

**Adaptation to climate variability in East African lakes and wetlands:
The role of social capital in promoting resilience.**

Marisa Goulden
University of East Anglia and Tyndall Centre for Climate Change Research

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Abstract

The mechanisms by which individuals and societies respond to climate variability can provide valuable insights into how societies might adapt to the impacts of future climate change. It is proposed that links between individuals, often described as social capital, are important for the resilience of societies to the impacts of climate variability. Extreme climate events such as floods and droughts have had an impact on people living on the shores of lakes in East Africa. These people are dependent on the resources of the lakes and wetlands for their livelihoods.

Results are presented from case study research in two lakeside communities in Uganda. The outcomes of social capital, as characterised by collective action or community-based groups, are examined for how they contributed to resilience to several extreme climate events and related impacts during the 1990s.

Membership of groups can offer individuals or households access to networking social capital, which can be important for resilience to climate impacts and other shocks and trends, in addition to the bonding social capital that individuals possess with relations, friends and neighbours. Groups formed for specific purposes other than natural resource management, livelihood diversification or improved resilience to climate impacts can nevertheless contribute to these outcomes. Both bonding and networking social capital are important for a group to be able to contribute to the resilience of individuals within, and external to, the group. This has implications for external interventions, which may be able to increase networking social capital but risk reducing bonding social capital when they try to change or create institutions.

1. Introduction

In order to predict society's vulnerability to future climate change and identify possible needs and options for adaptive action we need to understand more about how people cope with and adapt to the impacts of current-day climate variability. The impacts of climate variability can be particularly severe in societies where people are highly dependent on natural resources for their livelihoods and also experience the impacts of extreme climate events such as floods and droughts as well as other sources of stress to their livelihoods such as disease, conflict and increased population pressure. But resilient societies learn to cope with and adapt to these stresses. By studying the specific mechanisms by which

¹ Email: m.goulden@uea.ac.uk. School of Environmental Sciences, University of East Anglia, Norwich and Tyndall Centre for Climate Change Research

individuals and households are able to respond to climate impacts it is hoped that the conditions necessary for building societies resilience may be understood. The research in this paper presents an analysis of how social relationships or links (social capital) contributes to resilience to climate-related impacts in the specific setting of tropical lakes and wetlands in Uganda.

The theoretical framework of the research and hypotheses to be tested are laid out in Section 2, followed by a description of the case studies used to investigate the hypotheses in Section 3. Section 4 presents analysis of results from the study of social capital in community based groups in the two case study villages and some conclusions are presented in section 5.

2. Linking social capital to resilience through livelihoods and collective action

People that are largely dependent on natural resources for their livelihoods, such as farmers or fishermen, are often seen as very vulnerable to the impacts of climate change or climate variability as well as environmental change in its broader sense. Extreme climate events such as floods and droughts, or slow changes in climate, such as reduced rainfall or less predictability in the seasons, affect both human and natural systems and the interactions between them (Conway et al. 2005). The concept of Resilience, first applied to ecological systems and then to social and ecological systems, helps to explain the non-linear relationship between environmental change and the stability of systems that have a close link between humans and nature (Adger 2000; Gunderson 2000; Carpenter et al. 2001; Carpenter and Gunderson 2001; Quinlan 2003).

The resilience of a social and ecological system is described as the magnitude of disturbance that the system can withstand before a shift or change in state occurs that alters the overall function of the system and its underlying processes (Carpenter et al. 2001; Adger 2003a). Factors thought to influence the system's resilience are the degree to which the system organises itself (rather than being shaped by external factors) and the capacity for learning and adaptation to occur within the system (Carpenter et al. 2001; Berkes and Jolly 2002; Adger 2003a).

The applicability of the concept of Resilience to climate change and human security becomes apparent in the definition of social resilience provided by Adger (2000) : “the ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change”. Common to many approaches to resilience is the idea that resilient systems are able to exploit diversity and social networks for learning and adapting to surprises (Carpenter et al. 2001; Quinlan 2003).

Social capital and collective action

Collective action involving the collaboration of resource users has been observed in many societies as an effective means of managing natural resources and there have been many studies of the conditions necessary for successful community based natural resource management (Leach et al. 1999; Agrawal

2001; Pretty and Ward 2001; Pretty 2003). Ostrom and Ahn (2003) emphasize the close link between theories of social capital and collective action: “we view social capital as an attribute of individuals and of their relationships that enhances their ability to solve collective-action problems.” Adger (2003b) proposes that the flows of information in social networks, or social capital, are important for collective action for natural resource management and that the ability of societies to adapt to changes in climate is partly determined by their ability to act collectively.

Livelihoods approach

The importance of social capital to livelihoods is recognised by its inclusion in the livelihoods framework (Figure 1). This framework has been used in development research on sustainable livelihoods and poverty (Carney et al. 1998; Ellis 1998; Ashley et al. 1999; Ellis 2000; Allison and Ellis 2001). It attempts to describe the factors contributing to the success or failure of people’s livelihoods starting with the assets possessed by individuals or households. These assets are categorised into five different types of capital: natural capital, physical capital, human capital, financial capital and social capital (column A in Figure 1). Ellis (2000) describes the asset of social capital as being held in ties or networks and requiring investment in order to derive potential future benefits. The livelihoods framework describes how access to assets is modified by social relations, institutions and organisations (column B in Figure 1). These modifying factors could also be considered as outcomes of social capital (Dasgupta 2003). The framework is useful for studying the response of households to climate related stresses since it also describes how livelihood strategies result from access to assets in the context of shocks and trends, which could include floods and droughts as well as non-climate shocks and trends (column C in Figure 1).

The research presented in this paper is part of a PhD project that aims to assess the importance of and processes by which diversification of livelihood strategies and social networks, or social capital, contribute to the resilience of societies dependent on the diverse natural resources of lakes and wetlands and surrounding land to climatic impacts. The research is primarily looking at social resilience, but the resilience of the lake and wetland ecological system is clearly related to the actions of the people exploiting its resources and the success of their livelihood strategies. In this paper I concentrate on the contribution of social capital to resilience, as illustrated by institutions of collective action. The specific research questions being addressed here are: Is social capital important for resilience to climate related-shocks and trends a) through its contribution to livelihood diversity and b) as a mechanism for coping and adapting (through mechanisms other than diversification)? In order to address these research questions I will first explain the approach taken to understanding and measuring social capital.

Figure 1 The Livelihoods framework (adapted from Allison and Ellis 2001)

A	B	C	D	E	F
Livelihood platform	Access modified by	In context of	Resulting in	Composed of	With effects on
<div data-bbox="190 708 450 962" style="border: 1px solid black; padding: 5px;"> <p><i>Assets</i> Natural capital Physical capital Human capital Financial capital Social capital</p> </div>	<div data-bbox="508 539 757 758" style="border: 1px solid black; padding: 5px;"> <p><i>Social relations</i> Gender Class Age Ethnicity</p> </div> <div data-bbox="483 807 786 975" style="border: 1px solid black; padding: 5px;"> <p><i>Institutions</i> Rules & customs Land and sea tenure Markets in practice</p> </div> <div data-bbox="508 1024 741 1241" style="border: 1px solid black; padding: 5px;"> <p><i>Organisations</i> Associations NGOs Local admin State agencies</p> </div>	<div data-bbox="808 515 1122 879" style="border: 1px solid black; padding: 5px;"> <p><i>Trends</i> Population Migration Technological change Relative prices Macro policy National econ trends World econ trends</p> </div> <div data-bbox="842 975 1102 1217" style="border: 1px solid black; padding: 5px;"> <p><i>Shocks</i> Storms Recruitment failures Diseases Civil war</p> </div>	<div data-bbox="1158 807 1346 903" style="border: 1px solid black; padding: 5px;"> <p>Livelihood strategies</p> </div>	<div data-bbox="1373 563 1709 831" style="border: 1px solid black; padding: 5px;"> <p><i>NR based activities</i> Fishing Cultivation (food) Cultivation (non-food) Livestock Nonfarm NR</p> </div> <div data-bbox="1402 927 1691 1169" style="border: 1px solid black; padding: 5px;"> <p><i>Non NR based</i> Rural trade Other services Rural manufacture Remittances Other transfers</p> </div>	<div data-bbox="1771 563 2063 783" style="border: 1px solid black; padding: 5px;"> <p><i>Livelihood security</i> Income level Income stability Seasonality Degrees of risk</p> </div> <div data-bbox="1738 975 2069 1217" style="border: 1px solid black; padding: 5px;"> <p><i>Env. sustainability</i> Soils and land quality Water Fish stocks Forests Biodiversity</p> </div>

What is social capital?

Social capital has been defined in a variety of ways but many writers refer to aspects of social capital such as trust, reciprocity and exchanges, common rules, norms and sanctions, and networks (Pretty and Ward 2001; Adger 2003b; Ostrom and Ahn 2003). Social capital is not a single entity, but made up of many different elements (Dasgupta 2003). A key element of social capital is the system of networks, or series of social links or relationships held between individuals.

Although networks are formed from links between individuals they can either be considered as *private* assets held by individuals or close groups of individuals such as a household (as in column A of the livelihoods framework in Figure 1), or *public* assets held collectively by 'society' (similar to the modifiers of assets in column B of the livelihoods framework in Figure 1) (Adger 2003b). Links can be categorised into different types, for example, strong bonds or ties with family and friends that rely on kinship, affection, obligation and reciprocity, have been referred to as '*bonding social capital*'. Looser ties with others who are outside the close kin or friendship groups rely on trust, shared aims or beliefs, for example, links to other less well-known members of the village, village leaders, and members of external organisations. These have been described as '*networking social capital*' (Adger 2003b).

Social capital is a term that is sometimes used to represent the economic value of these networks or links, hence the use of the word 'capital'. It is different to other sorts of capital (financial, natural, physical) in that it is not reduced in value by use, but rather by disuse. Social capital theory is used here because it provides helpful concepts that recognise the importance of networks and bonds in decision making, natural resource management and collective action, but it is not employed in its economic sense for valuation purposes. Instead it is used to discuss how the outcomes of social relationships contribute to resilience.

How can social capital be observed?

There are no generally agreed methods for measuring social capital. Krishna (2001) suggests that measures of social capital must be relevant to the culture in which the research is taking place. De Weerd (2005) explored how networks are used to share risk by counting the links between each household and every other household in a village and looking at factors determining the formation of links. However, this approach does not give a great deal of information about how these links are used.

Measurement of social capital is problematic since many of the elements are intangible and difficult to observe or attach a value to. For example even if you can reliably count a persons links to others, how do you assess the strength or value of those links? It may, however, be more visible at times of high stress to livelihoods (Ellis 2000), for example during a flood or a drought.

Social capital is often observed by looking at proxy data about institutions, for example, information on membership of collective management institutions or groups (Pretty and Ward 2001).

Community based groups are formed by links or networks between people, the use of these networks can be analysed by looking at the activities of the group.

Care must be taken to distinguish between institutions and social capital. The word 'institution' can be used in several senses: to describe an organisation e.g. Department of Fisheries; to describe human relationships e.g. marriage; or to describe the rules that are used in relationships between individuals (Ostrom 2003). (Leach et al. 1999) describe institutions as "regularized patterns of behaviour between individuals and groups in society". Ostrom (2003) describes an institution as "the set of rules actually used (the *working rules* or *rules-in-use*) by a set of individuals to organize repetitive activities that produce outcomes affecting those individuals and potentially affecting others". Institutions can be formal, such as laws and land tenure regimes, or informal such as norms, customs or patterns of behaviour. Social capital, on the other hand, describes the networks which help shape institutions along with beliefs and culture (Adger 2003b; Dasgupta 2003). Institutions can be viewed as the outcomes of social capital since they emerge from networks (Dasgupta 2003). The study of institutions and organisations can reveal information about the nature of social capital.

To observe social capital in institutions I chose to look at community based organisations or groups, which might be formal i.e. recognized by government, for example Local Council committees or informal such as Burial groups. In order to look at institutions I will look not just at the organisations themselves but, more importantly, the patterns of behaviour associated with them, for instance the rules and sanctions, who is included, who is excluded, how members behave, and what their roles are, for example.

I recognise that not all of an individual's social capital is associated with membership of or links to community based groups. Whereas collective action and natural resource management is more likely to be associated with groups, social capital in the form of links to other individuals outside a group situation is also important for coping with the impacts of climate stress (and other stresses) and building resilience (for example through livelihood diversification). However, this paper concentrates on social capital associated with group membership.

3. Lakeside villages in Uganda and the impacts of climate variability

The observations of social capital presented in this paper come from two case studies on two Ugandan lakes: Lake Kyoga, the first Lake in the River Nile system after the Nile flows out of Lake Victoria; and Lake Wamala, a small lake in the catchment of Lake Victoria. These lakes were chosen because of their slightly differing history of climate-related fluctuations and impacts. Field research was carried out in two villages, Kiribairya on Lake Kyoga and Lubajja on Lake Wamala, in 2003 and 2004. The location of the lakes and the villages is shown in Figure 1. Table 1 describes the key features of the villages.

Figure 2 Map of the lakes of Uganda, showing the location of the lakes and villages in this study.

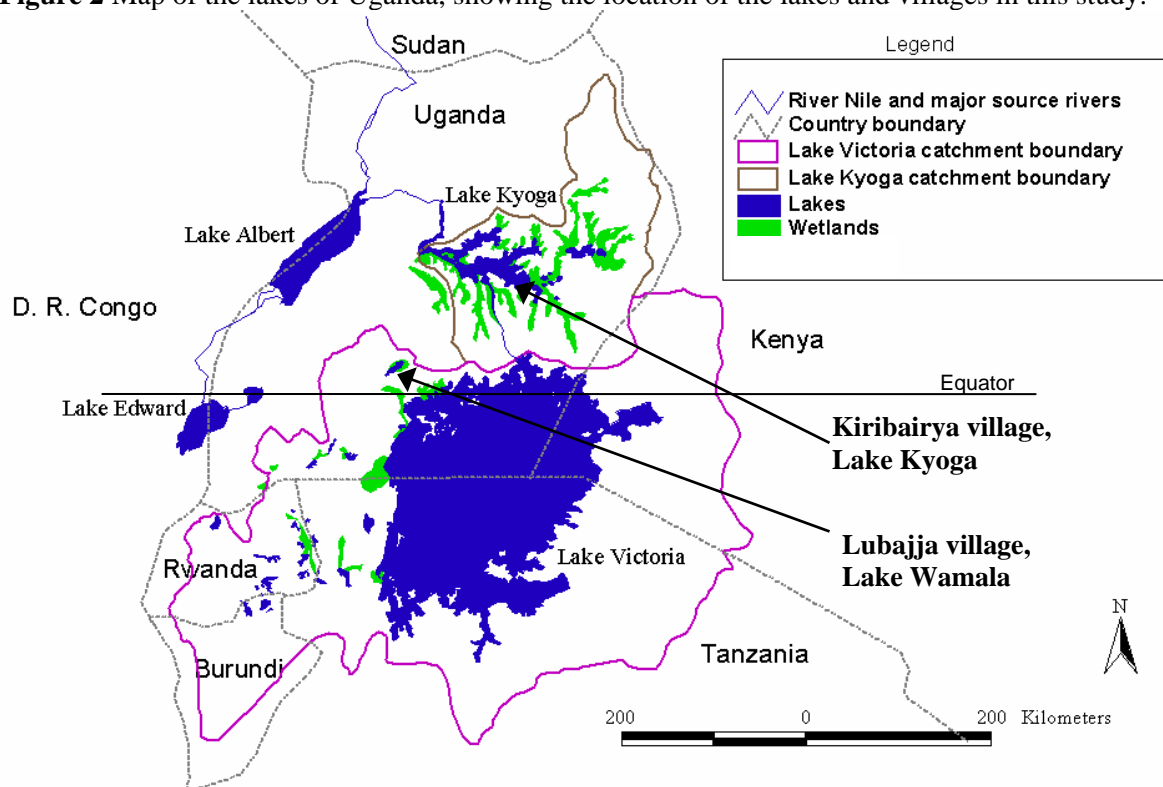


Table 1 Key features of the villages in this study.

	Case study 1	Case study 2
Lake	Lake Kyoga	Lake Wamala
Village name	Kiribairya	Lubajja
Population	201 households <i>total population unknown</i>	377 households <i>total population unknown</i>
Major ethnic groups (dominant group in bold)	Bakenyi , Basoga, Banyoro, Itesot	Baganda , Banyaruanda, Basoga, Bakiga
Main livelihoods	Cultivation, livestock, fishing	Cultivation, livestock, fishing
Main crops	Sweet potatoes, millet, cassava, maize, groundnuts	Beans, cassava, sweet potatoes, maize, bananas
Annual rainfall (mm)	1475 mm (<i>Mean annual rainfall 1970 to 2002 for Kiige, closest rainfall station to Kiribairya</i>)	1191 mm (<i>Mean annual rainfall 1940 to 1985 for Mityana, closest rainfall station to Lubajja</i>)
Key climate related events or changes in last 10 years	1994 Drought (<i>famine known locally as Kavera</i>) 1997 & 1998 Flooding (<i>water level remains high up to 2003/4</i>). Increase in floating vegetation with flooding.	1991 to 1994 Lake shrinking 1997 & 1998 Return of lake and flooding (<i>water level remains high in 2003/4</i>). Increase in floating vegetation with flooding.
Key social or economic events or changes in last 20 years	1986 & 1987 Large scale immigration (<i>Insecurity in Teso, arrival of Iteso, Bakenyi and other tribes</i>).	1991 to 1994 Collapse in economic fishing and emigration (<i>mainly fishermen leaving</i>) 1998 Immigration (<i>fishermen arriving when lake flooded and fish catch recovered</i>)

Impacts of climate variability

East Africa has experienced a number of drought and flooding episodes during the 20th Century (Conway 2002; Conway et al. 2005). According to verbal histories told by residents of these villages,

Kiribairya on Lake Kyoga is more prone to drought and famine episodes than Lubajja village on Lake Wamala, which has experienced fewer of these within living memory. Both lakes are shallow (four to ten metres in depth) and have suffered fluctuations in levels during the 20th century. Two extreme climate events in the early 1960s and at the end of 1997 and beginning of 1998 were responsible for widespread flooding around a number of lakes in East Africa (Conway 2002). The shores around both Lake Wamala and Lake Kyoga were flooded at these times. The lake levels may also be dependent on factors other than direct climate ones such as the build up of floating vegetation in the outlet, which in Lake Kyoga is thought to be responsible for the maintenance of the high level of the lake since 1998. The levels in Lake Kyoga are also heavily influenced by the inflow from the Nile, which is managed at the outlet of Lake Victoria as it flows through a hydro-electric dam.

Lake Wamala is not dammed and fluctuations in level might be expected to be in direct response to climate variability over the relatively small catchment area. This lake has suffered substantial drying and recession during two or three periods during the 20th Century and it is not known whether the cause is purely climatic or due to other factors such as land use change in the catchment and varying conditions of the outlet. Research on social responses and adaptation to climate variability focused on the local responses to climate events and resource fluctuations that occurred in the 1990s. In Kiribairya these climate impacts were a drought and famine in 1994 and flooding in 1997/98 that destroyed homes and crops. In Lubajja the recession of lake Wamala between 1991 and 1994 was accompanied by a dramatic decline in the size of fish and the overall catch sizes. The transgression of Lake Wamala in 1997/98 resulted in the flooding and destruction of crops that residents of Lubajja had grown on the dried up lake bed but was also followed by significant improvement in the size and overall fish catch.

Social context

Both case study villages exhibit a similar history of waves of migration throughout the 20th Century. After initial settlement of the land much of the migration seems to have been related to the availability of fish in the lake with people arriving when fish catch was high and leaving as fish catch declined. Refugees arriving from surrounding areas experiencing insecurity have also had an important influence on the mix of tribes in the area. Lubajja on Lake Wamala is located in the modern district of Mubende and the pre-colonial kingdom of Buganda, the Baganda people being the most common ethnic group. Kiribairya village is located in the modern district of Kamuli and the pre-colonial Kingdom of Busoga. The Bakenyi people traditionally live around the shores of Lake Kyoga and are most numerous in Kiribairya, followed by the Basoga, original inhabitants of Busoga. A large proportion of the inhabitants of Kiribairya, in particular those living at the landing site on the lake shore, arrived here after fleeing the northern shores of Lake Kyoga in the region known as Teso during inter-tribal conflict and rebellion in 1986 and 1987 and the following few years.

Livelihoods in both case studies are based on a mixture of cultivation, livestock keeping and fishing, along with trading activities. The landing sites attract new settlers hoping to earn a living, often those whose previous livelihoods have failed due to personal disasters such as divorce or death of the household head, for example.

The land tenure situation in Uganda is somewhat complex and is currently going through legal reforms. In Kiribairya local leaders describe land as being held as 'customary tenure' where people do not have formal title to the land but nevertheless carry out transactions such as renting out or selling land which they 'own'. In Lubajja the land tenure system appears more formalised with a system of 'ekibanja' or squatting, where the vast majority of the occupiers of the land are 'squatters' recognised by the landlord. In both case studies the lake and the swamp areas around it are effectively common resources available to all, providing fish, firewood, grazing land, reeds for thatching and papyrus for making mats, amongst others. Although discouraged by law the landless sometimes use swamp areas for dry season cultivation or, in the case of Lake Wamala, the dried up lake bed effectively became a common land resource when the lake shrank in the early 1990s.

The results presented here include quantitative and qualitative data from a household livelihood survey and qualitative data from in-depth interviews with groups and individuals that were conducted in each village between November 2003 and March 2004. The survey sample of 40 households per village was designed to be representative of the range of households in the village by ensuring that a variety of different wealth levels were sampled.

4. Social capital and collective action in Ugandan fishing villages

I will now present data from the two case studies described in Section 3 that provide some indications of how important social capital is to resilience to climate impacts and the processes by which it contributes to the adaptive capacity and resilience of the societies that experience the climate impacts. The results presented here focus on social capital as revealed by institutions of collective action such as community based resource management groups, village committees and micro-credit and savings groups.

Collective action can occur either through participation in such community based groups or through collective or communal tasks involving participation of a wider section of society, in this case people living in the village. The tasks undertaken collectively can have a variety of purposes and be prompted by a variety of shocks or trends. For example, formal burial groups or communal involvement in a burial deals with the 'shock' of a death in the household. Other purposes served by groups include natural resource management, coping with shocks, improved access to livelihood activities, the maintenance of security and the development of society (for example improvements in education or infrastructure). Groups that are designed for other purposes, may contribute to natural

resource management in general and to resilience to climate-related shocks and trends in particular. This may be either through livelihood diversification or by providing coping and adaptation strategies.

I will begin by using answers from the household livelihood survey to consider what groups exist in the villages of Kiribairya and Lubajja, what the patterns of membership are amongst surveyed households and how membership contributes to the social capital of the individuals or households who are members. I will also present evidence of communal tasks that can also be regarded as collective action but include a wider participation than the activities of a group. I will then examine some of the more visible groups in some detail to analyse how they function and what they contribute to resource management, livelihood diversification and resilience to climate related impacts. Finally I will present some examples of particular households that illustrate contrasting use of social capital for livelihood resilience.

Membership of groups

Respondents in the surveyed households were asked if they, or any other household member, belong to any kind of group such as a, village committee, burial group or credit and savings group, for example. By participating in groups household members may be using, creating or strengthening links to people that are outside their own particular friendship or kinship group, in which case this could be considered as networking social capital rather than bonding social capital between (see Section 2 for an explanation of bonding and networking social capital).

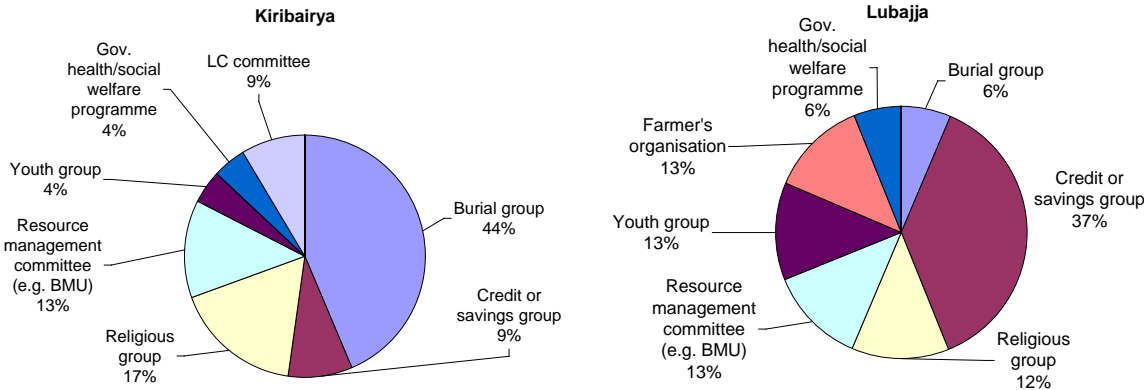
45 % of households surveyed in Kiribairya have at least one member who participates in a group, whereas only 28% of households in Lubajja have one or more members who participate in one or more groups. Figure 3 shows the distribution of the group memberships between different types of groups for the households that had someone participating in one or more groups. There are a variety of different kinds of groups, but burial groups are the most common in Kiribairya and credit or savings groups are the most common in Lubajja.

There is a strong gender difference in group participation, particularly in Lubajja where only two women in the surveyed households participate in groups, one in a credit group and the other in a church group, compared to the 14 group memberships held by men. It is worth noting that these two women are the heads of their households. In Kiribairya many more women participate in groups. Twelve (52%) of the recorded group memberships are of women (or women and men together), seven of these participate in burial groups, two in church groups, two in savings groups and one in a fishing committee. There are other female members of groups that were documented in the in-depth interviews but not the questionnaire survey, particularly the Local Council committees, the Beach Management Unit in Kiribairya and Women's groups.

Most of the groups to which people belong involve other members of the same village (this is the case for about 75% of the group memberships declared in the survey for both villages). About 25% of the group memberships are of groups that have members from outside the village as well as from

the village, either from neighbouring villages in the same Parish or from outside the Parish but within the same Sub-county or District. In most cases these are groups that are supported by NGOs, religious organisations or local government initiatives, although there are two burial groups in Kiribairya that have members in more than one village in the Parish. This indicates that group membership can be an indicator of either bonding social capital or networking social capital, although most groups may be stronger in bonding social capital.

Figure 3 Percentage of group members belonging to a particular type of group for the surveyed households in Kiribairya and Lubajja



Communal tasks

Approximately half of the households surveyed in both villages remembered participating in communal tasks (40% in Kiribairya and 55% in Lubajja). The most common task reported by the surveyed households was maintenance of the road (about 60% of the tasks listed in both villages). Other communal tasks that people remembered having occurred were cleaning of the water well and landing site or participating in a burial (reported as a communal task in Lubajja only). These tasks could be considered as contributing to the management of natural resources and improving resilience, since they would help in the recovery from the impacts of flooding, for example. The communal tasks were almost always within the village itself and so they are likely to form a basis of improving or building links between people living in the village but not outside it. Where the person interviewed in the household was aware of a communal task, it was usual for only one person to participate from the household. Participation in communal tasks was slightly higher in Lubajja (55%) than in Kiribairya (40%). Tasks are managed and participation ensured by the village leaders such as the LC committee members and the Mayor. In Lubajja, those who do not participate are fined a small amount.

Elected leaders and Local Council committees

Since 1987, when the National Resistance Movement gained power in Uganda, there has been an evolving system of decentralisation that has attempted to introduce democracy and self governance through a series of layers of administrative unit, all the way from district down to village level (James

et al. 2001). Each village is divided into one or more political units based on population size, known as the Local Council 1 (LC1). Neighbouring LC1 units make up the Parish or Local Council 2 unit (LC2). Each of these units, LC1 and LC2, has elected committees and the Chairmen of the committees are important leaders in the villages.

The landing sites also have an elected Mayor who works alongside the LC1 committees but has less power than the LC1 Chairmen. Some of the posts are elected every five years such as the Chairman and the representatives of Youth, Women and the Disabled for example, but others may or may not be elected by people in the village, instead being selected by the Chairman.

The Local Council 1 Committees and Chairmen have a broad set of responsibilities including aspects such as ensuring peace and security in the village by dealing with minor disputes and enforcing regulations, promoting the development of the village and being familiar with the day to day issues and problems affecting people in the village, such as births, marriages and deaths. They also provide a point of contact with Government officials and are frequently called away on administrative business to do with local government. The Chairmen of Lubajja and Kiribairya describe their responsibilities in Box 1.

Box 1 The LC Chairmen describe their responsibilities

“The main responsibilities of the LC are to see the situation in the area, how it is going to develop and what has caused it to lag behind and how the citizens are living, how they can overcome poverty. We go on attracting traders to buy things, for example me who lives on the lake, I attract them to come and buy fish so that my people may get money. I try to know whether they are healthy, they get treatment when they are sick, the children go to school, those are the responsibilities of the LC’s.”

Extract from in-depth interview with the Chairman of the LC1 committee in Lubajja, W14

“to encourage citizens to work and to settle civil cases and to report to the authorities about any crimes to police and to report problems facing people to government authorities”.

Extract from in-depth interview with Chairman of the LC1 committee in Kiribairya, LK10

“First is to encourage people to work, second is to make development plans, such as making roads, to tell people to have latrines and to encourage people to take their children to school and for people to pay government taxes.”

Extract from in-depth interview with Parish LC2 Chairman, LK44

The influence and visibility of the LC1 Chairman, Mayor and other leaders, seemed to vary between the two villages and this may be due to personality or other qualities such as trustworthiness, reputation or motivation. The same people have sometimes been in posts of leadership for many years, indicating the concentration of power and influence in the villages with a few. Individuals on the LC1 committee and the Mayor have strong ‘bonding social capital’ links to many people in the village but also are connected to almost everyone else in the village by ‘networking’ social capital because of their role on the committee and responsibilities.

Committee members also have networking links to individuals outside the village, such as representative of government and Non Governmental Organisations (NGOs). They are the main focus

for contact between the Government District authorities and the people in the village and are often used to help the government promote policies on health, sanitation and education, for example. Members of the LC1 committees, the Mayor and the Fishing committees represent the interests of their members and the village residents to the higher authorities.

Because of their links to the state the village LC committee members and Mayor have many roles, and these include the promotion of issues to do with natural resource management, excluding fisheries management, which is managed by a separate committee to be discussed later. Natural resource management issues include aspect of cultivation and wetland protection and a new programme for developing environmental action plans.

The LC committee members and Mayor can also help members of the village improve and diversify their livelihood by using their knowledge or networking links to help them to gain access to markets for their products or to equipment for fishing, for example (see Box 1 and below).

“It is the responsibility of the mayor to help people have development and to see that sanitation is maintained in the area. So it is the responsibility of the mayor to see that people develop themselves and use their money well.

Interviewer: How do you help people develop themselves?

Mayor: I help them like when somebody comes and asks me whether the capital he has can help him to start off fishing for example buying nets. I can advise him and if I have some little money I lend it to him so that he buys the nets. Even before I had a shop I could give them on credit the nets they would go and work and pay the money but now I do not have the shop.”

Extract of in-depth interview with Mayor of landing site B, Lubajja, W67

The networking links of the Local Council committee members with government officials and politicians such as local councillors are important for coping with the impact of shocks as they provide them with access to occasional emergency assistance from the state. The LC1 and LC2 Chairmen of Kiribairya have requested assistance twice in recent history: at the time of the flooding and also in 1987 when many internally displaced people (IDPs) crossed the lake to Kiribairya to escape an ethnic conflict and uprising against the new Government of the National Resistance Movement. Help was requested by writing reports and passing them up through the chain of LCs, as described by the Chairman in Box 2. This illustrates the rigidity of the formal network in the political system but also that perhaps less formal contacts with MPs and Councillors can be exploited. Some aid in the form of food or blankets was provided by the Red Cross, through local government.

The LC Chairmen and Mayors also help people themselves during times of crisis such as the flooding in Kiribairya in 1998. They helped by advising people to try and rescue crops from the floods before they rotted and advising those whose houses were flooded to move. They also negotiated with landlords to allow them to settle and pay rent at a later date. This is an example of the strong social capital of the LC Chairmen and other leaders contributing to the resilience of the village to the shock of flooding.

Box 2 The Local Council leaders in the village use the political system to interact with higher authorities

Interviewer: in case of a problem who does the LC run to?

Man: the LC1 reports to LC2, then LC2 reports to LC3, then LC3 runs to the District.

Interviewer: can an LC1 go direct to the District offices?

Man: no, you must follow procedures.

Extract from interview with LC1 Chairman, Kiribairya, LK10

Interviewer: During the floods did you get help from the Government?

Man: We got some, that was food supplies and they were little.

Interviewer: Did you have to do any thing to get help?

Man: We sent a report and then they sent us that food, but then from that time we did not get any more help.

Interviewer: Who did you send the report to?

Man: We sent it to food relief.

Interviewer: Did you send it through the LC3 Chairman?

Man: That time we had a Councillor who died, he is the one who worked on those things.

Interviewer: Were you asked to write a report or did you do it on your own?

Man: We are the ones who did it ourselves and it was also coming from this area.

Interviewer: Do you mean people from this area were asking you to do it?

Man: Yes

Extract from LK44, Interview with LC2 Chairman

Burial and self-help groups - 'muno-mukabi', 'a friend in need'

These groups appear to be formed independently of outside influence such as government or NGOs. They have a wide participation in Kiribairya, as shown in the questionnaire survey results, 44% of all group memberships recorded are of burial groups and 10 out of the 40 households surveyed have a member of a burial group. This high participation is explained by the following comment from one of the village leaders in Kiribairya:

“Interviewer: How many people would be involved in muno mukabi?”

Chairman: Every one is involved because when it comes to death it is every ones concern.”

Extract from in-depth interview LK10

The following comment, said by one of the participants during a discussion group about the environmental and social history of the village, shows the importance attached to the burial groups by members of the village in Kiribairya:

“Interviewer: Is there any project you have done as the community to develop yourselves?”

Man: The only thing that brings us together as a community is burial functions. We come together in a group called Munomukabi and we help the bereaved families to support them financially and physically.”

Extract from group interview LK6

Groups can have many members, for example twenty, and there can be several groups in a village. The questionnaire results indicate that members mainly come from the same village, but occasionally also from other villages in the Parish (20% of those surveyed who were members of burial groups said that members came from more than one village in the parish and the remaining 80% said that they came from the same village). The main purpose of the burial group is to help the family of the deceased to organise the funeral and provide for the people who will attend the funeral. There are predefined roles for men and women. For example, men provide money, set up the shelter and dig the grave and women bring firewood, water, collect food and cook. The groups also sometimes put together money to buy the items needed for the ceremony such as tarpaulins, cooking pots and lanterns.

Because the participation in these groups is mainly people from the same village it is likely that they are using social capital that is more of the bonding type. The burial groups only deal with the actual burial ceremony and not usually with supporting any orphans or widows for example. It is evident that they do not contribute directly to natural resource management or livelihood diversification, but they do contribute to coping with the specific shock of death in a household.

In Lubajja there is a group of the same name ‘Muno-mukabi’ (a friend in need) but this has a wider function than the burial groups in Kiribairya. The members will raise money to help send people home who don’t have money for transport, for example when they are sick or have already died, or to bury those people who have no family. Some similar groups that try and raise money have also existed in Kiribairya but the leaders did not view them as strong since they said that they often fell apart because there were no rules.

Religious groups

There are several religions represented in each of the villages. In both Lubajja and Kiribairya the Catholics are the most numerous, followed by Protestants and then Muslims. The Muslims in Kiribairya have formed an association in order to support and help each other with a variety of problems that people suffer. One Muslim explained how he would prefer to have his marriage problems discussed in the mosque before taking them to the Local Council Committee.

In Kiribairya there is at least one church group that performs a similar function. In Lubajja there does not appear to be anything similar, but some of churches do play a strong role in AIDS education and receive training via links with the diocese, which could be considered as networking social capital. The Chairman of Lubajja explained that the churches in Lubajja are not strong enough to assist people:

“Our churches are just starting they have not yet reached a stage of helping people, they are also looking for help from other sources, even mosques are the same.”

Extract from in-depth interview W14

These religious groups are exclusive in that they have a membership defined by those people that attend that church or mosque. Because of the close ties linking the members of the same church they use bonding social capital but may have links to churches or mosques outside the village (which may be considered also as bonding social capital). In the case of the Muslim Association they will only help non-Muslims if they have no other source of help, for example old people or orphans (see Box 3). This means that they contribute to the resilience of a specific portion of the village population. The role in of these organisations in natural resource management and livelihood diversification is not likely to be significant.

Box 3 A man in Kiribairya describes the village Muslim Association

Interviewer: If there ever was a problem in the future like a drought or floods, do you think the association would help people with their problems?

Man: Yes, the association would help people but it will help only those who are Muslims.

Interviewer: Why not others as well?

Man: We can also offer our help to non-Muslims like orphans and widows who are old and have no help.

Interviewer: What kind of help would you give the orphans?

Man: We would help them to get treatment and food.

Credit and savings groups

In addition to informal credit and lending arrangements between friends, colleagues or traders and shopkeepers and their customers there are also organised groups that are formed for the purpose of providing members with credit, lending and/or savings opportunities. These groups could be characterised as having either bonding or networking social capital, depending on their membership and the links they make use of.

In Kiribairya the groups that exist appear to be less formal and more ephemeral than those in Lubajja, and more likely to rely on bonding social capital than networking ties. They are more like 'self-help' groups, for example a Women's group where members put together money to buy things. There are only two such groups mentioned in the questionnaire survey.

Lubajja has at least one formal credit group, the Lubajja Traders Association. This has a constitution, about thirty members and some external 'networking' links. The survey recorded five different credit or savings groups or organisations that respondents in Lubajja were members of. Three of these were in the village, one was in the same Parish as Lubajja and one was outside the Parish but within the District. Other credit groups mentioned in Lubajja include one in the same sub-county which links people to larger National micro-credit organisations like Finca Uganda and Faulu Uganda. For the Lubajja Traders Association the interest charged is 10% a month.

Credit groups clearly contribute to livelihood diversification since people generally borrow money to help them with livelihood activities such as fishing, farming or trading. People used credit organisations to borrow money to start their businesses again when Lake Wamala expanded and

fishing and fish trading again became economic activities. This shows that credit groups in Lubajja also contributed to the resilience of livelihoods to climate related stresses.

Fisheries management groups

The main example of groups in Kiribairya and Lubajja that are designed for the purpose of natural resource management are the fishing committees. The fisheries of Lake Kyoga and Lake Wamala are effectively open access resources and, as such, attempts at managing the resources of the lakes and the activities of the fishers have involved collective action to a greater or lesser extent now and in the past.

There is a fairly complex history of state and local involvement in fisheries management efforts in Lakes Kyoga and Wamala. Table 2 shows the names of the different fishing committees that exist or have existed until recently in Lubajja and Kiribairya and the scale at which they work, from village or landing site-based committees up to organisations covering the whole of the lake or all of the lakes in Uganda.

Table 2 Fishing groups in Kiribairya (Lake Kyoga) and Lubajja (Lake Wamala)

	Kyoga	Wamala
National	Association of Fishers and Lake Users of Uganda (AFALU)	
Lake wide	Lake Kyoga Integrated Management Organisation	Lake Wamala Task Force Started in 1994 at the time of the lake recession
District and sub-county	Beach Management Unit Committees.	
Village/ landing site	Beach Management Unit, Assembly and Executive Committee (replaced Landing Site Committee headed by the hereditary role of 'Gabunga')	Task Force committee, headed by the Mayor, or 'Sabavubi' AFALU committee

Lake Kyoga and Lake Wamala provide an interesting comparison with respect to fisheries management activities. Efforts to manage the fishery of Lake Wamala began in earnest about 10 years ago (1994) at the time when the Lake had receded and the fish had become very small and uneconomic. Fishing committees were set up at each landing site in addition to a single committee that covered the whole lake (the Lake Wamala Task Force). The fishermen involved in these committees claim that it was the fishermen themselves who decided to act to protect the fishery resource and that the government only came in later to help them carry out enforcement of regulations on illegal and harmful fishing methods. At the time of fieldwork in early 2004, the fishermen largely agreed that regulations on correct fishing methods were being enforced by these committees, but that it took something like three years of tough enforcement for the fishermen to adopt the legal methods.

In contrast, at the time of fieldwork in Kiribairya at the beginning of 2004, the system of fisheries management was just changing from the long-established traditional system of landing site committees headed by the 'Gabunga', a hereditary title, to a new system of Beach Management Units (BMUs) with elected Executive Committees. The BMUs were introduced by government legislation in July 2003, following a donor funded Integrated Lake Management project (ILM, 2004). The BMUs are designed to introduce 'co-management' of fisheries resources, whereby those who are dependent on fishing livelihoods are involved in the management of the resource combined with support from the state.

In Kiribairya, the BMU has a membership consisting of all those who are involved in fishing related activities at the four landings sites covered by the BMU. The BMU is run by the BMU Executive Committee, which was elected by the members, and is separate from the LC Committee. There were strict quotas for categories of people to be represented in the Executive Committee so that the dominance of those who own boats was reduced and boat crew who do not own boats and other categories of people such as fish processors and women were better represented than in the previous Landing Site Committees. The BMU executive committee has several roles, including the education of fishermen, the enforcement of fishing regulations, the enforcement of by-laws that have been made by the BMU, the collection of revenue, the collection of fisheries data such as information on fish catches and the improvement and development of the landing site using revenue collected by the BMU. Interviews with some of the BMU members and village leaders show that prevention of the use of illegal fishing methods is a priority area of action for the BMU.

Despite the ambitious aims for the activities of the BMU and its contribution to the management of the fisheries resource, a year after they started work there are serious difficulties apparent. These include the continued use of illegal fishing gear by some members of the executive committee who are supposed to be enforcing the rules, the reluctance of the committee members to carry out their tasks without receiving payment for their efforts and the mishandling of income collected by committee members (see Box 4). These may be resolved with time, but the situation is not helped by a lack of finances available for training and support for the BMUs.

In Lubajja there are two fishing committees at each landing site and they operate under the LC1 Committee. The first one, known as the Task Force Committee is headed by the Mayor, or 'Sabavubi', who selects the other eight members of the committee that he works with. He himself was elected by the people at the landing site. The Mayor is also a member of the LC1 Committee. One of the roles of the Task Force Committee is to assist the Lake Wamala Task Force in enforcing government regulations on fishing methods. They also have their own rules for the landing site, which they claim to enforce, although the fines are small. The Task Force committee also acts as a link between the fishermen and the government authorities, particularly the Fisheries Department of local government. The committee members expect government officials who visit the landing site to work through them by contacting them first before they do anything at the landing site. The members of the

Task Force Committee are resistant to some of the fisheries management policies that they fear the government is trying to impose on them such as limiting the number of boats licensed to operate on the lake from the currently estimate 1000 to just 250. They claim to know and be able to manage the lake better themselves, but it is interesting to note that they do not feel that fish stocks are in danger from over fishing (see Box 5).

Box 4 A member of the BMU Executive Committee in Kiribairya describes the difficulties she has encountered in the last year

Interviewer: Is there anything you are supposed to do at the moment but cannot do for any reason?
Woman: Yes, there are other things we are supposed to do in this place for example the HIV positive people, the old people are all supposed to be catered for under the BMU. However this has not been possible here because many members of the BMU are reluctant about this. This is because they claim that being a member of the committee is just doing voluntary work. So since they don't get any payment for it many of them don't see the value of doing it. In fact many members of the committee have also gone back and started illegal fishing to earn a living at the moment. The finances received from this place are also not well managed presently by the Chairman of the committee, because he can choose to record some things in the book and leave out others. So one cannot easily follow up. In fact at the moment I am the only one still trying to be in this office, even meetings are no longer being held.

Interviewer: In your opinion what are the most difficult things or challenges in the BMU in Kiribairya?

Woman: The biggest challenge is that there is no unity in the members of committee.

Interviewer: For you personally are there any difficulties from being in the committee?

Woman: The biggest problem we have is that now because other trained members of the committee have gone back to illegal fishing and I have remained alone here. They hate me and say that I am bad because of what I am doing... Because of this disunity many activities now are at a standstill, for example the landing site is almost getting blocked and we are also failing to get a plot to put up the office because this place we are just renting it. We have been trying to wait and see that illegal methods of fishing are completely done away with, however our patience has run out because the work is just voluntary. Originally when they used to call us for training they used to give us some small allowances but this is not there now.

Extract from interview LK57, March 2005

Box 5 Views of a member of the Lubajja Task Force committee on fisheries management

Interviewer: Is there anything you think the Government should do in order to protect the lake?

Man: No, this lake of ours, it is we the fishers who use to put laws without the intervention of the Government. The Government can intervene when it does not know what is in the lake and the situation of the lake so we do not want the Government to intervene.

Interviewer: How do you think the fish in the lake should be protected?

Man: To stop using bad fishing methods and use only good fishing methods that means we protect them. Generally we are lucky because fish in this lake produce so much. So we found out that if we can fish with the right nets we cannot affect them and our work goes on well.

W76, interview with Task Force Committee, Lubajja landing site B

The second committee at each landing site in Lubajja is a branch of the nationwide Association of Fishers and Lake Users of Uganda (AFALU). This committee of five members is responsible for promoting hygiene amongst fishermen for their own health and to ensure the quality of the fish. It also provides benefits in the form of networking social capital to the fishermen:

“This organisation brings together all the fishermen from all lakes in Uganda. And when we meet even those from Kenya who fish from Lake Victoria also come, and those from Tanzania.....And another thing we do is to take the views of the fishers to other lakes which are a bit more advanced and to bring what they have seen there to this lake.”

W14: Extract from interview with LCI Chairman, Lubajja

Whilst the aims of the fishing committees described above are, at least in part, to manage the fisheries resources of the lakes, their success at doing this is far from apparent. In the household survey the fishermen in both villages reported falling fish catches in recent years. The government approach to fisheries management has been to regulate the fishing methods used, so that only passive, non-destructive methods should be used. But enforcement appears to have been patchy and has sometimes involved state employees behaving in a threatening or violent way towards fishermen and their families. The fishermen themselves often resist the government regulations and continue using illegal fishing methods. Whilst the fishing committees give the impression that they are enforcing the government regulations on illegal fishing methods it is clear that use of illegal gear continues in both lakes. Fish stocks are not just affected by fishing, and there is some agreement amongst Fisheries Department staff and fishermen that fish catches are also affected by changes in the level of the lakes due to varying climate conditions, for example the flooding of 1998. This was particularly apparent in Lake Wamala. The new approach to co-management of fisheries using BMUs is designed to help manage the fisheries resource sustainably with the fishing community participating in enforcement itself. It is perhaps too early to say whether this approach is likely to be successful.

In the short term the fishing committees can limit livelihood diversification and the resilience of fishing livelihoods if they are strict in enforcing government regulations, since fishermen lose capital and income earning potential if their illegal nets are confiscated and may have to stop fishing until they can raise capital for new nets. In the longer term the fishing committees may be successful in promoting fishing as a livelihood and improving the resilience of both the ecological system of the fishery and the social system relying on fishing livelihoods if indeed the fisheries resource is protected from over fishing.

Typology of groups and contribution to natural resource management, livelihood diversification and resilience.

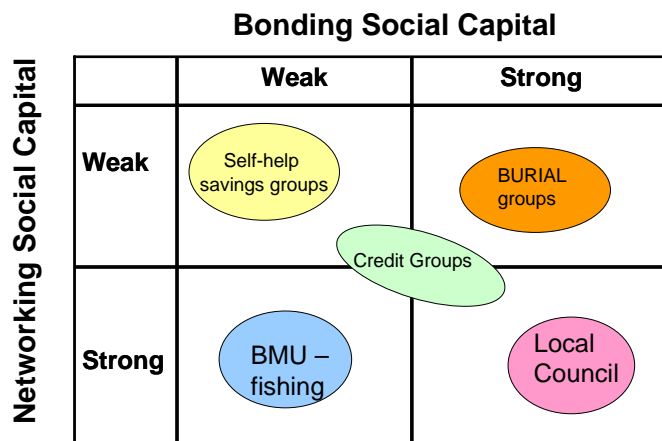
Table 3 shows the key properties of some of the groups discussed in this section. An attempt has been made to make a subjective assessment of the contribution of each group to natural resource management, livelihood diversification and coping, adaptation and resilience, based on the information presented in this paper. Figure 4 illustrates the different types of groups that exist, with respect to varying strengths of networking and bonding social capital. It can be seen that groups that

are highest in both bonding and networking social capital (for example the LC Committee) do contribute to resilience, livelihood diversification and natural resource management despite the main purpose not of the group being unrelated to these outcomes. I suggest that the BMU committee does not yet contribute much to resilience, livelihood diversification and natural resource management, at least in part, because it lacks strong bonding social capital. Groups that are weak in networking social capital have limited ability to contribute to resilience to climate related impacts, for example burial groups.

Table 3 Key properties of a selection of the groups discussed in this paper

	LC committee	BMU committee	Credit groups	Burial group
Group purpose	Security, order and development of village	Sustainable use of fisheries resource and development of fishing community	Development of individuals in village through provision of micro-credit.	Participation and sharing the cost of burial expenses
Permanence (how well established and how long lasting)	Well-established, in existence for more than 10 years	New since 2003	Varying degrees of permanence	Some are well established in Kiribairya, but variable
Inclusiveness of membership	Elected membership representing minorities, but powerful individuals can dominate	Elected membership representing minorities, but powerful individuals can dominate	Informal selection of members by application to join.	Voluntary membership, rules unknown.
Rules and sanctions	Rules enforced by committee, fines as sanctions or referral to legal institutions.	Rules enforced by committee, fines or imprisonment as sanctions	Some groups have a constitution and take household items on deposit for securing loan.	Unknown
Bonding social capital	Strong	Weak (due to lack of unity in committee)	May vary, but expected to be medium to strong	Strong
Networking social capital	Strong	Strong	Variable	Weak
Contribution to natural resource management	Medium	Supposed to be High, more likely to be low to medium	None	None
Contribution to livelihood diversification	Medium to Low	Variable	High	None
Contribution to coping, adaptation and resilience	Medium to High	May be high in long term if successful	Medium to high	High but limited (only applies for the shock of death)

Figure 4 Typology of groups with respect to bonding and networking social capital.



Examples of households

Boxes 6, 7 and 8 describe some people from Lubajja and Kiribairya with contrasting livelihoods, levels of social capital and resilience.

Box 6 Trader in Lubajja with high bonding and networking social capital



31 year old HK is a farmer and trader growing a variety of crops and trading in coffee, beans and animals. He has lived in Lubajja for 26 years and he is the head of a large household of six adults and nine children. He also has a second wife who keeps his shop for him and lives in a different home. He is a member of a group of farmers who have recently started keeping bees, an activity for which they

received support from local government officials at the sub-county.

He was encouraged by a friend to join a credit group in a village 12 miles away from Lubajja. Instead he decided to start up a credit group in his own village of Lubajja, since he had received many requests for loans from people in Lubajja that he hadn't been able to help with. He borrowed the constitution of the credit group in the other village and used it to help form the Lubajja Traders Association. An American he knew, who was teaching in a school in a village in the same sub-county as Lubajja, encouraged him to link with a community based organisation in the sub-county to get some funds for the Lubajja Traders Association. This link did not work well and no funds ever reached them in Lubajja.

Box 7 Old couple living in Kiribairya, with weak bonding and networking social capital



80 year old MW and his 52 year old wife have no children. They survive on the sweet potatoes and cassava that they grow. They also keep five goats which will be used for the costs of their burials when they die. No one has assisted them and they had to sell a goat to pay for medical treatment when they were sick. They don't belong to any groups as they say that they do not have the strength to

participate in them.

Box 8 Widowed and sick old woman, displaced from her home, bringing up her two grandsons in Kiribairya making use of bonding social capital.



66 year old LN Fled Soroti as a refugee 17 years ago with seven members of her family, all of whom have now died. She lives with two grandsons who are orphans and still at school. She used to dig for other people in their gardens to earn a living, but she is now weak and sick. She earns a living by helping other people peel potatoes in exchange for food. Sometimes other

people help her with food or other household items and she says that she is lucky that she is talkative and tells people her problems and that is why they help her.

6. Conclusions

The Ugandan case studies presented in this paper have shown that social capital exists in both bonding and networking forms and is possessed both by individuals and society through the existence of institutions that can be considered as embodied by groups of various kinds. Social capital also exists outside of the groups described here. Membership of groups can offer individuals or households access to networking social capital, which can be important for resilience to climate impacts and other shocks and trends, in addition to the bonding social capital that they possess with relations, friends and neighbours.

Groups formed for specific purposes other than natural resource management, livelihood diversification or improved resilience to climate impacts can contribute to these outcomes. This means

that it is desirable to promote and maintain strong institutions, not necessarily only those designed for natural resource management, in order to promote resilience. Existing institutions such as the LC committees are relatively strong in bonding and networking social capital and have the ability to contribute to resilience but they may also provide inequitable benefits to the population because of unequal power relations within the village.

The creation of new institutions does not necessarily lead to improved social capital and resilience. New institutions, such as the BMU committees, can fail because they are weak in bonding social capital, even if strong in networking social capital due to their members possessing strong links to government officials and other individuals or organisations external to the village. Care should be taken not to destroy bonding social capital when external interventions are used to introduce new institutions.

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