

The Cross-border Paradox: Why Indigenous Rights Matter for a Dwindling Desert Lake

WANGECHI KIONGO^{1,2} and WAMBUGU MWANGI^{1,3*}

¹ Department of Environmental Sciences, Karatina University, P. O. Box 1957-10101 Karatina, Kenya.

² United Nations Convention to Combat Desertification, Platz der Vereinten Nationen 1, 53113, Bonn, Germany.

³ Intergrated Research on Disaster Risk, Beijing 100094, P.R. China

*corresponding author:

e-mail: mwajeffa@yahoo.com

River Omo in Ethiopia supplies over 90% of Kenya's Lake Turkana waters, the largest desert lake in the world and a World Heritage Site. Alteration of the lake's hydrology through hydropower development across River Omo is predicted to lead to a dramatic decline of Lake Turkana's water levels, thereby depriving the over 300,000 indigenous people who depend on it for their livelihoods. In the recent past, the lake has been regarded as an important lifeline for the communities who have been experiencing climate change-related adverse weather events, especially prolonged droughts. In this paper, we use the case study of Lake Turkana to show that climate change coupled with existing political, environmental and economic development initiatives will have profound effects on the ability of indigenous people to access food, water, health and security. We show that the most profound effects of development in the era of climate change are felt by the most vulnerable groups, whose indigenous rights may be violated due to lack of representation, access to information, inadequate education and over-reliance on fragile ecosystems. We demonstrate the weaknesses and opportunities lost for International Safeguards for appropriate Environmental Management in the cross-boarder context. We demonstrate the need for a deliberate, all-inclusive, transparent, focussed and persistent effort for management of cross-boarder natural resources. Future cross-boarder natural resource management efforts require concerted effort between the governments, local leadership, civil society and other stakeholders for sustainability.

Key Words: Vulnerable Groups, Indigenous rights, Climate Change, River Omo, Lake Turkana

Introduction

Lake Turkana is the world's biggest permanent desert lake (Kolding, 1993). Many tribes in this arid region depend on the lake's fisheries to complement their traditional pastoral livelihood (Kaijage and Nyaga, 2009). The lake is also regarded as an area of high conservation importance, supporting over 350 native and migratory bird species and the world's largest remaining population of the Nile crocodile (Bennun and Njoroge, 1999). Because of its high faunal diversity and the area's paleoanthropological importance, two of the lake's islands, Sibiloi National Park on the eastern shores (all on the Kenyan side) and Lower Valley of the Omo (Ethiopian Side) have been inscribed as UNESCO World Heritage Sites (UNESCO, 2016). The lake's ecological function is currently threatened by multiple economic activities across its hinterland. One of the biggest threats to the lake is the development of hydroelectric power

generation (the Gibe Dams) and large-scale irrigation schemes along the Omo River, regarded as the Lake's umbilical cord. The Omo River supplies 90% of the lake's water. The Gibe III Dam, is one of the tallest dams in Africa (Allibhai, 2014), with Gibe IV already under construction. The Gibe dams have been predicted to reduce Lake Turkana's water levels and affect the lake's flood cycle, which will likely impact the timing and success of fish breeding and migration (Avery, 2012). By April 2014, over 6,400 hectares of land had been cleared for sugarcane and cotton plantations in the lower Omo Valley. These irrigation schemes have been projected to consume substantial amounts of the Omo River's flow and could lead to reduction of the lake level of averagely 30 meters (Avery, 2012). These changes in flow regime are expected to impact fish communities, through eliminating spawning and nursery areas in the watershed and altering food web dynamics through changes in species composition and basic limnological function (Gownalis et al., 2015). The effects of changing flow regime due to dam development and climate change may have a compounding impact of the fisheries of the lake. As a result, fish resources will become increasingly less abundance. Because of the community's over-reliance on fish, the impacts to their livelihood have been unknown prior to this study.

Studies indicate climate change-induced droughts in northern Kenya in the last decade, leading to a multiplicity of vulnerabilities among the largely pastoralist tribes in the area. Climate data has confirmed that pastoral livelihoods are at risk from rising surface temperatures, more intense rainfall and more frequent droughts. For example, in Lodwar, mean rainfall decreased by 13 mm between the first 23 years of record (1950-1973) and the last 34 years (1974-2008). In addition, the frequency and severity of droughts have increased in recent decades, with episodes of moderate to severe drought occurring more frequently since the 1980s (IDRC, 2010). Changing climate conditions have also been speculated to also have a certain degree of impact on the lake ecosystem due to a reduction in precipitation (Velpuri and Senay, 2012).

Environmentally sound development has been the subject of debate since the 1960s when the earliest concerns were raised as a result of rapid urbanization and industrialization in the western countries. The enactment in the 1970 of the National Environmental Policy Act by the USA set the stage for other countries to follow suit, and the United Nations Conference on the Environment in Stockholm in 1972 subsequently formalized the Environmental Impact Assessment (EIA) process. Many countries have formalized the EIA process as a tool to guide environmentally sound development (Lee, 1995), and multilateral and bilateral lenders have developed comprehensive guidelines that also guide EIA requirements in their project eligibility criteria (OECD, 1996). In many developing countries, the EIA process is still in development, and there are still challenges for its full implementation (Modak & Biswas, 1999). For high-risk projects, the importance of following strict guidelines (e.g. International Finance Corporation guidelines) often requires engagement of foreign expertise from developed countries, leading to increased animosity among local experts with regard to the process. The scenario is even more complex at the cross-border context, since the EIA processes are not deemed strong enough to guide the processes at this level.

In this study, the need for national development vis a vis environmental impacts in the face of climate change have been evaluated using an important cross-border lake straddling Kenya and Ethiopia. The combined impacts of climate change and controversial development to vulnerable societies are explored, and the opportunities and weaknesses for existing mechanisms for sound development evaluated in the cross-border, African context.

Study Area

Lake Turkana straddles the two biggest counties in Kenya: Turkana County to the West and Marsabit County to the East. The lake is approximately 60km from Lodwar, the County Headquarters of Turkana, and 70km to Marsabit, the County headquarters of Marsabit County. A small portion of the lake's northernmost tip is in Ethiopia. The lake lies between latitudes 3° 41.028' South and 3° 39.564' South and longitudes 35° 49.342' east and 36° 41.097' east. It has a maximum length of 290 km and a maximum width of 32 km. Its surface area is 6,405 km², while the average depth is 30.2 m. The deepest part of the lake is 109m. The lake has three islands: North, Central and South, two of which gazetted National Parks and World Heritage Sites (UNESCO, 1997). On the eastern shores is Sibiloi National Park, another world heritage site. Several small towns are found around the shores of the lake including Loyangalani, Kalokol, Eliye Springs, Ileret and Fort Banyar.

Six Major ethnic groups live adjacent to the eastern side of Lake Turkana. These are the Daasanach, Gabbra, Turkana, El molo, Rendille and the Samburu. The Daasanach are traditionally a pastoral people but in recent years they have turned into agropastoralism and fishing. Gabbra is the major tribe located at North Horr. Other minor tribes include Turkana, Boran, Wata, Somalis. The Gabbra live in the Chalbi desert of northern Kenya, between Lake Turkana and Moyale and Marsabit, extending into the Bula Dera plain east of the Moyale-Marsabit road, and the Mega escarpment in southern Ethiopia. They share portions of this area with the Boran, Rendille, Samburu, Daasanach and Turkana. The Gabbra are primarily pastoralist. The Gabbra culture is entwined with their care of camels. A mixture of tribes is found at Loiyangalani namely, the Rendille, Samburu, Turkana. The Rendille are ethnic group inhabiting the Kaisut Desert of Kenya. They are nomadic pastoralists. The Samburu are semi-nomadic pastoralists whose lives revolve around their cows, sheep, goats, and camels (Kiajage, 2009). The main ethnic group at Elmololo Bay are the Elmololo tribe with around 800 people only from this tribe. The main study group in this study were the Turkana around Kalokol and its surroundings. This tribe mainly does fishing and pastoralism. Other communities that have settled around Turkana to venture into various businesses such as boat making include the Luo, Kikuyu, Kisii and Luhya.

The lake is renowned for supporting a large population of the Nile crocodile *Crocodylus niloticus* and water turtles. Large mammals that range along the shores include the endangered Grevy's zebra *Equus grevyi*, Burchell's zebra *Equus quagga burchellii*, the Beisa Oryx *Oryx beisa*, Grant's Gazelle *Nanger granti*, the Topi Damaliscus *lunatus jimela* and the Reticulated Giraffe *Giraffa camelopardalis reticulata*. Carnivores include the African Lion *Panthera leo* and Cheetah *Acynonyx jubatus*. The lake is recognized as an Important Bird Area (Bennun and Njoroge, 1999), and hosts regionally threatened species such as African skimmer *Rhyncops flavirostris*. Other birds include white-breasted cormorant *Phalacrocorax lucidus* and Heuglin's bustard *Neotis heuglinii* found to the east of the lake region. The lake holds about 50 fish species, including 11 endemics, such as the cichlids *Haplochromis macconneli*, *H. rudolfianus* and *H. turkanae*, the barb *Barbus turkanae*, the robber tetras *Brycinus ferox* and *B. minutus*, the Rudolf lates *Lates longispinis*, and the cyprinid *Neobola stellae* (Freshwater Ecoregions of the World, 2008).

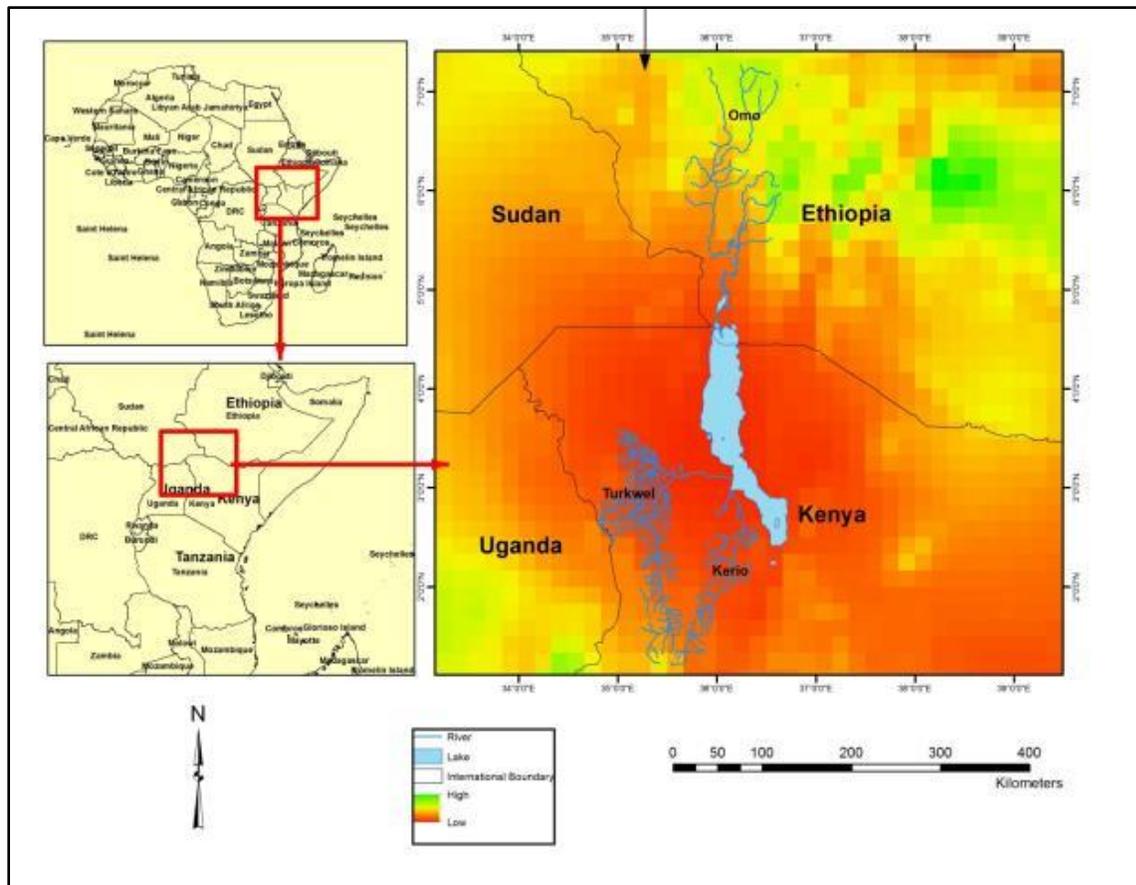


Figure 1: Map of the Study Area

Data collection Methods

Semi structured questionnaires were used to obtain social-economic information from the households and the respondent's interaction with the lake. Themes within the semi structured questionnaires were used to guide the whole exercise. They included sections on household characteristics (demographics), household resources, sources of income, and sources of food, lake conservation aspects, and awareness of threats facing the lake.

We used this method to profile people's behaviour and their interaction with the environment within the landscape. This method captures information deemed important which had earlier not been anticipated during the preparation stage. In addition, photography captured various coping strategies used by the people when environmental conditions are tough, besides documenting people and resources that were mentioned during the questionnaire administration. Several Focussed Group Discussions were carried out as a means of verification on the information gathered from questionnaires. Focused Group Discussions were done opportunistically when we encountered a group of people who were willing to participate. Secondary data were sourced from publications, verbatim from personnel of Friends of Lake Turkana (FoLT) and Kenya Marine and Fisheries Research Institute (KMFRI) and other knowledgeable persons from the area. Information was also sourced from various libraries, including National Museums of Kenya, Kenyatta University and personal libraries.

Lake Turkana: a lifeline to vulnerable communities

Fishing (56.6%) and trade (22.5%) constitute the bulk of occupations of all respondents interviewed. Besides fishing, there is heavy dependence on the ecosystem for provisioning, supporting, regulating and cultural services. In terms of provisioning services, the community relies on the lake ecosystem for food, building materials and livestock forage. The proportion of respondents relying on the lake for food is quite significant (56.7 % of respondents entirely, Figure 2). The average per capita annual fish consumption in Kenya is estimated to be 5 kg, and the contribution of fish to overall protein intake is low at 7.6%, likely because many Kenyans do not regularly consume fish for historical or cultural reasons (FAO, 2007). Fishing has been shown to be the main predominant activity for the communities in close proximity with lakes probably because these resources are easily available and open to all people for use. Similarly, in addition to the accessibility, fishing is a task that might not need a lot of skills hence many people can engage in it. In addition, traditional herding has suffered under scarce resources, and with the impacts of climate change being experienced more frequently, Lake Turkana has become a more vital resource hence communities rely on the lake for fishing and water for household uses.

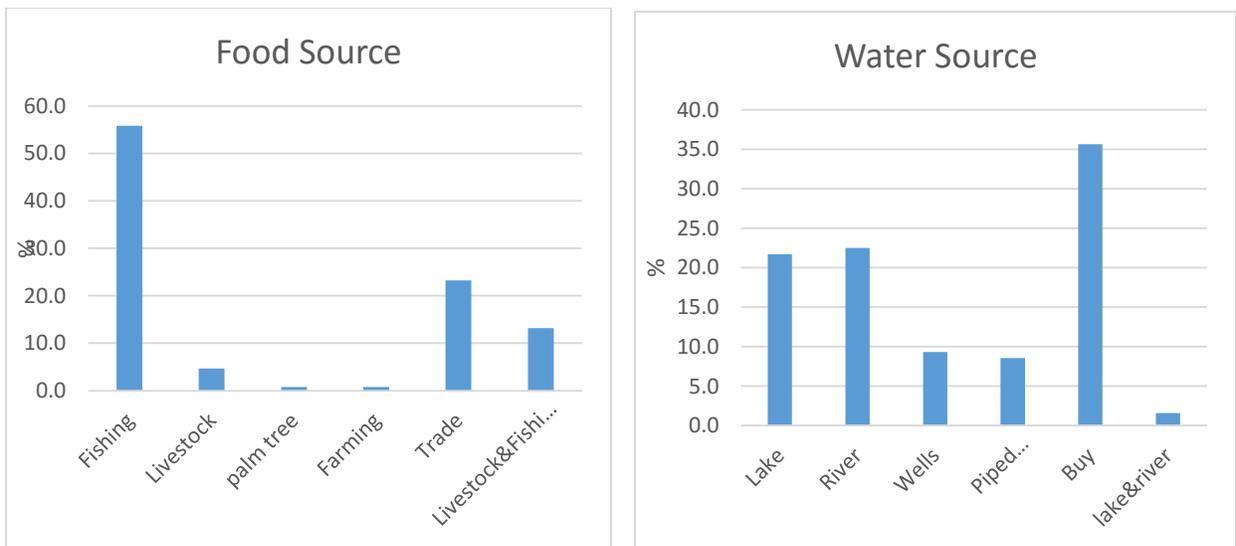


Figure 2: Proportion of respondents deriving various ecosystem provisions from Lake Turkana Ecosystem

Lake Turkana fisheries are a fragile resource, characterized with fluctuations in number of catches in different years (Figure 3). In Kenya, there remains to be a huge crisis in fish production considering the constantly rising human population and this has eventually led to overharvesting of fish of both mature and undersized fishing in urge to feed the rising demand. Our study recorded large numbers of undersize fish being harvested from the lake. As our work shows, the fact that fishing is a leading activity around Lake Turkana may also mean that this might end up being a big threat to fish conservation.

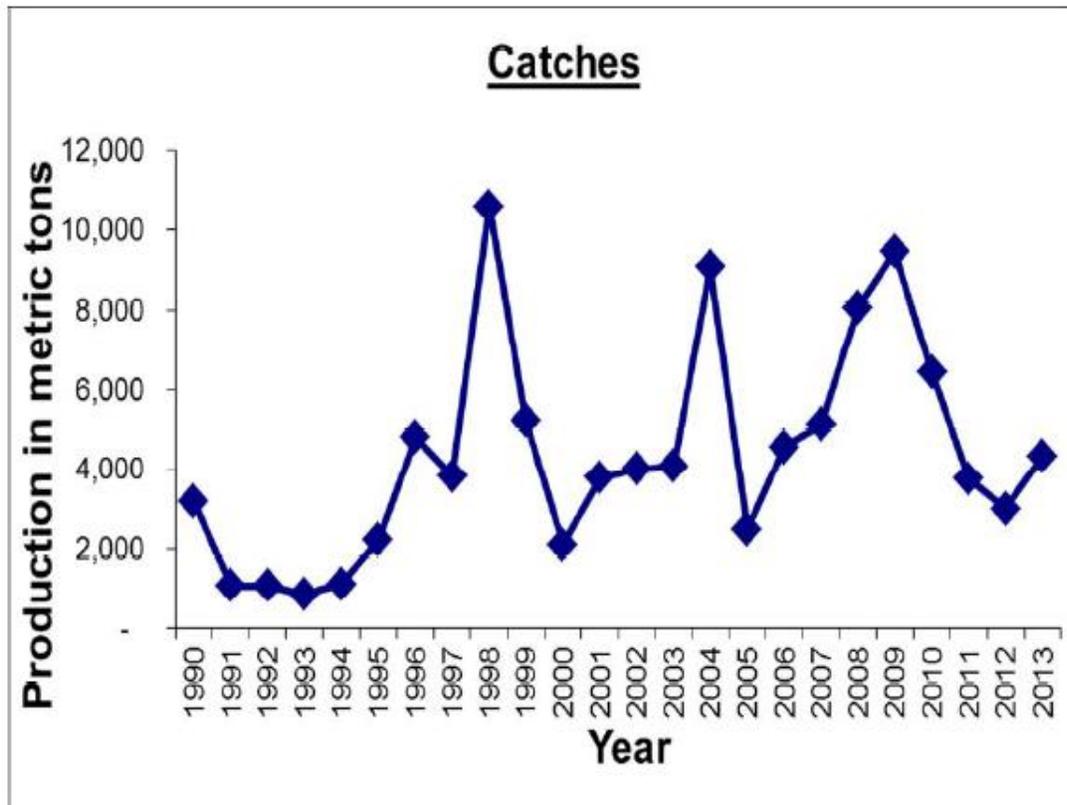


Figure 3: Fluctuating fisheries on Lake Turkana, indicating a fragile ecosystem (Source: State Department of Fisheries).

Although most respondents buy water from water kiosks since the lake water is too salty to consume (35.9%), the lake and its associated rivers provide a sizeable proportion of the community with water (21.9%) and 22.7% respectively. Seasonal rivers e.g. river Napasinyang are important in providing water. Respondents who cannot afford to buy water depend fully on the Lake. Sixty percent (60%) of respondents are entirely dependent on the lake for food and most would relocate if the lake's ability to provide food was to be compromised (41.4). A good percentage of the population also engaged in trade as a means of obtaining food (25%), and as expected, only a few individuals were involved in farming. Interestingly, a few individuals were involved in more than one means of sourcing for food where a combination of fishing and livestock keeping was shown to be an important source of food. Livestock keeping, independent of fishing, was not shown to be a key source of food in these communities. However, amongst livestock keepers, the lake shores and rivers provide most of the livestock grazing grounds, with the shores providing 61.8% and rivers 20.0% respectively.

Besides fish, the Lake Ecosystem supports a variety of plant resources that are directly used as food, including fruits, tubers and leaves. In particular, the Doum Palm *Hyphaene thebaica* provides a variety of services to the community living around the lake. Its trunks and branches are used for wood fuel, and the fibres from leaves are used for weaving (mainly baskets and mats) and forage for livestock. In addition, the tree provides building materials (poles for the frames, leaves and leaflets for thatch and walls).

Our results show that fishing is the main primary occupation of most of the respondents irrespective of gender ($>50\% \pm 0.5$) but significantly more males were more involved in fishing than females. Trade was shown to be the second most occupation with close to ($20\% \pm 0.5$) of the respondents engaging in it but of great interest is the result that significantly more females than males mentioned trades as their primary occupation. Both boat making and transportation were occupations dominated by males whereas basketry and beer brewing was dominated by females.

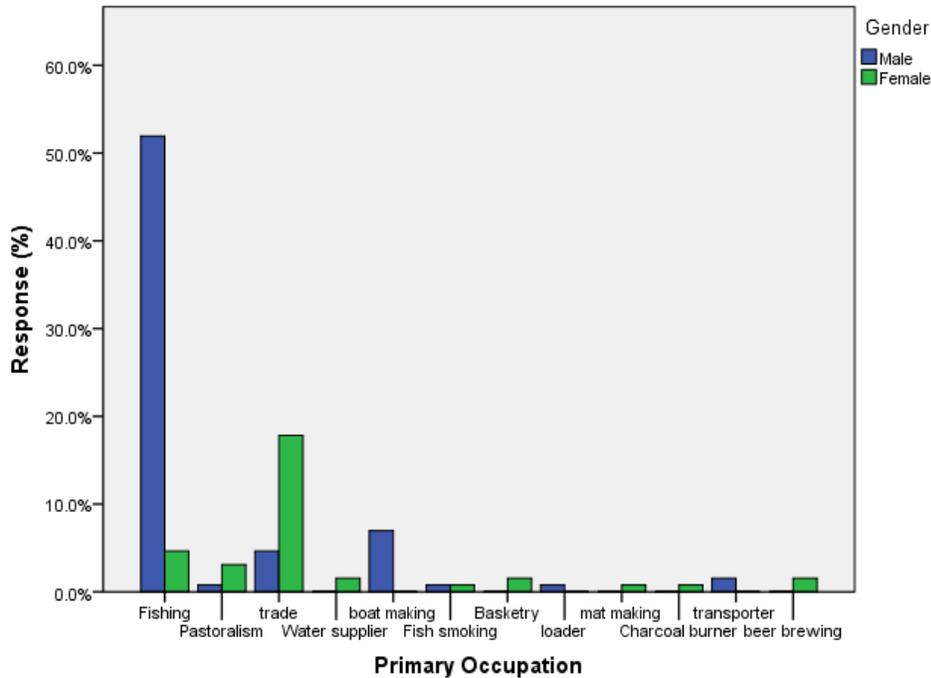


Figure 4: Primary occupation by study respondents around Lake Turkana

Even with the existing primary occupation, most of the respondents had corresponding secondary occupations where a big percentage were practising pastoralism ($39\% \pm 0.5$) and trade ($28\% \pm 0.5$) as a side occupation. Similar to the primary occupation, this varied with gender where males were significantly dominant in both of these categories. Equal number of males and females were motorists for a secondary occupation where as only males were recorded to practice boat making, boat riding and tour guiding.

Changing Climate, Changing Fortunes

Evidence of climate-induced prolonged drought has been recorded in the area surrounding Lake Turkana. For example, Survey results indicate decreased precipitation in the last five years, with respondents attributing effects as reduced water and fish in the lake. Respondents were asked whether they had observed any changes in rainfall patterns and lake levels in the last ten years. Most respondents said that they had indeed observed changes, and rainfall patterns were generally less frequent (75.2%). Thirty-five year weather data (1st January 1979 to 31st July 2014) acquired from Climate Forecast System Reanalysis (CFSR) for Maximum and Minimum

Temperature (°C), and Precipitation from Kalokol Airport weather station indicate that higher fluctuations for maximum and minimum temperature between 2011 to 2014, and lower precipitation compared to the previous period (1979 to 2010) (Figure 4). Changing rainfall patterns are attributable to the global climate change associated with greenhouse gas impacts. Respondents report that there has been a reduction of both water and fisheries (40.5%). According to officers at KMFRI, there is reduction of fish in the lake, and this is evidenced by smaller sizes of fish in Ferguson Gulf (which also has the highest primary productivity). In addition, the inshore is reported to be showing signs of overexploitation and increased salinity (KMFRI, 2016).

Heavy dependence on fisheries amongst residents in the sampled villages makes the communities particularly vulnerable to disasters. The survey did not record any diversification of livelihood activities from the traditional fishing or pastoralism-related activities. For most respondents, both primary and secondary occupations revolved around fishing (Figure 5).

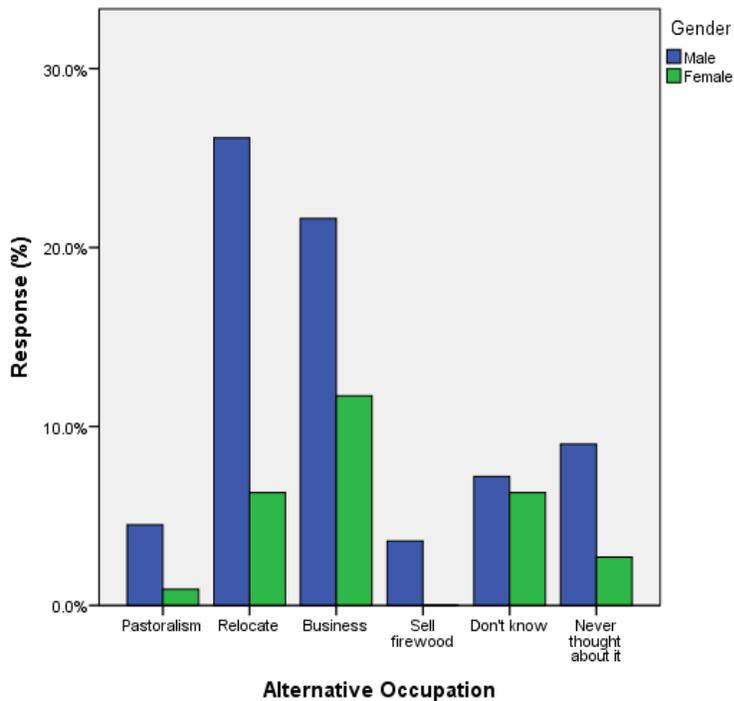


Figure 5: Alternative occupations that different individuals would take due to the lake changes; showing differences between gender.

Communities surrounding the lake seem to acknowledge the fact the lake water levels has been declining which has in return led to a reduction in the amounts of fish harvest hence hugely affecting the main primary occupation. The Gibe 3 Dam under construction on the Omo River will affect the quantity of water flowing into Lake Turkana and could cause Lake Turkana's level to drop up to 12 meters (African Resources Working Group, 2009)

Six recognized, indigenous communities - Dassanach, El Molo, Gabra, Rendille, Samburu and Turkana - depend on the lake to support their fishing and herding livelihoods. Many also rely on the lake as a primary source of drinking water and water for household use. Though a small

percentage of the respondents seem to have not noticed the reduction in water levels and fish amounts in the lake, it is evident that a big portion of the population are quite aware of the predicaments of reduction in water levels and as expected, this will be a real nightmare to the local people. Our data shows that although primary occupations vary, most of them have a huge dependence on the lake and hence there might not be other relevant occupations for survival.

A reduction in the lakes' water level comes with several predicaments to both the lake and the people where the salinity levels of the lake are expected to rise continually while same time, it is expected that the water quality might continue to decline. Despite Lake Turkana's high salinity level, many villages around the lake have no other source of drinking water for all or most of the year. The lake has come under increasing threat due to climate change and the reduction of other minor inflows such as the Turkwel River. As the lake level falls, the water's salinity and temperature increase. These changes threaten the habitat, breeding grounds, and food sources for fish stocks. Though we have shown the lake shores to be key grazing areas, a smaller and more saline Lake Turkana would reduce the grazing areas along the lake's shoreline and considering the level of dependence on the lake by people, it could also increase health risks of the lake water used for human consumption (International Rivers, 2010). The Gibe 3 Dam is expected to dramatically reduce Lake Turkana inflow from the Omo River through four factors (International Rivers, 2010), none of which have been sufficiently analyzed to date by project developers. The filling of the dam's massive reservoir would require several years, during which time the inflow to Lake Turkana would be reduced by nearly half. The filling is expected to take at least two years, but some believe it could take up to six years.

Policy Provisions and Gaps

A sound public consultation and disclosure programme is recommended for all EIA studies, but there seems to be a gap with regard to projects in developing countries. As indicated by our case study, majority of the respondents had not had any prior information on development of the Gibe dams (63% \pm 0.5), while the rest of the respondents acknowledged having a certain level of awareness of the developments. This indicates that the level of public consultation and disclosure programme was not sufficient on the Kenyan side, even though the project is being implemented in Ethiopia. At the international level, several key legislation exist that may guide sound EIA process. For example, the Rio Declaration (1992), Principle 17 calls for use of EIA as a national decision making instrument to be used in assessing whether proposed activities are likely to have significant adverse impact on the environment. This legislation is however not clear in the trans boundary context, but both Kenya and Ethiopia are signatories to it. Some policy instruments present themselves as missed opportunities for nations to pursue environmentally sound development. For our case study, the Doha Ministerial Declaration (November, 2001) under World Trade Organization encourages countries to share expertise and experience with members wishing to perform environmental reviews at the national level. Kenya is a member (1st January 1995), Ethiopia is not (in the accession process). In our case study, perhaps the most conspicuous of the weakness of international law to deal with controversial development in the cross-border context is demonstrated by the provisions of the Convention Concerning the Protection of the World Cultural and Natural Heritage, which requires parties to adopt effective measures that include assessment of the feasible project alternatives to prevent or minimise or compensate for adverse impacts and assess the nature and extent of potential impacts on these resources, and

designing and implementing mitigation plans. Both Kenya and Ethiopia have world heritage properties associated with Lake Turkana ecosystem (Table 1).

Name, Location and Country	Coordinates	Area	Date Inscribed
Sibilo National Park Marsabit District in Eastern Province, Kenya	N4 0 0.00 E36 19 60.00	157,085 ha	1997
Central Island Marsabit District in Eastern Province, Kenya	N3 29 30.00 E36 4 0.00	500 ha	1997
South Island Marsabit District in Eastern Province, Kenya	N2 37 57.00 E36 35 41.00	3,900 ha	2001
Lower Valley of the Omo in Southern Nation Nationalities & Peoples Region, Ethiopia	N4 47 60 E35 58 0	-	1980

Table 1: World Heritage Sites Associated with Lake Turkana (Source, UNESCO 2017)

Other conventions that provide for sound EIA process include United Nations Framework Convention on Climate Change (UNFCCC); The Stockholm Declaration 1972 which states that rational planning constitutes an essential tool for reconciling any conflict between the needs of development and the need to protect and improve the environment; and the East African Treaty EAC Treaty – 1999 requires the Partner States to cooperate in all issues of Environment and Natural Resource (ENR) Management. The World Bank, through International Finance Corporation's Guidance Notes (2012) also provides guidelines in which sound development can be achieved. For example, Performance Standard 6, Guidance Note 36 recognizes “Transboundary impacts are impacts that extend to multiple countries, beyond the host country of the project, but are not global in nature” e.g. “use or pollution of international waterways”. Performance Standard 6, Guidance Note 24 states, “In developing requirements for biodiversity, Performance Standard 6 is guided by and supports the implementation of applicable international law and conventions” including CBD, CMS, Ramsar, CITES and UNESCO World Heritage Convention.”

Conclusion and Recommendations

Our case study demonstrates that over-reliance on certain natural resources and lack of alternative livelihood sources may expose indigenous local communities in Turkana to extremities of climate change-related impacts, such as prolonged drought. In Turkana, climate change takes a heavy toll on vulnerable communities, leading to declining resource base and exacerbating the frequency of food scarcity. Lake Turkana offers a cushion against extreme climate events.

Hydropower development across the Omo river are likely to further affect Lake Turkana ecosystem, leading to a multiplication of impacts (altered hydrology, climate change). The cushioning effect of the Lake may be lost. Representation of the local people at the local, national, regional and international levels appears to be weak, leading to inability of the leadership structure to protect indigenous rights. Despite Kenya and Ethiopia being signatories to various international treaties that advocate for environmental conservation of trans-boundary resources, these systems have not been effective to safeguard indigenous rights in both countries. Promotion of Climate adaptation mechanisms to cushion communities against adverse effects of the environment and prevent minor hazards could degenerating into humanitarian emergencies. In addition, promotion of alternative sources of livelihoods may reduce over-reliance to the fisheries resources. The vulnerability of the community is in itself a factor that could accelerate over-exploitation of the fisheries resource.

Governments should make use of existing policy and institutional mechanisms for managing trans-boundary natural resources, including tools accepted internationally for EIA best practice. The representation structures for indigenous communities should be more pro-active in advocacy to ensure their rights are safeguarded especially in climate change era. Involvement of the civil society is particularly important, especially where indigenous rights are infringed upon. The international community should take a central role in mediating differences across international borders, especially those that involve trans-boundary natural resources.

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