



Research article

Uncovering human social networks in coping with Lake Chilwa recessions in Malawi



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ABSTRACT

This paper provides an in-depth understanding of social dynamics in the form of kinship ties in matrilineal societies. It unpacks gender roles and relationships at the community level to understand how social structures, created by the pattern of relations, enhance or hinder coping initiatives during lake recessions in the Lake Chilwa socio-ecological system. Using qualitative and quantitative methods including in-depth interviews, Focus Group Discussions (FGD) and household questionnaires, this paper provides insights into how people in the Lake Chilwa social-ecological system prepare for and cope with Lake Chilwa water recessions by capitalising on their social networks. The findings have shown that during lake recessions poor households in the Lake Chilwa socio-ecological system are cushioned by fellow households through lineage networks. There is strong tradition secured through kinship ties where the generic term '*mwambo wathu*' (our tradition) embraces a group of formative norms enforced via a series of rules and rituals. Based in a matrilineal system, women have strong rights over land allocation and use in which the female sorority group '*mbumba*' is very stable. There is a great deal of reciprocity and food redistribution among the households. This self-organization provides deeper meaning about how people assimilate the dynamics affecting their social and natural environments. Specifically the findings provide evidence on how households, communities and their livelihoods in Africa are reconstructed as natural resources fluctuate.

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1. Introduction

The Lake Chilwa basin in Malawi is one of the many socio-ecological systems in Africa that generates important ecosystem services while accounting for the human dimension that shapes and is shaped by its nature (Folke, 2006). The Chilwa ecosystem combines the natural productivity of freshwater and a coastal ecosystem with intensive farming (Government of Malawi, 2000, Kabwazi and Wilson, 1998) and is used by over 1.5 million people (NSO, 2008). The lake itself produces fish valued at over 17 million USD annually. Fishing, as compared to farming, provides greater economic returns per square kilometre (Schuijt, 1999). However, the productivity and economic gains fluctuate seasonally and periodically due to lake recessions. The lake water levels have receded to complete drying twelve times between 1900 and 2012. The recession periods may last two to three years before production

of natural resources from the ecosystem returns to normal. The periodic lake recessions have therefore altered the temporal and spatial distribution of natural resources.

Despite the historical natural resource fluctuations in the Lake Chilwa socio-ecological system, it is not well understood how people survive the periods of resource scarcity, especially during complete dry-ups of the lake. The recent findings on the limitations of Lake Chilwa fishers to migrate to other lakes (Njaya, 2009) and the limited access to Lake Chilwa wetlands for farming (Kambewa, 2006) reveal knowledge gaps in understanding how livelihoods in the socio-ecological system are structured. Analysing networks at the community level therefore helps to understand how social structures, created by the pattern of relations, enhance or hinder coping strategies to natural resource fluctuations.

The Lake Chilwa basin is a socio-ecological system where people are both formally and informally connected through social networks. A social network is defined as a form of social coordination in which actions are coordinated voluntarily by individuals and organizations with self-organising and self-enforcing capabilities (Lee, 2003). Previous studies have identified social networks as an

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important denominator in unifying different stakeholders to effectively deal with natural resource problems and dilemmas (e.g. Gunderson, 1999; Hahn et al., 2006; Folke et al., 2005; Olsson et al., 2008). Social networks bond people together by bridging their diverse norms and promote reciprocity (Dekker and Uslaner, 2001; Uslaner, 2001). Cook (2005) also emphasises the importance of social networks in solving local problems such as illnesses, paying school fees and finding work. He argues that this type of support becomes crucial when coping with disasters. Similarly, Gunderson (1999) underscored the role of informal networks as incubators for new approaches to governing social-ecological systems. Thus, social networks can be seen as having the potential to improve natural resource governance processes by facilitating the mobilisation and allocation of key resources and conflict resolution, especially in managing common pool resources (Ostrom, 1990; Carlsson and Sandstrom, 2008; Hahn et al., 2006). For example, Chilivumbo (1971) reported that the recurrent Lake Chilwa water recessions and their effects on resource availability in the pre-independence era of Malawi opened up traditional management trajectories of the resources from the socio-ecological system through networks.

It has also been shown that social networks can be more important than the existence of formal institutions for effective enforcement and compliance with environmental regulations (Scholz and Wang, 2006). The existence of social networks and institutions that can either enable or constrain coping actions are some of the factors that play a role in decision-making processes (Ostrom, 1990). Davies (1996) states that coping may be either positive or negative in the decision-making process: positive if it is by choice, reversible, and increases security; and negative if it is of necessity, irreversible, and fails to increase security. In this context, coping is not a change in a single behaviour, but a suite of beliefs and practices that take shape under locally specific conditions of uncertainty. In a setting where individuals experience on-going challenges to their well-being, such as the Lake Chilwa water recessions, these beliefs and practices become integral parts of everyday decision-making about life and livelihood, making coping and livelihood inseparable as people manage livelihood vulnerabilities.

The interactions in a network provide information, opportunities and perspectives that can be beneficial to each of the players in the network (Crona and Hubacek, 2010; Papachristos, 2009). With reference to Hewitt (1997), this paper therefore looks at the conditions that influence people's coping strategies and that enable them recover from crises, rather than the severity of the crisis itself. The paper uses the social network perspective to analyse the structural dynamics when communities are faced with natural resource fluctuations (Bowler and Brass, 2011; Crona and Hubacek, 2010). Social structure in this context means the social arrangement and social-economic stratification of a society (Giddens, 1981; Sewell, 1992), while social systems include levels of social units such as neighbourhood, community or society (Giddens, 1984).

2. Methodology

2.1. Study area

The study was conducted at Chisi Island of Lake Chilwa situated in the Zomba District in southern Malawi. Chisi Island is the largest body of land on Lake Chilwa (Fig. 1) located between 30° 35' and 30° 38' east of Greenwich Meridian and 15° 18' and 15° 21' south of the Equator. The island has an area of approximately 21 square kilometres (km^2) and is surrounded by marshes to the west and open waters to the east. The Lake has three main distinct zones in terms of depth where the northern zone is very shallow and the southern zone is the deepest (Fig. 1). The deepest part is about five metres.

The choice of Chisi Island for this study was based on the premise that people's livelihoods on the island primarily dependent on the lake and are therefore highly impacted by lake water recessions. The Island's population depends on fisheries with 90% of the economically active group (men and women above 18 years) employed as fishers, fish processors, fish traders or as sellers of firewood and food. The other 10% of the population are primarily involved in agriculture and other non-fish related livelihoods.

2.2. Methods

Multiple methods were used that included focus group discussions (FGD), in-depth semi-structured interviews with key informants, direct observation and household questionnaire interviews. Eight villages were purposively sampled for the FGDs based on differences in the presence of and distance to schools, markets and health clinics. Women and men formed separate discussion groups with each group having 18 people on average. FGDs involved resource mapping drawn in a participatory way, institutional analysis, cause-effect analysis, seasonal calendars, and well-being or ill-being analysis. FGDs focused on knowledge of past recessions of Lake Chilwa, food security status during recessions and during normal lake levels, common challenges that people face in each village, and consensus discussions of household assets as a proxy of well-being, perceptions on vulnerability including people's hopes and fears for the future.

In-depth interviews using semi-structured questions and discussions were conducted with a snowball sample of 25 key informants. Interviews were conducted with the village heads on their village histories and wealth status, fishermen, women processors and traders on the lake and fishing histories. For the purpose of this research all key informants were elderly people with ages estimated to range from 60 to 90 years. The eldest informant was a sister of the former Traditional Authority Mkumbira herein called Gogo Nasibeko (not her real name). The choice to interview her was deliberate in order to understand the matrilineal society in detail as well as kinship ties in the area. These interviews provided deeper understanding of some of the complexities of the social structure, the fishing business and its governance. The interviews and observations of social networks, governance issues and customs were conducted while residing on Chisi Island between August 2012 and March 2013. These were done in order to interpret deeper meanings of some of the people's social actions (Walsham, 1995).

Household survey used questionnaire that was administered with the support of two additional research assistants following a training that included the pre-testing the questions on a different community in Zomba. The questionnaire was completed in a structured interview, where we read and interpreted the questions to the respondent and recorded the answers as described by larossi (2006). Questions included demographic measures as well as food security and coping strategies during recessions. The survey targeted 150 household heads or the spouses which represented 30% of the total households in four villages.

3. Results and discussions

The Lake Chilwa socio-ecological system provides multiple opportunities for generating food and income thus it is an important source of livelihoods for local communities. The lake and its surrounding wetland hosts many natural resources including fish, invertebrates, zooplankton, algal species, birds, insects and reptiles. The wetland provides space for agriculture production and natural resource gathering. However, the Lake Chilwa socio-ecological system has one of the highest population densities in Malawi and

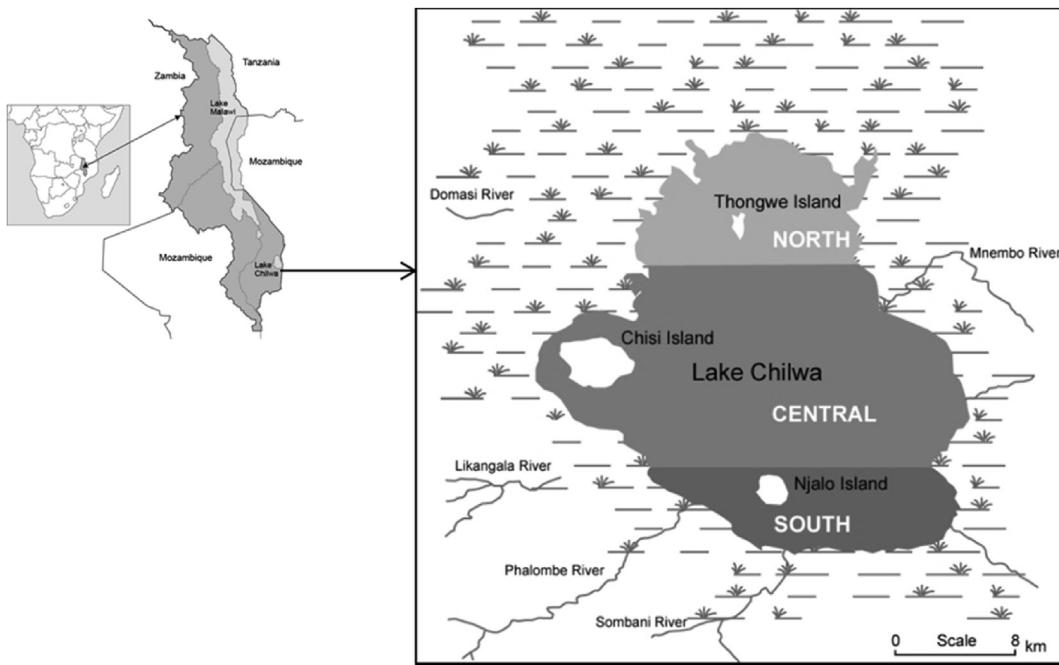


Fig. 1. Lake Chilwa and Chisi island.

Southern Africa at 321 people per square kilometre (NSO, 2008). The study found that people are attracted to the natural resources specifically when other sources of earning a living are limited. The limiting factors could be attributed to political, environmental and social-economic changes. The following sections provide historical changes of social structure of societies and organisations that have shaped the norms and behaviour of actors and access to natural resources within the social system of Lake Chilwa.

3.1. Changes in social and natural resources (time and space)

3.1.1. Social changes

There are two main reasons why Malawi's population is mostly rural and why smallholder farming production is dominated by women. First, over a century ago, rural social structures in Malawi shifted radically from imperialist regimes, positioning Nyasaland (now Malawi), within the Federation of Rhodesia and Nyasaland, as a labour reserve (Vail, 1975). As early as 1902, the Witwatersrand Native Labour Association (WNLA) spearheaded labour recruitments with the objective of assisting the growing Witwatersrand mining industry in sourcing and engaging workers for various mines outside Nyasaland. In the mid-1970s, recruitment agents were scattered across the region contracting cheap labour from young men to work in mines and commercial farms in the surrounding countries of Southern and Northern Rhodesia, now Zimbabwe and Zambia respectively (O'Laughlin, 2002). The colonial government further encouraged labour exports to mines in South Africa due to failure of the Nyasaland government to absorb the existing labour (Vail, 1975). However, the labour export resulted in shortages of labour for the expanding local tea and coffee estates in the Shire Highlands in the 1920s. As a result, the government instituted political mechanisms to scavenge labour for domestic production through taxation, forced labour and collusion with pre-capitalist elites.

Second, smallholder agricultural production was re-structured in the 1900s as a consequence of the out-migration of active male labour. Women in rural areas became providers of labour-power for

subsistence food production (O'Laughlin, 2002). As a result, agricultural production stagnated or declined deepening on the level of poverty in the rural areas. Rural households became increasingly dependent on monetary income, both for consumption and for financing investment in their own agricultural production (O'Laughlin, 2002). The poverty situation for rural society became even worse with the oil shortages in the 1970s and Structural Adjustment Program (SAP) by the World Bank in the 1980s. The oil crisis resulted in high transportation costs, while the SAP encouraged the removal of input subsidies on agriculture. SAP aimed at establishing and supporting formal institutions through producer price reforms such as liberalisation of internal and external trade and new foreign exchange regimes which were premised on currency devaluations and privatisation of selected government services (World Bank, 1992). The dismantling of state services such as the Agricultural Development and Marketing Cooperation (ADMARC) prior to the emergence of domestic private capacity, resulted in patchy geographical availability of agricultural inputs (for the few who could afford market prices) especially in remote locations (Havnevik et al., 2007).

3.1.2. Climatic and natural resource changes

The study found that livelihoods of people in the Lake Chilwa basin are affected by adverse effects from sudden climatic or natural shocks such as unreliable and poorly distributed rainfall, flooding, droughts and lake recessions (Government of Malawi, 2000). Since data has been recorded from the late 1800s, the lake has receded twelve times: 1879, 1900, 1914–15, 1922, 1931–32, 1934, 1954, 1960–61, 1967, 1973, 1995 and 2012 (Kalk et al., 1979; Njaya et al., 1996; Government of Malawi, 2000).

The study found complementary flows of income between fishing and farming where income from fishing is used to buy farm inputs and the food from agriculture supports the fishing communities and the entire economy of Malawi. As a socio-ecological system, Phipps (1973) also observed that the water recessions of Lake Chilwa have consequences that extend beyond fishing and local communities alone. This is due to the fact that the whole of

the Chilwa plain and the lake are an economic network as well as an ecological system. [Njaya et al. \(2011\)](#) again reported of a large-scale movements of financial resources from fishing to farming, pastoralism and other occupations when the lake is in full production and that this trend reverses when the lake dries up.

Apart from the climatic changes, the decline of natural resources in the Lake Chilwa socio-ecological system is caused by anthropogenic effects. It was found that formal and informal agents were contributing to the fragility of the system by putting extreme pressure on the availability of natural resources. There was increased loss of forest cover as a result of high demand for wood fuels for fish smoking and household cooking in the urban areas of Zomba and Blantyre ([Kambewa et al., 2007](#)). In general, 90% of Malawi's energy for cooking comes from firewood and charcoal ([Ngulube et al., 1999](#)) and in particular about 6500 tons of wood fuel is used annually to smoke fish in the Lake Chilwa socio-ecological system ([Kabwazi and Wilson, 1998](#)). Forest area has declined from 5084 ha to less than 1000 ha between 2001 and 2011 ([Mankhambera et al., 2011](#)). Forest degradation was already having negative impacts on the socio-ecological system in the form of soil erosion and loss of soil fertility, water depletion, pollution and loss of biodiversity. Further pressure on natural resources was caused by conflicts of interest among the different ecosystem users and increased competition. For example, water from the Lake Chilwa catchment area feeds three large irrigation schemes that irrigate rice growing. The same catchment water is also used for domestic purposes for the growing city of Zomba under the jurisdiction of the Southern Region Water Board.

The future looks bleak for the Lake Chilwa socio-ecological system in terms of natural resources availability. Climate change projections for the region indicate a decrease in available water resources ([IPCC, 2007](#)). Some studies indicate that surface air temperature will increase by 2.6–4.7 °C by 2075, potentially increasing evaporation rates of water from the lake ([Chavula, 1999](#)). Current fluctuations in natural resource production will likely be exacerbated by climate variability putting further pressure on natural resources. [Sarch and Allison \(2000\)](#) note the greater importance of climate change in driving dynamics of fish stocks in African inland lakes such as Lake Chilwa. Climate change and variability will modify fish distribution and ecosystem productivity, negatively impacting livelihoods of the communities that depend on fisheries.

3.2. Kinship networks in coping with lake recessions

In 2012 coping strategies were mostly based on kinship networks for over 60% of the households ([Table 1](#)). Kinship networks have consistently featured as the central coping strategy during all lake recessions, most likely as a result of the matrilineal systems prevalent in the area. Matrilineality is a social system in which a person's descent is traced through her/his mother and the maternal ancestors ([Kurtz, 2001](#)) thus individuals are related through the female line of descent. As is the case in most parts of southern Malawi, the people in the Lake Chilwa socio-ecological system are traditionally matrilineal and have uxorilocal residence, whereby husbands come to live in their wives' villages.

Coping strategies to mitigate the effects of climatic variability have varied in relation to the different recessions. For example, 200 fishermen managed the 1968 recession by migrating to Lake Malombe and Lake Malawi ([Agnew and Chipeta, 1979](#)). During the 1996 recession, the introduction of community-based management institutions restricted the movement of fishermen between Lake Malombe and southern Lake Malawi ([Sholtz et al., 1998; Chirwa, 1998](#)).

At Chisi Island, where most traditions follow the Mang'anja

ethnic group, lineages were grouped into political units which in themselves included multiple extended families. Each lineage was headed by a leader at the village level and several lineages were headed by a clan leader overseen by a chief or Traditional Authority as the highest leader. The Mang'anja ethnic group in the Lake Chilwa socio-ecological system had Traditional Authority Mkumbira as its head and another Mang'anja group on the main land was headed by Traditional Authority Mwambo, originally an elder brother of Mkumbira. Another well-structured ethnic group was the Yao, which was headed by Traditional Authority Kuntumanji. Although some Yao men were polygamous, the wives lived in different matrilineal villages while the husband alternated accommodation between or among the wives' households. The Lomwe ethnic group which had no endemic leadership was also found on Chisi Island and was ruled by Mang'anja leadership. In all these matrilineal ethnic groups, sisters lived close to each other, although each sister usually ran a separate household. There was a great deal of informal mutual aid and food-sharing among sister households.

Kinship in the matrilineal relations represented a large and complex network in people's existence. The study found a strong tradition of kinship ties where the generic terms '*mwambo wathu*' (our tradition) embraced a group of formative norms enforced via a series of rules and taboos associated with natural resource use and management. There were also rituals that perpetuated social security through *mwambo* (tradition) such as initiations for both girls and boys called *chinamwali*. *Chinamwali* provided a framework for communal behaviour and rites of passage to adulthood.

Mwambo wathu also served conservational and political functions including the designation of sacred sites where people were not allowed to fish or cut trees. FGDs revealed that there were two important islands (Chaone and Chidyamphiri) with a traditional religion wherein elders used to offer sacrifices during recessions or when fish catches were unexpectedly low. Chidyamphiri Island in particular was not inhabited but maintained old shrines associated with earlier faiths. In 1930, the island was earmarked by the colonial government of Nyasaland to be designated as the first aquatic protected area because of its python (*mphiri*) population and the presence of numerous religious shrines.

[Gunderson \(1999\)](#) also found that the *mwambo wathu* fulfilled political functions such as conflict resolution, administration of land rights and collective decision-making in matters concerning the community. It was found in this study that the management and control of land rights within the lineage was perhaps the highest position that women held in the matrilineal system of the Chilwa socio-ecological system. During an interview with Gogo Nasibeko, it was revealed that leaders in matrilineal systems could be either women or men but were nominated and chosen by a group of women elders. Men acted as spokespersons for the female sorority group called *mbumba*. The *mbumba* was perhaps the most

Table 1
Major coping strategies to 2012 Water recession on the Chisi Island.

Coping strategy	% Households involved (N = 150)
Short term loans from kin	9
Food aid from kin	55
Government relief	4
NGO relief	2
Reduced meal frequencies during famine	40
Selling of household assets	5
Livestock selling	30
Selling of family labour (ganyu)	20
Migration	2
Irrigation	2
Selling other grains (rice) to buy maize	9

stable unit in the matrilineal system of Lake Chilwa area, where the eldest female was treated with respect and consulted for all decisions involving the group. It should also be noted that social arrangements in matrilineal society provide women with strong rights over land allocation and use. In fact, it was found that women had a high degree of tenancy over land in the north of Zomba District in the 1940s (Hirschmann and Vaughan, 1983). Similarly, Hirschmann and Vaughan (1983) found that 80% of women had security over land tenure and would not lose their land in the event of a divorce or separation. However, in other matrilineal descent groups land may be owned by women but controlled by their matrilineal male kin.

Kinship networks played an important role in providing social safety nets in the Chilwa socio-ecological system during lake recessions. There were complex kinship relationships that were observed where the use of names represented functions or roles of individuals. For example, the name 'father' was sometimes used to mean a helper or somebody who plays the same function as a biological or surrogate father. Similarly 'mother' would include aunts from extended families who would fill the same roles as biological mothers. It is one thing to gather data about name relationships, but another important aspect of research is to understand the implications of the relationships (Lévi-Strauss, 1969). These implications could range from different entitlements and roles in different lineages.

Additional social safety nets through kinship relations were manifested during disasters such as the lake recessions, funerals and other events regarded as catastrophic. It was found that 77% of households from the household survey had given or received food support within and outside the socio-ecological system during these events. When a person died in a village, households from within and outside the village gathered flour and money to support the bereaved family. It was also found that terminal sicknesses in the villages of Chilwa went beyond the responsibility of a single household. In Malawi where no formal social welfare or security systems exist, funeral and sickness costs have always been a shared communal burden, both in rural and urban areas. This imperatively preserves the communal aspect surrounding death and sickness.

3.3. Gender relations and entitlements

This section analyses two types of entitlements: endowments (or owned assets) and exchange entitlements (Sen, 1990) as they relate to gender relations in the Lake Chilwa socio-ecosystem. Entitlements are legally and socially defined rights to resources (Fortmann and Rocheleau, 1997; Djoudi and Brockhaus, 2011). The matrilineal system in the Chilwa socio-ecological system had shown some negative implications for women's ownership of assets at the household level. In the case of Lake Chilwa, marriage instabilities affected asset ownership. Marriage instabilities were said to be high during lake recessions. During recessions, men easily migrated to other places under the pretence of looking for employment, though most did not come back. On the contrary, women were tied to their matrilineal land for fear of losing their land rights should they leave. The following two quotes from Namilanzi¹ and Nangondo explain the nature of weak families during recessions in the matrilocal Chilwa society:

[...] my husband left for Limbe to go and look for work when his fishing business collapsed as a result of lake recession. It's now

three months; he has not come back or called. I am now left to take care of my children [...] (Namilanzi).

[...] life is tough with the lake drying. Our husbands are now leaving us. My husband left for his home in Mulanje to ask for food from his parents but up to now he has not yet returned. I called his parents and they said he is not there. There are rumours that he has married in Thyolo where there is food. (Nangondo).

It has also been shown elsewhere that households in matrilineal systems can be unstable. Traditionally, the marriage bond is weak and can therefore be easily dissolved (Peters, 2010; Phiri, 1983). Both Phiri and Peters attribute weak family bonds to conflicts between filial and conjugal loyalties, i.e. between the loyalty of a woman to her own male and loyalty to her husband. Traditionally, women take orders from their brothers and men are responsible for their sisters as well as their sisters' children. As such, husbands do not overly invest in their own households.

Historically-manifested relationships of gender and class are embedded in the beliefs and behaviours of agents as well as in the social structures that they have established and developed. Although the matrilineal system provides stronger rights to land, there were other gender inequalities that were expressed in language. During FGD of both men and women, it was revealed that there were popular sayings that limited women's participation in leadership, decision making and division of labour. The sayings end up stereotyping women as inferior to men and in conflict to the matrilineal societies' social structure: These sayings included:

- Ng'ombe yaikazi sikoka ngolo [A cow does not pull an ox-cart] simply implying that women cannot lead.
- Mkazi azimva nkhwali kulira [a good woman should hear a francolin crow]. This saying implies that a woman should rise up very early before others wake up.
- Wamkulu mbanja ndi mwamuna [the head of a household is a man]. In this case men have the final say in decision making process at household level.

As a consequence of these stereotypes, the division of labour in the Lake Chilwa socio-ecological system is highly gendered. In Lake Chilwa fisheries for example, men dominate in all areas except for sun-drying and marketing of small fish species – the *Barbus species* commonly known as *matemba*. Women were not allowed to fish in open waters or be seen working with men in fishing. This was also observed by Chiwaula et al. (2012). Similarly, the labour demand for women was high, resulting from their multiple roles related to reproduction, production and household chores (see Elson, 1992). These roles include water and fuel wood fetching, child care, caring for the sick and the elderly, while being expected to contribute equal amounts of agricultural labour (Government of Malawi, 2008). Decisions at household level on food and incomes were dominated by men.

Gender inequalities greatly reduced the capacity to harness the benefits of the Lake Chilwa socio-ecological system for human well-being. For example, women were the major fish processors, and yet their access to fish processing technologies was limited due to low incomes, weak presence in fisheries governance and unequal division of labour. This is due to the entrenched weak economic structure and the overall social injustices of women in Malawi (Government of Malawi, 2008; Chiweza, 2005; Ngwira, 2001). In many mainstream organisations, policies have for decades given priority to the generally male-dominated production sphere and have largely neglected the processing and marketing activities where women often play a key role. However, research has shown

¹ All names used for quotes in this article are pseudo names except those for chieftaincy.

that women are better custodians of the environment (Agarwal, 2001, 2009; Chiweza, 2005). Similarly, women's involvement is vital in governance of natural resources. When women are given opportunities to govern natural resources, they look beyond the economic benefits of the resource to sustainability and its social value despite resistances from mainstream organisations (Arora-Jonsson, 2013).

3.4. Institutional networks

The formal organisations and networks in the Lake Chilwa socio-ecological system were complex in their conceptualisation and in the operations of their activities. However, a common theme was the idea to involve local people in managing the Chilwa common pool resources. Many common pool resources are regulated by user groups through collective land ownership or through customary tenure (Carlsson and Sandstrom, 2008). Although there were no private property rights, the wetland and other natural resources in the Chilwa socio-ecological system were *de facto* properties for some households, chiefs and governance organisations (Kambewa, 2006). Land allocation of the wetland was controlled by chiefs while access to fish and birds were controlled by governance committees formed under the co-management arrangements.

Over the last decade the concepts, policies and practices of conservation in Africa shifted towards what has been viewed as a community-based approach. Although these challenges have commonly been perceived as a move towards putting the community in conservation (Agarwal, 1997) and are widely referred to as 'community-based conservation' (Western and Wright, 1994) or 'participatory approaches', they are more complex than the simple dynamic of shifting of responsibility and authority from the state to the community. Through the co-management approach, there were thirteen various organisations that worked within the entire Lake Chilwa socio-ecological system. These organisations functioned on two levels: those that were in direct contact with the community such as Community Based Organisations (CBO), faith based groups and local resource management groups such as the Village Natural Resources Management Committees (CBNRM) and Beach Village Committees (BVC); and those whose services were available in the communities but the organisations had no physical presence in the area such as government departments. The Chilwa socio-ecological system also hosted diverse organisations that were nested as quasi-autonomous decision-making units that operated at multiple scales under co-management arrangements. These committees were formed either by NGOs or different government sectors backed by their sectoral policies and included: Violence against Women Committee, Village Credit Committee, Community policing committee and many other small committees that were developed as the need arose. The working relationship among the organisations and government sectors was disjointed and the coherence of messages by different sectors was often lacking such that one community member could be a member and attend to more than three different committees during the same week.

Analysis of reliability and trustworthiness of the institutions showed that elected committees were not as effective in knowledge sharing and resource governance as compared to informal networks. The government backed institutions were ranked very low on reliability, while CBOs and NGOs ranked very low on trustworthiness. During a FGD at Tchuka Village, participants concluded that:

[...] government programs take time to be implemented [...] NGOs' and CBOs' choice of beneficiaries is always biased and

only few people in the village benefit, besides we even don't know their budgets. (Tchuka FGD).

In terms of representativeness and participation of local people in the committees, the technical and development committees such as Area Development Committee, Village Development Committee, Village Natural Resources Management Committee and Beach Village Committee were weak due to the low motivation of their members. It was mentioned in FGDs that positions in these committees (such as Chairperson, Secretary, and Treasurer) were considered as symbols of high social status and people aspired to get them for status as opposed to the urge to serve. Thus, the rich and powerful were more easily able to obtain these positions because they had bigger influence on the society. During meetings of the committees, few members actively contributed to decision-making related to natural resource governance. The decisions were dominated by the higher ranks of chairperson, secretary and treasurer. It was noted that most of these committees were donor-driven and as such there was a perception by many, including traditional leaders, that the executive committee members got monetary benefits from their donors.

As a result of untrustworthy of elected or sponsored committees, 98% of the people in the Chilwa socio-ecological system belonged to different social self-organised groups (see Table 2 below). The most important among these groups were religious groups (churches and mosques) where 81% of the households belong. Membership in groups on the island was found to be at the household rather than individual level. These groups were said to be important in safeguarding livelihoods in times of need chiefly by providing safety nets. Apart from food support during hunger and disaster periods, religion also shaped the society through beliefs that influenced the code of conduct and food consumption habits for example catfish was not consumed by other religious groups. Politics rated second with almost 36% of the respondents supporting political parties. The main reason given for this was the provision of security and prioritisation of government targeted subsidies, which favoured those supporting ruling parties. This may suggest that access to government services is affected by political affiliation.

4. Conclusion

The Lake Chilwa socio-ecological system demonstrates the importance of social networks where people and households cope with and handle recessions through social cohesion and reciprocity. The choices that households or individuals make around livelihoods are affected by socio-cultural and economic factors. Furthermore, the agents (individuals and organised groups) are continually interacting to effect change in natural resource availability. In addition, assets and supportive social relations enhance

Table 2
Household membership in social groups in the Lake Chilwa socio-ecological system (N = 150).

Social group	Percentage membership for each social group ^a
Religious (Church or Mosque)	81
CBOs	28
Political parties	36
NGOs, Clubs and Associations	13
Governance committees	12

^a Note that the total percentage is more than 100 because most of the households belonged to more than one social group.

the capacity to cope with resource fluctuations among rural communities in the Chilwa socio-ecological system.

Informal social networks demonstrate how people can cope to the dynamics of surrounding environments (social and natural), and how livelihoods are impacted in different ways in rural Africa. These sets of networks are practically described as assets and constitute a form of social capital. However, the consequence of weak assets and unfavourable institutional environments are the causes of the limited opportunities available for livelihood diversification. It has been demonstrated in this paper that collective action to cope with the intensity of vulnerabilities requires networks and flows of information between individuals and groups to oil the wheels of decision making.

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