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Social Capital And Climate Change Perception in the Mara River Basin, Kenya

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Abstract
Climate change is a phenomenon that affects different facets of human livelihood. However, the general public does not easily comprehend it. This study was inspired by the realization that climate change is not just an ecological entity but that social processes have a crucial role to play in responding to the climate change crisis. Community perception is critical because it determines response to the crisis. Social capital has been identified as key in creating a framework for understanding community dynamics. In the Mara River Basin in Kenya, a fragile environment that supports a large population in Western Kenya, social capital has been analyzed by this study and linked to community perception of the climate change crisis within the basin. The study therefore seeks to demonstrate how social capital can be used to develop a deeper understanding of the cognizance of climate change nuances at community level.
Key Words: Mara River Basin, Social Capital, Networks, Ties, Climate Change, Perception, Information flow

1.0 Introduction
Climate change plays a critical role in environmental, social and economic development and its effects are experienced in several sectors including health, energy, forestry and agriculture. Africa's capacity to effectively adapt to climate change variability has been hampered by existing developmental challenges such as endemic poverty, political instability, inadequate institutional capacities, limited access to capital, infrastructure and technology; ecosystem degradation; and complex disasters and conflict. (Houghton, 2009). The effects of the changes in climatic conditions continue to be experienced in several sectors including: agriculture, energy, water, health, plant and animal ecosystems, forests and recreation.
In Kenya, the Mara River Basin (MRB) is increasingly facing water shortages as well as problems with poor water quality and environmental degradation as a result of climate change (Global Water for Sustainability, 2012). Some of the reported threats include loss of native forest cover in the upper parts of the catchment and along rivers, unsustainable agricultural expansion and intensification (including irrigation), human population growth, poorly planned tourist facilities, water pollution and abstractions by industries and urban settlements; issues that have direct impacts on local people's incomes, health, food security and natural resources (Dessu & Melesse 2013; Gereta, Wolanski, Borner, & Serneels, 2002; Serneels, Said, & Lambin, 2001). The threats are exacerbated by weaknesses in local, national and regional legislation and inadequate capacity of institutional structures in the enforcement of laws.
It is important to note that identifying and deducing climate change, presents a challenge for the lay public (Weber, 2010). Depending on what is important for a particular society therefore, they are able to assess their risk and determine what they would then define as 'dangerous' climate change. This assessment is informed by knowledge of the ways in which individuals and societies contribute to global environmental change, potential impacts, vulnerability and the society's adaptive capacity (Richardson et.al, 2011). Through the establishment of their role in the climate change crisis, the society would then be motivated to engage in protective strategies, as well as increasing the range of adaptive strategies an individual is likely to choose from (Kroemker and Mossler, 2002).
Social capital facilitates access to information within networks by exposing actors to a wider variety of information sources, improving the quality and relevance of information through filtering processes and ensuring timeliness in delivery (Adler & Kwon, 2000). Structural social capital facilitates information sharing, collective action and decision-making by passing information from one actor to another in an endeavor to create common knowledge. Cognitive social capital refers to shared norms, values, trust, attitudes, and beliefs. Its influence on ease of information flow is therefore more subjective and intangible compared to structural social capital. (Uphoff, 2000). Internal ties within a given society according to often mean informal, face-to-face interaction or membership in community associations or social clubs (Brehm & Rahn, 1997; Evans, 1996; Ostrom, 1994; Putnam, 1993). Putnam (2000) argues that through the links presented by social capital, information gets to flow from person to person, creating awareness about how people are interconnected and thereby allowing them to question the validity of their prior formed views about societal issues. According to Granovetter (1973), weak ties tend to promote the transfer of new knowledge. This is because they comprise of actors who are loosely connected, are drawn from a wider area and are therefore bound to make contact with new people who posses different kinds of information. He posits that weak ties are advantageous for society because they feed back into the strong ties thereby creating a mutual relationship between different segments in society. Therefore, different groups and actors produce different knowledge, which is crucial in

determining people's reaction to different phenomena. Addressing the climate change crisis therefore requires the accommodation of varying perceptions and approaches to knowledge within different local contexts (Olsson &Folke, 2001; Berkes, 2007). This presents an opportunity for the identification of gaps, challenges and opportunities for different strategies of adaptation to climate change.

As Kenya grapples with the reality of the climate crisis and tries to put itself on the map in the efforts towards climate change adaptation and mitigation, as exhibited in the National Climate Change Response Strategy and Action Plan, and most recently the draft climate change policy, there is little evidence of efforts directed towards taking into account local perceptions to facilitate the resolution of this problem (Government of Kenya, 2010; 2013). The focus currently has been at the macro-level, with nation states striving to sign agreements with each other. Most of these agreements might take little or no account of the local strengths, weaknesses and needs since they are driven by emerging market opportunities and not necessarily by the need to improve the adaptation capacities of those already experiencing the effects of climate change. There have been several forums and conferences focusing on developing national, regional and even global policies and agreements on climate change as a way of mitigating further devastation. However, existing literature does not clearly establish how these forums address the local perceptions of different communities and how this can be harnessed to reduce the rate and magnitude of climate change especially with focus on the Mara River Basin. Such knowledge that appears to be inadequately acknowledged especially by policy advisors, makers and to some extent also taken for granted by community members is crucial in solving this collective problem of climate change. This study was inspired by this realization that local perception is critical in the fight against the climate crisis and therefore sought to investigate the role of structural and cognitive social capital in constructing climate change perceptions within the Mara River Basin, Kenya.

2.0 Study area

Mara River Basin is one of drainage basins that feeds into Lake Victoria and is ecologically related to the socioeconomic activities of the lake. The Mara River originates from the Napuiyapui swamp in the Mau Escarpment (2,932m above sea level) and flows through the plains of Maasai Mara National Game Reserve in Kenya and Serengeti National Park in Tanzania before entering Lake Victoria (1,134m above sea level) (see Fig 1). The Mara River Basin covers approximately 13,750 km^2 and is shared between Kenya (65%) and Tanzania (35%). Kenya holds a key responsibility in determining the future of this basin, as the basin's headwaters stem from Kenya's Mau Escarpment and Loita Hills. The basin is located between longitudes 33º 47' E and 35º 47' E and latitudes 0º 28' S and 1º 52' S.

The Mara River Basin provides water, which is crucial for execution of domestic activities, livestock farming to wildlife maintenance and irrigation for agriculture. This also means that the communities have direct stakes in the management of the river basin and brings to fore the different degrees of climate change vulnerabilities. The rationale for selecting this study site was therefore pegged on the importance of this river basin in contributing to the national economy and supporting the livelihoods of the different communities that lived within it. Further, the existence of these different communities present an issue of the governance and management of the common resource, which brought up the question of the role that social capital played.

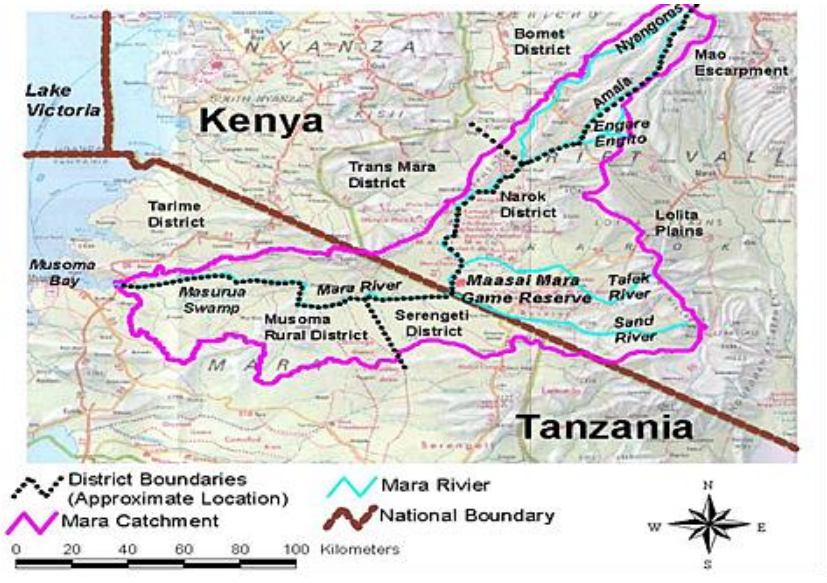

Figure 1: Map of Mara River Basin (Source; WWF)

The Mara River Basin is facing serious environmental problems primarily created from wide spread encroachment on protected forests and other fragile ecosystems for settlement and cultivation. These include: Soil Erosion and high sediment

loads; Deforestation resulting from encroachment and human settlement in the Mau forest areas; Wildlife-human conflicts resulting from large-scale farming that has extended into wildlife corridors; Declining water quality and quantity due to poor agricultural practices and excessive water abstractions; Pollution due to unregulated wastewater discharges, especially from mining activities, poor sanitation facilities and excessive use of agro-chemicals for pest and disease control in crops and livestock; Increased frequency and intensity of floods and droughts due to climate variability and land use change; Uncoordinated water resources planning and management processes due to lack of a comprehensive cooperative framework for trans-boundary water resources management. The situation is further exacerbated by poorly enforced water related laws and regulations, and water resources management institutions with inadequate technical and financial capacity to monitor and ensure compliance with established standards and regulations (Water Resources and Energy Management International (WREM) (2008).

The basin presented an intriguing environment to conduct the study as it provided an opportunity for the assessment of linkages and networks amongst and within the different communities sharing the resource. The study also sought to establish if these linkages/networks were in any way responsible for the social construct of climate change within the area.

3.0 Methodology

3.1 Study Design

The study employed both cross sectional and retrospective study designs. The cross sectional aspect of the study was descriptive in nature and involved a one-time interaction with individuals and groups of people within the study area and provided quantitative or numeric descriptions of the population. This generally provided patterns and trends with regard to social capital and adaptation to climate change of some sample of the population with focus being on respondents from six selected clusters. The retrospective aspect of the study required the respondents to look back at the historical development of certain issues pertaining to climate change. The respondents were both males and females different socioeconomic classes, ranging from 18 to 87 years old, and were also people with different abilities and accomplishments.

3.2 Study population

The study focused on the Kenyan side of the Mara river basin. The population in the MRB is approximately 800,000 people, the majority of who live in Kenya (Hoffman 2007). In Kenya, the combined annual population growth rate for Bomet and Narok Counties is 2.4% for the period from 1999-2010 (Kenya NBS, 2006). The study population was drawn from locations lying on the borders of these two Kenyan counties.

3.3 Sampling and Sample size

The sampling unit for the questionnaire survey was the household whence one adult individual was drawn for the household survey. The study incorporated both probability and non-probability sampling techniques and multi-stage sampling was used to arrive at the sample size for structured interviews. First, the Basin was divided into two clusters: middle rangelands, represented by Bomet County at 1750m, and savannah plains defined by Narok County at 1100m above sea level. These clusters were further stratified into administrative locations, from which one location that lies along the border was purposefully sampled to allow for assessment of trans-boundary associations. The sampled locations were Mulot, Kiplabotwa, Enelerai, Chemaner, Kipreres and Ilmotiok.

A sampling formula (Yamane 1967) was used to arrive at the number of households from which individuals to be interviewed were drawn.

$$n = \frac{N}{1+N\,(e)^2}$$

Where:

n is the sample size,

N is the population size and

e is the level of precision.

The level of precision or sampling error for the study, was taken as + or - 5% and a confidence level of 95%. A sample size of 400 was computed for the study. This was proportionately divided into the six locations.

Table 1: Sample Frame

Location	No. of households	Sample %	Sample
Chemaner	2,108	14.5	58
Kipreres	1,849	7.8	31
Mulot	4,212	23.3	93
Kiplabotwa	2,828	17.8	71
Enelerai	2,330	15.5	62
Ilmotiok	2,455	21.3	85
TOTAL	**15,782**	**100**	**400**

3.4 Data collection methods

The data collection was done at two levels, namely primary data collection and secondary data collection. Primary data collection methods involved contact with the respondents through the use of interviews and observation whilst secondary data collection was mainly an analysis of already existing published information with regard to social capital and climate change. The study incorporated both quantitative and qualitative methods of data collection. The use of these complementary methodologies allowed for confirmation and corroboration of information received through triangulation. A questionnaire survey was used to collect data from 400 respondents at household level sampled from six locations within the basin.

12 Key informants who were believed to have crucial information in relation to management of the river basin and climate change within the river basin were identified through purposive sampling. Appointments were then made for an in-depth interview. These informants included officers from the ministries of public health, water and irrigation and agriculture; the project manager and coordinator, World Wide Fund for Nature, Mara River Basin Management Initiative (MRBMI); the officials of Mara River Water Users Association (MRWUA).

The study also made use of focus group discussions so as to get the general views of the different segments of the population with regard to social capital within the community, changes in climate patterns and some of the strategies for adaptation.

4.0 Findings and Discussion

Social capital has been argued to comprise a valuable source of information benefits in that, who you know affects what you know (Lesser, 2000). Therefore the role that social capital plays in the social understanding of climate change nuances is critical not only to the community itself but also to policy makers because it provides a basis for local and global social context analysis within which policy makers and scholars operate (Crona, Wutich, Brewis & Gartin 2013). The study therefore sought to establish how social capital influenced the perception of climate change amongst community members within the Mara River Basin.

4.1 The Role of Community Networks in Climate Change Perception.

The study revealed that residents of the basin were informed about climate change with 96.2% reporting to have heard about the phenomenon. The electronic media was a popular source of information on climate change at 94.6%. However, close intimate networks also played a very vital role in relaying the information about climate change with 70.8% of the respondents reporting to have received the knowledge from a close friend, relative or child. This was a multiple response question, which sought to establish all the avenues available to the community members with regard to accessing information on climate change.

The study established that as a major contributor to information about climate change, dense networks were responsible for the Mara people's perception of the phenomenon. First, issues of network density and proximity, which are important for ease of information exchange, come into play here. Family members, close relatives and friends who present as intimate and informal ties, presuppose constant interaction and thus facilitate efficient flow of information on climate change. This was illustrated for example by the roster provided by the respondents, which indicated household members who interacted on a daily basis. Timing, on the other hand, was also critical in this case because it ensured availability of personal contacts to

provide information sooner than it became available to people without such contacts. This, according to social capital scholars may in this case increase the value of said information (Granovetter, 1973; Ibarra, 1992; Krackhardt, 1989; Lesser, 2000).

Table 2: Source of Information on Climate Change.

Source of Information	Percentage
Radio	80.8
TV	13.8
Computer/internet	5.3
Local newspapers	20.0
Church	12.0
NGOs	4.8
Meetings	28
Street theatre/drama	0.8
Posters	2.5
People (family, friends, kids)	70.8
In school	2.3
Other (from the old men during my circumcision, observed)	2.7
None	0.8

Source: Field study

A second important component attributed to learning about climate change is trust. Generally, people are bound to be more attentive and incorporate information into their decisions and actions, if the information emanates from a trusted source (Weber, 2010). Respondents within the Mara River Basin held their close networks in high esteem and interactions at this level elicited trust from the actors. This trust was exhibited by responsibilities like trusting family and friends to take care of the homestead while travelling (55.2%), and a further 65% trusting their kin more than any other person to deliver on their promises.

Third was the issue of shared language and codes which not only allows for debate and exchange of information but also influences opinion by providing a common setting for observing and interpreting the environment (Berger & Luckman, 1966; Pondy & Mitroff, 1979). The study made a presumption that being members of the same kinship, family members had the same operational language. In this case bonding social capital, which is more inward looking and focuses on homogeneity played a crucial function in the facilitation of information flow on climate change.

Group membership of different sorts may also influence perception of climate change (Weber, 2010). From the study findings, 44.8% attested to have heard about climate change from a group meeting of sorts. This was either the voluntary group they subscribed to (28%), a church gathering (12%) or a meeting called by a partner organization (4.8%). Being part of a formal group, enables information flow and knowledge transfer in four ways. First, through the diversity of the network ties, there is efficient screening and distribution of information to persons who are members who are able to use said information (Burt, 1992). The more diverse the network contacts, the richer the information benefits since useful contacts established in different places provide an opportunity for the actors to access from different perspectives. On that score with regard to the study area, people who were members of voluntary associations were able to access climate change information from the different members who were drawn from different parts of the locations. In the case of MRWUA for instance, information from the chairperson of the group revealed that the membership of the organization comprised of 33 sub-catchment member groups from all over the basin and drawn from different occupational backgrounds. The organogram of the umbrella group (Fig 2) was made up of small-scale farmers, large-scale farmers, ranchers, hoteliers and other water users. This meant that all these actors brought different bits of information to the table, which other members could then access. Further information provided by the MRWUA office confirmed that, these groups worked with other stakeholders and partners like Water Resources Management Authority which is a government body, World Wide Fund for Nature, Ministry of Agriculture,

National Environmental Management Authority, County Councils, Municipal Councils and German Technical Cooperation (GTZ). All these partners held different conferences and capacity building forums where members of WRUA were expected to be in attendance and during some of these forums, climate change within the basin was a topic of discussion. This is in agreement with Burt's, (1992) and Granovetter's, (1973), position that weak networks provide more information benefits as opposed to strong networks, which provide less diverse information and are limited in terms of their geographical position.

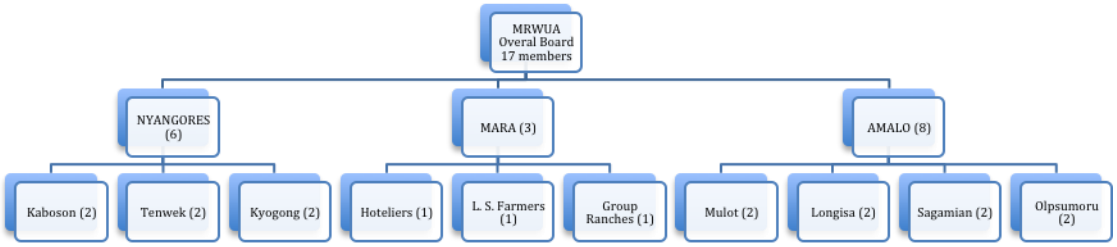

Fig 2: Mara River Water Users Association

Second, these voluntary associations and groups were bound by norms, which enabled their day-to-day operations. Discussions with members of the community during the FGD held in the MRBMI office indicated that, the 33 sub-catchment groups found within the expanse of the basin, had a constitution, which directed their modus operandi. This constitution included information like how much subscription members should pay to become a member and the administration of the office following formal registration. According to Coleman (1990), norms represent an agreement within a social system, that others control actors' actions within the system. These norms therefore bind members of these organizations or associations and apart from fostering cooperation; they provide a basis for creation of knowledge by facilitating exchange processes and access to information (Kramer & Goldman, 1995; Putnam, 1993). Therefore, in order for the groups within the Basin to achieve their different objectives, openness and teamwork were norms that would be critical in fostering a 'groupthink' mentality and this called for open disclosure of information. Towards this end, the discussions in the FGD further indicated that the various sub-catchment groups had offices or information centers where members would then go to access information on the various issues and activities. The MRBMI project officer affirmed this information.

Third, was the aspect of obligations. Being part of a voluntary organization represents a personal commitment to be able to undertake or take part in the group's activities in the future. This therefore acts as motivation for members of a group to share knowledge about phenomenon if they are expected to undertake in activities in future. An interview with the Water officer Bomet County, established that the sub-catchment groups in collaboration with MRWUA were in the process of implementing the water and environment Act as stipulated in the government policy. In order to achieve this, there were capacity building sessions supported by partners like WWF, NEMA and Water Resources Management Authority (WARMA), which were aimed at providing information to the members of these groups about said activities. In this process, he established that information about the different aspects of climate change was discussed and passed on to members of the community.

Finally, was the aspect of identifying with the group. As a process of enrolling into these formal organizations found within the Mara River Basin, members are expected to pay a subscription fee before they are formally recognized as members of the group. According to the chairperson, the MRWUA for instance has a paid up membership of over 1000 members across the basin. This process of enrolment and undertaking of the various group activities present an opportunity for members to identify with the different formal networks and therefore feel free to share information with other members. The study for instance found that the groups within the basin undertook different activities together including savings and loans mobilization, income generating activities, provision of social support and environmental management According to Kramer et al. (1996), found that identifying with a group enables an actor to see themselves as one with other actors within the group and this heightens concern for group activities and outcomes. As a result this feeling of togetherness influences the anticipation of value to be achieved through exchange of information with other actors within the network.

Thus far, the study has argued that social capital provides a foundation for the exchange of information and knowledge about climate change and consequently influences how people understand the phenomenon within the Mara River Basin. The

consequent sections addresses results about these perceptions about climate change with regard to the causes, impacts and possible adaptation mechanisms.

4.2 Climate change as understood by Residents of Mara River Basin

This sub-section explores the perspectives held by the residents of the basin with regard to climate change causes, impacts and known adaptation mechanisms.

4.2.1 Causes of Climate Change within the Mara River Basin

The study sought to establish what the people of the Mara River Basin understood as the cause of this phenomenon. The majority of the respondents (96.2%), agreed to have heard about climate change. This was a question that elicited multiple responses from the respondents of the household questionnaire surveys.

Table 3: Causes of Climate Change.

Perceived Causes of Climate Change	**Percentage**
Burning fossil fuels	58
Deforestation	76.8
Curse/punishment from god	4.3
Poor agricultural practices (overstocking, too much fertilizers, tree planting, encroaching on riparian way leaves)	15.2
Don't know	9.8

Source: Field Study

Climate change was attributed to deforestation by 76.8% of the respondents interviewed. This was supported by views from the focus group discussions, (see table 4). The trends and timelines analysis done by participants' of the FGD revealed that in the 1970s, there was a lot of forest coverage in the basin which started significantly changing with a rise in population in the 1980s. This decade saw the felling of more and more trees for domestic purposes, selling of firewood and also to free land for agricultural purposes. This was magnified by charcoal burning as an economic activity, which took root in the 1990s and got to its peak in the turn of the millennium. The discussion further revealed that, due to the increase in population, the towns grew and so there was substantial demand for timber for building and fencing purposes.

Another 58% of the respondents blamed the practice of burning fossil fuels for the climate change crisis. According to discussions with the participants of the focus group, in addition to the thriving charcoal business which was contributing immensely also to the issue of fossil fuel burning, the year 2000 also saw an increase in factories which were making the situation worse by burning petroleum and emitting the smoke into the atmosphere. These results were supported by studies by Malhi, Adu-Bredu, Asare, Lewis & Mayaux, (2013), that indicate that the African rainforest cover has been on a decline subject to deforestation and could increase climate variability and vulnerability of the region. This massive degradation of forest cover has been attributed to rapid population growth and subsequently cutting down of trees for fuel wood and to make room for cultivation land in countries like Ghana, Bukina Faso, and Cote D'Ivoire (FAO, 2010; Francois, Götz & Kone, 2015; Ouedraogo 2010; Pouliot, Treue, Obiri & Ouedraogo 2012).

A small percentage, 15.2% of the respondents within the Mara River Basin also attributed the problem of climate change to poor agricultural practices like overstocking of domestic animals, encroaching on riparian way leaves or the overuse of fertilizers. Interestingly, there were still a few people, 9.8% who despite having heard about climate change, had no idea what caused it and a further 4.3% who believed that it was a curse from God.

Two Key Informants namely, the coordinator WWF Mara River Basin Initiative and the County Planning officer echoed similar sentiments. They both agreed that over the years the increase in population has led to a massive expansion of towns and this apart from changing the settlement patterns, has also increased agricultural activity. The coordinator WWF went further to give a breakdown of the activities along the basin that might be contributing to the climate crisis. He mentioned that apart from a lot of illegal irrigation taking place, there is also quite a bit of pollution from agro chemicals. According to the project officer, WWF Mara River management initiative:

> "Wheat farmers have gone overboard and started farming in areas that were originally not meant for wheat. To make it worse, wheat farming requires cutting down of trees to allow for mechanized farming".

4.2.2 Impacts of Climate Change within Mara River Basin

The highest percentages of the population believed that climate change would result in less rain, more disease outbreaks and

hotter temperatures. These stood at 52%, 44.5% and 42.8% respectively. This was in concurrence with arguments raised during group discussions, that in the 1970s, the basin enjoyed heavy and regular rainfall patterns. These contributed to an abundance of water and consequently few incidences of water borne disease outbreaks. However, in the 80s, the amounts of rainfall started reducing ergo there were reductions in water available for both domestic and agricultural use. Consequently, there was a proliferation of waterborne diseases in the 1990s. However, 36.8% of respondents felt that climate change would lead to more intense rains and storms. Increased erosion was a concern for 28.8% of the respondents while 17.3% associated climate change with loss of vegetative cover. Only 6.3% associated the damage of public utilities like roads and private investments like houses with the climate crisis.

Table 4: Trend Analysis

Issue	1970s	1980s	1990s	2000s
Rainfall	Heavy rainfalls	Rainfall reduction	Little rainfall	Famine Floods
Forest Cover	Large areas under forest; Low soil erosion	Clearance of forest cover; Beginning of soil erosion	Selling of split Firewood; Started charcoal burning	Charcoal business increases; Selling of tree-posts and timber increases; Afforestation intensifies
Water	High quality and quantity of water	Water quantity reducing	Gully erosion increase	Sale of water increased; Farming through irrigation
Water borne Diseases	Little water borne diseases	Water quality becoming poor	Waterborne diseases increase	Livestock reduced
Land use	Low population	Population increase	Farming increase; Use of chemical fertilizer increase.	Population high; Factories increase; Towns expand; Change to grade cattle.

Source: Field Study

Key informants felt that certain activities within the basin were exacerbating the already experienced impacts of the climate change crisis. For instance, the water officer alluded to the point that illegal sourcing of water by hotels and ranchers had amplified the water shortages. Interestingly, the mention of floods as an impact of climate change was only in passing yet in 2010 through to 2015, flash floods caused a lot of damage within the basin and even saw loss of lives and sections of the roads in the lower part of the basin cut-off (FEWS-NET, 2013; ReliefWeb, 2015).

4.3 Climate Change Adaptation Measures as Understood by the Mara River Basin Community

Adaptation to climate change impacts is a process that requires people to internalize their local context and depends on knowledge by local communities. (Ader & Kelly, 1999; Locatelli, 2011). The study therefore sought to establish if the community of the Mara River basin was aware of what adaptation options were available to them.

In response to their view about the causes of climate change, the biggest percentage of respondents interviewed at household level felt that planting, not cutting down and looking after trees would be a suitable way to adapt to the already experienced effects of climate change. These responses stood at 65.3%, 51.8% and 34% respectively. Building gabions to prevent erosion and not cultivating along the riverbanks both stood at 12% each.

Table 5: Perceived Adaptation Mechanisms.

Perceived Adaptation Mechanisms	Percentage
Must plant trees/bushes	65.3
Must look after trees/bushes	34
Must avoid cutting down the trees	51.8
How to build gabions to prevent erosion	12
Should not cultivate on the river banks	12
Must avoid burning bushes or waste	0
Everyone needs to cooperate in adapting to CC	5.5
Pray	4.0
Nothing	1.3

Source: Field Study

Despite the respondents having mentioned burning fossil fuels as a major cause of climate change, there was no mention of any activity to counter the diverse use of coal and petroleum products either at household level or industrial level. Some respondents felt powerless in responding to the climate crisis as 5.3% felt that people should do nothing or pray to God for divine intervention. These opinions were similar to those of a study carried out by Read et al., (1994), in Point Park, Pennsylvania. 177 people were interviewed and the results showed that the respondents rated forest preservation as one of the most effective strategies for responding to global climate change.

The results on the perceptions of the climate crisis by the Mara River Basin community can be referred to as a double-edged sword. On one hand it exhibited how social capital had oiled the wheels of information flow. Through social networks, community members were able to access information benefits that might not have been available to just anyone. For instance, by being members of voluntary groups, community members were able to benefit from conferences and trainings that enabled government bodies and other International organizations to pass on different kinds of information to the masses through linking social capital. On the other hand, the views of the Mara people seemed to be skewed mainly towards issues of environmental management, which reflected the aims of the institutions already implementing certain activities in the area. The government of Kenya for instance, initiated a project towards the restoration of the Mau forest complex, which included a component on public awareness and community sensitization on the ecological value of the forest (GoK, 2009). WWF, on the other hand had initiated the MRBMI whose long-term goal was the improved water quantity and quality of the Mara River and its associated streams, which was expected to eventually benefit diversity of plants and animals of the Mara-Serengeti ecosystem. This result is supported by Ishihara & Pascual's (2013) position that, in social capital's quest to influence the formation of common knowledge within the community, actors who wield more power and resources (what they refer to as symbolic power), usually influence the kind of information that trickles down to the other actors. Thus forming common knowledge that is in line with these individuals' or organizations' own aims (see fig 3).

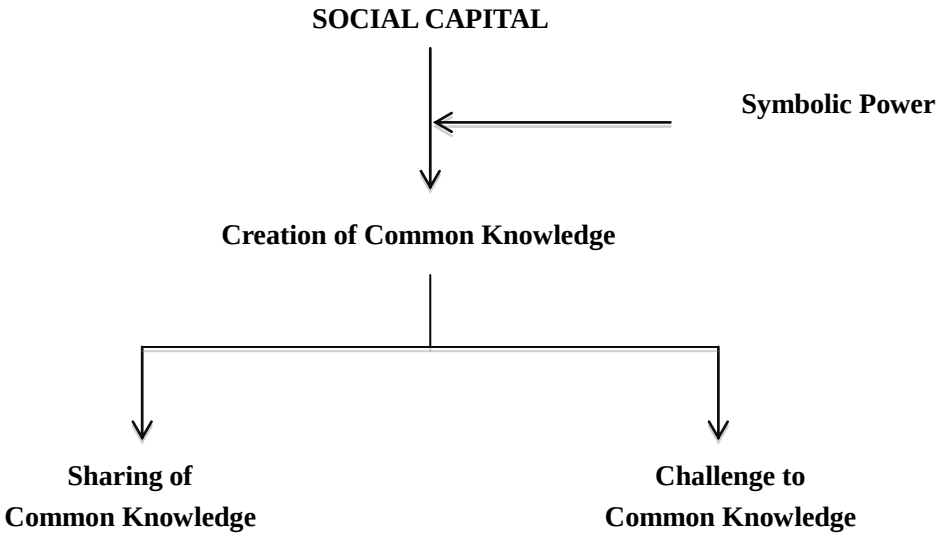

Fig 3: The Role of Social Capital in Creating Common Knowledge.

(Adapted from: Ishihara and Pascual 2013)

5.0 Conclusion

In conclusion, social capital had a role to play in the understanding of the climate change phenomenon amongst the people of the Mara River Basin. This was facilitated by the existence of both informal and formal networks that eased the flow of information from one actor to another. It was key to note that locals did not report climate change in terms of mean temperatures or precipitation. However, they highlighted mostly the inter-annual changes or variations in the frequency or intensity of various events that were of importance to them as a community. This indicated that community knowledge on climate change was not based on statistical figures but rather on things they could observe or experience. Another issue worth noting was that the presence and active involvement of formal institutions created an interaction between the institutions' objectives and the perceptions of the locals. This means that information passed around to locals from institutions governing certain resources tended to shape their perceptions of the climate change crisis. This suggests that the outcomes were mainly crosscutting findings emerging from the underlying social structures as opposed to being sectorial in nature. That is, being a predominantly agricultural community, the expectation would be that the perceptions of climate change causes, impacts and possible adaptation strategies would be approached from an agricultural perspective; this was however not the case. The understanding of the Basin's local community was more inclined towards the partner organizations working in the area. These were organizations like WWF, WARMA and NEMA that seemed to have a strong presence in the area. As a consequence, regardless of whether deforestation in this particular region could be causally linked to global climate change or not, political pressures at the national level have been seen to mount defining forest protection as a priority area in efforts to address climate change. This has been evidenced by the government's efforts to restore the Mau forest complex, which is the origin of the Mara River Basin.

All in all, the study came to a conclusion that both community based approaches and interventions by external agencies for facilitating local adaptation to climate change are more likely to be successful if they build on existing local knowledge and perceptions of the phenomenon. Further, the study brought to fore the recognition of social processes in society as a way of addressing the climate crisis. Hence, future research could look into ways of integrating ecological approaches with social processes and concepts, as a way of holistically addressing the climate crisis.

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