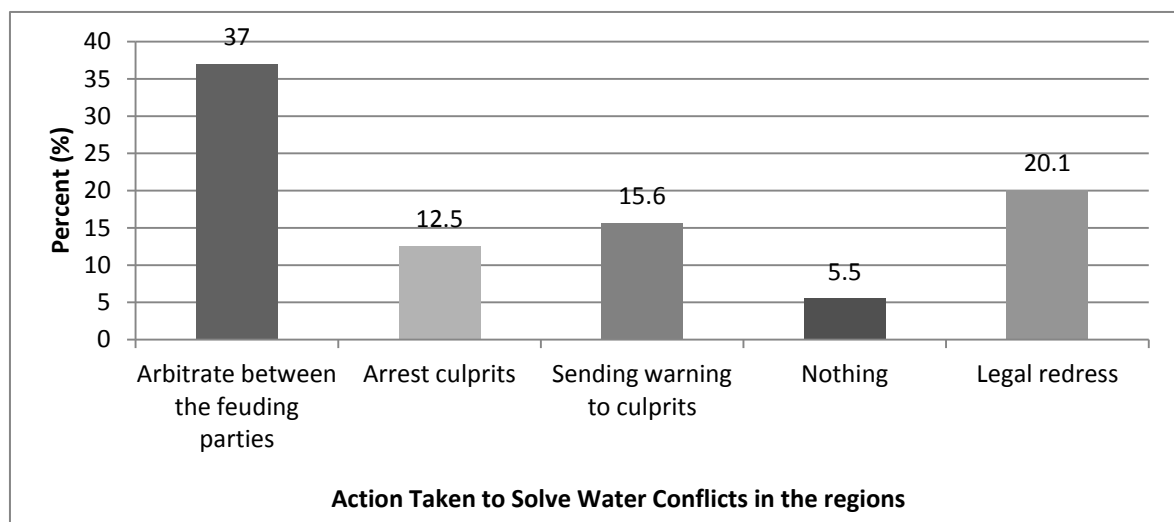


Figure 9: Action Taken to Solve Water Conflicts

From the Focus Group Discussions, the study established that water users have in the past come together to discuss issues and see the way forward such as planning demonstrations against the large-scale farmers who are over abstracting water. However, these initiatives are often not successful because of political interference where some politicians inform the large-scale farmers of their plans then they release the water so the demonstrations do not take place. At times they are denied permission to demonstrate by the authorities since some of these authorities are in collusion with the farmers. The key informants further indicated that instead of the authority of looking for the alternative ways of assisting water users in water scarcity challenges, they instead exploit them by selling them water.

DISCUSSION

The objective of the study was to assess the presence and causes of water related conflicts, and how these conflicts are managed in the Upper Ewaso Nyiro River Sub-basin of Kenya. Results show that 66.7% and 49.4% of downstream and upstream households respectively confirm the presence of water related conflicts in the study area. The results further show that 60.7% of the households mention conflicts as seasonal while 26.6% state water related conflicts as unpredictable with FGD suggesting climate change as a possible cause for unpredictability. Study results show that conflicts were intense in the years; 1984, 1994 and between 2015 to 2017 due to water scarcity caused by prolonged droughts. The findings profile a trend where experienced water conflicts are related to water scarcity. The findings agree with studies by Kiteme et al., (2008) that the months of January and February were among the most dry months of the year experiencing dry seasons and hence a potential for conflicts..

The study further established that 32.6% of the households indicated increased tensions, animosity, quarrels, hostile verbal exchanges, fighting and loss of property as the major manifestation of water conflicts, 31.3% indicated tensions and animosity while 16.9% indicate fighting and loss of property. 23.7% of reports were made to faith-based organizations while 19.5% reported to WRUAs. The study established that 43.5% of the conflicts were reported to provincial administration as the authority in conflict management. Provincial Administration still plays a significant role in water related conflict resolution in spite of its expected diminishing role in the management of local affairs since its role was devolved to county governments under the Kenya Constitution 2010 (Republic of Kenya, 2010).

The findings also show majority (78%) of the respondents expressing confidence in the capacity of institutions they reported water conflicts to. The study findings show that 37% of the respondents mention that water related conflicts were arbitrated between the feuding parties, 20.1% of which sought legal redress, 15.6% sending warnings to rule breakers while 12.5% mention arrests of rule breakers. This in line with game theory as explicated in Ostrom's principles of graduated punishment of water rules violators (Ostrom, 1990). The findings disagreed with Muigua, (2014) who established that the current framework has not been efficacious in resolving conflicts and that there is a need to develop a new approach to conflict management. The finding agrees with Lanari et al., (2018) that established that water conflicts were common during dry season and involved mainly pastoralists and large-scale farmers followed by farmers upstream and farmers downstream getting worse over the years. Warurii (2015) study based on inter-ethnic conflicts confirms the findings in this study of the adverse position pastoralists find themselves in severe dry periods. This finding corroborates those of Gichuki, (2000) who posited that over-abstraction of water resources by large-scale farmers among water users have been blamed for reduced water volumes in the lower reaches increase frequency of conflicts among water users.

CONCLUSION

The study concluded that high water demand in the region has exacerbated water related conflicts between water users within Upper Ewaso Nyiro North River Sub-Basin. The study further concluded that water related conflicts are seasonal and on the increase over the last four decades. The study confirms that downstream water users experience more negative impact of water scarcity with inequality in water access affecting vulnerable downstream water users triggering conflicts between water users upstream and downstream. The study shows that conflicts are mainly dealt with through arbitration between users themselves or reported to WRUAs, faith-based organizations and provincial administration for action. Water users have confidence in the ability of institutions to resolve conflicts but also accuse them cause of reluctance to deal with violations of water use rules as expressed in over abstraction by some water users. The study echoes that ensuring equal access to water resources through respect for institutions responsible for water resources management as established under various environmental laws is the best solution in ensuring reduced water related conflicts.

RECOMMENDATIONS

The study recommends that development of effective communication mechanisms regarding state of water resource to ensure all water users share data and information on water allocation to stem over abstraction or perception of inequality to water access. Also, that agencies mandated with implementation of water regulations should be responsible for disseminating evidence-based scientific research information to water users to avoid current blame game over water abstraction and water pollution based on perceptions. Thirdly, all water users and water providers should invest in water harvesting and water use saving technologies to reduce seasonal water related conflicts.

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