INVESTIGATING AND EXPANDING LEARNING IN CO-MANAGEMENT OF FISHERIES RESOURCES TO INFORM EXTENSION TRAINING

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Abstract

This study investigates and expands learning associated with the co-management of fisheries resources to inform extension and training in the fisheries sector in two case study sites in Malawi. The study was located in the field of environmental education with a specific focus on community learning, agency and sustainability practices in co-management of fisheries resources. It focuses on how fisheries stakeholder learning can be mediated through expansive social learning processes to inform extension and training in the Malawi fisheries sector and aims at understanding learning as an emergent, agency centred process of change through social learning models that are said to have power to mobilise community agency for change.

The empirical research for the study was conducted in two Malawian fishing communities: in Lake Malombe and the south-east arm of Lake Malawi using qualitative case study research design. The two sites were selected because they were the first sites in Malawi to implement fisheries co-management programmes following the failure of centralised management of fisheries resources. Data was generated through interviews, focus group discussions, document analysis, observations and change laboratory workshops in both sites. The two sites fall under one administrative office based in Mangochi where the two important institutions of the sector – the Fisheries Research Unit of the Department of Fisheries and the Fisheries College (a government institution responsible for the training of extension services) are also based. Both sites have implemented new governance structures named Beach Village Committees which are community-based organisational structures that function in parallel with traditional authorities to manage the fishery.

Contextual and literature review work showed that extension services and programmes over the past hundred years, as observed in the fisheries sector in Malawi and in extension services elsewhere, have co-evolved with approaches to natural resources management. Early approaches to natural resources management involved traditional management (associated extension services and programmes were community based); later fisheries governance practices changed to centralised management and associated extension approaches were mainly top-down involving command and control or technology transfer. These early approaches have been problematic as resource users were pushed away from their own resources and were viewed as poachers. This resulted in loss of ownership among resources users. Recently in Malawi, after the change of government to democracy in 1994, fisheries management policy focused on co-management and/or adaptive co-management approaches, an approach that has also been adopted in other African water bodies. This has implications for extension service programmes in the fisheries sector that are not yet well defined.

The study's literature review revealed that co-management approaches assume collaborative learning, or co-learning, also termed social learning, or approaches that promote the

engagement of different actors who are working on shared practice. They also assume a new form of agency among co-management stakeholders and extension workers. However, the theoretical foundations for establishing co-learning or social learning approaches in support of co-management policies are not well established in the fisheries co-management sector in Malawi, nor are the practices of *how to support co-learning* amongst diverse stakeholders in the fisheries co-management in the Lake Malawi context. This study sought to address this gap in knowledge and practice.

To address this gap, the study explored the use of expansive social learning processes and practices in extension and co-management of the fisheries sector to model an expansive social learning process within a co-management policy framework. To do this, the study drew on cultural historical activity theory (CHAT), a post-Vygotskian approach developed further by Yrjo Engeström and his colleagues, which provides a well-theorised and widely tested approach for both understanding and expanding learning. This framework, which is oriented towards expanding human activity, provided tools for understanding the socio-cultural and historical dynamics of co-management in the two sites, and allowed for analysis of how existing learning potential can be expanded to enhance and contribute to transformative agency within and across activity systems, necessary for co-management. CHAT focusses on in-depth analysis and careful co-engagement with contradictions as a potential source of new learning. In this study I analysed the contradictions associated with co-management at primary, secondary, tertiary and quaternary levels within diverse activity systems involved in the fishing co-management system (fishing community activity systems, government activity systems and the college activity system) in order to mirror these insights back to co-management participants in change laboratory workshops. This process, as explained by Engeström, is the basis for expanding learning and associated development of human activity. Such an approach to learning was seen to be relevant to the core object of co-management, as it provides a framework in which learning is both collaborative and continuous. It also provides an opportunity to resolve contradictions and model and develop solutions in collaborative ways through expansive social learning processes.

This methodology, applied in the two case study sites, provided a means of understanding existing forms of co-learning, identifying contradictions as a source for new learning, and expanding co-learning for co-management. Through this process, the study developed insights on how new knowledge and possibilities for transformative agency are created through stakeholder interactions in the expansive social learning process that responds to contradictions in a fisheries co-management context. The study argues that such social learning platforms must be created for co-management policy to be effectively realised; without social learning engagements and solution building to address contradictions, co-management practices cannot evolve, as per policy intentions and interests. Such processes are especially important for sustainable fisheries management where practices are shaped by

deep-seated contradictions that are historically shaped, and which manifest as tensions between shorter term economic and social outcomes and longer term social-ecological goals (i.e. sustainable management of the fishery) which are ultimately tied to longer term social and economic well-being goals. This appeared to be important also in a context where poverty prevails and where few alternatives exist for livelihood creation other than the use of natural resources (in this case the fishery).

The study contributes to the fisheries management sector by providing examples of co-learning for co-management that occurred via the expansive social learning processes in the two case study sites. The study also suggests that these can provide a model for the further development of extension training curricula at certificate and diploma levels. It suggests that such a model for curriculum development appears to be congruent with co-management principles and assumptions, and is necessary given the recommendations from stakeholders that the curriculum requires revision to be more closely aligned with co-management approaches and principles.

The study's broader contribution to new knowledge is to deepen understanding of the praxis and potential of expansive social learning in co-management policy environments, especially shedding light on how social learning processes can help to mediate arising tensions and contradictions that characterise the intended paradigm shift to co-management in fisheries resources management. Overall, the study contributes to a realisation of the intended paradigm shift in fisheries resources management where social learning processes (as modelled in the study) are identified as necessary elements of the actualisation of adaptive co-management in achieving more sustainable fisheries management. The study shows how transformative agency for co-management can be enhanced through expansive social learning, and points to the importance of deepening understanding of power relations that exist at the traditional governance / authority and state-based governance mechanisms (in the form of BVCs and government extension and research agents) for the further expansion of co-management activity. The study makes recommendations for extension training curriculum development, and ultimately hopes to facilitate the capacity and active engagement of all stakeholders engaged with co-management especially extension and training officers (as they have a longer term responsibility for facilitating co-learning) through approaches that allow them to also engage with the expansion of learning, knowledge, agency and change of practice towards a more sustainable fishery.

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Dedication

This thesis is dedicated to all those who are using social learning to develop new knowledge as a contribution to the sustainable management of natural resources.

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Acronyms

BMU	Beach Management Units
BVC	Beach Village Committee
CHAT	Cultural Historical Activity Theory
CL	Change Laboratory
FAO	Food and Agriculture Organisation
FGD	Focus Group Discussion
GoM	Government of Malawi
GDP	Gross Domestic Product
GTZ	German Technical Corporation
GVH	Group Village Headman
DWR	Development Work Research
IVMC	Integrated Village Management Committees
MDG	Millennium Development Goals
MCF	Malawi College of Fisheries
NGO	Non Governmental Organisation
RDDA	Research Design-Disseminate-Assimilate
TA	Traditional Authority
UNDP	United Nations Development Programme
UNESCO	United Nations Education Scientific Cultural Organisation
ZPD	Zone of Proximal Development

CHAPTER 1

HISTORY AND CONTEXT OF THE FISHERIES SECTOR

To sustain the livelihoods of fishing people, two things are fundamental. Their natural resources must be conserved and their fishing community must be secured. In other words, fishing people need a healthy resource, as they need to feed themselves. ... Since both requirements not only affect those who actually fish but also the general public as consumers of fish products, the issues involved are of general concern. (Jentoft, 2004, p. 93)

1.1 Introduction

This chapter introduces the context in which the study took place. I discuss the geographical position of the two study areas: *Lake Malombe*[1] and *the south-east arm of Lake Malawi*[2] as well as trends in fisheries management. The chapter also includes some background on my motivation for conducting the research. It further provides an introductory overview of key aspects of other co-management cases in the region, setting the wider context of the study. The chapter highlights the main focus of the study and shares the goals of the research, and the research questions. Finally I provide an overview of the thesis by introducing each chapter.

1.2 Research context

This is a social learning and sustainability practices study which is aimed at developing knowledge on how fisheries co-management communities learn to respond to risks and crises of declining fish catches through robust dialogues and expansive social learning processes with different stakeholders. This case study research seeks to understand learning as an emergent, agency centred process of change in a fisheries co-management context and how the learning can inform extension and training in the fisheries sector. The study is located in two fishing communities in Lake Malombe and the south-east arm of Lake Malawi where co-management programmes in the fisheries sector started (see Figure 1).

1.2.1 Demography and Geography

Malawi is a landlocked country bordered by Tanzania in the north, Zambia in the west and Mozambique in the south west, south and south east. The country has a total area of 118 405

[1] Lake Malombe lies 12 km from the outlet of Lake Malawi on the Shire River which continues from the lake to the Zambezi River.

[2] The south-east arm of Lake Malawi is the most southern part to the east of the lake where Shire River exits to Lake Malombe.

km² of which about 20% (24 405 km²) is covered by water. According to the 2012 national population census, Malawi has a total population of 14.8 million people (7.1 million men and 7.7 million women) and of this population 12.5 million are located in the rural areas and 2.3 million in urban areas (National Statistics Office, 2012). A majority of the population in Malawi depends heavily on the natural resource base for their livelihoods (CSIR, 2004; UNEP, 2006). Malawi has a broad range of natural resources: national parks, game reserves, historical and cultural sites as well as mountains with unique and endemic tree species e.g. Mulanje Cedar. There are vast water resources such as lakes, rivers and swamps from which fisheries resources are harvested. There are four lakes: Lake Malawi is the biggest (24 208 km²) and is responsible for over 50% of the total fish production, Lake Chilwa is 1 800 km², Lake Malombe is 390 km² and Lake Chiuta is 200 km². There are also a number of rivers, the largest of which is the Shire River which is the outlet of Lake Malawi at its southern end and then continues from Lake Malombe to the Zambezi River (see Figure 3).

This study was conducted in two Malawian fishing communities along the shores of the south-east arm of Lake Malawi and Lake Malombe.

The south-east arm of Lake Malawi lies 13° 50′ to 35° 10′ east and 13° 44′ to 14° 25′ south and it stretches about 80 km from the northern end to the southern outflow into Shire river, the Lake's outlet (FAO, 1993) (see Figure 1.1).

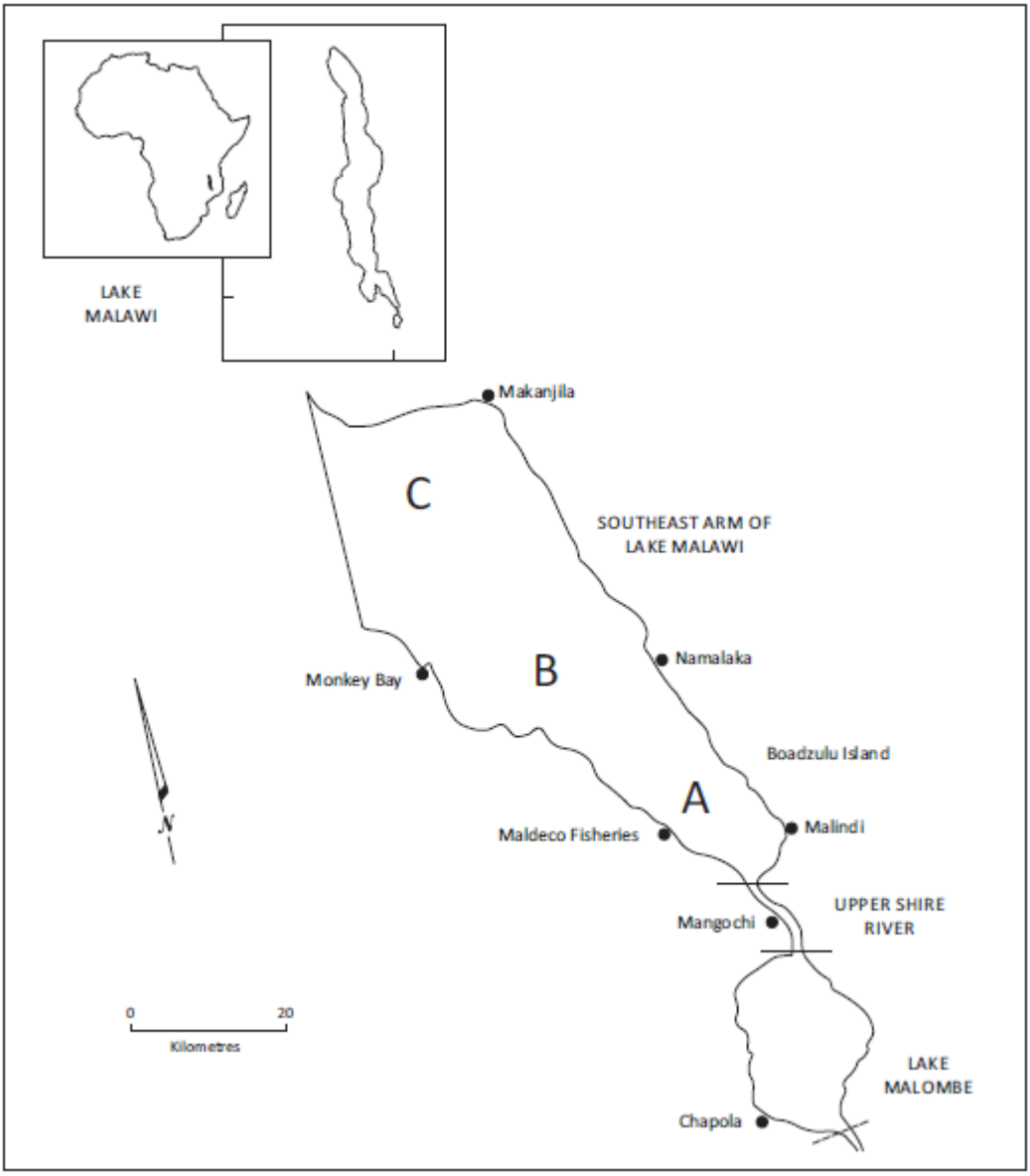

LAKE
MALAWI
Makanjila
C
SOUTHEAST ARM OF
LAKE MALAWI
Namalaka
Monkey Bay
B
Boadzulu Island
A
Maldeco Fisheries
Malindi
UPPER SHIRE
RIVER
Mangochi
0
20
Kilometres
LAKE
MALOMBE
Chapola

Figure 1.1: Research sites: the south-east arm of Lake Malawi and Lake Malombe (Source: GoM/FAO/UNDP Chambo Fisheries Research Project Report)

The area covers approximately 2 000 km² and is in the southern end of the Lake which leads to the Shire River before flowing into Lak lalombe (see Figure 1 above). It is the shallowest part of the Lake ranging from 7 to 17 metres deep and supports much richer fisheries than any other area (Eccles, 1962). The area experiences winter mixing and upwelling which drives the thermocline down causing the extra water column to mix and bring up the nutrient rich bottom water to the euphotic zone (ibid.). Because of its high nutrient production levels, the area holds the biggest stocks of fish and has the highest number of fishers. It is also one of the areas with the greatest cultural mix because people come from all over to fish in the area.

Lake Malombe, which is an enlargement of the Upper Shire River and an outlet for Lake Malawi, has an area of about 390 km^2 (GoM/ FAO/UNDP 1993) and empties its water back to Shire River which runs into the Zambezi River. It lies south of Lake Malawi (14° 40´south and 35° 15´ east) and has a surface area of 450 km². The lake is 30 km long and 15 km wide with a maximum depth of 7 metres (FAO, 1993). Lake Malombe is densely settled by a population who are primarily of the Yao tribe (77.5%) who originated from Mozambique. They migrated into the area in the 19th century (Bell, 1998) making up the largest population group with the same cultural background. The remaining 22% are from other tribes (Chewa, Lomwe and Nyanja), most of whom are fishers. Fishing is the major socio-economic occupation for the communities around Lake Malombe. Most of the fishers also have land where they farm different kinds of crops for their household use.

1.2.2 Socio-economic context

The economy of Malawi is predominantly rural and agriculture based. Like the other countries in the southern African region, over 80% of the people largely depend on natural

resources for their livelihoods. As an agriculture-based economy, the country's performance depends largely on weather conditions and also international commodity prices. At the time of independence in 1964, Malawi adopted an agro-based development strategy due to the low potential of mineral resources and the small size of the domestic market (GoM/FAO/UNDP (1993). The country still remains agro-based and the agriculture sector accounts for over 38.6% of the GDP, employs about 84.5% of the labour force and accounts for 90% of foreign exchange (GoM, 2012). The main export crops include tobacco, tea, sugar, and coffee. From 1980s Malawi suffered from a number of exogenous shocks such as high import costs due to oil price increases, disruption in trade routes, and the influx of refugees from Mozambique during the civil war and extreme weather events all of which disrupted the patterns of growth (GoM/FAO/UNDP (1993).

The fisheries sector plays an important role in poverty reduction through its contribution to household food security and the provision of rural employment. It is responsible for the management of both capture and aquaculture fisheries and fish are an important renewable resource and an essential part of people's livelihoods. Fish are an important source of nutrition, income and employment for both rural and urban communities. The sector provides direct employment to over 62 000 fishers and indirect employment to over 350 000 people involved in fish processing, fish marketing, boat building and engine maintenance (GoM, 2010). Furthermore, nearly 1.6 million people in lake shore communities are supported by the fishing industry (GoM, 2010). The available data shows that fish provide 70% of animal protein consumed (40% of total protein supply comes from fish) and contribute about 4% to the GDP (ibid.). Lake Malawi has over 800 endemic fish species which create both ecotourism and an export trade for aquarium fish locally known as *Mbuna* which bring foreign exchange into the country. The fishing industry is therefore crucial to the physical and economic well-being and has been an integral part of life of the people of Malawi for a very long time.

The fisheries sector is classified into two sectors: a small-scale commercial sector called traditional/artisanal fisheries and a large-scale commercial sector with large capital investments (Njaya, 2007). The small scale sector usually makes use of traditional methods of fishing, contributes over 85% of the total fish catch and consists of 90% of the fishers (GoM, 2004). From the early 1980s, it was the Malawi government policy to exploit fully the economic potential of the fish resources of Malawi waters in order to enhance the nutritional status of the population. This has changed to an orientation of sustainable utilisation of the fisheries resources as a result of increasing demand due to the increasing population depending on fish (see Section 1.6). The fishing communities consist of different stakeholders: gear owners, crew members, fish traders, fish processors, traditional leaders, fisheries officers who are based in the rural areas working with fishing communities and

other people with businesses dependent on the fishery and based at different fish landing sites.

1.2.3 Trends in fisheries management

Management of the fisheries resources has been evolving over a long time and dates back before colonisation (before the 1900s). There are three main forms of management systems: *the traditional fisheries management system*, *the centralised management system* and *the participatory fisheries management system* (Donda & Njaya, 2007). These systems used different management approaches depending on the policies that governed people at a particular time and also on the objective of the management system. The changes in approach associated with these three management systems have played a role in the present status of the fisheries resources.'

1.2.3.1 Traditional fisheries management system

During pre-colonial times (before the early 1900s), the fisheries resources were managed by traditional chiefs surrounding the water bodies. During that time exploitation of fish stocks was limited only by a fisher's access to the labour needed for the construction, maintenance and use of fishing gear (Russell, Dobson, and Wilson 2008). Chiefs were traditionally able to establish regulations based on social contacts with constituents that were expressed in a combination of worldly and spiritual powers (Mandala, 1990, Willis, 2001). The primary regulation of fishing efforts by the chiefs revolved around controlling access to the annual spawning period of some species. One of the key regulations enforced by traditional chiefs involved protecting yearly spawning areas of *potamodromous* (fish species that migrate from lakes to streams to spawn) (Russell, Dobson, & Wilson, 2007). Traditional leaders had the authority to close and open entry to the fishery using traditional rules and regulations. Permission was required from the chief or village headman to fish from a particular beach and any fisher contravening the rules and regulations was disciplined and charged by the traditional leaders (Donda & Njaya, 2007).

Territorial use rights, taboos and magic were employed to allocate and maintain the fisheries (Munthali, 1994). There were also taboos concerning certain species of fish as inappropriate for human consumption and regarding inappropriate times to fish, all of which protected the fish stocks (ibid.). The use of locally made fishing nets and dugout canoes coupled with the small population allowed for sustainable exploitation of the fish stocks. Munthali (1994) argued that the gradual reduction in people's adherence to traditional fishing taboos and the marginalisation of traditional leaders' authority over fishing in some areas have both led to increased fishing pressure. Control by traditional authorities over the number of fishers provided protection against over-fishing and equity to fishing. Some areas (e.g. Mbenji Island on Lake Malawi) are still practising fisheries management according to the traditional systems but government interventions and interactions with NGOs are slowly causing a shift towards co-management.

1.2.3.2 Centralised management system

The government-centred approach to the management of fishery resources dates back to the time when Malawi was colonised by the British in the early 1900. The first 'national' fisheries regulations were introduced in 1930 and since then fisheries management policies have been influenced by the principles of the conservation paradigm i.e. the centralised biological/scientific approach which emphasises the transfer of technology from research through extension officers to fishing communities (Donda and Njaya, 2007). Fisheries management was guided by the conservation paradigm that was a biologically based philosophy focusing on the protection of fish stocks (Donda, 2001). This provided guidance to policy requirements, and there were no efforts concerning the resource users. Technology transfer from research to the fishers through extension officers was seen as the only scientifically legitimate means of knowledge creation to manage the fisheries resources. However some of the research information unclear to the extension officers resulting in them bringing contradictory messages to the communities and causing misunderstandings among fishing communities (Kachilonda, 2005).

Fisheries sectoral activities in different areas followed a top-down approach e.g. there was little consultation with the resource users or lecturers regarding the development of the curriculum at the Fisheries College for training extension officers (Kachilonda, 2005). For a long time this resulted in the implementation of very technical training courses which did not benefit fishers and other stakeholders as the main focus was science based responding to the scientifically formulated fisheries policy. The approach therefore provided an expert driven training and extension service which was not very valuable to the fishing communities (ibid.).

The centralised approach continued after independence in 1964. Fisheries resource management was fully in the hands of the government and was largely based on a centralised approach where the government formulated fisheries development policy goals to maximise production at a sustainable level (Njaya, 2007). The approach brought challenges such as increasing defiance and open resistance to compliance with regulations instituted by the Fisheries Department (Hara, Donda, & Njaya, 2007). This policy did not take into consideration the fishing community's involvement, assuming a lack of scientific knowledge for contributing to the management process. This approach did little to enhance the responsible management of different water bodies as government officials remained scattered in far-flung stations and offices, often with limited resources to allow for meaningful monitoring of the fisheries resources. The situation also led to a loss of ownership and control by fishing communities who were often simply treated as poachers.

In order to fully manage the system (i.e. enforce the regulations), the government required high levels of financial and human resources. These resources were not available as the

government was participating in the World Bank and the International Monetary Fund Structural Adjustment Programme which resulted in cuts in government expenditure (Lawry, 1994). Conflicts between government officials and fishing communities became common. Fishing equipment was confiscated and those found fishing were taken to court where they were tried and fined if found guilty (Hara, Donda, & Njaya, 1999). The approach further exacerbated the problem of lack of ownership amongst user communities, pushing them further away from their own resources; they started seeing the fisheries resources as belonging to government, leading to an increase in mismanagement.

The command-control approach to fisheries management generally led to the creation of distrust and disloyalty among communities and increased levels of conflict amongst communities and government officials. This was the context then, with fish stocks declining (see Section 1.6) and local economies crumbling, when the Malawi government realised something needed to be done.

1.2.3.3 Participatory fisheries management system

A gradual recognition by the government of its inability to control fisheries activities through the centralised approach (with support and influence from donor agencies) necessitated the introduction of a co-management approach in Lake Malombe in 1993, the south-east arm of Lake Malawi, and later Lake Chilwa in 1995 (Njaya, 2007). This enabled bringing resource users and government into partnership to manage the fisheries resources. The approach attempts a balanced partnership, in which government and communities share power and responsibility leaving room for mutual learning. The sharing of skills, knowledge, expertise and experiences became necessary for the proper management of the fisheries resources. The World Conservation Council (WCC) (1996) approved the approach referring to co-management as a partnership in which government agencies, local communities and resource users, NGOs and other stakeholders share, as appropriate to each context, the authority and responsibility of the management of a specific territory or set of resources.

The approach resulted in a gradual shift in fisheries management from the conservation paradigm which focused on scientific findings to a social/community paradigm which has more focus on the involvement of the fishing community as partners in fisheries management (Donda & Njaya, 2007). Training of extension officers and the extension service became ever more oriented towards participatory approaches and techniques but was critiqued for lacking engagement with deeper meanings of the concept of participation (Rahnema, 1992). Extension and training programmes tended to deal more with politics of participation, neglecting in-depth engagement and insights into participation as a reflexive process of learning for training, extension and social learning in fisheries co-management (see Chapter 2). This is the gap in knowledge that this study will address.

1.3 Researcher's motivation

My interest in conducting this research arose from working for the Department of Fisheries for over 20 years at different levels and in different sections. Over time, I made a number of observations:

1. I started with compiling fisheries statistical reports (monthly, quarterly and annually) and my observation was that the catches were declining over time.
2. Extension messages used by extension officers were outdated, were not reviewed and seldom related to the situation on the ground. Nothing was discussed on the declining fish catches at the district level where I was based.
3. Every time I went to the field to work with fishers, I found myself less knowledgeable than the fishers. The fishers were ahead of extension services in terms of technology, because they were changing the designs of their fishing gear and their fishing practices, all the time responding to the declining fish stocks.
4. After some years when co-management was introduced in Lake Malombe, Chilwa and the south-east arm of Lake Malawi, government extension officers were drawing closer to the fishing communities, with increased interactions taking place among fishers and government extension officers. To date no one has researched what they learn from each other as they interact. I feel this is a crucial area to consider especially at this time where, despite the introduction of the co-management approach, we still experience continuously declining fish catches.
5. Fishers are mobile because they go about searching for better fish catches. What I noted was that as they moved from one area to the other, they engage in informal interactions with fellow fishers, and this influences them to learn about and make use of different fishing gear designs, and fishing practices. My interest therefore was to find out what they learn, and how they learn as they strive to respond to the challenges of declining fish stocks.

As a new young extension officer originally from inland, I increasingly became more interested in the fishing activities and the togetherness that fishers displayed when sharing their skills, knowledge and experiences (designing fishing gears, net maintenance, discussing the new fishing grounds and marketing of their fish catches). The interaction with fishers in different areas along the lakeshores gave me the opportunity to learn more practical knowledge of fish gear designs and fishing practices of fishing, which were never mentioned in our extension programmes. My contributions to the fishers' fishing skills were very limited because the only advice I could comfortably give was in relation to the fisheries regulations e.g. recommended fishing gear, closed seasons. I found that much of this was already known to them.

The dominant approach to fisheries extension was command and control (see Section 1.2.5): extension officers were getting scientific recommendations from the fisheries research unit, which at times were not clear to them, and which they subsequently imposed on the fishing communities. As time went on, the declining fish catches got worse and started to affect people's lives. This is a severe problem as many people depend on the fisheries resources for their livelihoods, and have few alternative ways of earning a living.

My engagement with fishers was discontinued when I was later transferred to the Malawi College of Fisheries to teach extension and also to design and introduce an Environmental Education course for both certificate and diploma programmes in Fisheries Management. In preparing for the Environmental Education course, I studied a six months course on fisheries conservation and biodiversity which at the time was seen to be an appropriate approach to Environmental Education. The course however concentrated mostly on fisheries science and was not very helpful for formulating the environmental education curriculum for the college. I therefore decided to look for an Environmental Education course and I started interacting with Environmental Education practitioners from different backgrounds. I started with the Rhodes University/SADC Environmental Education course, after which I completed an Advanced Certificate in Environmental Education (1998 and 2003) at Rhodes University. One of the course requirements was to conduct educational research in the work context. I completed an action research project on the development of appropriate and effective extension materials for use by extension and training officers in outreach programmes. This drew my attention to how one could work with some educational ideas with fishing communities because the action research demanded that I work closely with different fishing communities and extension officers. The results and recommendations from the study (Kachilonda, 2003) were well received by both extension and training officers and people kept on referring to it during training sessions and meetings. However, the fish catches continued to decline, and the situation became complex as more fishing gear was being modified, fishing practices changed and more and more illegal fishing gear was being confiscated.

I then enrolled for a Master's of Education in Environmental Education (MEd) programme at Rhodes University where I was required to do course work and half thesis. I decided to research the college curriculum (Kachilonda, 2005). I started with a contextual profile to understand how the college curriculum was developed and implemented and then reflected on the quality of graduating students at both certificate and diploma levels. I decided to research the potential of including local community contributions in the college curriculum because fishers were complaining that the graduating students were not performing according to their expectations and had very little knowledge of their local practices. Recommendations from

the study resulted in the review of the college curriculum through a national consultation process with different stakeholders who work with the graduating students from the college. The curriculum was then reviewed with support from the University of Malawi who later accredited it and provided a clear career path for graduating students to be able to continue with Bachelor of Science Degrees in Fisheries Management with the University of Malawi, now Lilongwe University of Agriculture and Natural Resources (LUANR).

My passion for fisheries resource management did not end there because I continued to reflect on the role it plays amongst the poor rural Malawians who have few alternative livelihoods sources. The establishment of co-management was seen as key to future protection and sustainability of the resource (see Section 1.5.4). I wanted to explore critically what the people who are utilising the resource at different levels could positively contribute through the co-management interactions that occur among them and also what could be learned from the current practices which are contributing to the declining fish resource for improved co-management. Many studies have been undertaken to address the declining fish catches in lakes and rivers (see Section 1.5.4) but I have found no other research that focusses on the social learning processes and interactions and the potential of expansive social learning between stakeholders in the Malawian fisheries context.

1.4 Fisheries policy and decentralisation

The Malawi Government Development Strategy (MGDS) is the main instrument guiding the national strategic goal of economic and social development in the country. Under the strategy, various instruments and tools aimed at maximising the contribution of the fisheries sector have been developed: the National Fisheries and Aquaculture Policy; the Fisheries Conservation and Management Act and its subsidiary legislation; the Chambo Restoration Strategy; the National Aquaculture Strategic Plan and the Presidential Initiative on Aquaculture Development (GoM, 2003). Responding to the commitment made at the World Summit for Sustainable Development in Johannesburg in 2002, the government of Malawi launched the National 'Save the Chambo' campaign which aimed at mobilising all Malawians to take part in the sustainable use of the Chambo fish (GoM, 2003). Malawi's development policy expresses the need for reduction of poverty, ignorance and disease by the achievement of rapid and sustained economic growth, an improvement in income distribution and a reduction in the instability of welfare for both the individual and the nation. The policy recognises that if the welfare of Malawi is to be secured further increase in economic growth will have to exceed population growth and also that the performance of agriculture and other natural resources will, where viable, need to be explored (GoM, 2001). Among the Malawi commitment to the Millennium Development Goals (MDGs), goal number seven is to ensure environmental sustainability and one of the targets is to integrate the principles of sustainable

development into country policies and programmes and reverse the loss of environmental resources (GoM, 2005). Collaborative learning among stakeholders regarding particular natural resources, as is the case in this study, is potentially appropriate for achieving this goal.

The Malawian Fisheries Conservation and Management Act of 1997 were reviewed in 2000. It now emphasises community participation, resource ownership and empowerment of rural communities (GoM, 2000). The active involvement of fisheries co-management stakeholders provides a good background for joint learning as people get different views and perspectives from different backgrounds. According to Campbell and Townsley (1996), community participation is the active, meaningful and influential involvement of individuals or groups of fishers and all other people in an activity. The fisheries and aquaculture policy clearly stipulates the involvement of all the people involved in fisheries or those in fisheries related activities. In line with the policy statements, in co-management it is important to engage all the fisheries stakeholders to allow for wide contributions to the management of the fisheries resources. Wilson, Ackeson, Metcalfe and Kleban (1994) argued that if fisheries resource management is to succeed, fishers must support the management efforts. As is evident in the fisheries and aquaculture policy, there is a shift towards more people-centred approaches (away from a fish-centred approach) where, apart from focusing on the resource, there is now an attempt to also look at the people who are utilising the resource (GoM, 2001). The new fisheries sectoral policy is oriented to sustain the contribution of the national fish resource to uplifting of the quality of life in Malawi by making sure that the resource is conserved for the benefit of the present and future generations (Hara, 2001).

The fisheries sectoral policy aims at maximising the sustainable yield from the national waters of Lakes Malawi, Chilwa, Malombe, and Chiuta, and other water bodies (GoM, 2001). Secondary objectives are to improve the efficiency of exploitation, processing and marketing, promote investment in the fishing industry, rural fish farming units and exploit all opportunities to expand existing and develop new aquatic resources (ibid.). The co-management process which emphasises the importance of knowledge sharing among different stakeholders helps them to develop and maintain appropriate skills and experiences. This is supported by the guiding principle of the policy:

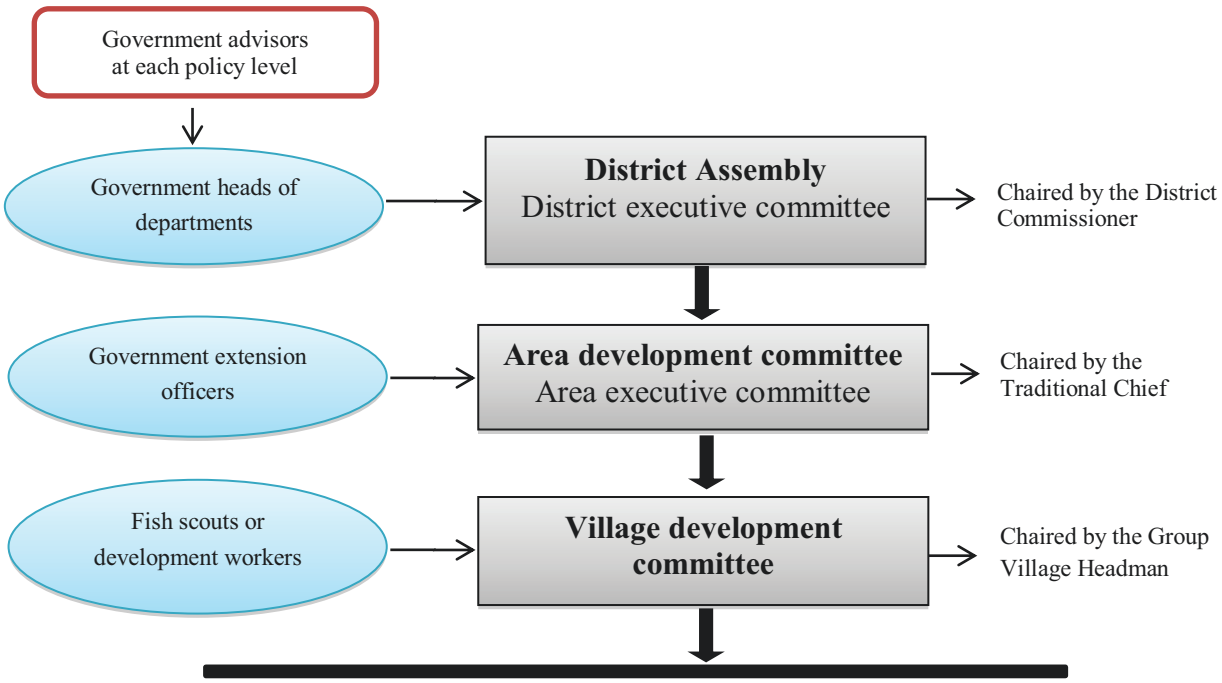
> … in the past, major emphasis was placed on the issue of enforcement to police fisheries regulations, the low effectiveness and high cost of this strategy in fisheries management has created the need for an extension [and by implication training] approach, which fosters greater community participation in fisheries management. The need to strengthen the extension service in order to implement an effective participatory management of the fisheries has been emphasised. (GoM, 2001, p. 6).

According to Donda (2001) co-management was brought to Lake Malombe and the Upper Shire River to:

1. Promote the recovery of the fisheries to levels that could sustain an annual catch of 10 000 tons (see Section 2.3)
2. To achieve the set objective through co-operation, dialogue and negotiation between the department of fisheries and the communities with decision making power to be transferred to community level organisations
3. Promote the formation of community level organisations, named Beach Village Committees (BVCs), and fishers associations to assume communal management and also act as a channel of dialogue between the Fisheries Department and fishing communities.

The primary objective of the fishing communities in the co-management arrangement was to have improved living standards through increased income (Bell & Donda, 1993). On the same, Hara (2001) noted that the main concern of fishers was to ensure their economic advancement and social and economic well-being.

The policy changes reflected above follow the wider change of government from dictatorship to democratic system in 1994. This wider change in governance arrangements and approaches has influenced the decentralisation of government activities, which, as shown above, has also led decentralisation of fisheries management and governance. This has led to a system that involves sharing of roles and responsibilities with local institutions at district assembly level for implementation of fisheries policy (see Figure 1.2).



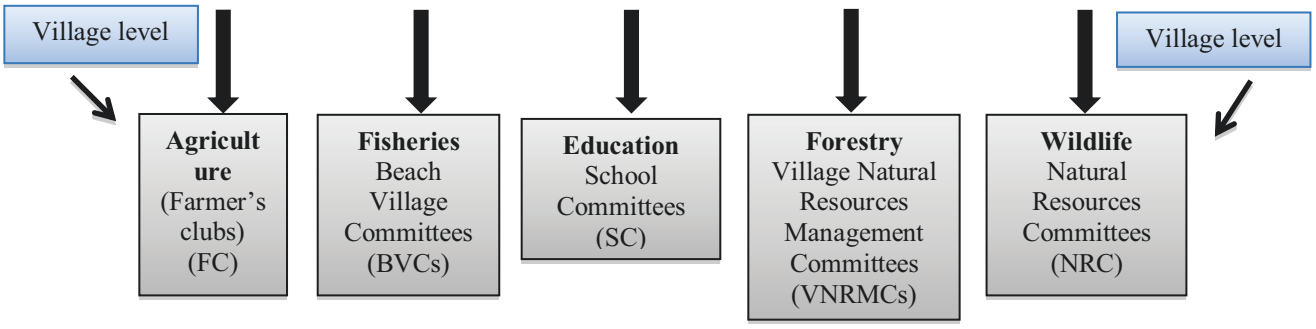


Figure 1.1: Decentralised structures showing government and local implementation policy (Adopted from Donda, 2001)

The implementation of the fisheries policy at district level follows the structure outlined in Figure 2 above, which as can be seen from the figure, combines both formal district level governance structures, and engages with traditional leadership and associated governance processes. Within the formal governance structure, the head of the government institutions involved in the fisheries co-management arrangement is the district commissioner. Under his/her guidance, different heads of government departments participate in the assembly structure as district executive committee members. Other members who serve as district executive members are traditional authorities (TA), members of parliament, heads of NGOs, and councillors, making for an inclusive governance structure. Decisions are made at the district executive level, and are based on consultation with all the executive members. The approach is largely 'bottom-up' although it follows national policy guidance, and the assumption is that development plans should originate from the village level to the village development committee, the area development committee and then to the district executive committee for consideration and approval. The government officers are policy implementers at each level and they serve as advisors at district, areal, sub-areal and village levels. A well-coordinated fisheries co-management arrangement follows the structures starting from the Beach Village Committee level[3], to the village development, areal and the district assembly for recommendation and approval. The engagement of different stakeholders at every level allows people to deliberate issues and link village plans to the district executive level.

1.5 Cases of fisheries co-management

There have been different definitions of co-management produced by different researchers and practitioners. Sen and Nielsen (1996) defined co-management as some form of institutional arrangement between the government and user groups to effectively manage a

[3] A Beach Village Committee is a legally and democratically elected local institution at a beach level to assist in the management of the fisheries resources. The committee consists of gear owners, fish traders, fish processors and business people in a specified location.

defined resource. Along the same lines but with further detail, Nielson et al. (2004) defined co-management as a dynamic partnership using the capabilities and interests of user groups, complemented by the ability of the fisheries administration, to provide enabling registration and administrative assistance.

As noted above, the failure of the centralised management approach to fisheries resources management brought in the co-management option. In the 1990s debates and discussions on institutional arrangements and government reforms emerged not only in Malawi, but in southern African water bodies inclusive of Mozambique, Zimbabwe and Zambia, representing a wider response to fish resource decline at regional level (FAO, 1993; Bell & Donda, 1993; Sowman, Beaumont, Bergh, Maharaj, & Salo, 1998); Hachonela, Jackson, Malasha, & Sen, 1998; Lopes et al., 1998). Like in Malawi, there are a number of factors that led to the decline of fish stocks in the above countries – including changes in traditional management structures, increased levels of poverty and lack of alternative livelihood sources, and the assumption was that bringing resource users to decision making processes together with government would improve the situation. I therefore discuss a number of co-management cases from other African countries in addition to Malawi to show different processes and arrangements, as this can help to inform understanding of the cases discussed in more detail in this study. I also introduce further detail on co-management related to the two cases that form the focus of this study.

1.5.1 Co-management in Lake Kariba

Co-management in Lake Kariba in Zimbabwe was introduced to strengthen the roles and responsibilities of local structures (Traditional Authorities) and to engage them more actively in the management of the fisheries resources. It was noted that there were post-colonial changes that had reduced the role of traditional leaders and this led to unrestricted entry into the fishery (Malasha, 2003). This also led to the use of illegal fishing methods and setting-up of settlements along the shores and on islands (Chipungu & Moinuddin, 1994). Scattered fishing camps made it difficult for the Department of Fisheries to collect accurate data and monitor the violation of fishing regulations. The introduction of co-management allowed Zimbabweans to set up designated fishing settlements on the lake shores and to delegate responsibilities to the artisanal fishers to control and manage some fishing grounds. Zone Management Committees (ZMCs) were established comprising Traditional Authorities in the zone areas, a representative from the local authority, a Department of Fisheries official, representatives from NGOs operating in the zone area and two business persons with well established businesses (Chipungu and Moinuddin, 1994, p. 5). The role of Zone Management Committees is to coordinate activities of the fishing camps. Another local institution called Integrated Village Management Committees (IVMC) was instituted under Zone Management Committees and comprised an elected chairperson from among the artisanal fishers in a

particular camp, three elected ordinary members, a village headman, fisheries assistant and a fish scout appointed by Fisheries Department. In the structure of these local institutions, IVMCs are the ones who control access to the fishery by vetting new entrants and these could be new fishers or those from the other camps within Lake Kariba before they start fishing.

1.5.2 Co-management in Lake Victoria

In Tanzania Lake Victoria was faced with declining fish stocks and water quality concerns and this was, among other things, due to increased human population pressures, on-going levels of poverty and lack of alternatives. Together these combined to increase the reliance on different fishing practices to satisfy the demand for fisheries resources from the increasing population. A co-management programme was introduced to respond to increasing population pressure, overfishing, use of illegal fishing gear, and introduction of pesticides in the agriculture sector, all of which were damaging and increasing pressure on the fish stocks. The programme brought together different stakeholders: government officers, fishing communities and other NGOs to work together to address diverse fisheries management issues. Malasha (2003) noted that co-management promotes the notion of shared authority, shared responsibility, stakeholder ownership of the fisheries resources and direct benefit to all those involved. The introduction of co-management facilitated the establishment of 91 Beach Management Units (BMUs) in Mwanza Gulf with the aim of sharing responsibility between the Fisheries Division of the government and the BMUs who continuously patrolled their fishing grounds against illegal fishing (Hoza & Mahantane, 1998). The Beach Management Units were responsible for patrolling and enforcing the fisheries regulations along the shoreline in Lake Victoria.

1.5.3 Co-management in Lake Chilwa

Lake Chilwa is the second-largest lake in Malawi after Lake Malawi and is located to the east of Zomba District near the border with Mozambique. The lake is approximately 60 km long and 40 km wide and is surrounded by extensive wetlands. Lake Chilwa supports over 60 000 inhabitants who are engaged in fishing activities and produce an average of 17 000 metric tons of fish per year, 20% of the total fish caught in Malawi (GoM, 2012). The lake has no outlet and the level of water is greatly affected by dry weather. Apart from the fishery, the lake supports a water bird population of around 1.5 million with about 160 different species some of which migrate along the Asian-East African Flyway from Siberia each year (GoM, 2012).

The co-management programme in Lake Chilwa started when the lake dried up in 1995/96. As with the other lakes discussed above (see Sections 1.5.1 and 1.5.2), the introduction of co-management facilitated the establishment of local institutions known in Malawi as Beach

Village Committees (BVCs) with similar conditions to those established in Lake Malombe and the south-east arm of Lake Malawi (see Section 1.5.4). The Malawi Beach Village Committees and the Fisheries Association (FA) (an institution comprising of traditional leaders and local leaders from the surrounding areas in Lake Chilwa meant to work together with BVCs) came together to design fisheries conservation rules after seeing that the fish stocks in the lake had disappeared due to the drying of the lake (GoM, 1999). In relation to conflicts in Lake Chilwa, there is also the issue of society heterogeneity in terms of different tribes compared to fewer conflicts in Lake Chiuta, a more homogenous community. The rules which aimed at protecting the surviving fish stocks included the ban for poisonous plants (*Syzigium* species) and seines operating in river mouths and lagoons. BVCs and the Fisheries Association in Lake Chilwa agreed to work together with fisheries officers by conducting joint patrols to monitor illegal fishing gear and practices. However, the lack of clear roles between the two institutions brought about conflict. The conflicts mainly related to who was responsible for running the fisheries activities in Lake Chilwa: co-management arrangements are not without conflict! Culturally, the local chiefs own land where all the fishing activities take place which meant that they had greater control over activities taking place in the area than the elected BVC members, most of whom were mere fishers and local business people. This arrangement automatically created a situation where the association was seen to have superior powers to the BVCs and any decision made by the association was final, undermining the roles of the BVCs and causing dissent.

1.5.4 Co-management in Lake Malombe and the south-east arm of Lake Malawi

Fish stocks in both Lake Malombe and the south-east arm of Lake Malawi were declining at an alarming rate (Bell & Donda, 1993) and this raised concerns amongst both the Fisheries Department and the fishing communities in the two areas. In 1993 a co-management programme was introduced in Lake Malombe and later in the south-east arm of Lake Malawi as a pilot project which, depending on its success, was to be replicated in other parts of Lake Malawi (Njaya, 2007). Co-management was introduced to promote recovery of the declining fish stocks and to promote the formation of community level organisations (BVCs) and Fisheries Associations (FAs) to assume communal management of the resources and to reduce monitoring costs. This was based on the assumption that increased self-regulation and increased acceptance of the regulation by users would result and that this would improve management of the resources (Bell & Donda, 1993). The introduction of this approach was seen as a shift from a top-down type of management to a participatory process where fishing communities were drawn into decision making processes (with a channel of dialogue between the Department of Fisheries and the fishing communities). Wals (2007, p. 127) sees people's participation in decision making processes as crucial and noted:

> Participation in and for sustainability is an important way of recognising the value and relevance of local or context specific knowledge. If properly undertaken, this knowledge becomes part of decision making process and weighed up with knowledge from other sources. Solutions are developed relevant to each community or stakeholder group. Rather than relying on outside specialists, or managers, participation can engage more stakeholders in becoming part of the process of self-governance and decision making. Successful participation for sustainability involves a wide range of stakeholders and provides opportunities top build shared vision, greater sense of unified purpose and common identity.

Bringing the two co-management players together allows for sharing of knowledge and the process facilitates the development of context based knowledge relevant to those involved. The process in Malawi has been slow due to the history of distrust outlined above in Section 1.2.3.2. However, there is also increased evidence that learning among fishing communities along the shores of lakes and rivers has been and is taking place through the shared technologies and practices although this has not been well documented. Co-management can be seen as a learning process as described by Hara et al. (1999, p. 19):

> The introduction of co-management should not be viewed as a short-term crisis management measure. As a form of institutional reform, it must be realized that co-management might take a long time to take root. This means that the goals or objectives and the timeframe for achieving them must be clear to all the role players. The short-term goals could best be institutional reform of the regime in the hope that this in the long term will result in change of behaviour of the fishers towards sustainable exploitation patterns.

Beach Village Committees (BVCs) were established to bridge the gap between government extension officers and the fishing communities and they represented the interests of the fishing communities along the shores of Lake Malombe and the south-east arm of Lake Malawi. As mentioned above, a BVC is a legally constituted local institution with members elected by the entire fishing community in an area to represent fishing communities in the fishing activities. The composition of a BVC includes gear owners, fish traders, fish processors, traditional leaders and others doing fish related businesses. Each community elected 10 to 14 members of the BVC to serve as intermediary between government and the fishing community. Traditional authorities and village heads are regarded as *ex officio* members within the BVC structure. The locations of BVCs along the shores of Lake Malombe and the south-east arm of Lake Malawi are shown as black dots on the map below indicating their prominence as a newly established governance structure (see Figure 1.3).

Figure 1.2: Map of Lake Malombe and the south-east arm of Lake Malawi with BVCs (Source: Government of Malawi, 2007)

The assumption in establishing the BVCs was that they would have a better understanding of local livelihoods and the social capital that would provide local legitimacy to effectively design and enforce fisheries regulations (Bland, 1992; Ferguson & Derman, 2000; Scholz, Chimatiro, & Hummel 1998). However, in order to delegate to them the above responsibilities, there is need for better understanding of the socio-cultural perspectives of the fishing communities and also in-depth understanding of practices, the challenges of fishing businesses, how they interact with each other and how they react and respond to the issues that concern their livelihoods. Commenting on the role and importance of communities in co-management, Wilson 2003, pp.208) noted:

> Reduction in communicative distortions through co-management can only be achieved when the state is authentically willing to surrender real decision making power to local institutions, even while holding them accountable for their responses to the needs of the broader society. Accountability can in fact, itself be empowering

when it takes the form of outside participation in goal clarification and the evaluation of achievements.

As can be seen from the discussions in this section, and in earlier fisheries management practices described above, people along the lake shores and river banks have been involved with fisheries for a long time. This has enabled them to develop skills, knowledge and experiences (Kachilonda, 2005). As people who have been dependent on the fisheries resources, they learnt how to manage and use the resources and this knowledge has been passed on from generation to generation with local leaders taking the lead (T. A. Msosa, personal communication, January 3, 2010). This process continued until user communities had their responsibilities removed during the colonial era and after independence. Now co-management approaches aim to bring participation of resource users back into management. As can be seen from these cases reviewed briefly in this section, a core focus of the co-management arrangement is co-operation or participation, established via inclusive governance structures. This is expected to increase the efficiency of fisheries management as compliance and self-regulation are assumed to be better in a bottom-up system (Jentoft, 1989).

1.6 Reality and complexities of co-management on the ground

The introduction of participatory fisheries management or co-management resulted from failure of centralised management systems to reduce fish stock depletion. As indicated above, in order to address the issue, there was need for shared responsibility between resource users and the government where the fishing communities were seen as important partners in the management of the fisheries resources. Jentoft (2004) argued however, that management systems cannot gain support from communities unless they help to nurture them. There is need for in-depth understanding of what co-management practices require and not merely in the simplistic way of ensuring people's presence in meetings and workshops. In all of the cases discussed above (see Section 1.5) co-management practices have been in existence for up to two or three decades now, but there are still challenges of declining fish stocks, conflicts among stakeholders and contradictions in a number of aspects within the co-management process. Co-management approaches therefore also need to be understood in relation to other complexities and factors that shape the fisheries concerns.

The declining fish catches in Lakes Malawi, Chilwa, Malombe and Chiuta and also Shire River are due to, among other things, high population growth and the resultant increase in fish demand (Turner, 1996). This was (and still is) exacerbated by the lack of essential social services and alternatives amongst rural communities who depend primarily on the fisheries for their livelihoods. As the fish catches continue to decline, fishers continue to develop survival strategies and there has been an increase in the number of modified fishing gears and changes in fishing methods over the years. This has resulted in the use of illegal fishing gears

and methods hence a decrease in legal fish catches. The low catch entails loss in revenue which in turn affects the living standards of large numbers of people (Matiya & Wakabayashi, 2005). The most recent estimated data for the two research sites show that there have been variations in the total fish landings from 2009 – 2012 as shown in the table below.

Table 1.1: Production for Lake Malombe and the south-east arm of Lake Malawi for the past four years (Source: Mangochi District Fisheries Office)

Year	Lake Malombe and Upper Shire (Annual production in metric tons)	South-east arm of Lake Malawi (Annual production in metric tons)
2009	4 668.22	17 948.49
2010	368.92	20 524.58
2011	4 826.50	16 972.76
2012	1 097.44	5 995.81

The data shows that there was a sharp decline of fish landings in 2010 for Lake Malombe and in 2012 the south-east arm had the lowest total fish landings. The statistical figures show that fish landings are declining whist there is also an increase in human population (see Section 1.6), indicating loss of food security from the fisheries.

Some of the reasons for the declining fish catches are:

1. Overfishing of the fish stocks – no quota system is used in the Malawi fishery for the artisanal fishery;
2. Use of illegal gear that has resulted in the exploitation of fish stocks including the juvenile and immature fish;
3. Non-compliance of fisheries regulations leading to non-observance of closed seasons use of illegal fishing gear and fishing practices;
4. Destruction of fish habitat due to degradation of the environment – clearing of land cover up-hill for farming causing rivers to dry and increased siltation due to run-off; and
5. Human population increase and over-dependency on the fishery due to lack of alternative livelihood options. (GoM, 2005)

The overfishing of fish stocks in Lake Malombe and the south-east arm of Lake Malawi as well as other water bodies has a direct link to increases in fishing practices hence the increase in the number of fishers, fishing gears and fishing crafts over the years (GoM, 2005). It has been observed that there has been increase in the use of illegal gear with small meshes, which catch juveniles and immature fish. Increased effort has also resulted in ecological destruction, for example in Lake Malombe overfishing resulted in ecological overfishing where the large

Chambo species has been replaced by the small *Lethrinops* species locally known as *Kambuzi*[4] (GoM, 2005). The clearing of the vegetation cover along the shores of lakes and rivers and in shallow areas of the lakes also has diverse effects on the habitat. Degradation and loss of aquatic vegetation reduces food and refuge especially for fry and juveniles, affecting breeding areas of fish (Banda & Hara, 1994). One of the issues associated with the surrounding terrestrial environment has been the increased rate of soil erosion that has led to increased siltation and eutrophication affecting the breeding and spawning grounds for fish. Clearing of vegetation coupled with the cutting down of trees along river banks and clearing of upland areas for farming activities has also resulted in many of the rivers that flow to the lakes drying up in certain periods of the year, further affecting the aquatic ecosystem.

As can be seen from the discussion above, aquatic ecosystems cannot be seen in isolation from social systems, and co-management practices therefore need to be seen within a social-ecological systems view (see Chapter 2). Other socially related factors affecting the aquatic ecosystem include non-compliance with fisheries regulations, a practice which has also contributed to the decline of the fish stocks especially the *Chambo*[5] e.g. the closed season which was introduced to protect the spawning of Chambo has never been observed by fishers resulting in the catching of brooders, juveniles and immature fish. This has resulted in the reduction of brooders and baby fish which are meant to increase fish population, paradoxically reducing the availability of Chambo as a highly prized food source amongst the very communities that over-fish the species.

A combination of increased poverty and increases in human population numbers along the shore districts of Karonga, Nkhata Bay, Nkhotakota, Salima and Mangochi further contribute to the complexities of co-management practices. In these areas lakeshore populations have rapidly increased over the years and this has been due to migration of people from upland areas to the lakeshore areas in search of economic opportunities (Todd, Kaphuka, Kanyanda, & Chinula, 2000). This increase in human population exerts pressure over the fish stocks because the emerging population requires socio-economic support from the fishing industry which is already exploited. Lack of alternative livelihood options leaves the rural people with no option but fishing.

In the Malawi report to the World Summit for Sustainable Development (WSSD) held in Johannesburg in 2002, Malawi highlighted its concern over the decline of its fisheries, and

[4] Kambuzi are small benthic species genera *Lethrinops* and *Otopharynx* found in shallow waters less than 50m deep.
[5] Chambo is the sub-genus of the genus *Oreochromis* and comprises three closely related species of tilapiine cichlid, namely *Oreochromis lidole*, *Oreochromis karongae* and *Oreochromis squamipinnis* all of which are endemic to Lake Malawi.

expressed a commitment to develop measures to restore particularly the Chambo fishery to its maximum sustainable yield by 2013 (GoM, 2003). This is because the declining fish catches affect the socio-economic development of the country.

Further light on the complexities of co-management emerged from management programme evaluation conducted in Lake Malombe in 1999 following a recommendation to assess the patterns and interactions among stakeholders and the outcomes which may have resulted from co-management. The evaluation process assessed three aspects to assess change of behaviour towards sustainable exploitation of the fishery: *efficiency* in the exploitation and management of the fishery; signs of improved *equity* in representation and sharing of benefits among resource users; and *sustainability* of the co-management arrangement (Hara et al., 1999).

The evaluation found that the establishment of Beach Village Committees (BVCs) caused some conflicts with other local structures (chiefs, village headmen) which were already present when BVCs were put in place. The introduction of BVCs brought about misconceptions that the BVCs should have greater powers than the village headmen. By custom, village headmen derived privileges from the fishery through their positions (ibid.). Traditionally chiefs and village heads are the overall controllers of the activities taking place in their areas. This meant that all BVCs were theoretically under their authority and power. Under the co-management arrangement however, incoming migrant fishers have to seek permission from both the village headman and the BVC and this directly infringed the benefits and authority of the chiefs (Hara, Donda, & Hara. 1999). BVCs were democratically elected by the fisher community to represent their interests, but because they assume enforcement activities they thought and continue to think they derive their powers from government. The above tensions and contradictions regarding power in the management of the BVCs have been shown to constrain the implementation of the co-management programme (ibid.).

These complexities indicate that while the co-management approach to fisheries resources management has over the years been seen as a solution to resource management in a number of countries (see Section 1.5), it is not without complexity and tension and it is a practice that may also be characterised by contradictions. The general assumption in the cases of co-management that have been mentioned briefly above, was that involving resource users in the management of the resources through local structures (Zone Management Committees and Integrated Village Management Committees in Lake Kariba, Beach Management Units in Lake Victoria and Beach Village Committees in Lakes Chilwa, Malombe and Malawi) would bring the resource users close to their resources and make them accountable for any kind of mismanagement. Introduction of the above local structures and the co-management concept

itself has however resulted in a number of newly emerging tensions and contradictions. As in the case of the Lake Malombe evaluation cited above, issues of power and power conflicts have been observed in all four cases mentioned above (Chipungu & Moinuddin, 1994; Malasha, 2003, Hara, Donda, & Njaya, 1999, and Donda, 2001). A number of studies have highlighted weaknesses of co-management arrangements around Lakes Malawi, Malombe, Chilwa and Chiuta: (Banda, 1996; Dawson, 1997; De Gabriel, 1998; Donda, 2001; Ferguson & Derman, 2000; Njaya, 2002; Njaya, Donda, & Hara, 1999). Analysis of co-management weaknesses in some of the above water bodies are generally represented in terms of conflicts between fishing communities and government due to unclear roles and responsibilities between the government and the community and also lack of accountability and transparency amongst stakeholders in the programme.

The evaluation results on outcome-efficiency in the Lake Malombe case showed that there were still cases of illegal gear use and low catches even with the co-management arrangement. One of the outcomes highlighted in Hara, Donda and Njaya, (1999, p 10), provided further insight here:

> According to Banda (1996) the experimental fishing trials done in Lake Malombe as part of the monitoring of the fishery over a period of two to three years (1994-96) showed that the agreed 19 mm mesh size nkacha net still caught 40% immature fish. Furthermore, by 1995, 40% of the fishermen had not yet changed to the 19 mm mesh size and were still using nets of mesh sizes less than 19 mm (Mtika, 1996; Jumpha, 1996). Apart from this Banda further points out that a simple gear selectivity test between a 19 mm mesh size net and another of less than 19 mm mesh size (0.5 or 0.25 inch) showed that the former caught 54% less fish than the latter. Implementation of the 19 mm mesh size regulations has thus serious socio-economic implications for the fishers as it would result in much less catch. There is strong suspicion therefore that even fishermen who changed to 19 mm are still using mosquito net linings in their bunts to keep their catches healthy.

The above shows that illegal fishing activities (use of under-meshed netting and practices) were still taking place even while co-management arrangements were being implemented, as fishers did not change to the agreed recommended mesh size nets. Those who changed to 19 mm were not catching many fish, and therefore resorted to using mosquito nets at the bunts, a practice which is even more destructive. Though the case quoted above is a bit dated, not much has changed in terms of the use of illegal fishing gear and the fish catches have increasingly declined over the years (see Table 1).

Engeström (2001, p. 137) argued that contradictions are not the same as problems or conflicts but are historically accumulating structural tensions within and between activity systems. While studies such as those cited above focus on tensions in co-management, I was unable to identify specific studies focusing on expansive social learning processes as a model to

collaboratively address issues highlighted above where through mediated deliberation stakeholders came together to carefully explore the issues and find lasting solutions to the tensions and contradictions that constrain the implementation of fisheries co-management.

However, despite the complexities and contradictions reported on above, contextual profile [6] data showed that since co-management was introduced, the government and the fishing communities have been brought closer together and that it is the coming together of these two parties that has necessitated the sharing of knowledge crucial for the proper management of the fisheries resources. Fishing communities have more access to extension officers and are able to sit together with fellow fishers through their formal and informal meetings (Kachilonda, January 3, 2010). Chief Msosa said and I quote "we are able to talk to each other as people who are benefiting from the same resources unlike the old days when government had full control of the resources". Chief Msosa's views on the successes of co-management through sharing understanding and people's views in a social context are reflected in wider literature on social learning. Wals, van der Hoeven and Blanken (2009), for example, argued that the success of social learning depends a great deal on the collective goals and/or vision shared by those engaged in the process (see Chapter 2).

Wals (2007, p. 36) argued that sustainability education should mobilise engagement with sustainability problems that are faced by particular communities and focus analysis on such concerns by means of interdisciplinary, comprehensive approaches which will permit deeper understandings of sustainability problems, with potential engagement with solutions or new ways of doing and being. In all of the cases reviewed above, very little was said about mediated social learning processes that involved the training of extension officers for new forms of engagement within co-management approaches. This appears to leave the emerging tensions and contradictions unresolved.

1.7 Problem statement, aims, goals and research questions shaping the study

1.7.1 Problem statement

As noted above (Section 1.6), the introduction of the participatory fisheries management system which led to the emergence of the co-management approach provided a change in policy to focus on participatory fisheries management. The approach facilitated a shift from

[6] In preparation for this study, to I undertook six contextual profiling field trips to Chapola, Kadewere in Lake Malombe, Mbenji in Salima and the Malawi College of Fisheries where I conducted six face to face and two focus group interviews with fishers, local leaders, government extension officers and college lecturers to understand more comprehensively the context and object of this research.

the centralised management system to a participatory management system in the management of the fisheries resources. The latter allowed for the participation of resource users in the decision making processes. The study's literature review (see Chapter 2) shows that co-management approaches assume collaborative learning or co-learning approaches that promote the engagement of different actors who are working on shared practice. However, the theoretical foundations for establishing co-learning or social learning approaches in support of co-management policies are not well established in the fisheries co-management approach nor are the practice on how to support co-learning amongst the diverse stakeholders in the fisheries sector. Extension and training programmes in the Malawi fisheries tend to deal more with politics of participation (Kachilonda 2005) neglecting in-depth engagement and insights into participation and reflexive processes of learning. The study sought to address this gap in knowledge by exploring the use of expansive social learning processes and practices in extension and co-management of the fisheries sector to model a social learning process within a co-management policy framework in Lake Malombe and the south-east arm of Lake Malawi. As such, this research aims to give attention to the social aspects of adaptation to loss of fisheries resources with emphasis on the learning and agency of the fishing communities. The research seeks to facilitate understanding of learning as an emergent, agency-centred process of change, using a multi-site case study research design in the two case study sites.

1.7.2 Aim and goals of the research

The main aim of this study is to deepen understanding of sustainability oriented learning in co-management of fisheries resources in Malawi, through exploring how this learning can potentially be expanded, and to analyse implications for extension education and training.

To engage with this aim, the study had three main research goals:

1. To investigate how fisheries co-management communities learn to respond to the risks of declining fish stocks;
2. To investigate historically and socio-culturally constituted knowledge and practice differences as these emerge from or are related to tensions and contradictions that affect learning processes; and
3. To analyse implications for agricultural extension education and training and develop a model and tools that can be used to inform extension curriculum development and training of extension officers in co-management practices to expand learning for the sustainable utilisation of fisheries resources.

1.7.3 Research questions

In order for the research to achieve the aim and goals above, the following questions were raised and investigated throughout the research process:

1. What learning takes place among different stakeholder groups in the context of fisheries co-management that influence co-management practices?
2. What are the learning and co-management practices that can be expanded in and through learning?
3. How can such learning be expanded amongst key stakeholders?
4. What extension and training approaches or models can be used to improve extension education and training within a co-management system?

Additional sub-questions further expanded the insights into these questions, aims and goals:

1. What type of learning interactions occur amongst the players in co-management?
2. What do they learn when they come together?
3. How do the fishers think about sustainable use of the fisheries resources?
4. What historically and socio-culturally constituted knowledge do they draw on in their learning?
5. How do tensions and contradictions and practices influence their learning?
6. How can the learning interactions in the co-management context be expanded?
7. What extension tools and processes have traditionally been promoted in extension education and training curricula?
8. What extension tools and processes are possible to use in co-management approaches? How can these influence curriculum thinking for extension education and training?

1.8 Potential significance of the study

Before embarking into this study, I undertook contextual profiling research to inform the direction of the study. Some of the insights from this phase of the research point to some aspects of the significance of the study. The profile showed that the history of fisheries management dates back over hundreds of years and has been passed on from one generation to another, before the introduction of the centralised management approach (see Section 1.2.3.1). The experiences and skills gained over a long time by the fishers are important for the success of co-management. During the interviews, one of the respondents said:

> Fishing is not a practice that comes from outside the society for people to take and accept but is a societal practice that has been there for ages and has been passing from generation to generation. We were born and found the practice in existence and we have learnt it as part of our rural life, building on experiences, skills and knowledge as we have continuously been involved in the fishery and learning from our elders Ali, January 4, 2010, personal communication.

The practice-based type of knowledge reflected in the citation above could be seen as a shared resource that has been generated within the community and is shared amongst or between members of the community (Wenger, 1998). Such knowledge is learned over time, through participation in communities of practice. It involves identity formation and meaning making in a context of practice (Lave & Wenger, 1991). This requires sharing of practices as people strive to find solutions to existing problems. However, this is not all that can be learned about fishers' knowledge (as the rest of this study will also show). There is more to it than histories of learning through engagement in practices and localised knowledge sharing.

In another contextual profile interview Chief Msosa said:

> Working together with government has helped us as a community to see what people in the other areas are doing but also to be able to share with our own fellow community members here how to go about some of the challenges around fisheries. We used to work as independent groups, local leaders, fishers and government officers but we are now pulled together through the existing collaboration with government. (T. A. Msosa, personal communication, January 3, 2010)

This citation points to further processes involved in social learning in communities of practice. This also involves encounters with knowledge from elsewhere, engaging with challenges and sharing knowledge with others, not necessarily participating in the practice of fishing in the same way as the fishers. This point to a need for wider views of knowledge and learning. Failure to share and explore the meaning of new knowledge and techniques that relate to the fishing communities' knowledge and experiences creates a gap between extension officers and the fishing communities.

This is where this research is located. I aimed firstly to develop a fuller understanding of how fishers learn co-management practices and then to understand the existing tensions and contradictions that emerge at the interface of different actors in co-management. I also wanted to see if their knowledge could be expanded to create new solutions for both community and government while preserving precious resources. My ultimate aim was to inform new types of extension and training approaches that allow for stakeholders' deliberative processes to address complexities and inclusive decision making processes for new knowledge creation and change of practice. To be able to do the above, there was a need

for some in-depth understanding of how people learn (see Chapter 2), particularly how such learning can be expanded as people meet to discuss the risks of declining fish stocks and as they share (often conflicting) knowledge and experiences amongst themselves (see Chapter 3).

The aim of this study is to contribute to knowledge of the co-management of fisheries resources by providing examples of expansive social learning processes from which extension training curricula can be derived. The study provides a deeper understanding of the praxis and the potential of expansive social learning processes in fisheries co-management policy environments emphasising how social learning processes can help to mediate the existing tensions and contradictions in sustainable fisheries management. This study provides a potential paradigm shift in fisheries resources management where social learning processes are seen as elements of actualisation of adaptive co-management in the context of co-management.

1.9 Outline of chapters

Chapter 1 introduces the study providing the research context, demographic and socio-economic context of Malawi and trends in fisheries management. It provides insight into my researcher motivation to conduct the study. It also outlines fisheries policy and the emergence of decentralisation approaches to fisheries co-management. It shares some insights from other lakes and co-management practices in the region and people's involvement in fisheries management. It further provides some perspectives on tensions and contradictions in fisheries co-management as outlined in the literature and then discusses the aims of the research and the research questions. The chapter ends with a discussion on the potential significance of the study.

Chapter 2 discusses social-ecological systems and adaptive co-management and their implications for learning. It discusses the history of extension training approaches and co-management implications for learning by reflecting on how these relate to human well-being and ecosystem services with a focus on fisheries resources management. It discusses some suggested principles of collaborative social learning in adaptive co-management and extension services and links them with co-management of fisheries resources. The chapter ends with a critical literature review of extension and training curricula, using some broader examples and focussing more specifically on examples of fisheries extension curricula to help inform an appropriate model for extension and training in the fisheries sector.

Chapter 3 discusses the theoretical framework of the study. It explores socio-cultural approaches to expansive social learning and the theoretical framing of the study. It further

briefly discusses Cultural Historical Activity Theory as a socio-cultural learning theory, and its application to fisheries co-management. It provides some in-depth understanding on how social learning across boundaries and within different activity systems can provide opportunities for learning among people from diverse backgrounds. The chapter ends by discussing expansive social learning processes in fisheries co-management, which is part of the paradigm shift to fisheries co-management and sustainable fisheries as discussed in Chapters 1 and 2.

Chapter 4 outlines the research methodology and methods used in data generation. It discusses the two phases used in the study (investigation and expansion). The investigation phase responds to the first two research questions on the kind of learning taking place in fisheries co-management. The chapter provides insight into how the investigation phase was conducted: using semi-structured interviews, focus group discussions and intervention workshops research techniques. Responding to the first two questions enabled the identification of some tensions and contradictions in the learning process and the chapter explains the analysis process used to identify and surface these contradictions. The chapter then goes on to explain the methodological process which was used in the second phase to surface and deliberate the contradictions with co-management stakeholders in the form of mirror data in change laboratory workshops. Processes of data generation, management and analysis are discussed for both phase one and phase two.

Chapter 5 discusses the findings from the first phase of the research (investigation) on how fisheries co-management stakeholders learn from each other. It reports on the data generated through documents analysis, face-to-face interviews, and focus group discussions. A brief history of each case study is provided, giving the necessary background on the origin of co-management practice and the desired practices in order to sustain the fishery in the particular case contexts. It outlines the history of fisheries co-management and factors that motivate fishing communities to come together to discuss current fishing practices. It provides a synthesis on learning in fisheries co-management as found in the two case study sites and introduces the start-up processes for working with the learning in change laboratory workshops with all the stakeholders.

Chapter 6 discusses the contradictions in the three main fisheries co-management activity systems. It shows how the contradictions were surfaced within and across different activity systems. It further explores some of the causes of the contradictions and how this influenced more learning as stakeholders' debated issues and discussed them in an expansive social learning process. This chapter starts the expansion of the contradictions identified in the first

phase and concludes by surfacing them as mirror data for further in-depth discussions with the fisheries co-management stakeholders.

Chapter 7 discusses the expansive social learning process where the contradictions are critically discussed with the stakeholders in the two research sites. It gives an overview of this learning process and how the contradictions become solutions through the deliberation in the change laboratory workshops. It also discusses my role as an interventionist researcher and the other research participants involved in the research process as we engaged with co-management stakeholders. It finally discusses the solutions identified by stakeholders, leading to the recommendations and conclusion chapter.

Chapter 8 discusses the research recommendations and conclusions. Recommendations are framed based on insights gained into social learning and extension in fisheries resources management in Malawi, as this pertains to co-management of the fishery. The recommendations are based on the findings of the study and respond to some of the crucial areas identified and deliberated by stakeholders during the expansive social learning processes. It further discuses insights gained, how learning takes place in these activity systems and how it is shaped by historicity, culture, power relations and changes in practice over time. Ultimately, the chapter provides recommendations on ongoing reflexive learning and active engagement of fisheries stakeholders with the aim of sustaining the fishery which in turn can contribute to sustaining people's income and food security situation, improve their livelihoods and help to alleviate poverty among rural people who depend on the fisheries resources. The conclusion of the study pulls together the aim of the research, its goals and research questions as discussed in Chapter 1 and concludes the research process outlining how it contributes to learning processes in a fisheries co-management context.

CHAPTER 2

SOCIAL-ECOLOGICAL SYSTEMS AND ADAPTIVE CO-MANAGEMENT: IMPLICATIONS FOR LEARNING

Sustaining co-management will mean resolving the challenging dilemmas facing it, and the requirements for this solution are multidimensional. They include clarity of roles and authorities, management capital, fiscal resources and a capacity for learning and adaptation all consistent with the social and ecological context of the fishery. (Hana, 2003, p. 317)

2.1 Introduction

This chapter presents an overview of the literature pertaining to extension and learning in the co-management context. It discusses social-ecological systems and adaptive co-management, the history of extension training approaches and co-management implications for learning by reflecting on how these relate to human well-being and ecosystem services. The chapter contains a literature review of extension and training curricula. It takes a broad approach which considers how other institutions design and implement their curricula, which in turn provides some guidance on how to engage with extension and training curricula, which is one of the focus areas of this study.

2.2 From conservation to social-ecological systems and adaptive co-management: learning gains stronger focus

This chapter begins with a review of the wider shifts in practice that have occurred in the conservation field: from mainstream and earlier conservation practices based on assumed certainty of knowledge, to more recent approaches including adaptive co-management as reviewed in Chapter 1. In this section I focus on the implications for learning that have emerged in and through the shift to adaptive co-management.

Social-ecological systems consist of a bio-geo-physical unit and its associated social actors and institutions. Social ecological systems are complex and adaptive and delimited by spatial or functional boundaries surrounding particular ecosystems and their context (Glaser, et al., 2007; Barker & Ghimire, 2003). The fisheries social-ecological system that constitutes the Malawi fisheries is very important to the Malawian people. Apart from its ecosystem roles there is social responsibility to consider: thousands of both rural and urban communities are supported by the fisheries (see Section 1.2.). The concept of a social-ecological system

enabled me to distinguish three possible types of system elements: natural, social and hybrid entities which roughly correspond to the natural sciences, the social sciences and the field of research of human ecology (Jahn, Bergmann, & Keil, 2012). While a scientific understanding of natural resources is important there is also a need to understand human learning, situated and social learning approaches which are key to the social dynamics of community based natural resources management and thus the social-ecological system as a whole. These approaches concentrate on the socio-cultural and historical context of learning and the outcomes or effects of such learning. Jahn et al. (2012) argued that it is impossible to understand nature without society and society without nature and those social-ecological systems becomes the core object of cognitive interest.

In natural resources management social learning has been defined as a form of collective action and reflection which takes place among individuals and groups when they work to improve the management of the inter-relationships between social and ecological dynamics of the social-ecological system (Keen, Brown, & Dyball 2005). In this regard therefore, on-going reflection is a key part of social learning processes. According to Muro and Jeffrey (2008) processes to foster social learning in social-ecological systems management contexts include careful facilitation, small group work repeated meetings, opportunities to influence the flow of events in a given process, open communication, diverse participation, unrestrained thinking and the inclusion of multiple sources of knowledge.

In the early literature, the term social learning was first used in the context of fisheries management in the late 1980s and early 1990s (Dale, 1989; Pinkerton, 1994a) to refer to a process in which parties learn to work collaboratively to enable more successful fisheries management. Based on observations in fisheries co-management, Dale (1989) regarded social learning as an emergent outcome of long term interactions in a social-ecological system context, and defined it as a process shared among diverse groups, for making sense of a complex, turbulent environment. A few years after, Pinkerton (1994a) took this forward and influenced by Harbermas's communicative rationality, described social learning as taking place when parties deliberate over problems, undertake shared tasks, reveal values and perceptions and conduct joint monitoring.

From a pedagogical perspective, the growing emphasis of social learning in natural resources management represents a shift away from transmissive expert-based teaching, (which characterised traditional conservation and agricultural extension activities that also tended to separate humans and nature) towards transformative community based learning in a wider systems context (Copra, 2007).

Before social learning was put into practice, the command and control approach was dominant in natural resources management (see Chapter 1). As discussed earlier, the assumption was that scientists and policy makers or managers had the right knowledge and operated under high levels of certainty and that science based interventions were best suited for the protection of natural resources.

In the late 1970s to early 1980s adaptive management became prominent in natural resources management. Adaptive management was largely seen as learning that was taking place in the domain of managers and scientists where sources of knowledge were believed to come from experimentation for better understanding of ecological changes and the links between social-ecological systems, adaptation, learning and resilience (Holling, 1986; Lee, 1993; Gunderson, Holling & Light, 1995). The conceptual trends of adaptive management called for active experimentation as a means to learn, an approach that became embodied in adaptive management (Holling, 1978). During that time learning was described as an iterative process based on the scientific model of carefully planned experiments that involved scientists and decision makers or managers who learnt through the process of setting objectives, planning, taking action, monitoring and reflecting on the outcomes, learning and taking action again (Walters, 1986). Here the focus was on the individual and group-based learning process which was expected to take place among scientists and policy makers or managers via regular feedback and reflection processes. During that time command and control approaches to natural resources management became less prominent, although the two systems often continued to operate 'in parallel'.

Concurrently, in the early 1980s and 1990s another (often related) approach to natural resources management emerged called collaborative management (described in Chapter 1). Collaborative natural resources management, sometimes also referred to as participatory natural resources management, was seen as desirable and feasible in practice, with the potential to also contribute to adaptive management within a social-ecological systems framework (Murphree, 2000). The approach contributed further insights and a different understanding by critically looking at who learns, how, and what people learn in natural resources management (i.e. it was not only the managers and scientists that needed to learn how to adaptively manage in social-ecological system contexts, but also communities and other stakeholders). These shifts influenced the participation of rural communities in development decision making (Chambers, 1994) and were also associated with rights based approaches to develop and empower the poor. Research into community-based natural resource management, and participation and learning in co-management and adaptive management contexts started to reveal roles of communities in such processes. Ostrom (1990) suggested common pool resources could be better managed by the communities living around these resources under certain conditions and with appropriate levels of

decentralisation (Murphree, 2000). Thus it is clear to see that some overlaps between adaptive management, collaborative management and social learning discourses were evident by the early 2000s.

During the 2000s there was a growing interchange of ideas from adaptive and collaborative management, heavily influenced by systems ecology, which led to a stronger emphasis on adaptive co-management (Ruitenbeck & Cartier, 2001; Olsson, Folke, Galaz, Hahn, & Schultz, 2004). Adaptive co-management is an approach that focuses more on sustainable eco-system management within a social-ecological systems perspective. It focuses on processes that build knowledge, create networks between multiple actors and also foster effective leadership, an approach that can strengthen co-management institutions. It is an approach where suitable platforms are created involving stakeholders for knowledge sharing and collaborative learning and that seeks to find solutions to existing management problems and contradictions, through what can be described as a social learning process (Armitage, Berkes, & Doubleday **(**2007).

The complexity of the fisheries sector requires an approach that will capture both social and ecological aspects of the environment to be able to reduce the uncertainties through the involvement of different stakeholders in decision making. While there has been a greater emphasis on adaptive management and co-management, in the last 10 years, scholars and practitioners have also become increasingly critical of the dynamics and outcomes of participatory processes (Mosse, 1995; Wagemans & Boerma, 1998; Cooke & Kothari, 2001). Some of the critiques include failure to properly anticipate dynamics of power, conflicts, and politics; assumption that intervention projects introduced from outside are the main carriers of change; assumptions that processes of self-organisation are moderated and can be adequately addressed at the local level. Such approaches are said to avoid taking higher-level constraints or more deep-seated structural issues adequately into account (Giller et al. 2008), hence there is a need to think about adaptive management and co-management not only at a localised, participatory level, but at a wider social-ecological systems level that includes multi-levelled processes of interaction between communities, policy makers and wider systemic and structural factors. There have also been challenges with structures which are put in place with regard to proper implementation of co-management programmes in a number of areas (see Section 1.5). As described in Chapter 1, there have also been conflicts between locally instituted structures e.g. Beach Village Committees in Malawi, Zone Management Committees in Lake Kariba and Beach Management Units in Lake Victoria (see Section 1.5). In the case of the Malawi co-management arrangements, the focus has been on the constraints at the lower level (BVC and the fishing communities) leaving out those constraints at the higher levels (e.g. policy making) or the deeper structural constraints (e.g. persistent poverty) which are equally important for sustainable fisheries management.

As discussed earlier (see Section 1.6) the evaluation of fisheries co-management cited lack of transparency and accountability as one of the reasons for its failure. Within more recent approaches to adaptive co-management, monitoring and evaluation is carried out to improve the management decision making, increase transparency and accountability, reduce risks and uncertainty, foster learning and improve the way in which projects are implemented (Bellamy, Walker, McDonald, & Syme, 2001; Stern, Maroluis, Salafsky, & Brown, 2005). Engaging adaptive co-management within a wider, multi-levelled framework may therefore potentially address some of the challenges in fisheries co-management contexts, but this will require ways of enabling interaction between different 'parts' or players in the social-ecological system (e.g. communities, managers, government officials, policy makers etc.), each which have their own roles to play, with interaction between them being vitally important.

Solving problems in social-ecological systems require a deep understanding of the system and all of its contributors, and sustainability indicators and measurable variables for reporting on progress or change within the system need to be developed in collaboration with all those involved in the systems. In order to address social-ecological problems, what is needed is inter- and trans-disciplinary research, which takes into consideration the involvement of all who are involved, allows stakeholders to learn through the process and become part of decision making (Wals, et al., 2010). Tress, Tress and Fry (2006) noted that the production of new knowledge and collaborative learning processes are two important dimensions of transdisciplinary research. Intensive interactions with stakeholders during research serve not only to access and develop locally relevant questions and insights but also to build up confidence in the process and be able to share objectives and improved relationships with others (ibid.). This is based on integration of disciplines and the inclusive participation of stakeholders representing different societal sectors in the process of problem formulation, knowledge production and learning (Tress, et al., 2006; Hirsch et al., 2008; Klein, 2008; Axelsson, 2010; Axelsson, Angelstam, Elbakidze, Stryamets, & Johansson, 2011). Including the complexities of the social system in a social-ecological systems perspective means understanding the ecological context, as well as the needs and interests of different stakeholders. It also involves understanding the interconnectedness with the regional, national and international levels of societal steering, and interconnectedness amongst different activity systems and communities of practice at local levels (see Chapter 3). For social learning to emerge in such context, there is also need for methodological processes that can allow for such learning to occur and emerge (see Chapters 3, 4, 5, and 6). In a southern African context, it is the extension services that are officially tasked by most governments to work on facilitating learning and interaction in natural resource management (co-management and adaptive management) social-ecological system contexts; therefore it is important to understand the history and role of extension services, which I turn to next.

2.3 A history of extension training approaches, with an emphasis on Malawi

2.3.1 Introduction

I now turn to a review of the history of extension and scope the main trends and changes in the field of extension services, again because these have embedded assumptions about learning in/for co-management and/or adaptive management in social-ecological systems. I particularly focus on bringing the embedded assumptions of learning to the fore in this section.

In most countries in the southern African region extension services were strongly linked to agriculture and the primary national agricultural development goal was to achieve food security through increased production. Most of the extension programmes focused primarily on technology transfer activities that would improve the production of basic food crops (Swanson & Rajalakti, 2010). Less attention was given to production of other services like horticulture, fisheries, livestock and natural resources management (ibid.). Historically, in earlier extension and teaching processes, extension workers relied on research stations or central administrative offices to determine what lessons should be taught to farmers.

The history of extension services in Malawi goes back to the colonial era when the first agriculture extension system was recorded in 1903. It started with the distribution of free cotton seed through the British Cotton Growers Association to African farmers who were to grow cotton (Masangano & Mthinda, 2012). Government instructors known as "travelling agents" were dispatched to teach farmers the cultural practices associated with cotton production (Dequin, 1970). In an effort to modernise agriculture, the colonial government decided to force African farmers to increase their production (Masangano & Mthinda, 2012).

When the first extension service was introduced, the colonial government enacted a natural resources ordinance that legalised the use of force in compelling the African farmers to follow prescribed farming practices e.g. early land preparation and planting, correct spacing and the uprooting of old stalks by certain dates after harvesting. Violators of the measures were either fined or made to serve a short-term prison sentence (Kettlewell, 1965; Dequin 1970). During that period extension workers were seen as enforcement officers rather than advisors to the local farmers. The regulatory measures were further enforced in the 1950s after the 1948 famine which the colonial authorities partly attributed to the weakness of the traditional African farming practices (Kettlewell, 1965). Such an approach to extension services created great animosity between extension workers and the African farmers; farmers even started running away from their villages whenever they spotted extension workers

(Masangano & Mthinda, 2012). Since then different extension approaches have evolved and the ones which have been commonly used in Malawi are outlined below in more detail.

2.3.2 Technology transfer extension system

This system involved a linear concept of technology transfer from research to extension and then to the farmer to implement the practice. It was based on the following assumptions: technology and information were available which in most cases were not used by rural people and if the right knowledge was communicated and followed, then people would experience improvement in their livelihoods and thereby increase production (Axinn, 1988). The assumption was that if farmers increased their production, both their families and their nation would be better off (ibid.). It was further assumed that increase in people's production and proper management of the natural resources would improve both the community and the entire nation. The basic premise of this approach was that the people within the government ministries had superior scientific knowledge and that they knew better than the rural farmers or rural people.

New knowledge was developed through research institutions and then taken to the extension workers who in turn extended the knowledge to farmers or groups of rural communities. The transfer of technology approach was enforced during the Green Revolution period to increase food production with some specific newly introduced crop varieties. The approach follows a general extension system which is the most common approach practised by government departments and organisations responsible for extending messages to farmers or rural people.

The technology transfer approach was also dominant in natural resources management programmes where government aimed to control natural resources formerly managed by rural communities through local leaders, effectively taking their authority away. In the fisheries sector the approach was used up to the late 1980s, where extension officers went out to fishing communities with the regulations formulated through scientific research for fishers to follow. Management policies for the government e.g. the Fisheries Department were influenced by the principles of the conservation paradigm i.e. the centralised biologically led approach (see Section 1.2.5). Extension officers acted as enforcement officers with messages, for example in the Fisheries Department, about fisheries regulations. At times they were involved in checking illegal fishing nets and illegal fishing practices rather than providing advisory services to fishers on sustainable fisheries management. These resulted in a loss of trust by the fishing community and on many occasions this brought about conflict between local extension workers and the fishing communities (see Section 1.2.3.2).

2.3.3 Training and visit extension approach

This approach was used in many developing countries from 1970s to 1990s with recommendation from the World Bank. It was used to speed up dissemination of the Green Revolution techniques to farmers and also to strengthen extension management systems (Benor & Harrison, 1977; Benor, Harrison, & Baxter, 1984; Benor & Baxter, 1984). The assumption of this approach was that the extension personnel were poorly trained, did not visit farmers often, and that supervision and management was not adequate. The 'Training and Visit' approach therefore had a fixed schedule involving the training of village extension workers by subject matter specialists and a specific fixed schedule of visits by the village extension worker to farmers. The approach was aimed at improving contacts between the extension staff and farmers and also improving content knowledge of the extension workers through frequent in-service training programmes.

In Malawi the Training and Visit approach in extension services was introduced in 1981 but it was called something different. In the Ministry of Agriculture and Food Security the system was known as the 'Block Extension System'[7] where an extension worker was advised to sub-divide each working area into eight sub-sections known as blocks (Masangano & Mthinda, 2012). Each block had a 'block-centre' where all the extension activities took place and each extension worker was supposed to visit farmers in each of the blocks at least once every fortnight (ibid.). Effective implementation of Training and Visit approach/block extension system required enough staff and resources to ensure farmers in all the blocks were visited and trained. The approach became very expensive and most of the extension workers did not reach their targeted training programme (ibid.).

In the fisheries sector, for example, a similar arrangement to the training and visit approach was applied where the extension worker was required to conduct Beach Village Committee (BVC) training programmes following a specific programme with topics provided in an extension manual from the district fisheries office. These training programmes were conduct in different BVC sites. Sometimes the extension worker would bring a number of BVCs together to an inter-BVC training session. As with the observations made in agriculture extension, effective implementation required considerable human and financial resources, skilled and knowledgeable extension workers with principles of extension training and also the use of a training guide provided by the extension agents. Extension workers were sent to workshops to be trained on the use of the training manual. The assumption was that after receiving the training, they would be able to train BVC members and fishing communities.

[7] Block extension system refers to an area which was sub-divided in a designated area for an agricultural extension agent and used for all the extension activities. The sub-division of the area was introduced for effective implementation of agricultural extension activities.

Area supervisors, who were specialists in co-management, monitored the training courses and gave support to the local extension workers.

At the end of every month extension workers were required to submit progress reports on the number of training activities conducted, the number of people trained and the topics covered in the training. Most of the extension workers were not able to conduct the planned training programmes because of lack of resources like fuel, and also due to the large number of BVCs (in some areas one extension worker would have more than 10 BVCs to train in one month). Most of the extension workers had limited scientific knowledge and it became difficult to convey the 'right' messages to the rural communities on specific aspects e.g. fisheries co-management and / or explanations of why some of the regulations were developed.

2.3.4 Research extension approach

This approach was not very different from the technology transfer approach. Most of the research programmes which were organised within this approach were based on the Research-Design-Disseminate-Assimilate (RDDA) approach where all the sources of knowledge came from the research institutions. Extension agents were vehicles of innovations and farmers or rural communities were recipients of technologies. The key assumption of the RDDA approach was that scientists did the research and design, extension workers disseminated and farmers consumed (Leeuwis & Van den Ban, 2004). In the Malawi fisheries, strategically positioned research stations were established and equipped with scientists and equipment to develop technologies that would improve production in specific areas. These would be packaged for extension officers to take to the farmers or rural people to assimilate.

This approach was the most dominant during the time when a centralised management system of fisheries resources was used (see Section 1.2.3.2). Research stations were located in some parts of the country (Nkhata Bay in the north, Monkey Bay and Makhanga in the south) and fisheries scientists were deployed to run different research programmes for policy recommendations. The recommendations were then used for policy guidance including the development of fisheries regulations (see Section 1.2.5). The scientific research programmes were basically conducted by scientists and fishing communities hardly contributed. While these research programmes were important for the management of the fisheries resources, most of them had a purely scientific focus and did not respond to the needs of the fishing communities. In most of the research programmes, researchers never involved fishing communities even when the research activities were taking place in their areas and because of this, very little was known by the fishing communities.

2.3.5 Participatory extension approaches

With the multi-party system of government in 1994 came several freedoms: freedom of choice, freedom of speech and freedom of association. Participatory extension approaches were introduced in most of the countries following these democratisation processes. The assumption in participatory extension was that rural people have wisdom regarding production of food and other resources but their level of production could be improved by learning more of what is known outside (Swanson & Rajalahti, 2010). The other assumption was that there is an indigenous knowledge system which is different from the scientific knowledge system and that there is a lot to learn through interaction of the two knowledge systems (ibid.). By offering decentralisation services it was assumed that decision making would take place close to the farmer's level and thereby increase chances for farmers to participate in both decisions making processes and accessing of services. It was therefore assumed that the above would facilitate demand driven services which was relevant to the farmers. Funtowez and Revelz (1993) argued that scientists need to engage in what they term 'post-normal science', or research that is embedded in interaction with relevant stakeholders. The argument is that it is important that we understand systems of communities and that we begin to think (again) in terms of relationships and connections (Wals, et al., 2009).

The coming of democracy in Malawi in 1994 also created an open society in which people started to be proactive in demanding services from the public sector (Masangano & Mthinda, 2012). It facilitated the need to introduce an extension system that was based on democratic principles and practice, one which was close to the people and which could more effectively respond to their needs. The changing socio-economic environment over the past decade (see Section 1.6), necessitated a radical change in the provision of extension services to farm households from top-down to bottom-up approaches in the early 1990s. A new extension policy was introduced in Malawi which was aimed at addressing farmers' demands and farmers' access to high quality extension.

The purpose of the participatory extension approach in this regard was to increase production and enhance people's quality of life. It aimed at increasing the relevance of extension messages to rural people through their involvement, enhance learning through purposeful participation and group pressure, secure appropriate recommendations from research through feedback from rural people to researchers and increase efficiency and effectiveness in extension service (Masangano & Mthinda, 2012).

Participatory extension approaches facilitated the introduction of decentralisation policy through the act of parliament in 2000 and this resulted in decentralisation of government functions to district assemblies (see Section 1.4). The process facilitated a shift from centralised to participatory extension services. Following the changes that were taking place,

the fisheries sector changed its approach through an act of parliament from centralised type of management to Participatory Fisheries Management (PFM) (GoM, 2000). Decentralisation of fisheries extension services allowed for decision making at the lowest level and this provided an opportunity to bring extension services closer to the fishing communities who started taking part in fisheries resources management decision making processes. It was through this that fishing communities had the opportunity to participate in the planning and implementation of the fisheries co-management programme.

2.3.6 Co-management and how it shapes implications for learning in extension service context

According to Hara and Nielsen (2003, p95), co-management needs to be a mutual adaptation that tries to establish a convergence between government policies and the local institution structures, a partnership in which government agencies, local communities and resource users, NGOs and other stakeholders, share, as appropriate to each context, the authority and responsibility for the management of a specific territory or a set of resources (see also Section 1.5.4). Co- management means that some or all management responsibilities are formally shared between government management agencies and user-organisations as well as other stakeholder groups, such as the scientific community (Jentoft, 1989). Nielson et al. (2004) defined co-management as a dynamic partnership using the capabilities and interests of user-groups complemented by the ability of the fisheries administration to provide enabling registration and administrative assistance. Hersoug, Jentoft and Degnbol (2004) noted that co-management takes into consideration that a fishery cannot easily be run by an external authority such as political assembly, but must permit those who are directly concerned and who control the inputs that the management process relies on, to assume responsibility. Co-management promotes interactions as those involved in the process continuously meet as a community of practice to decide on the practices.

Co-management strongly advocates a more bottom-up deliberative approach; it recognises that most of the management and development ideas should originate from the communities themselves (Sen & Nielsen, 1996). The introduction of co-management reform in Malawi was a response to the community participation concept which was promoted in many parts due to the introduction of democracy. This facilitated the decentralisation reform in the fisheries sector, a process that has also consolidated democracy (see Section 1.4). This shifts emphasis from being either government based or community based to a co-management system which provides opportunity for stakeholders to come together; it also seeks to create a sense of ownership as people participate in the process of planning and decision making on how to effectively manage their resources. However, it requires continued dialogue, learning and understanding between the two co-managing partners (Donda, Hara, & Njaya, 1999) to be able to benefit from each other's contributions. Donda (2000) noted that fisheries co-management in Malawi is aimed at

promoting local stakeholders' involvement in decision making over the management of the fisheries resources to alleviate poverty and improve rural livelihoods. Participatory Fisheries Management is a cycle of working in partnership, planning and implementation of monitoring and learning to continuously improve practice and provision of services to improve the well-being of people and the fisheries resources (GoM, 2005). A co-management arrangement in the fisheries sector has a number of assumptions:

1. Co-management is supposed to increase efficiency of fisheries management as compliance and self-regulation are supposed to be better in bottom-up than top-down management systems (Jentoft, 1989).
2. Co-management involves resource users as managers in different areas e.g. BVCs, placing them in a position where they were held accountable for management outcomes which they participated in creating (Dobson & Russell, 2008.
3. By incorporating users in the decision making process as co-authors co-responsible for design, implementation and enforcement, fishing communities are expected to acquire a sense of ownership of rules and regulations (Hersoug, et al., 2004).

The literature shows that in co-management, there is potential to facilitate learning among fishing communities through sharing of experience-based expertise. There are more interactions between resource users and extension officers at different levels and it is assumed that the process encourages the sharing of knowledge, skills and experiences. However, what has been observed through literature (Engeström, 2001) is that the interaction which occurs among stakeholders also becomes a source of contradictions which can paradoxically constrain effective management of the fisheries resources.

In co-management, the extent to which the government is willing to share its management powers and a framework for considering responsibilities with the resource users provides a continuum of co-management arrangements from those in which communities were merely involved, for example, involving some local participation, to those in which local communities hold all the management power and responsibility (Berkes, George, & Preston, 1991; McCay, 1993; Sen & Nielsen, 1996). Figure 2.1 below provides a graphical presentation of the possible co-management arrangements spectrum.

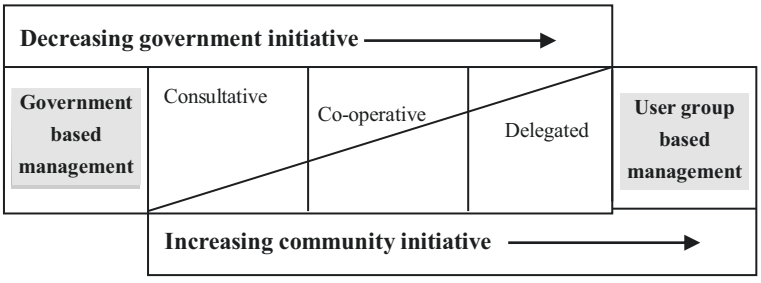


Figure 2.1: A possible co-management arrangements spectrum (Source: Sen & Nielsen 1996; McCay, 1993)

The spectrum shows three scenarios in a co-management system with one extreme with government fully responsible for the management of a resource. In the middle there are three levels where resource users and government join hands to co-manage the resources through consultation, cooperation and delegation at different levels of engagement and interaction. The other extreme is user group-based management where the user communities develop their own management objectives and strategies and implement them with minimal government intervention. Co-management involves power sharing in the process of managing the defined resource. It promotes the notion of shared authority, shared responsibility, stakeholder ownership of the fisheries resources and direct benefit to all those involved. It is therefore evident that the co-management in the above spectrum mainly takes place in the three middle levels of consultative, cooperative and delegation since the three involve sharing of responsibilities at different levels (Sen & Neilson, 1996). The learning interaction potentially increases as the two sides continue dialoguing in an effort to find solutions to the existing challenges, in this case the decline of fish stocks in Lake Malombe and the south-east arm of Lake Malawi. As discussed earlier, declining fish stocks prompted the government to introduce co-management and the approach was aimed at facilitating the recovery of the fisheries (see Section 1.5.4). In the co-management system fishing communities and the government collaborate and form a network where they share skills, knowledge, experiences, and challenges, and the existence of the network allows them to explore appropriate solutions. It is therefore assumed that the process provides an opportunity to change to better management practices.

The bottom-up approach in co-management assumes that the views and contributions of the user communities should be taken into consideration and promotes ownership among resource users. However success in co-management does not come automatically. Pinkerton (1992) defined co-management as power sharing in the exercise of resource management between government agencies and a community organisation of stakeholders. What is important is that co-management systems remain flexible and are able to adapt to social and institutional circumstances which are unique to fisheries in the case of this study. In the process both sides should feel they are contributing to the success of the resource management and that views and ideas from those taking part are respected and taken into consideration. In one of the newly developed co-management systems in the marine lobster fishery, Acheson (2003) observed:

> Bottom up approaches are successful largely because people support them so that the enforcement costs are lowered. When people devise their own rules, they will formulate ones they consider sensible, effective, and low-cost. They will also frame rules that embody local knowledge, that are designed to be adapted to local conditions, and that avoid conflicting with basic norms. They are far more likely to obey such rules than those imposed by outside authorities, which, all too often, are framed in ways that impose high economic costs on users, promote conflict, and are seen as effective in helping to maintain the resource. (p. 231).

Co-management arrangements differ from one context to the other; in other words there is no blueprint formula. Co-management raises questions as to who the relevant user-groups and stakeholders are and exactly how they should be represented. The second concern pertains to scale: at which level should co-management be instituted – at local, regional and/or state level? A third key question is what should be the underlying property rights regime: state, private or communal property? A fourth issue concerns the management function: should it be retained by the state and or handled by user organisations (Pomeroy & Berkes, 1997). The questions raised by Pomeroy and Berkes focus on issues of transparency and accountability among co-management stakeholders. This has been one of the big challenges faced by the co-management programme in Malawi (south-east arm of Lake Malawi and Lake Malombe). Co-management is a recent phenomenon, newly installed as a response to a resource crisis, as in the case of Beach Village Committees on the lakes of Malawi (Donda, 2001). Jentoft (2004) argued that a government that does not provide communities with a role and function in fisheries management misses the opportunity to enhance community viability and to make management systems work more proficiently. Resource rights vested in communities are among the tools at hand for creating qualities crucial for sustaining the resource and avoiding community failure. The continuous interactions between the fisheries co-management stakeholders as they seek ways to improve the crisis at hand provide good resource management opportunities. Etzioni (1988) presented the view from a sociological perspective, that it is the relations that people have, the networks they build, the interactions that occur between them, the history they share and the identity and the meaning they attribute to it all – this makes the communities what they are. Members of the community – which may or may not, as the case may be, be place-based – do not view each other as strangers: their social relations are multifaceted and extend beyond the moment (ibid.). People that form a true community have a feeling of 'togetherness', of belonging to a 'we'. Meaningful participation requires better understanding of all the stakeholders involved in the process since their participation is based on trust and understanding of the subject involved. Ramaru, Mamabolo and Lekgolo (2000) provided insight into how this can be done by describing five progressive stages of participatory approaches to extension, as shown in the table that follows.

Table 2.1: Five stages of the participatory extension approach (Ramaru, Mamabolo, & Lekgolo, 2000)

	Approach to the progressive stage	Process informing the extension approach
1	Social mobilisation	1. Entering a community and building trust with the community members 2. Identification of local organisations working with the communities 3. Awareness raising on the subject matter 4. Feedback to the community
2	Action planning	1. Prioritise needs and problems with the community members 2. Search for solutions together with the community members 3. Mandate local institutions 4. Action planning together with the local communities
3	Experimentation	1. Trying out new ideas with all the concerned people
4	Sharing experience	2. Joint evaluation at midsession 3. Review and monitor progress
5	Self- evaluation	4. Joint planning for the next cycle

As already stated, the concept of co-management revolves around the idea of shared roles and responsibilities between the government authority and community institutions (Sen & Nielsen, 1996). One of the assumptions in co-management is that management with active fishing community involvement is expected to result in strong legitimacy of the regulations and management rules, especially when these are formulated by, or in consultation with the user communities (Jentoft & Kristofferson, 1998; Pomeroy, 1995; Sen & Nielsen, 1996) (see Section 1.5.4). However, the co-management approach to natural resources management programmes has recently received criticism, following evidences of recurrence of issues such as "elite capture" (Abraham & Platteau, 2000; Crook & Sverrisson, 2001; Béné & Neiland, 2006) whereby particular individuals or groups (usually among the elites and/or privileged) hijack the reform to their own interests. This is evident in some BVCs in Lake Malombe and the south-east arm of Lake Malawi where some local chiefs have disbanded BVCs which were democratically elected and instituted their own management regimes because of power conflicts between the traditional leaders and BVC members.

In the field of natural resources management, social learning has been defined as collective action and reflection that takes place among both individuals and groups when they work to improve the management of the interrelationships between social and ecological systems (Keen et al., 2005). The current participatory extension models do not provide in-depth insights into the role and significance of learning and *how* communities learn to respond to, and adapt to fish depletion as most provide only broad process descriptions as in the case of the Ramaru et al. framework outlined in Table 2 above. The assumption is still that extension workers know and that the communities have to learn to know, which can be process reduced to a technology transfer approach, using the concept of participation to educate communities about risks in declining fish catches and how to adapt and respond.

Both these sections (Section 2.2 and 2.3) point in the same direction, namely towards more collaborative social learning approaches in the conservation and extension context, especially for supporting adaptive co-management practices.

The introduction of co-management approaches as described in this section, show that there is a strong emphasis on collaborative approaches to learning and engagement. However, there is a need to probe what this means in more detail. In the next section I focus on what is being said about these latter approaches to learning in adaptive co-management contexts. In particular, I draw from the international literature on extension, social learning and co-management, a set of what seem to be key principles for guiding collaborative social learning practices in the context of co-management and extension.

2.4 Key principles of collaborative social learning in adaptive co-management and extension service contexts

In this section, I review recent literature that is more focussed on collaborative social learning in adaptive co-management and extension service contexts. As noted in the discussion on trends above in Sections 2.2 and 2.3, this focus forms part of recent trends, hence I draw mainly on literature published in the past 15 years. I seek to 'draw out' of the international literature on extension, social learning and co-management a set of what appear to me to reflect **key principles for guiding collaborative social learning practices** in the context of co-management and extension. These, as mapped out through my literature review work, include:

1. Dealing with sustainability issues creates certain new learning challenges.
2. Participatory approaches gain significance, and include the recognition of local knowledge.
3. There is a stronger practice-centred and action-oriented approach to extension and associated learning interventions.

4. The concept of social innovation is more strongly foregrounded.
5. Collective learning and problem solving are key concepts shaping learning and learning interaction in extension work.
6. The knowledge that is dealt with is systems based, and involves social-ecological and socio-cultural dynamics, making for a complex knowledge context.
7. The role of the extension agent is a co-learning role.

I now discuss these principles, sharing perspectives from the literature on each.

2.4.1 Dealing with sustainability issues creates certain new learning challenges

Sustainability issues are widely recognised as being complex, often contested, and difficult to resolve. This is because sustainability issues bring together a range of dynamics, which include the social, economic and the ecological, and these are often in tension. This has an effect on the learning process, as will be outlined in the section below. One of the earlier papers on how sustainability issues influence learning is by O'Donoghue (1993) in which he reported that environmental issues need to be treated holistically in educational work, and should involve the social, political, economic and biophysical aspects of a particular issue or concern. This work was very influential in environmental education, but it also raised the issue of complexity as it is not easy to address all these issues at the same time. However, O'Donoghue and followers of this work in southern Africa continued to point to the importance of the relationship between these elements.

However, it is not only the tensions between environment, economy, ecology and politics that create new learning challenges. It is also the approaches to natural resources management and how they have changed in response to sustainability challenges that also influence learning. As already stated in Sections 2.2 and 2.3.6 above, more recent discourses shaping natural resources management are adaptive management, co-management and adaptive co-management (Berkes, 2009). Of interest is that these approaches emphasise attainment of sustainability from a social-ecological systems perspective, and from a perspective of complexity, which tends to lead to an emphasis on co-learning as this is seen as one of the ways of responding to complexity, and for building resilience. This recognises a *process approach* to sustainability, which cannot be attained without giving attention to learning processes (Hollings, 1986; Lee, 1993; Gunderson, et al., 1995). The table that follows illustrates the changing roles of learning (and how learning is viewed) from a top-down approach to co-management as potentially applied to fisheries management co-management.

Table 2.2: The changing role of learning in fisheries resource management (Adapted from Cundill and Rodela, 2012, p. 15)

	Learning by	Learning about	Learning through
Command and control approach to fisheries management	Fisheries extension and research officers	Fisheries conservation under high levels of certainty	Set instructions and regulations on how fisheries resources should be managed
Adaptive fisheries management	Policy formulation from the Department of Fisheries through scientific research	Fisheries conservation management, science based management	Experimentation through various research work on the available fish stocks
Fisheries co-management	Everyone who has a stake in the fisheries resource can contribute to the management of the resources	Working together, sharing ideas, skills and experiences.	Deliberation, exposure of values, knowledge sharing, knowledge creations through social learning process and practice in fisheries co-management context

Giving attention to the political dynamics of co-learning also appears to be an important concern in sustainability related learning processes. Literature related to the United Nations Decade of Education for Sustainable Development (UNDESD) has focussed more on the social, economic and environmental aspects, neglecting the political aspects (UNESCO, 2005) of the learning process. However, as noted above in Section 2.4.1 and in Chapter 1, co-management is often characterised by conflict situations, which indicates that the learning processes should not ignore or leave out political dynamics, as was also recommended by the O'Donoghue model of 1993. It is interesting to note therefore that the processes of learning outlined above in Table 3 (adapted from Cundill and Rodela, 2012) do not necessary emphasise this dimension, although it could be implied.

Focussing on the concept of sustainability brings the complexity and also the political / inter-related nature of the issues that have to be dealt with in fisheries co-management learning processes, further to the fore. Sustainability has been an on-going topic in the extension literature, particularly during the past ten years. For example, in 1997, Garforth and Lawrence published a paper in which they noted that sustainability issues/agenda call for

local participatory planning and willingness by extension agents to learn from rural people or farmers' experiences, knowledge and technology. Garforth (1993) and Smith (1994) noted in their papers that sustainability issues are often contested, and therefore that extension agents need conflict management skills, and capacities to engage with contestation. Stone and Coppernoll (2004) reflected a similar finding in their paper focussing on sustainability and extension work in Ghana where organisations managing training programmes and field staff come together to identify specific skills and knowledge required for the extension workers to work effectively with complex, often contested, sustainability issues in natural resource management contexts.

Some of the more recent Education for Sustainable Development literature also provides insights into how sustainability concerns shape learning processes. In 2007 Wals published a book *Social Learning: Reflexively learning towards Sustainability* with a number of papers that report on extension, learning and sustainability. The paper by Glasser (2007), while not reporting directly on sustainability and extension services, raised the issue of the gap that exists between rhetoric and action in sustainability learning contexts. Of interest to this research is the point made by Wals in the title of the book, that sustainability requires a form of reflexive learning, meaning that learning is related to the process of negotiation with different interests and that the creative tensions between consensus and dissent can trigger learning among interest groups or within systems.

More recently, Mukute (2010) also reported on the relationship between sustainability issues and learning in his work on agricultural extension. He suggested that the economic, societal and environmental dimensions of sustainability are in tension, and are hard to reconcile at a local level, especially amongst rural poor communities, where economic concerns are most critical as people struggle to survive and feed their families. He, however, suggests that extension agents should develop tools to work with rural communities to discuss the relationship between these issues that are in tension, so that they can make informed choices as it is not tenable to let community resources (e.g. fish stocks) deplete in the name of economic activity, when the depletion of the resources will (perhaps later on) create greater economic crises for people (as is being shown by the loss of the Chambo fish in Lake Malawi today).

Sustainability learning also draws attention to inter-generational learning, as discussed by Pesanayi (2009) in his exploration of learning interactions in rural farming communities of practice in Manicaland in Zimbabwe; he noted that learning processes were oriented towards capabilities for risk negotiation in everyday basis involving inter-generational knowledge sharing e.g. local farmers sharing drought resistant seeds. Belay (2012) also found that sustainability learning requires inter-generational interactions, a process that he supported via

participatory mapping involving a wide range of community members who used the mapping process to make decisions on how to better plan their land-use and manage their natural resources.

Sustainability issues, when interpreted from a situational perspective, also have implications for learning. Researchers working at the University of Wageningen (Wals, 2007) noted that sustainability in natural resources management contexts is highly contextual, as the natural resource-base differs in different contexts, biomes etc. This has specific challenges for extension agents as they need to have relevant knowledge of the biomes, and the particular sustainability challenges in a specific context. For example, extension agents working with fishers in Lake Malawi must have good knowledge of the fish, and their habitats, ecosystem needs and so on; they must also be good at facilitating learning in particular extension service contexts with their particular sustainability contexts and natural resource / social-ecological systems. This has implications for the content and the type of content that is included in extension training programmes.

Wallace (1999), in discussing extension in the environment and sustainable agriculture, argued that there are clear links between the levels of participation, the educational innovativeness of the learning process, and access to relevant content of issues on environment and sustainability. He therefore suggested a balance between content, pedagogy and application. His work also highlights the importance of the relation between learning and participatory processes in sustainability oriented education (as outlined in Table 3 above), but also innovative processes of learning and *how* these occur, *as well as* relevant content related to sustainability issues. He further explained that training needs are supposed to facilitate learning over a long period of time.

Tilbury and Cook (2005) noted that sustainability is essentially an on-going social learning process that actively involves stakeholders in creating their vision, acting and reviewing changes. Fisheries are renewable resources that involve different stakeholders that require proper management to allow for the sustainability of the fisheries in such a manner that they will remain available for future generations. The 'on-going social learning process' question that Tilbury & Cook (2005) referred to in the context of this study, is *how can stakeholders work together to create their vision, act together, and make changes so that fisheries resources can be managed more sustainably for present and future generations, especially since these resources play such an important role in sustaining the daily lives of people?* (as described in Chapter 1)

As can be seen from the literature review work above, there has been a growing level of engagement with the issue of sustainability and what it means for learning in extension services contexts. There has been a deepening of understanding that sustainability issues are

complex, that there is tension between the different dynamics of sustainability (economics, social and environmental and political aspects). There has also been a growing understanding that sustainability requires social-ecological systems thinking, and engagement in open social learning processes in which stakeholders must work together to formulate visions, learn to act together, and 'work out' how to manage their resources (e.g. fisheries renewable resources) more sustainably for present and future generations. This, as is shown in the Malawi case, is made more difficult when there is a lack of alternatives, and when there is high pressure on the resources for current livelihoods provisioning.

2.4.2 Participatory approaches gain significance, and include the recognition of local knowledge

Another key feature in much of the recent literature on extension training and learning through extension processes and in co-management contexts is the emphasis on participation, as is also highlighted in the discussion above. An important facet of participation discourse is the associated relationship that exists between participation and the mobilisation and use of local knowledge (also named indigenous knowledge or traditional ecological knowledge in some cases). In a paper by Garforth and Jones (1997) on the history, development and future of agriculture, they argued that participatory approaches are innovative and that they bring fundamental change in the respective roles of extension agents and clients. They also argued that extension agents are no longer seen as experts who have all the useful information and technical solutions; the clients own knowledge and ingenuity and individually and collectively are recognised as a major resource; and solutions to local problems are to be developed in partnership between agents and clients.

Wallace in his papers (1997, 1999) argued that there is need for a more integrated approach to the whole business of training rather than the straightforward delivery of lessons on series of subjects or topics. According to Wallace (1999), training involves partnerships with learners and other stakeholders to be more responsive to changing situations and needs. This in turn requires openness amongst training providers, leading to the creation of learning organisations.

Commenting on participatory curriculum development, Taylor (1999) argued that dialogue and interaction are needed to reach an understanding of stakeholders' various interests. Alluding to the observation by Jones and Garforth above, Haug (2007) noted that knowledge and information are powerful tools in the process of change and that the strength of human capital and the production of inter-related knowledge frameworks for action to promote sustainable agriculture and food security for the poor are needed. Such knowledge frameworks should take account of local and / or indigenous knowledge systems, and how they relate to other (scientific knowledge systems). The arguments by Taylor and Haug both

emphasise curricula that are open, and that accommodate deliberation by all the stakeholders concerned, as well as recognition of local or indigenous knowledge.

Pretty & Chambers (1994) noted in their paper that participatory approaches and methods support local innovation and adaptation, so are more likely to generate sustainable processes and practices, and that support for participatory methods for curriculum development give innovators the freedom to act and share. The term participation has over the years been used broadly by different people. It may mean taking part, contributing to, giving an input to, getting involved, partaking amongst other meanings. In the process of investigating the learning that takes place among fisheries stakeholders, a participatory approach with all the concerned parties in an attempt to answer some of the critical questions in relation to the inter-connectedness/linkages of the interacting actors is crucial, especially in co-management learning contexts, as outlined in Table 3 above.

In a paper on training for extension in environment and sustainable agriculture, Wallace (1999) expressed a need to develop a wider understanding of the context within which training is taking place and the process in which it is planned, implemented and evaluated. He expressed the importance of having training needs as a means of facilitating learning over a longer period taking a holistic view of the curriculum process. Making reference to other extension training curricula, Wallace (1999) argued that one of the challenges experienced in most of the curricula in South East-Asia, for example, was curriculum documents which were essentially a menu or checklist of topics to be taught in a prescriptive manner. He argued that this is a very restrictive approach to extension training curriculum because in most cases the curricula are non-existent and in cases where they do exist, people do not use them; as such an approach to extension curriculum development fails to take participatory approaches and engagement with local knowledge into account.

Even where participatory approaches are used, these are not without their problems. There is an expanding body of literature reporting on how participatory approaches in natural resources management and community-based environmental education and training programmes often ironically and paradoxically assume a deficit model of community learning and change (i.e. that the extension worker/development agent knows, and that communities have to learn to know) despite the fact that they use participatory approaches. Cleaver (1999) argued that if the purpose of participation is to create an agreement over the wider group and avoid disagreement then individual agency will be side-lined for the sake of the group. Another observation by Price (2007) was that participation may also lead to maintenance of existing power structures and relations especially in situations where the process is dominated by those who maintain an interest in existing power structures. Lotz-Sisitka and O'Donoghue (2008) also raised questions about participation, where they pointed out that there are submerged paradoxes in the participation concept in that participation can

become ‘choreographed’ by outsiders or within a particular community. The paradox lies in that participation in such a framework is reduced to another form of knowledge transfer using technologies of participation to ‘more effectively’ transfer knowledge to ‘educate’ communities about risk, and how to adapt and respond to risk. These are often characterised more by a politics of participation (e.g. involvement of communities at the level or representation) but ironically often fail to ensure deep level or more reflexive forms of participation and learning (Lotz-Sisitka, 2013. This transfer approach to knowledge and learning fails to adequately engage community knowledge and agency (see Section 1.2.5). In participatory learning, the communication and relationship ideally needs to be more horizontal where each partner knows something and where each partner can contribute to the creation of new knowledge and to learning (Mvumi & Mukute, 2006, p. 49).

In contrast to Mvumi and Mukute’s observations above, the conventional approach to training and management knowledge was also evident at the Fisheries College where I worked for 11 years. Despite a new orientation to participatory extension, the curriculum was product-centred, developed by a consultant with no consultations with user communities and the lecturers (Kachilonda, 2005). An in-depth analysis of the curriculum showed that the implementation of the extension training curriculum did not have a deep understanding of participation and co-management. This led to a lack of competent and well trained extension officers who, after graduating, were expected to be able to work effectively with fishing communities whose practical knowledge was quite advanced. Real participation means a lot in social learning and goes beyond politics of participation; it requires full understanding of being reflexive and being able to share knowledge and learn from one another (Wals, 2007).

The literature review above indicates the need for and efforts to establish participatory approaches in training and extension. The growing use of the approach clearly indicates that through participatory approaches there is potential for knowledge creation that may influence change in practices. However, there is a need to create relevant knowledge, knowledge that benefits rural people and at the same time knowledge that enhances sustainability among all those involved. This calls for a wider framework for knowledge and knowledge co-production in participatory learning processes that recognises the knowledge of fishers and local communities, while also recognising and working with knowledge that is more often found in colleges and training institutions. It also requires participatory approaches that go beyond a politics of representation, and include instead a politics of reflexive engagement and interaction, learning and change.

2.4.3 Stronger practice-centred and action-oriented approach to extension and associated learning interventions

Another feature of the extension and co-management learning literature is a stronger emphasis on practices, or a practice-centred action-oriented approach to extension and associated learning interventions. For example, Halls (1993), writing on efficiency of land and energy extension programmes, argued that learning occurs when individuals assimilate new information or draw on previous experiences and apply this to their actions. When people interact with each other, they adapt relationships to each other based on the type of interaction and experiences in that particular environment. The process allows them to evaluate the new information with some reflection of their previous experiences and then act based on the nature of the experience shared (ibid.).

The practice-centred action-oriented emphasis appears in the literature in discussions on curriculum relevance and curriculum design, as can be seen in the work of Wallace, Mulhall and Taylor (1996) who suggested that many agricultural and education curricula in the sub-Saharan Africa are unresponsive to socio-economic and technological changes in the rural sector and that they are inappropriate for the local context. They relate this to a lack of systemic training needs analysis and see this as one of the concerns and that often lead to the adoption of delivery modes and mechanisms that fail to suit the reality of the situation of the people working in the rural areas. This point to the need for a deeper understanding of local level practices, actions and concerns for informing extension training and learning processes. Commenting on curriculum challenges in agricultural institutions, Taylor (1999) noted that the greatest challenge facing agriculture training institutions was that the curricula are rigid and inflexible, not only in structure and content but in the way they are developed. One of the recommendations is to have a curriculum as a dynamic instrument that reflects the educational objectives and the educational experiences that can be provided to achieve them. On-going and more reflexive approaches to curriculum reform are seen as an option where observations of practices and actions 'on the ground' are made as the society itself develops, involving processes through which these are considered for inclusion into curricula. Here curriculum development is seen as an important aspect of rural development in which there is a need also to reflect changing perspectives on the nature of sustainable production and associated practices.

Learning is a human process that continuously happens as we meet and discover new things; it does not begin and end at a specific time and there is often a situation in which people have gained knowledge and understanding from experiences outside of school or other formal learning contexts, where simple conversation and storytelling with friends and family members have provided insights and learning opportunities (Wenger, 1998; Elliot, 1999; Field, 2003).

There are also suggestions in the literature on how to focus more substantively on practice-centred action-oriented approaches. Wals et al. (2010), in a paper on transformative learning in a complex and uncertain world, argued that action learning, workshop-based learning, and hands-on, experiential learning all refer to learning that supports the creation of meaningful synthesis between theory and practice and the relevant disciplines. Emphasising the importance of reorienting curricula, Wals said re-thinking curriculum means discussing the changes in teaching, learning and instruction that are needed to better link the academic world to today's global and local realities. Wals emphasised that in order to overcome the growing mismatch between the requirements of the curriculum and the realities of life, it is necessary to develop new epistemological, ontological and methodological tools in order to give a more coherent view of life.

The literature reviewed above shows the importance of practice-centred and action-oriented approaches to extension and learning and how these have been emphasised over the years. It is noted that people's interactions create new knowledge and changes in practice. However, a number of the papers reviewed show that most of the curricula in agriculture extension and training, mostly in the sub-Saharan region, are unresponsive to the socio-ecological technological changes that are important for sustainability processes. Among some of the issues raised in the literature are a lack of systemic and regular training needs analyses and also the presence of rigid curricula in most of the institutions that may require curricula reforms. It has been emphasised in the literature that there is need for collective effort and commitment to the process of mutual learning where people in extension and training agree that no-one has the answer to a particular problem, as a way of enhancing practice-centred and action-oriented approaches in extension and training.

2.4.4 The concept of social innovation is more strongly foregrounded

In addition to the focus on sustainability dynamics, participation and local knowledge, practices and action-oriented learning, is also a focus on social innovation, which appears to be more strongly foregrounded in the extension, social learning and co-management literature. A 1999 paper on participatory curriculum development for agricultural education and training by Taylor noted that in educational terms, change may come about in people's knowledge, understanding, skills, attitudes and behaviour and that change should result in a person having an increased capacity to make decisions and to choose, implement and evaluate strategies effectively utilising their available resources. Taylor's point is echoed in Haug 2007 on a successful experience in Zimbabwe where learning by experimenting instead of through being taught foreign knowledge showed that it is possible and important to regard people's knowledge and experience in agricultural innovation. Their study showed that there was no contradiction between applying both local knowledge and conventional agriculture research results in efforts towards achieving sustainable agriculture and food security for all.

Wals and Heymann's work (2004) not only draws attention to the importance of knowledge, skills, values and decision making for social innovation, but also to the issues of dissonance, challenge and uncertainty as a source for social innovation via learning processes. They noted that often when people are faced with challenges, conflicts and uncertainty, they tend to get together in an attempt to respond to and adapt to the circumstances. In the context of this study, this means that people's interactions on different fishing activities, including the crisis of declining fish catches, may have the potential to allow them to share different fishing practices that could respond to the challenges they are facing.

Taking another perspective, that of learning social innovations over time via apprenticeship approaches, Wenger (1998) is of the view that learning takes place through apprenticeship and that a community of practice is created over time by the sustained pursuit of a shared enterprise; as we pursue different enterprises we define and co-generate those enterprises together.

Social innovation is also seen to be associated with pluralism. A paper focussing on pluralism in systems approaches and institutional structures in extension and training by Christoplos and Nitoch (1996) emphasised that pluralism needs to be encouraged as this allows for greater innovation potential. They argued that this is because a broad variety of structures providing extension services are already in place in many rural development contexts, and that this allows for considering the comparative advantage of different structures and approaches for handling different technologies and creating dialogue with different groups of farmers, and amongst extension services themselves.

Co-management is a negotiated process that foregrounds principles of equity and seeks to enable active engagement of all players; the interactions and learning experienced by players should represent their common interest. People have different ways of describing the common purpose of fisheries management but it is generally accepted that there is the need for a sustainable fisheries resource for all people to be able to rely on. In addition to the need for a focus on negotiated situated aspects of co-learning.

Social learning in the literature is also related to institutional innovation. Fazey, Fazey, Fischer, Sherren, Warren, Noss, and Dovers (2007) argued that learning provides the basis for fostering the innovation necessary for positive transition in social-ecological systems and social learning in particular has been shown to facilitate *institutional innovation*. They suggested that in such learning processes, people's experiences motivate them to reflect on what their practices are and how these impact on the resource, and how their practices can potentially change. This is what people in the fishing communities who participated in the contextual profiling for this research refer to as a "remarkable benefit of co-management over the years" (T. A. Msosa,

personal communication, January 3, 2010; T. Ali, personal communication, January 4, 2010). It is also important to note that people can share any knowledge which could inter alia be practices or social innovations leading to better management or social innovations practices that are detrimental to the fishery, as they strive to address their problems. Social innovations may therefore not necessarily be oriented towards sustainability, but may be oriented towards other goals, e.g. food security.

Social innovation and learning are also related to deliberation. As noted in Table 3 co-management approaches to learning favour deliberation processes that promote social learning among concerned stakeholders as indicated by Lotz-Sisitka (2012, pp. 17;19)

> Social learning takes place through deliberative processes involving sustained interaction between individuals, and the sharing of knowledge and perspectives in a trusting environment. Social learning improves decision making by increasing awareness of human-environment interactions, and by building relationships and the problem-solving capacity of stakeholders.

Social learning involves reflexive participation in practices where stakeholders deliberate their practices and find solutions to existing disturbances.

In order to sustain the lives of fishing people, two things are fundamental: their natural resources must be conserved and their fishing communities must be secured (Hersong et al., 2004). Thus social innovation thinking is also guided by the concept of sustainability or sustainable development. Lotz-Sisitka (2008) defines sustainable development as practices that take full account of the economy environment-society nexus in development interventions and initiatives (e.g. production processes) and that are oriented towards ecological sustainability, social justice and a more benign economic system. The World Summit for Sustainable Development in Johannesburg in 2002 reasserted three pillars of sustainable development namely society, environment and economy (UNESCO, 2004; UNESCO, 2005). On the same UNESCO (2009) linked sustainable development to development of natural ecosystems in ways that maintain the carrying capacity of the Earth and respect for the non-human world; in this study fisheries resources can be seen as one of the fundamental aspects of sustainable development.

Social innovation is also seen more systemically, with learning being at the centre of enabling system innovation. According to Wals et al. (2009), sustainable development is a system innovation that requires an integrated redesigning of products, lifestyles, processes and structures. They continued to argue that it is about *doing better things and not doing things better*. Conway (1995) viewed sustainability as the ability of a system to maintain productivity in spite of major disturbances.

Chambers & Conway (1992) also saw social innovation from a resilience perspective, and argued that a livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets now and in the future, while not undermining the natural resource base. Understanding sustainability issues, for example, in government departments, organisations, communities and other business industries, is currently given priority (UNESCO, 2003, 2004) when looking at the importance of socio-ecological issues in developing societies. A deeper understanding of sustainability issues helps in the creation of a sustainable world that includes humanity which depends on socio-economic systems, coupled with principles, values, behaviours and lifestyles (Chambers & Conway, 1992). Sustainable development therefore involves processes of social innovation and change in a society that also seek to enable resilience of the social-ecological system. In an effort to coordinate learning the United Nations dedicated a decade (2005-2014) as a Decade of Education for Sustainable Development. At the start of the decade, the vision of Education for Sustainable Development was translated into four objectives (Lotz-Sisitka, Gumede, Olvitt, & Pesanayi, 2006, UNESCO, 2009): 1. Facilitate networking linkages, exchange and interactions among stakeholders in ESD; 2. Foster an increased quality of teaching in learning and education for SD; 3. Help countries make progress towards, and attain the MDGs through ESD effort; and 4. Provide countries with new opportunities to incorporate ESD into education reform efforts. The possibility exists that such change can be achieved through deliberation processes where stakeholders are able to develop innovations that can facilitate change of practices (Wals, et al., 2009). Fishing communities, like all communities faced with sustainability challenges, need to be able to explore sustainable innovations that will help them to adapt to the current crisis and challenges.

Social innovation and learning is also viewed from a sociological perspective, and here Etzioni (1988) emphasised that it is the relationships that people have, the networks they build, the interactions that occur between them, the history they share, and the identity and the meaning they attribute to it all, that makes the communities what they are. Success of social learning and social innovation depends a great deal on the collective goals and/or visions shared by those engaged in the process. Major problems cannot easily be solved with current ways of living and will require a shift from the traditional ways of thinking and acting upon environmental and social economic problems (Milbrath, 1989; Environment Canada, 2004; SustainUs, 2005; Eckersley, 1998; Doppelt, 2003; UNESCO, 2002, 2005). Collaborative learning with different stakeholders provides opportunity for all to take part in collective decision making processes and helps to solve problems collectively.

> The vision of a small, integrated community using locally evolved norms and rules to manage the resources sustainably and equitably is powerful. But because it views community as a unified, organic whole, this vision fails to attend to the differences within communities, and ignores how these differences affect resource management outcomes. (Agrawal & Gibson, 2001, p. 7)

Hara et al. (2007) argued that co-management as a form of institutional reform might take a long time to take root and that the goals or objectives and the time frame for achieving them must be clear to all the players. A co-management arrangement therefore needs to have stakeholders' views and sociological perspectives on how it should be implemented, especially those fishers who have been in the industry for a long time and have acquired skills and knowledge that can contribute to its management. It is important also to explore effective ways of expanding such learning to the rest of the stakeholders as an on-going expansive learning process.

Some also discuss social innovation and learning from an indicators perspective. In order for one to be assured of innovations that contribute to sustainability practices, Wals, et al. (2009) noted the following sustainability indicators: should be politically relevant, simple for people to understand, be valid and have a good representation of reality, important so that those who use it should find them relevant, informative, and reliable and action oriented. Intensive interaction with fisheries co-management stakeholders has the potential to build their confidence to become equal partners and be able to develop a shared understanding of sustainable fisheries practices and also to improve stakeholder relationships as they work as a group with similar objectives. In order to bring workable solutions to the social learning process, those involved would ideally be open to, and be ready to accept change.

Recent studies in the region have shown that a curriculum that takes a holistic approach has the potential to address the needs of the clients. In my earlier research (Kachilonda, 2005), I argued that a curriculum that considers the views, knowledge and skills of the local communities provides more learning opportunities and deals with real issues on the ground. A paper by Haug (2007) on International Agricultural Extension noted that there is myriad of opportunities for building upon people's knowledge, informal information systems, farmers' ability to conduct their own experiments. A paper written by Lotz-Sisitka (2011) on Teacher Professional Development with an Education for Sustainability focus on network curriculum framework emphasised the importance of quality curriculum which in most cases is influenced by different stakeholders working together rather than a fragmented approach in order to respond to challenges.

In the above review on the concept of social innovation, participation and learning in the literature, it seems that social innovation and change is often associated with people's knowledge, skills and attitudes and that this is related to increased capacity to make decisions in various aspects. The importance of recognising pluralism and a systems approach is also seen to be important in social innovation and social learning, as is the direction of the change towards sustainability / sustainable development. The literature reviewed above has also touched on the importance of bringing people from different backgrounds together to interact

and learn from each other. It further considers the involvement of others in extension and training curriculum development processes as being key to the social innovation and social learning.

2.4.5 Collective learning and problem solving are key concepts shaping learning and learning interaction in extension work

Highlighting the importance of collective learning and problem solving and interaction in extension work, a publication by FAO (1993) noted that the curriculum which is developed and reviewed with the participation of various groups and stakeholders from outside the organisation has the potential to improve relevance. This reflects the notion that where curriculum processes are open and participatory, they are seen to be more likely to lead to changes, and new local and global issues may be included.

Emphasising collective decision making, Jentoft (1997) argued that co-management is inclusive of rights to participate in making key decisions about how to fish, when to fish, where to fish, how much fish will be harvested and who has the right to fish. To this end, social learning processes integrate negotiation, reflexivity, participation and system thinking as strategies to incorporate ecological complexity and the diverse knowledge and experiences of multi-stakeholders in addressing management issues (Dyball, Brown, & Keen, 2007). As indicated in the previous chapter, the centralised management of fisheries by the state alone was identified as one of the major contributing factors to the problems of fisheries management (Pomeroy, 1994; Baland & Platteau, 1996).

Giller et al. (2008) discussed this form of collective decision making using a concept of networks or networked learning suggesting that change in a multi-stakeholder context arises from multiple interactions in and between stakeholders who all play a role in providing solutions to the problems being faced. They suggested further that as change occurs simultaneously in multiple societal networks, it is clear that deliberate efforts to stimulate change cannot usefully focus on a single network or societal level only.

Focussing more on the actual processes of interaction in such collaborative situations or networks, Wildermeerch (2007) noted that learning is related to processes of negotiation which result from differences of interest represented inside and outside the social system involved. He stated further that the management of these differences can be consensus-oriented or dissent-oriented, or a combination of both. Negotiation processes can be put into two categories: negotiations that are destructive in nature where stakeholders tend to hold onto their own perceptions and positions, and / or integrative where stakeholders develop new and at least partially shared problem definitions and cognitions on the basis of a social

learning process resulting in the identification of win-win solutions among stakeholders (ibid.).

It is also said that an integrative negotiation process facilitates new learning and development of new solutions (ibid.). The process allows those involved to be engaged in the learning process; they learn through deliberation and interaction, which is often based on experience or experimentation (Lotz-Sisitka, 2013) and the outcome of their learning practices, occurs collectively. As shown in my previous research, resource users bring their tacit knowledge gained from years of fishing, and knowledge that may not be found documented in the government extension system or in associated training curricula (Kachilonda, 2005).

Emphasising the complexity of such interactions, the social learning literature indicates that social learning involves reflexive participation in certain practices using relationships, knowledge, culture, language cognitive skills, values, knowledge and prior experiences (Lotz-Sisitka, 2013) that may lead to change in practices. Social learning takes place in groups or societal systems that operate in new, unexpected, uncertain and unpredictable circumstances (Wildermeerch, 2007). As a process, social learning is meant to enable actors to come together to question norms, policies and management objectives through the creation of deliberative platforms that support an interactive dialogue with a wide set of stakeholders (Collins & Ison, 2009). Taking the above argument further, Engeström (1999) confirmed that in an activity system people have to decide where they want to go, which way is up. It is important that the decision process comes from all the players involved in the management process and that any decision made takes into consideration the socio-cultural factors of the stakeholders. Lave and Wenger (1991) commented on the importance of networks for learning when they noted that learning happens through the interactions and relationships amongst people who share a common object or concern over time. Similarly Field (2003) noted that people make connections with people they share an interest with.

On-going reflection and reflexivity is also a key part of social learning processes because every time we reflect on the value of what we know as individuals and how we know it, this leads us to a new understanding which is a very important component of successful social learning. Reflexivity is reflecting on the learning that has taken place during a given process and using that reflection to stimulate more learning and action (Dyball, et al., 2007). Hersoug, et al. (2004) argued that communities can do more if they are equipped to interact with each other in a coordinated management effort around those issues that cut across community boundaries, and if they are supported to engage in regular reflections and review of practices (reflexivity). In this regard, however, Bull, Petts, & Evans, noted in Lotz-Sisitka, 2008, pp. 47noted:

> Social learning is not an automatic outcome of a participatory process … if one is going to assert that the process can affect people as environmental citizens, then what

> happens to people, not just outside of, but also after the process, is critical. The question is whether or not through a process of public participation, people can learn to see beyond their own agenda and pursue a collective one of responsible citizenship. (Bull, Petts, & Evans, 2008:703).

Reflecting on the methods and practices people use and developing in-depth understanding on why those practices are being used is crucial in resources management. Schusler, Decker and Pfeffer (2003) argued that learning can be 'mistaken' or misdirected if there is inadequate reflection and reflexivity. Such 'mistaken' learning could impede collaborative relationships. Wals et al. (2009) noted in this regard that social learning is more likely to succeed if the participants can view their own interests in relation to other interests. From this it is possible to see that people's relationships and the acquiring of different knowledge due to interactions may enable them to critically relook at their own practices. Through realising the effects or impact of the practices, such a process may allow them to reflect on their practices and then go through the process of unlearning unsustainable practices and change to more sustainable practices. How this can be done and facilitated through extension training is the subject of this thesis.

The literature reviewed above shows that collective learning and problem solving are seen to be an important aspect of learning in extension and training work. There is a sophisticated understanding of the importance of engaging different stakeholders in such processes, which has implications for curricula related to extension training for natural resources management. However there are still tensions in understanding learning as a process of negotiation where interactive negotiation facilitates learning through people's interactions and learning from their contradictions or differences through a deliberative process. The importance of reflection and reflexivity is also highlighted in such learning processes.

2.4.6 The knowledge that is dealt with is systems based, and involves social-ecological and socio-cultural dynamics; making for a complex knowledge context

A paper on supporting sustainable agriculture through extension in Asia by Garforth and Lawrence (1997) pointed out that extension personnel need both to build up a broad understanding of ecological systems and processes relevant to the area in which they work and help to develop skills to interpret local information and support local decision making. They continued to argue that many of the environmental problems which affect small-scale farmers can only be solved through collective decision making with their active involvement throughout the processes.

Prior to co-management, fisheries management policies were influenced by scientific research programmes which were based on a biologically oriented conservation paradigm (see Section 1.2.5) and the approach facilitated transfer of knowledge from research to extension officers then to the fishing communities. Science was seen as an important origin

of new technical and management innovations which were to be defused through intermediaries and then adopted by farmers and other resource uses (Rip & Kemp, 1998; Geel, 2002). However, the approach brought in assumptions that government policy on natural resources management, for example, could be developed in government bureaucracies and then implemented in straightforward manner. This unfortunately did not lead to appropriate or acceptable policies or innovations (Scoones & Thomson, 1994; Rip, 1995; Aarts & van Woerkum, 2002) as the approach resulted in disempowering resource users and ignored the rich contextualised local knowledge gained over years of practice. It has further been noted that marginalisation and exclusion of resource users in natural resources management is a major source of conflict over its access and also sustainable use.

Thus, Edmunds and Wollenberg (2001, p. 232) argued that scientists need to actively and strategically engage with specific stakeholders in order to contribute to more sustainable resource use. This does not, however, preclude using the best available scientific knowledge in such engagements. Emphasising the role of science in the dynamics of natural resources management, Giller et al. (2008, p. 1) noted:

> Scientists can, therefore, not merely describe and explain resource use dynamics and competing claims, but in doing so, they should actively contribute to negotiation process between stakeholders operating at different scales (local, national, regional and global). Together with stakeholders they explore alternatives that can contribute to more sustainable and equitable use of natural resources and where possible, design new technical options and institutional arrangements.

As indicated above, fisheries co-management is dependent on a variety of learning interactions which would include engagement around scientific knowledge of ecosystems and ecosystem services. According to Bahn and McGill (2007), an ecosystem is a dynamic complex of plant animals, microorganisms and the non-living environment interacting as a functional unit. The fisheries sector is a complex system where both living and non-living things interact and more importantly contribute to the human well-being of both rural and urban populations in Malawi (see Section 2.2). Ecosystem services are the benefits that people obtain from nature and they directly and indirectly provide products for human consumption and maintain a healthy living environment. Ecosystem services are generally divided into four categories:

1. Provision services such as food, water, timber, fuel etc.;
2. Regulating services that affect climate, floods, drought, diseases, waste, land degradation and maintenance of air and water quality;
3. Cultural services that provide recreational aesthetic and spiritual benefit; and
4. Supporting services such as soil formation, photosynthesis, biodiversity and nutrient cycling (Bahn and McGill 2007)

Ecosystems are based on networks, mutual dependency, flexibility, resilience and these dynamics together constitute dynamic sustainability of an ecosystem. According to FAO and World Bank (2000), all economies depend on ecosystem services and ecosystem services are particularly important to the economies of low income developing countries. The world's fisheries contributed $55 billion in export value in the year 2000 (ibid.). It was evident from the contextual profile process undertaken for this study that certain ecosystem services such as inland fisheries and fuel wood production are particularly important to the livelihoods of the poor, especially in the southern Africa region where 75% of people live in rural areas. In Malawi 12.5 million people live in rural areas (see Section 1.2.1).

However, within the co-management approach there is a need for a more systemic view of knowledge, and an approach that integrates social systemic knowledge with ecosystems and ecosystems services knowledge. As briefly noted in Chapter 1, people of different backgrounds and from different areas are now able to engage with extension and research officers to deliberate the status of the fishery in Malawi water bodies, sharing different forms of knowledge within a co-management systems approach. However, as noted from the other co-management cases in the other water bodies (see Sections 1.5.1, 1.5.2, and 1.5.3), the approach has brought a number of tensions and contradictions to both fishing communities and the extension officers. The complex knowledge context appears to result in some levels of confusion and uncertainty among stakeholders, which requires a careful deliberated process with all those concerned to develop the requisite understandings of the social-ecological system and its functioning, issues and potential. In order to cope with the risks, it is important that stakeholders from these diverse backgrounds work together and share knowledge and experiences that will allow new knowledge creation. As noted above already, but also underscored by Pinkerton (1994b), learning takes place when parties deliberate over problems, share knowledge of different kinds, undertake shared tasks, reveal values and perceptions and conduct joint monitoring.

As indicated already, the complexity of the fisheries system and the interaction that occurs among those involved in the system allows heterogeneous groups of people to meet and share various forms of knowledge and common practices. Dealing with such complex systems require a broader approach that emphasises the dynamic interaction between people and the environment in the construction of meaning and identity (Lave & Wenger, 1991; Wenger 1998). People learn through crossing boundaries as they interact with each other. Confirming this, Engeström (2000) noted that it is important to extend beyond the singular activity system and to examine and work towards the transformation of a network of activities where learning can be expanded across boundaries (see Chapter 3).

Because poor societies are mostly dependent on harvesting ecosystem services, they are vulnerable to changes taking place in the ecosystem and they require careful understanding on how they can be used sustainably. Understanding the factors that are causing ecosystem services to change is essential to designing interventions that can have positive benefits to the ecosystems and their services and those changes in ecosystem services affect many aspects of human well-being (World Research Institute, 2000). Daily (1997) noted that many ecosystem services are largely unrecognised in their global importance or in the pivotal role they play in meeting needs in particular countries and regions. It is evident in the Malawi fisheries sector that the demands for ecosystem services are growing rapidly due to increases in human populations who depend on them for their daily lives (see Section 1.6). Broadly the fisheries sector covers the three sustainability dimensions: the economic, the ecological and the socio-cultural dimensions, all of which need to be taken into account when considering ecosystem services and their use.

Wals et al. (2009. P. 7) noted:

> Sustainable social development *(people)* is aimed at the development of people and their social organisations, in which notions of social cohesion, justice, liveability, and health play an important role. Sustainable economic development *(profit)* focuses on the development of the economic infrastructure, in which the efficient management of our natural and social resources is important. A sustainable ecological development *(planet)* is all about the development of the natural ecosystem, in which maintaining our natural resources play an important role.

The management of the fisheries resources therefore require clear understanding of the interconnectedness of social, ecological and economic factors that may affect sustainable management of the fisheries resources, as was also noted in Section 2.4.4 above. There is need for generation of new knowledge on how the ecological and economic systems to human well-being can be well managed for more sustainable fisheries. It is therefore important that people managing natural resources, e.g. fisheries, be able to form a learning system that will be able to cope with the challenges being faced.

Drawing attention to systems at a more sociological level is a paper by Worth (2008) on sustainable livelihoods approaches and agricultural extension. She argued that in order to address poverty, there is a need to understand how people operate within systems, given that there are household systems, community systems, social systems and in particular, household systems. Thus, in engaging with ecosystems knowledge it would seem important to locate this within these wider systems, all of which are relevant in the Malawi fisheries context.

As seen from the literature reviewed above, for extension and training to be functional, there is a need for the extension personnel to have a broad understanding of the ecological systems

and processes which are relevant to the local context. There is also a need for better understanding on how to deal with the complex knowledge base in extension and training because social-ecological and socio-cultural issues are interconnected and they need to be treated holistically in the context of concepts such as ecosystems, ecosystem services and people's interactions with these services. In such a context, there is a further need to understand how people operate as systems e.g. household system, community system and social system and how these are related to practices related to ecosystem services use and sustainable (co-)management. Better understanding of the above will help to deal with the complex systems that exist in the context of extension services work.

2.4.7 The role of the extension agent is a co-learning role

Another feature of extension work found in the literature is a reframing of the extension agent, from the role of transferring agent, to a co-learner, someone who is ready to learn from others. Elaborating the role of extension agents as co-learners, Worth (2007) noted that one of the roles of an extension worker is to organise participative learning where people share ideas and experiences on specific issues of common interest. Worth emphasised that there should be an exchange of ideas that facilitate learning between extension worker, farmer and policy maker and more importantly among farmers themselves.

Hara (2001) commented on the general functions of extension agents in co-management and identified them as encouragement of partnerships, provision of local incentives for sustainable resource use, and the sharing of power and responsibility for conservation. A co-management approach is a compromise between government concerns for efficient resource utilisation and protection on one hand, and resource user's concern for equal opportunities, self-determination and self-control (ibid.) on the other. According to Campbell and Townsley 1996), community participation is the active, meaningful and influential involvement of individuals or groups in an activity.

As already mentioned, co-management is an arrangement where the power and authority to manage resources is shared between the user group and the government (see Section 1.2.3.3). However, little is said about the *mediation processes* that are needed when governments and user groups come together. One proposed approach that is being suggested is inter- and transdisciplinary research, especially for situations where one is dealing with uncertainties. It is said that inter- and transdisciplinary research that can address the social-ecological issues that affect stakeholders and can enhance social learning. Confirming the importance of this kind of research in social-ecological systems Wals (2007, p. 36) noted:

> Sustainability education should bring about a closer link between sustainability problems that are faced by particular communities and focussing analysis of these by means of

interdisciplinary comprehensive approaches which will permit proper understanding of sustainability problems.

For extension services to mediate co-learning successfully using such approaches will, however, require a clear recognition of all of the different stakeholders in the co-learning process. Jentoft (2000) noted that fishing communities are a missing link in modern fisheries management and that they represent untapped possibilities for making fisheries management more legitimate and effective. Management systems cannot expect to gain support from communities unless they help to nurture them (ibid.). Fishing communities have been in the practice and they have over the years gained considerable knowledge, skills and experiences that can be of benefit to fisheries management (Kachilonda, 2005). The engagement among them provides a potentially powerful platform to identify and develop contextual new knowledge to support sustainable fisheries where co-learning becomes key to new knowledge creation.

As can be seen from the above, a co-learning approach, as emphasised in the literature, requires a new set of competences. According to Wals and Bawden (2000), dealing with complexities, uncertainty and conflicting norms, values and interests associated with sustainability, extension workers need to be multi-functional so that they have the required transformational competencies for these complex issues. Developing such competence is not an easy it deals with sustainability concerns which people need to develop a combination of systems competences for them to be able to solve their own problems. This competence framework can potentially also be helpful for supporting extension services that are to mediate co-learning processes, and can potentially also support improved extension training. In this regard, it is salient to see that Chizari, Baygi and Breazeale (2006) suggest that an extension agent is supposed to be multi-functional, someone who is conversant with issues of participatory extension, participatory techniques in rural development, biodiversity protection methods, sustainable fertilisation methods and improved utilisation of indigenous knowledge and rural people, which reflects to a certain extent the scope of competences outlined by Wiek et al., but with less definition. Chizari et al. (2006) suggested that the above 'mix' of skills would enable an extension agent to be able to assist rural communities to address complex issues as the case is in most of the rural areas.

The literature reviewed above provides a broad perspective of who an extension worker is supposed to be and what needs to be done in order to train and motivate a professional extension agent. The review shows that, in a co-management context, the extension worker has an important mediation role, and that this requires certain knowledge, skills and competences. Key amongst these is a willingness to be a co-learner because in a social-ecological and socio-cultural context, he/she will have a considerable amount to learn from the people and will also need to be able to share knowledge and experience in order to

support them to implement new co-management approaches and practices. An extension worker should be able to allow for the exchange of ideas to facilitate learning between extension workers and people, policy makers and also among the rural people themselves. The review also shows that in a sustainability context, there are specific competences that the extension worker needs to develop, such as systemic / inter-or transdisciplinary competence, as well as anticipatory and normative forms of competence, in addition to social competences, and practical and strategic competences. The extension agent also needs to be able to work with multiple forms of knowledge, and have abilities to mobilise and utilise indigenous knowledge systems in the context of scientific knowledge systems, which can be used to improve different knowledge interactions in the society. Enabling such an extension agent's professional development and growth will require a reflexive curriculum, and a curriculum that motivates the extension agent to be able to perform effectively in such a context.

This in-depth understanding of available literature on learning and extension in a co-management context also allows for further description of the social learning assumption potential of co-management approach, and its implications for curriculum development in the Malawi fisheries context. This is dealt with in Chapters 5 to 8. The literature review informs the following research goals:

1. First goal of my research which focuses on how fisheries co-management communities of practice learn to respond to the risks of declining fish catches, and also
2. Goal 2 on enhancing understanding of the historical and culturally constituted knowledge and practice differences and how these may influence co-management policy implementation; and
3. Goal 3 is to develop a model and tools for the education and training of extension officers and fishing communities involved in supporting co-management practices to expand learning for the sustainable utilisation of the fisheries resources.

This literature review is of course important for informing curriculum innovation in and for extension services, which is one of the goals of my study. Thus, after reviewing this literature and teasing out the recommended approaches to collaborative social learning processes and practices as they pertain to extension and co-management, I then consider their meaning in relation to current extension service curricula in Section 2.5 where I discuss extension service curricula critically (drawing on the literature review outlined above in Section 2.4).

2.5 A critical review of international literature on extension and training curriculum development

I begin with a review of the literature on extension service curriculum development in natural resources / sustainability issues contexts. However, my literature research did not reveal many articles dealing with these aspects of extension services and learning. For that reason I also chose to critically review a sample of extension services curricula, using the seven principles outlined above, to establish the 'status quo' of extension service curriculum development. This is necessary for the final development of recommendations towards a model for extension services curriculum in the final phase of the study, after the empirical cases of learning and co-management are reported in Chapters 4, 5 and 6.

In the review I looked at extension and training curricula from a few European institutions, a few from the Asia and also a few from Africa. The purpose of the review was not to compare the different curricula from different regions but to tease out some of the fundamental issues that will inform recommendations for extension and training in this study.

2.5.1 Curriculum review in the European context

There are a variety of ways in which extension education is offered in European universities. These include the bodies of knowledge used, the structures of the programmes and in the way their administrative organisations are set up as per their teaching and learning research interests and also according to different university policies. A critical review of the curriculum literature (Wallace, 1999; Garforth & Lawrence, 1997; Peters & Matarasso, 2006) shows that extension and training curricula are aimed at improving farmers' capacity to deal with their problems, and that there is evidence of a systems approach to curriculum development. According to Wals et al. (2010), curricula based on a systems paradigm offer an educational process more appropriate for an era of limits. He continued to say the interpretation of our planet as the ultimate global ecosystem requires an acceptance of natural limits to human activities and services to instil a context culture, where a sense of belonging and responsibility for sustainable development are promoted. The emphasis in curricula development is on the context where they see extension as a supporting process aimed at motivating and enabling extension partners for problem solving through appropriate curriculum development processes.

However, Wallace (1999) argued that the development and implementation of extension and training curricula in some European universities do not respond to the current needs of the farmers. He argues that, to address the current unsustainable issues the agriculture and extension curricula, thorough needs assessments should be conducted to more accurately establish what issues need to be incorporated into the curriculum in order to respond to the existing needs. In their argument on the importance of a curriculum that emphasises on

engaging farmers in order to provide new skills to the farmers, Garforth (1993) and Smith (1994) from the University of Reading in the UK noted that curricula for extension and training need to build capacity of extension agents to have skills for negotiation, conflict resolution and the nurturing of emerging community organisations, indicating that they have a co-learning and social learning orientation embedded into their assumptions for the extension agent's practice. It was noted that lack of the above affect the training of extension staff in various institutions in the United Kingdom and other European institutions.

Based on a review of international literature on extension I was able to identify that there are a number of characteristics that are considered in the extension education curricula in different agricultural extension institutions in a European context (Levander, 2008). The key characteristics identified are: the curriculum should be able to offer training that prepares learners for *professional agricultural extension* or *rural development work*, the training should prepare *professionals in change management* for any occupation, and the training should prepare *professionals in extension to be more multi-disciplinary and multi-dimensional* to be able to work with rural communities. It has been argued in one of the papers by Smith (1994) that curricula designed to foster social and environmental interdependence have more chance to offer students multiple opportunities to experience learning within the context of their neighbourhood and that this will allow them to acquire important skills and knowledge of local cultural traditions that will help them to take an active role in the care and management of their communities.

2.5.2 Curriculum review in the Asian context

In the literature review of the South East Asian curricula, there is evidence of segmented efforts in the curriculum development process. A paper by Wallace (1999) noted that one of the challenges experienced in South East Asia was a curriculum which is a written document which to him was essentially a menu or checklist of topics to be taught with some instructions on how to teach them. The review revealed that there is a need to develop a deeper understanding of the local context so that the implementation of curricula responds to specific contexts. In his paper Wallace argues that the effectiveness in promoting changes in environment and sustainability related to behaviour among both extension workers and clients require an approach which models greener, soft and more holistic lifestyles management approaches and learning systems within the training system itself. Highlighting the need for curriculum reform in the South East Asian context, Wallace expressed the need for both training institutions and curricula to reflect the global concerns for the environment and sustainability and that education is critical for promoting sustainable development and improving the capacity of people to address the environmental and development concerns.

Peters and Matarasso (2006) conducted a study in Vietnam on participatory curriculum development, and cited the important role of environmental education programmes in

demonstrating the relationship between people's activities and their effects on the environment and in encouraging people to get involved in both the curriculum development process and also taking full responsibility in the management of their environment.

2.5.3 Curriculum review in the African context

A paper by Worth (2008) on developing the capacity of curriculum markers for agriculture extension in South Africa noted that training in agricultural extension, as with training in any formal discipline, is the product of an educational process which has unique scientific content. This places emphasis on the knowledge of the discipline. Van Crawder, Lindley, Brucing and Doron (1998), emphasising the participatory and mediating practices of extension agents, noted that some of the issues that need to be considered for successful agricultural extension development are experiential learning, collaborative learning approaches and participatory teaching and learning strategies. In this literature review it is emphasised that development and implementation of a curriculum is supposed to be needs based. An example is given in the case of a Ghanaian extension and training curriculum process where each year the organisation which is managing the training programme allow the managerial and field staff to come together and identify the specific skills and knowledge required to work effectively (Okorley, Gray, & Reid, 2009). This example shows *how* a curriculum can be developed to take stronger account of local needs and *how* staff can also be involved in the determining of the needs. A critical feature of field staff training from the Ghanaian case is the involvement of farmers in training processes (Pasleur, 2002). The process is seen to improve the field staff's knowledge of farmer's practices and the reasons behind the practices (ibid.).

In Wallace's (1999) paper on training for extension in environment and sustainable agriculture for sub-Saharan Africa, he emphasises that training involves partnership with learners and other stakeholders, responsiveness to changing situations and needs, and openness amongst training provides. In reviewing the status of extension service training curricula in sub-Saharan Africa, Wallace, Mulhall and Taylor (1996) noted that most are not responsive to the needs of the people in the local context. Taylor (1999) commented that participatory curriculum development dialogue and interaction among stakeholders is crucial for a curriculum to be responsive to its context. Chambers (1997) also drew attention to a more learner-centred approach to extension training in Africa, and suggested that in the context of experiential and learner centred education, learners are encouraged to take responsibility for their own learning and that trainers should have an input into what they teach and also how they do it.

In another participatory curriculum development for agricultural education and training paper by Taylor (1999), he argued that most of the development programmes in agriculture extension and training attempt to bring about change. Here he suggested that through

effective extension programmes, change may come about in people's knowledge, understanding, skills, attitudes and behaviour and that change should result in person's increased capacity to make informed decisions, a point that was also raised in Section 2.5.2 above. The extent to which this is actually taking place in extension training is, however, not clear.

A review of the fisheries and extension curricula for both the Malawi College of Fisheries and the Lilongwe University of Agriculture and Natural Resources respectively, revealed that both have comprehensive content of extension and natural resources management aspects and that they contain instructions on how the trainer should approach the curricula with an outline of literature. A checklist of things to cover in different learning areas is provided. However, there is need in both curricula to explore broader aspects of extension and training curriculum to be able to capture the complexity of the fisheries sectors. A more reflexive, collaborative and open curriculum that focuses on sustainability and context will be responding to the current social-ecological, socio-cultural and socio-economic issues in extension and training and would potentially add value to extension and training of extension officers at both diploma and degree levels that will allow them to work with clients out there.

The above critical analysis of the extension and training curricula from different institutions shows that there are efforts for collaborative approaches to curriculum development in different contexts in European, Asian and African contexts. However, it is emphasised in the literature review that there is a need to explore in-depth understanding of reflexive and sustainability practices for the extension agents to understand their role of motivating their clients to participate and also for the extension agents to be co-learners and facilitators. A review of different curricula shows that lack of understanding and a broad overview of ways in which curricula are developed and what goes into the development of curricula that is reflexive, open, responsive and appropriate to extension and training, are common challenges. Wallace (1999) discussed the need to have a curriculum that has the collaboration and partnership with all those involved in extension and training, a curriculum that is responsive to changing situations and needs and also openness amongst training providers. In the review from Wageningen University, Wals 2009 emphasised transformative action learning, learning that supports the creation of meaningful synthesis between theory and practice including other relevant learning areas.

A literature review of the fisheries curricula both at the Fisheries College and at the Lilongwe University of Agriculture and Natural Resources showed that there is a need for a wider and in-depth understanding of curricula that are reflexive, open and also responsive to the current fisheries management challenges. Potentially responsive extension and training curricula could consider curricula that combine collaborative management (which strives to respond to some of the crucial questions in extension and social learning: Who learns? How do they

learn? What do they learn?) and adaptive co-management which focuses on sustainable ecosystem management, where the focus is on building knowledge, addressing issues of complexities in natural resources management, creating networks between multiple actors and foster effective leadership among co-management stakeholders. This approach to the extension and training curricula could provide a shift from the conventional curriculum development to a more collaborative, open and reflexive kind of curriculum which strives to respond to the needs of the society.

2.6 Conclusion

This chapter has discussed social-ecological systems and adaptive co-management and their implications for learning. It outlined the trends in extension service from technology transfer up to the current participatory extension approaches and how these have shaped learning in extension. It discussed some of the suggested key principles of collaborative social learning in collaborative and adaptive co-management in the extension service context, and the extension curriculum based on the available literature. The chapter ended with a critical review of some extension service curricula and this will be used to draw some recommendations towards a model for extension services curriculum in the final phase of the study.

The next chapter discusses socio-cultural approaches to learning and extension in the fisheries sector. It discusses the use of post-Vygotskian expansive social learning theory and also socio-cultural and socio-material theories. It then explores how expansive learning processes help to resolve tensions and contradictions, offering a potentially new way of conducting extension training in the context of co-management discourse. The empirical dimension of the study (Chapters 5, 6 and 7) will then reflect on this, in relation to the principles outlined above, and deliberate the possibilities of such an approach for curriculum development.

CHAPTER 3

THEORETICAL FRAMING OF THE STUDY

Social learning is like a spider web, with many different components all interacting and affecting movements towards social action and change. While it is impossible to untangle and dissect a web and still maintain its essential characters, we can embark on an experimental and adaptive process of learning that strengthens rather than weakens the web. Each time we find a new web of social learning we need to work with it gently, probing to see how the parts are connected and the strands are related. (Wals, 2007, p.192)

3.1 Introduction

This chapter discusses Cultural Historical Activity Theory (CHAT), which is the main theoretical framework used in the study to describe and identify the object among fisheries co-management stakeholders, and guide expansion of learning. The chapter discusses the features of CHAT, and how CHAT conceptualises social learning. The chapter also shows how this theory was used to examine social learning in the three fisheries co-management activity systems discussed that formed the focus of analysis in this study (see Chapter 5). It also discusses how CHAT provided a language of description for identifying and providing insight into the activity systems in co-management and how elements within and across the activity systems interact as people regularly meet to discuss fisheries issues. Additionally, it discusses how the social learning processes were expanded across boundaries of the main activity systems, and how the CHAT language of description helped to illuminate and narrate how learning in one activity system can be linked to, and benefit learning and practice in related activity systems, potentially enabling the processes of fisheries co-management.

3.2 Cultural Historical Activity Theory (CHAT)

The theory that is central to this study is Cultural Historical Activity Theory (CHAT) and I refer to the three generations of CHAT to provide an in-depth understanding of the learning interactions that take place among fisheries co-management stakeholders. CHAT is a socio-cultural theory of learning which is built on the earlier theory of learning and development of Lev Vygotsky (1978). It foregrounds dialectical contradictions which are one way of offering explanations for the learning that takes place through activities in work places (Engeström, 1999a). Cultural Historical Activity Theory (CHAT) provides a theory and methodology to examine how groups of people with different experiences and perspectives working on the same object can work with new problems and jointly develop new knowledge or tools to address the problem, thereby expanding the object (Engeström, 1987, 1999a; Daniels, 2008;

Engeström & Sannino, 2010). Activity theorists argued that learning takes place through collective activities that are conducted towards a common object (Daniels, 2008; Engeström, 2000, Engestrom & Sannino, 2010).

According to Daniels (2008) and Engeström (2000), in order to probe beneath the surface of the issues and identify the underlying causes of the contradictions that emerge in activity systems and in the activity systems involving different stakeholder groups, Cultural Historical Activity Theory (CHAT) seeks to mobilise collective agency in response to contradictions identified in the interactive activity system (see Section 1.6). Engeström (1999b) proposed a process of expansive learning through change laboratory workshops where communities are involved in constructing and implementing a radically new, wider and more complex object and concept for an activity; in the case of this study this would be fisheries co-management (Engeström & Sannino, 2010). Such a process, in this study, potentially provides practical opportunities for capability development of the fisheries extension officers, trainers from the college and local leaders including BVC members who together may be able to expand their object for better fisheries co-management practices (see Chapters 4, 5 and 6 where this possibility is explored in more depth via the empirical research process of this study).

3.2.1 Post-Vygotskian and social learning theory

Wals, van der Hoeven and Blanken (2009) noted that social learning is about bringing people of various backgrounds, and with different values, perspectives, knowledge and experiences both from inside and outside the group or organisation together in order to engage in a creative quest for answers to questions for which no ready solutions are available. In order to understand learning, there is a need for careful, in-depth understanding of the involvement of different people: what their roles are, what they are working on, what they are using to achieve their objectives and who is also involved in the process besides those that are most obviously engaged in the learning process. According to Engeström and Sannino (2010), the ultimate test of learning theories is how they help practitioners to generate learning that grapples with the pressing issues of humankind. As explained in Chapters 1 and 2, fisheries co-management is a complex system because it involves people with diverse backgrounds, but it assumes similar interests and understandings related to the sustainable management of the fisheries resources in the context of co-management. Social learning promotes and intensifies the application and establishment of participatory learning platforms, where individuals can meet, interact, learn collectively and make collective decisions (Keen et al., 2005). Social learning among stakeholders therefore requires proper communication and interaction which in the process potentially results in the generation of new knowledge, acquisition of new skills and also development of relationships and trust among stakeholders which may help to bring common understanding on the issue being discussed.

CHAT, as noted above, was developed from the earlier socio-cultural psychology of Vygotsky, and as such it provides a socio-cultural and socio-historical framework for analysing relationships between human actions. Another important aspect of CHAT is the ideas that as people develop capabilities in collaboration with others; they can also act upon their immediate surroundings (Blackler et al., 2000). In this process there will be evidence of transformative agency which involves an individual or another person directing an individual intentionally and introducing a stimulus into an on-going stream of activity or problem solving (Heli & Laura, 2014). Activity theory is a theory of object-driven activity. Engeström (2009a) argued that the core idea of expansive learning is qualitatively different from both acquisition and participation in that in expansive learning learners learn something that is not yet there. In this process learners construct a new object and concept for their collective activity and implement their object and concept in practice (ibid.). Objects are concerns; they are generators of, and the foci of attention, motivations, efforts and meaning. The task of activity theory is to turn some of the disorders e.g. contradictions that people experience, into usable solutions that people can benefit from through collaborative socio-cultural engagement.

While it is not often cited in this way in the social learning literature, it is possible therefore to see that social learning is also a socio-cultural learning process, involving language, meaning making, motivations and shared activity. Social learning tends to be referenced mainly to the work of Bandura (1977), a social psychologist who emphasised modelling of behaviour, rather than socio-cultural interactions. In this study I will work with an understanding of social learning as being a socio-cultural and socio-historical learning process involving meaning making, shared interaction, motivations and shared activity, rather than as a process of modelling behaviour. I also work with Engeström's notion of expansive learning (Engeström, 1987) as a social learning process that occurs at the interface between different activity systems, in this case the different activity systems involved in fisheries co-management (see Section 3.2.4 below).

This way of theorising and interpreting social learning has been used by fellow southern African researchers undertaking environmental education research in workplace and community contexts (Mukute, 2010; Masara, 2010; Lindley, 2014). Lindley (2014) in his PhD thesis, for example, argued that it is possible to suggest that an expansive social learning process occurs between activity systems. Building on the earlier work of Leont'ev (1981) who developed the notion of activity out of Vygotsky's earlier first generation of cultural historical research, Engeström and his colleagues have noted that the essence of expansive learning activity is production of new activity structures out of actions manifesting the inner contradictions of the preceding form of activity in question. My study adds to this body of research, and considers this possibility in the context of fisheries co-management in Malawi as indicated in Chapter 1.

3.2.2 First generation CHAT

Cultural Historical Activity Theory (CHAT) was developed by Engeström based on the work of Vygotsky and his Russian colleagues Leont'ev and Luria (Daniels, 2001; Edwards, 2005; Warmington et al., 2005; Roth & Lee, 2007; Engeström & Sannino, 2010). In struggling to understand the process through which the human mind is formed, Vygotsky argued that creativity is a social process which requires appropriate tools, artefacts and culture in which to thrive (Vygotsky, 1978). First generation cultural historical activity theory drew more upon Vygotsky's concept of mediation tools (Daniels, 2008) and considered a triad of subject, tool and object. In this activity system, Vygotsky concentrated on the symbolic mediation of culture, analysing the relationship between human action (object), human subjects (the individual) and cultural artefacts (tools) in order to dispense with the individual/social dualism and create a Marxist psychology (Engeström, 1987). Vygotsky argued that people learn from their culture and history by applying its conceptual and material tools to transform the object, and his research focussed on this relational unit of analysis. In this study I drew on insights into first generation CHAT to develop an understanding of the culture and history of the individual stakeholders and their involvement in fisheries co-management programmes (their motivations) before understanding the interaction of the whole system (i.e. the mediation processes). I therefore needed to understand their socio-cultural relationship to fishing and this helped me to develop an understanding of the conceptual material tools and how these mediate action. This was helpful in developing a critically understanding of the reality on the ground in relation to sustainable fisheries management.

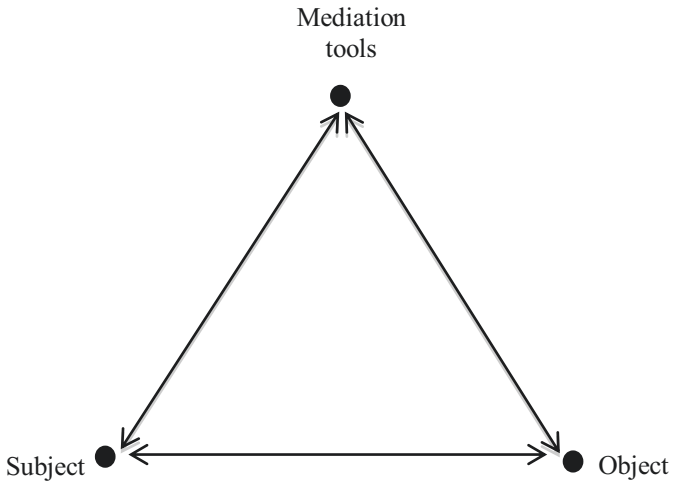


Figure 3.1: Vygotsky's mediational triad (Source: Engeström 1987)

Using Vygotsky's mediational triad outlined above in the fisheries co-management context I was able to identify different subjects engaged in the fisheries co-management processes. In the fishing communities' activity system, for example, I identified fishers, BVCs, and traditional

leaders as the subjects who were working on co-management as their object and I found that they used particular mediation tools/artefacts towards achieving their object. I was similarly able to identify other related activity systems with subjects who shared the same object, but who used different mediational tools / artefacts (the detail of this is reported in Chapters 4 and 5). This basic understanding of Vygotsky's mediational triad was important for me to gain a better understanding of the relationships in the particular context and how individuals work on a daily basis and what they use to achieve their objective which might be different when they start working as an interacting group of stakeholders from different activity systems. However, as reported on in the CHAT literature, a key limitation of the first generation of CHAT was that the unit of analysis remained individually focused. Leont'ev (1981) described the crucial difference between an individual action and a collective activity and this limitation was overcome by the second generation of CHAT, which I discuss next.

3.2.3 Second generation CHAT

In developing the second generation of the CHAT, Engeström (1987) added to Vygotsky's mediation triangle aspects that broadened the unit of analysis, which responded to an expansion of the Vygotskian research process into actual societal contexts where the mediations were observed. He included rules, community and the division of labour, socio-historical aspects of mediation that were omitted by Vygotsky in the first generation of CHAT (Engeström, 1999; Engeström, 1987, see Figure 2). The result was an expanded unit of analysis for understanding human learning in activity systems which included the triadic interaction that Vygotsky introduced, and socio-historical components from context that were found by Engeström to also mediate learning and change in the object (shown in Figure 3.2). Engeström therefore suggested: a) that the relationship between the individual and the object of their activity are mediated by concepts and technology, b) the relationship between the community and the overall object of its activity is mediated by its division of labour, and c) the relations between the individuals and the communities of which they are part of are mediated by rules and procedures which can be explicit or implicit (Blackler et al., 2000). Daniels (2001) noted that the importance of second generation CHAT was that it brought inter-relations between the individuals and the community into focus. From the Vygotskian genetic tradition, an historical developmental analysis of activity is adopted in second generation CHAT in which contradictions are thought of as sources of change and development (Daniels, 2008).

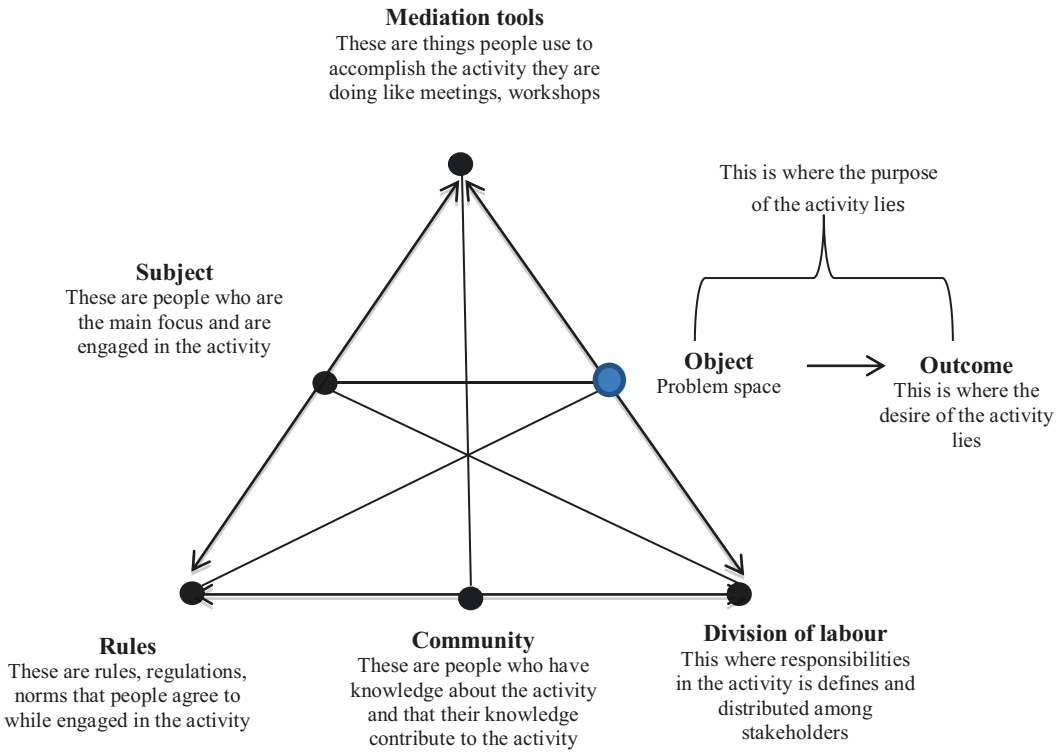


Figure 3.2: The second generation CHAT (Source: Engeström, 1987)

3.2.3.1 Elements of the activity system

As indicated in Figure 3.2 above, an activity system comprises of a group of people who are doing something together in a purposeful way (Peal & Wilson, 2001). Blackler et al. (2000, p. 281) claimed that an activity system comprised of an "interrelated bricolage of materials, mental, social and cultural resources for thoughts and actions". An activity system is an interactive forum where people with the same interest and aiming at a similar goal, deliberate issues using different sources of materials (see Chapter 4). In Figure 3.2 above the subject refers to the individual or subgroup whose position and point of view are chosen as perspectives of the analysis. Object refers to the raw materials or problem space at which the activity is directed. The object is turned into outcome with the help of tools and signs. Community comprises individuals and subgroups who share the same general object. Division of labour refers to horizontal division tasks and vertical divisions of power and status while tools refer to the explicit and implicit regulations, norms, conversions and standards that constrain action within the activity system (Engeström, 1987).

Table 3.1: Elements of an activity system in CHAT (Source: Engeström, 1999b, 2005; Daniels, 2001; Peal & Wilson, 2001; Ala-Laurinaho & Koli, 2007)

Element of an activity	Explanation of the activity
Subject	Individuals or groups of people who are involved in an activity and are the focus of the analysis of the activity system. The subject's relation with the object of the activity is mediated by the four elements: rules, community, division of labour and the tools.
Object	This is the problem being worked on
Outcome	The desired result as one works with the object
Mediation tools	Materials, artefacts used in the process of working on the object
Community	Groups of people who have knowledge about the activity and they are ready to contribute to the activity being undertaken
Division of labour	Horizontal and vertical allocation of responsibilities which mediate relationships between the community and the object
Rules	What mediates the interactions between the subjects and the community as well as between the subject and the object

The elements above explain what happens in each activity system. Interaction of the elements in the activity system helps to understand the socio-historical context of the system and can provide insight into the kind of activity that is taking place, why the activity is taking place, who is involved in the activity, and how the activities are carried out. Using these analytical lenses, one is also able to develop insight into the rules or cultural norms or regulations governing the performance of the activity, who is responsible for what when conducting the activity, and how the roles and responsibilities are being organised, in what kind of environment the activities are conducted or performed and finally, what is it that is desired. Additionally, it is important to identify contradictions that exist either within the elements, or between them, as this provides a dialectical space for new learning and interaction as described by Engeström (see Section 3.5 below). On the same, Engeström and Sannino (2010) argued that in the theory of expansive learning, and its criteria and yardstick of learning are built by means of historical analysis, aimed at identifying contradictions that need to be resolved and charting the Zone of Proximal Development (ZPD) that needs to be traversed in order to move beyond the existing

contradictions. The identification of contradictions in an activity system is central to learning as noted by Leont'ev (1987)

> Contradictions become actual driving forces of expansive learning when they are dealt with in such a way that an emerging new object is identified and turned into a motive; the meeting of need with object is an extraordinary act. (p. 54)

The next section shows how I applied the second generation of CHAT in this study focusing on fisheries co-management context.

3.2.3.2 Application of second generation CHAT in the fisheries co-management context

Applying the second generation CHAT in co-management of fisheries resources gave me deeper understanding on how the elements in the activity systems operate and also interact with each other within the elements and also across the elements within the activity system.

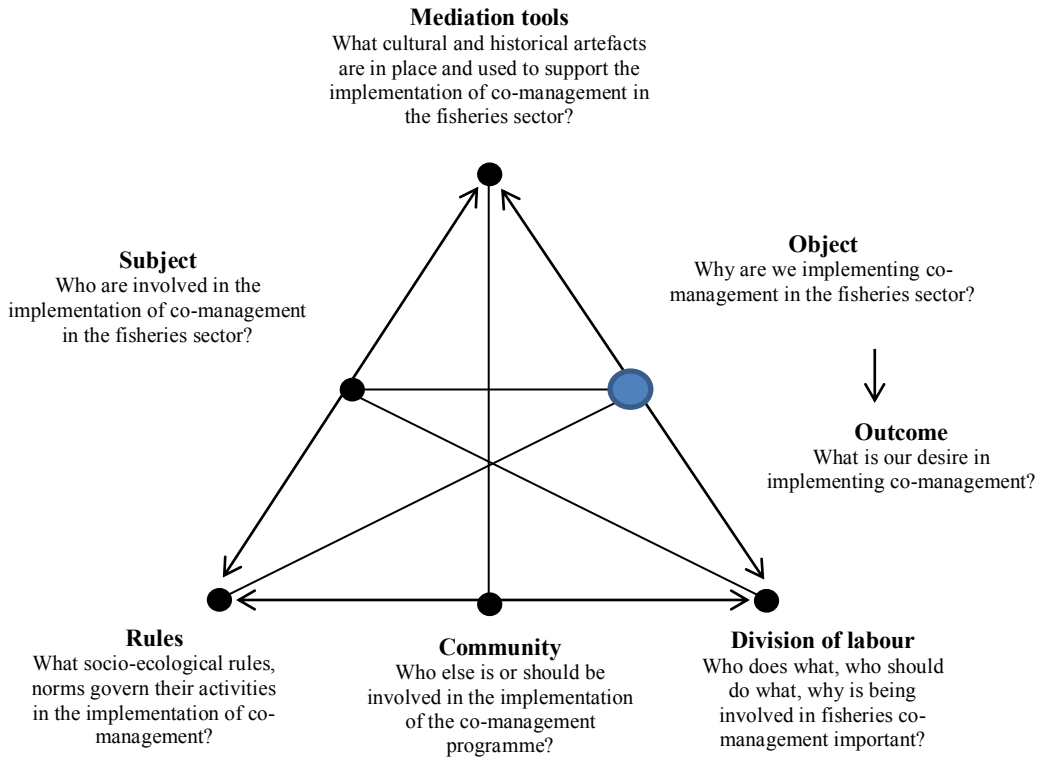


Figure 3.3: Application of second generation CHAT in the fisheries sector (Adapted from Engeström, 1987)

The questions raised in relation to each element of the activity system (outlined above in Figure 3.3) provided a way of understanding how the elements from a particular activity system were connected, and also how contradictions arose within and between the elements of the activity systems. Empirical perspectives on these questions are presented in more detail in Chapters 4, 5, 6 and 7.

3.2.4 Third generation CHAT

The third generation of cultural historical activity theory as outlined in Engeström (1999) takes the joint activity or practice as the unit of analysis for activity theory rather than individual activity. It exists when there is more than one activity system of the second generation and where there is interaction between the activity systems. The theory, which was developed by Engeström (Engeström, 1987; Edwards, 2005, Engeström & Sannino, 2010), focussed on the interaction between different activity systems. It emphasised that all the activity systems were part of a network of activity systems that in its totality constitutes human society (Daniels, 2008). The fisheries co-management activity systems presented in this study (see Chapters 5 and 6) are examples of activity systems which are diverse and distinguishable activity systems and according to Marx (1867/1976), cited in Daniels (2008), are as a result of continuous historical process of progressive job diversification and collective division of labour at a societal level. Learning across activity systems involves boundary crossing to show the importance of stakeholder's interaction across the activity systems (see Section 3.8). Third generation CHAT is built on the idea of multiple interacting activity systems focussing on a partially shared object. Daniels (2008) noted that the third generation of activity theory aimed to develop conceptual tools to understand dialogue, multiple perspectives and networks of interacting activity systems. Diverse activity systems are the result of a continuous historical process of progressive job diversification and collective division of labour at a societal level (Marx, 1867/1976 cited in Daniels, 2008). This interaction among stakeholders with and across activity systems also brings contradictions and Engeström's (1999) analysis was concerned with the process of social transformation and incorporated the structures of the social world with particular emphasis upon the conflictual nature of social practice. Instability and contradictions are regarded as "the motive force of change and development" and the transitions and recognitions within and between activity systems as part of revolution (ibid.).

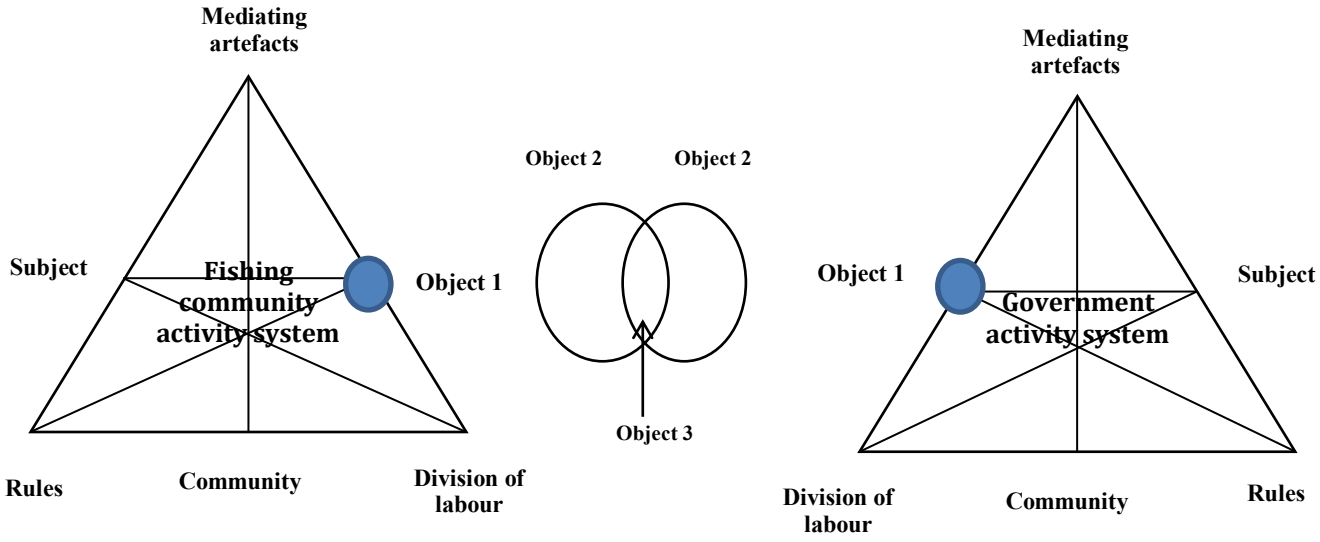


Figure 3.4: Two interacting activity systems as a minimal model for third generation CHAT (Source: Engeström, 2001, p. 136)

The application of third generation CHAT meant focussing the research unit of analysis beyond the outcomes and interactions occurring within the elements of a given activity system as shown in Figure 3.3, leading to Engeström's theory of expansive learning. Figure 3.4 shows interaction and learning between two activity systems and shows how the merging of the two objects ends up creating a new or changed object via an expansive learning process. In third generation CHAT, the interactions that occur between activity systems surrounding and contributing to the shared object forms the unit of analysis. Expansive learning which engages this shared object, put primacy on communities as learners, on transformation and creation of culture, on horizontal movement and hybridisation, and the formation of theoretical concepts (Engeström & Sannino, 2010). Expansive learning focuses on learning processes in which the very subject of learning is transformed from isolated individuals e.g. fishers to collectives and networks e.g. co-management activity systems which consist of BVCs and government extension officers working on co-management. Engeström (1987, p. 125) noted:

> Expansive learning activity is mastery of expansion from actions to new activity. While traditional schooling is essentially a subject producing activity and traditional science is essentially an instrument-producing activity, expansive learning activity is an activity-producing activity.

3.2.5 Unit of analysis in CHAT

CHAT's concept of unit of analysis was applicable in a number of ways in this study. I used it as my analytical tool in order to gain an in-depth understanding of the structures in fisheries co-management and how they contribute to the day-to-day operations of the key activity systems and the engagement with the shared object of fisheries co-management (i.e. I used second generation CHAT to analyse the diverse activity systems). I additionally also used the third generation CHAT unit of analysis to examine the interactions between activity systems and the engagement with the shared object of fisheries co-management via an expansive learning process.

I also used the notion of a 'unit of analysis' as a reflexive lens to look beyond the obvious things during my change laboratory workshops where I sought to, with the members of the activity systems, understand the debates and deliberations among stakeholders associated with the shared object of co-management (see Chapter 6). Engeström (2000) argued that the unit of analysis is usually a conceptual idea strictly for the researcher and advocated for the turning of the unit of analysis into an external auxiliary means, a mediating conceptual tool for both the participants and the researcher. Engeström (1987) argued that every work activity is organised around an object which is actually regarded as the true motive of the activity. The activity systems in the two case studies were my units of analysis and I used them to

develop an in-depth understanding of the structures of co-management and what takes place within and across the activity systems.

Third generation CHAT was particularly appropriate in the study because of the complexity of fisheries co-management activity systems which required careful tracing of the socio-cultural and socio-historical contexts of different stakeholders involved in the approach (see Chapter 6). As indicated above, in third generation CHAT the unit of analysis was *the interaction between* the BVC members and traditional leaders from the fishing community activity system and the other activity systems i.e. the government in the case of Lake Malombe and research, extension and lecturers for Lake Malawi, as focussed on the shared object of fisheries co-management.

3.2.6 Principles of third generation CHAT

According to Dick and Williams (2004), CHAT has three main components: system, learning and development. Engeström (1999b) suggested that activity theory may be summarised with the help of five principles:

a. The first one is that a collective, artefacts-mediated and object-oriented activity system seen in its network relations to other activity systems is the prime unit of analysis.
b. The second principle is the multi-voicedness of activity system: an activity system is always a nexus of multiple points of view, traditions and interests. The division of labour in an activity creates different positions for the participants; the participants carry their own diverse histories and the activity itself carries multiple layers and strands of history engraved in its artefacts, rules and conventions. The multi-voicedness increases exponentially in networks and interacting activity systems. This is the case in the fisheries co-management activity systems where, due to the crisis of the declining fish stocks, fishing communities (who for a long time had been voiceless) were forced to start talking to each other on strategies for survival. This was a source of tension and contradictions, demanding actions involving translations and negotiations.
c. The third principle is historicity. Activity systems take shape and are transformed over lengthy periods of time and their problems and potentials can only be understood against their own history. Engeström (1999) bemoaned the absence of historical analysis in some areas of social science which espouse Vygotskian roots and emphasises that people have to decide where they want to go, which way is up.
d. The fourth principle is that the contradictions play a central role in activity theory, and are a source of change and development. Engeström drew on Ilyenkov (1997 to emphasise the importance of contradictions within activity systems as the driving force of change and thus development. Engeström, (2001, p. 137) argued that

contradictions are not the same as problems or conflicts but are "historically accumulating structural tensions within and between activity systems". Activity systems are also seen as open-ended learning systems that can adopt new elements from outside which can also create contradictions in a particular activity system.

e. The fifth principle is the possibility of expansive transformations in an activity system. As the contradictions of the activity system are aggravated, some individual participants begin to question and to deviate from the established norms. This in some cases facilitates change of practice among stakeholders through collaborative envisioning and a deliberative change effort. An expansive transformation among stakeholders is accomplished when the object and motive of the activity are reconceptualised to embrace a wider horizon of the given activity system.

3.3. Expansive social learning and CHAT

3.3.1 Expansive learning, agency and sustainability

Expansive learning enables learners to reach a level of transformation of their newly generated creative agency that is not only necessary and useful for the present but also applicable to their future lives (Yamazumi, 2009). According to Engeström and Sannino (2010), the most important outcome of expansive learning is agency which is the participant's ability and willingness to shape their activity system. Agency is regarded as an important outcome of "… formative interventions such as developmental dialogue" (Engeström & Sannino, 2010, p. 15). Emirbayer (1997) argued that agents enter into a relationship with surrounding persons, places, meanings and events via a dialogic process by which actors immersed in the degree of lived experience engage with others in collectively organised action content. Lave and Wenger (1991) in Edwards (2005) suggested three approaches to support learning: scaffolding interpretation, where a more knowledgeable other assists the learner to move to a new understanding; cultural interpretation, which is concerned with addressing the difference between everyday experience and scientific understanding using instruction; and the collectivist/societal interpretation of learning which is concerned with dealing with new problems thus emphasising externalisation and contestation of the object, allowing for people to develop new solutions (as is promoted within CHAT). The process of developing new solutions to problems (old or new) through stakeholder's engagement allows people to deliberate issues that constrain the proper implementation of co-management, and to engage their agency in this process. Emirbayer and Mische (1998, p. 970) depicted agency as a quality of engagement between the actors and their structural context, involving the dimensions of habit, imagination and judgement.

Workshops, networks, and formal and informal meetings can create conducive learning spaces through engaged and purposeful and sustained interactions. UNESCO (2007) recommended learning processes that are locally relevant and which tackle real-life issues. Appropriate implementation of learning processes in such a context can encourage learners to view the world through a view of concern for sustainability (ibid.).

According to CHAT, which draws on Vygotskian cultural historical social psychology, learning takes place in two ways: via 1) internalisation – when an individual makes sense of available cultural capital in an existing social relationship, thinking and action; and via 2) externalisation – when a person or group of people create new knowledge or solution. Learning that encompasses both internalisation and externalisation is therefore called expansive learning (Engeström, 1999a). Expansive learning processes (such as change laboratory workshops – see below) therefore provide a forum where stakeholders engage in such learning. As indicated above contradictions in activity systems are seen as a source of learning and development, and expansive learning processes can therefore occur as stakeholders engage with the contradictions in co-management practices and strive to find solutions and create new knowledge that will enhance the management of the fisheries resources. Such a process of expansive learning is concerned with the resolution of evolving tensions and contradictions in a complex system that involves object, artefacts and perspectives of participants (Engeström, 1999).

3.4 Expansive learning as proposed in CHAT

Engeström (1999b) argued that expansive learning involves the creation of new knowledge and new practices for a newly emerging activity: that is learning embedded in constructive qualitative transformation of the entire activity system. He also claimed that the form of learning that happens in expansive learning involves reformulation of problems and the creation of new tools for engaging with the problem and that the on-going production of new problem-solving tools enables subjects to transform the entire activity system (Engeström, 1987, pp. 158-9). Gaining a deeper understanding of how people learn in the fisheries co-management context and surfacing contradictions potentially provides an opportunity to develop new practices that can inform better extension and training in the fisheries sector to enhance sustainable fisheries management. Engeström (1999a) noted that a transition from action to activity is considered expansive when it involves the object transformation of the actions themselves and when subjects become aware of the contradictions in their current activity in the perspective of a new form of activity. Expansive learning brings voices of all those involved together through a deliberative process, helping them to frame a common agenda. Engeström (1987) argued:

> ... this form of learning involves reformation of problems and the creation of new tools for engaging with these problems. This on-going production of new problem-solving tools enables subjects to transform the entire activity system and potentially create or transform and expand the objects of the activity. (pp. 158-9)

Engeström (1999 cited in Daniels 2008, p. 127) continued:

> A full cycle of expansive transformation may be understood as a collective journey through the zone of proximal development of the activity system. Such a transformation may be triggered by the introduction of a new technology or set of regulations but is not reducible to it. This type of learning may be seen as distinct from that which takes place when existing knowledge and skills embedded in an established activity are gradually acquired and internalised, as in apprenticeship models, or when existing knowledge is deployed in a new activity setting or even when the new knowledge is constructed through experimentation within an established activity.

Vygotsky (1978, p. 86) defined Zone of Proximal Development (ZPD) as the distance between the actual development level as determined by the independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. According to Engeström (1999), the expansive learning process involved the following stages:

- Questioning: drawing on researched evidence to question existing practice or existing wisdom
- Analysing: tracing and analysing the history and current dynamics of learning and development problems in the practice
- Modelling: involves the construction of new ways of working or engaging with practice
- Examining the model: experimenting with the new model to fully grasp its dynamics, potentials and limitations
- Implementing the model: working with the model in real life situations and monitoring its impacts
- Reflecting: using monitoring data to evaluate the model for refinement
- Consolidation: implementing the refined model into a new, stable form or part of practice. (Engeström, 1999, p. 384).

Figure 3.5 below shows how the expansive learning process outlined above was adapted for use in the fisheries co-management context joint learning process with the engagement of all the stakeholders involved. Section 4.4.5 explains this in more detail from a methodological point of view.

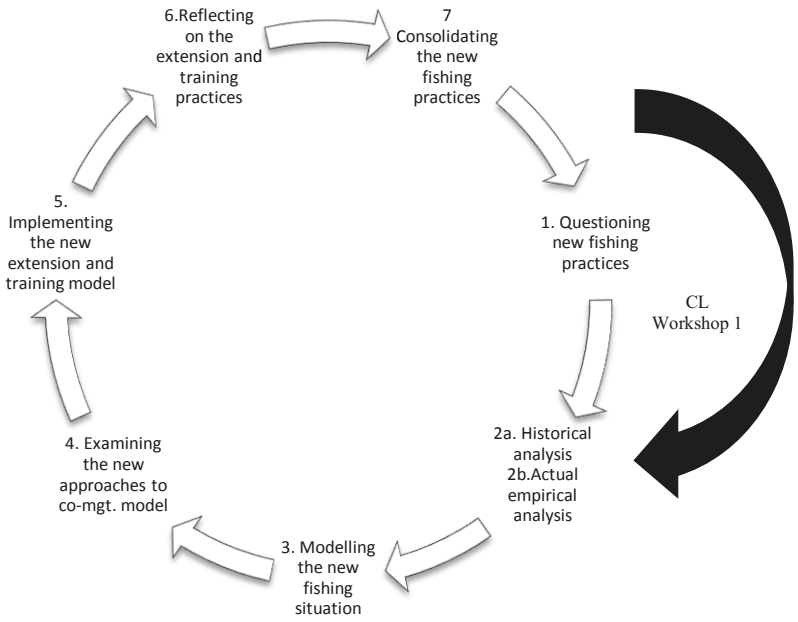


Figure 3.5: Expansive learning cycle in fisheries co-management
(Adapted from Engeström, 1999)

Roth and Lee (2007, p. 203) observed that when inner contradictions are conscious, they become the primary driving forces that brings about change and development within and between activity systems. Clot (2009) argued that the source of development is the creative use of mismatches between individual and the collective activities; thus agency can be understood as active working through contradictions. A careful expansive social learning process through the outlined stages (Figure 3.5), as applied in this study, was seen to provide a potential opportunity for joint learning among fisheries co-management stakeholders (see Chapters 4, 5, 6 and 7). Engeström and Sannino (2010) noted that the "what" of expansive learning consists of a triplet: expanded pattern of activity, corresponding theoretical concepts and new types of agency. Expansive learning provides a shift in thinking about learning, from rote learning to a participatory learning process, which allows those involved to contribute to a shared practice. This model of learning is consistent with the trends in extension and learning that were outlined in the previous chapter (Section 2.4) but the Engeström work provides a stronger framework for *researching* such learning, and also for *guiding* such learning. The shift in the form of learning draws on Bateson's levels of learning (Daniels 2008, p. 126) as shown in the table that follows.

Table 3.3: Bateson's levels of learning

	Description	*Examples*
Level 1	Conditioning through the acquisition of responses deemed correct within a given context	Learning the correct answers and behaviours in a classroom
Level II	Acquisition of deep-seated rules and patterns of behaviour characteristics to the context itself	Learning the hidden curriculum of what it means to be a student
Level III	Radical questioning of the sense and meaning of the context and the construction of a wider alternative context	Learning leading to change in organisational practices

While appreciating the importance of the three levels of learning as provided by Down (2004) depending on context, this study focuses primarily on the third level given that the focus of the study is on the complexity of co-management where there is a need for supporting diverse stakeholders to generate new solutions and practices. The work of Bateson is also used in environmental management literature to explain first, second and triple loop learning, as shown in the diagram (Figure 3.6) below. This focus on first, second and triple loop learning (Pahl et al., 2007) also focussed on the reflexivity of learning new practices, but it failed to provide an adequate *research lens* and / or *intervention lens* for researching and expanding learning, which is more adequately provided by Engeström's CHAT. Commenting on the importance of collective action and expanding learning, Nelson, Adger and Brown (2007) noted that collective action is also related to the ways in which people perceive change, their vulnerability and their need for action. Addressing mistrust as discussed earlier (see Chapters 1 and 2), Duhaime, Searles, Usher, Myers and Fréchette (2004) noted that trust relations and reciprocal action among individuals and organisations were crucial to a group's development and maintenance and can be achieved through shared experiences and on-going social relations that function to build social cohesion which is evident in Engeström's CHAT work.

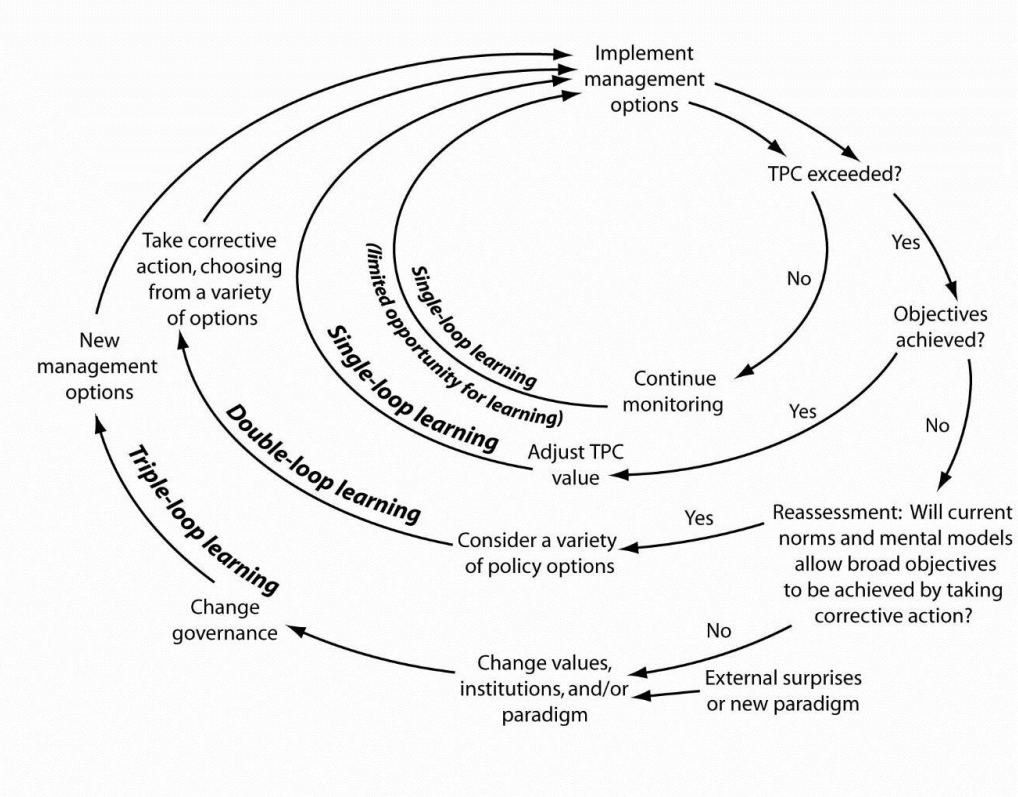


Figure 3.6: Single, double and triple loop learning
(Source: Chapin, Kofinas, & Folke, 2009)

What differentiated Engeström's work from the work of Bateson, Pahl Wostl and Chapin et al., was his emphasis on the object of activity, historicity, cultural historical activity, and contradictions as sources for expansive learning. As indicated above, Engeström (2001, p. 137) confirmed that contradictions are not the same as problems or conflicts but are "… historically accumulating structural tensions within and between activity systems". Engaging different stakeholders to deliberate existing contradictions from the three activity systems (fishing community, extension and research and fisheries training) through change laboratory workshops potentially therefore provides tools and models that can facilitate better extension and training consistent with the more recent trends in extension as scoped in Chapter 2. Engeström, 1987, cited in Daniels, 2008, p. 125) summarised contradictions at four levels:

Level 1: Primary inner contradictions (double nature) within each constituent component of the central activity

Level 2: Secondary contradictions between the constituents of the central activity

Level 3: Tertiary contradictions between the object/motive of the dominant form of the central activity and the object/motive of the culturally more advanced form of the central activity

Level 4: Quaternary contradictions between the central activity and its neighbour activities

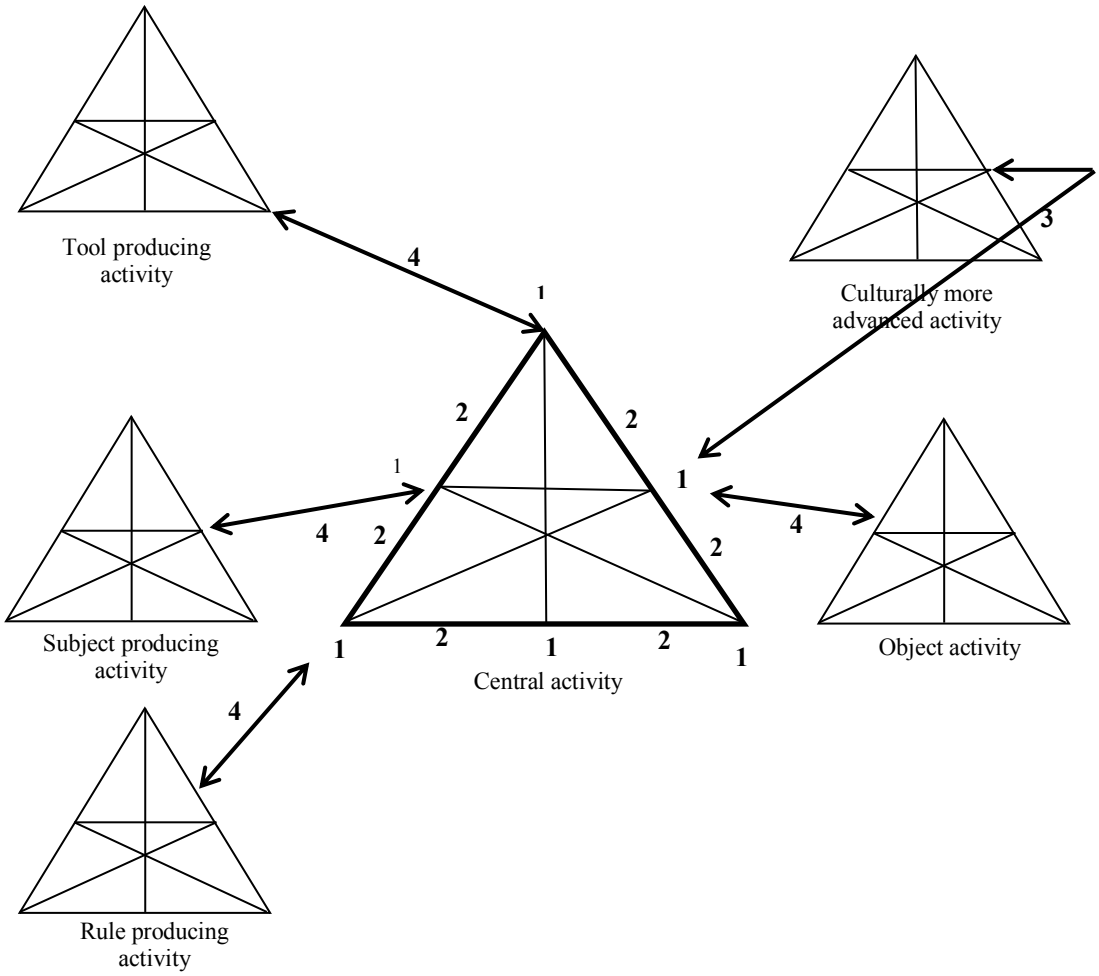


Figure 3.7: Four levels of contradictions within the activity system (Source: Engeström, 1987)

Recent expansive learning studies (Engeström, 2007; Mukute, 2009; Masara, 2011; Mukute & Sisitka, 2011; Lindley, 4014) with cultural historical systems and social-psychological roots have shown how dialectical engagement with tensions and contradictions in interacting activity systems can be drivers of knowledge, learning and agency development at multiple levels. Finding solutions to contradictions across the four levels requires the engagement of different stakeholders with similar interests or common practices, who in the process of deliberation, strive to turn contradictions into solutions in a more participatory manner.

3.5 Social learning theory and expansive social learning

As indicated above and in Chapter 2, there are clear linkages between social learning theory and expansive social learning. As indicated in Chapters 1 and 2, the theories discussed in this chapter and also in the entire study are aimed at responding to the research questions outlined in Chapter 1 (see Section 1.12.2). Its main aim is to gain in-depth understanding of the learning taking place among fishers as they respond to declining fish stocks. World Wide Fund European Space Agency (2012) has noted that it is when we reflect on what we are involved with that experience is turned into knowledge. Knowledge is about pure facts, practical skills, deeper understanding, being well informed and wisdom – in short what we

know (ibid.). Cultural Historical Activity Theory as a form of social learning theory helps to analyse tensions and contradictions that exist amongst different communities of practice who are working on the same object and in the case of this study 'co-management', and which provides the impetus for on-going expansive social learning to occur if mediated and engaged by fishing communities of practice.

According to Wals, van der Hoeven and Blanken (2009), social learning is a way to arrive at a learning system in which people learn from and with one another and collectively become more capable of withstanding setbacks and dealing with insecurity, complexity and risks. Such learning requires that we not only accept one another's differences but are also able to put these to use. Social learning is about creating trust and social cohesion in order to become more accepting, it is about creating ownership with respect to both the learning process as well as the solutions that are found which increases the chance that things will actually take place (ibid.). In the context of co-management where this study is positioned, the involvement of resource users in planning and decision making, collaborative learning amongst the entire fishing community of practice is crucial. Social learning helps to bring people of various backgrounds and with different values, perspectives, knowledge and experiences both from within and outside co-management into discussion that has potential to provide solutions to the existing challenges. Barton and Tusting (2005) argued that learning is constructed as an integral part of reciprocal interactions and is constrained and facilitated by skills, structures, networks and cultural factors. It raises questions and engages opportunities for mutual learning across professionals and between professionals and their clients. One of the important aspects of this study is building agency among co-management stakeholders to help address the existing tensions and contradictions that constrain sustainable management of the fisheries resources. Exploring some of the constraints stakeholders in co-management experience, Blackmore at al. (2011, p. 26) noted:

> It is difficult for poor fishing communities on the shores of Lake Malawi (even if they may be both knowledgeable and willing to act) to harvest fish sustainably unless the conditions affecting their poverty are addressed at policy and structural levels, and unless other less sustainable fishing practices (practiced by large artisanal fishers) are legislated, managed fairly and transformed.

Findings by Sannino (2008) revealed that agency emerges in situations in which a person commits to concrete actions in an innovation process or refers to former experience of good practices as an explanation of a future solution. In this study, I used social learning theory to gain an in-depth understanding on how communities learn to adapt to increased risk associated with the declining fish catches and how capabilities of communities are developed (Sen & Nielsen, 1996). Better understanding of the relationship between the fishing communities' learning and agency was sought to provide an in-depth understanding of what co-management practices are relevant to enhance the way learning amongst fishing communities can be actualised and expanded. Wals (2007, p. 37) noted that social learning is

often referred to as a way of organising individual, organisations, communities and networks that are particularly fruitful for creating a more reflexive, resilient, flexible, adaptive and indeed ultimately more sustainable world.

3.6 Features of social learning interactions

As discussed in Chapter 1 (see Section 1.2.5) the command and control approach to natural resources management (Holling & Meffe, 2002; Adams & Hulme, 2001; Brockington, 2002) dominated natural resources management particularly within protected areas. In the case of fisheries management, the command and control approach actually contributed to more unsustainable fishing practices because so many resources and personnel were required to monitor and control the illegal fishing practices. The approach also disempowered the fishing communities as fisheries resources became a government resource with no care from the community. A co-management approach which involved power sharing between the fishing communities and the government was seen as the only process where ownership of the resource was given back to the resource users who for a long time did not have a say in its management. Researchers such as Bradbury (2007), Cramer and Loeber (2007) and Lund-Thomsen (2007) have noted that social learning is introduced in organisations and companies as a means of actively involving people in a far-reaching process of change. Mukute (2010) argued that people learn from what they do, from their mistakes as well as from their successes. Wals, van der Hoeven and Blanken (2009) claimed that people learn more from heterogeneous groups than in homogenous groups. The scenario alluded to above is reflected in fisheries co-management where people within and across activity systems share fishing skills and practices (see Chapter 5).

As indicated above, CHAT allows for researching of, and expanding the social learning processes within and across the activity systems that engage the interactions of the fisheries systems, potentially allowing for an expansion of the object of co-management practices. This allows for a critical understanding as the process moves from one step to the next through a participatory learning process that is understood from a cultural historical activity system perspective. UNESCO (2005) recommended learning processes that are locally relevant and which tackle real-life issues. The use of CHAT in this study helps to explain how people learn to execute activities in activity systems and how their activities affect each other within and across activity systems through formative intervention activities. The aim of formative intervention is to enhance the agency of participants (Engeström & Sannino, 2010) especially during complex change situations in their work activities. Engeström & Sannino (2010) suggested that transformative agency can be facilitated via various methods such as Developmental Dialogue (DD) which involves discussions in which the participant's individual professional development and engagement with collective work activity changes are analysed. In the case of this study I engaged individual interviewees on co-management

concerns (see Chapter 4) but the main focus was on supporting change of collective work activity of all the co-management stakeholders who agreed to engage with each other on the development of new actions, thereby expanding their shared object (see Chapters 4, 5, and 6).

3.7 Application of CHAT and fisheries co-management activity systems

In this study, CHAT was used as theoretical approach to understand socio-cultural and cultural historical forms of learning. It further provided methodological guidance and analytical tools to investigate how different fishing co-management stakeholders who come from different backgrounds, experiences and perspectives learn and work together towards the same object (fisheries co-management) and also how they can work on existing problems and together develop new knowledge to improve fisheries management. Sannino, Daniels and Gutierrez (2009, p. 1) confirmed the above saying "in activities, humans develop their skills, personalities and consciousness and that through activities, we also transform our social conditions, resolve contradictions, generate new cultural artefacts, and create new forms of life and the self". A number of reasons motivated me to use CHAT:

a. I needed more clarity on the learning that occurs among different stakeholders and how they respond to the crisis of declining fish stocks in the midst of a co-management approach which was assumed would improve the situation.
b. I needed to have well-grounded historical explanation about the fishing gears and practices which have emerged over the years as a response to the declining fish catches and how these have been shared among different fishing communities
c. Co-management is a participatory approach but using CHAT provided me to develop a deeper understanding of the limitations of traditional participatory management approaches which are used as participatory transfer of fisheries technologies. The expansive social learning approach provides a shift to active engagement of stakeholders which is geared towards reflexively developing collaborative solutions and action development.
d. Analysis of the tensions and contradictions through the second and third generation CHAT enabled me to deal with emerging issues within and across the activity systems in the fisheries sector and enabled me to develop some tools to help with solutions to these issues.

CHAT provided a way of understanding the history of the local fishing communities and the origin of their practices. Fisheries co-management stakeholders interact with each other as they move from one area to the other and their mobility influences their fishing practices. Fenwick (2006) held the view that participation, expansion and translation were relevant alternatives and complementary metaphors for theorising work-based learning. In CHAT, knowledge is viewed as contextual and transformative and it is assumed to be generated

through a process of reflexive investigation and learning which takes place among all the stakeholders involved in a specific activity. In sum, CHAT suggests that learning takes place through collective activities that are purposefully conducted towards a common object (ibid.).

3.8 Conclusion

This chapter has discussed the socio-cultural approaches to learning and extension by looking at how the use of social learning theory promotes learning and also how these approaches could be applied in the fisheries co-management context. It provided an overview of CHAT in the Post-Vygotskian tradition following the work of Engeström, describing the three generations of CHAT and these can be related to the fisheries co-management system. The chapter also considered how this work relates to recent theorising on learning via social learning and Bateson's triple loop learning in the natural resources management arena, suggesting that Engeström's work provides a stronger language of description and methodology for engaging with such approaches to social learning than what is currently evident in this literature. The discussion on social learning was also linked to agency, and socio-cultural theories and their application in the natural resources management context. The chapter concluded with considering features of social learning interactions and the features of the expansive learning process, an approach that promotes deliberation and interaction of people from different backgrounds to model solutions to the existing contradictions.

In the chapter that follows I discuss philosophy underpinning the methodology of the study – Cultural Historical Activity Theory (CHAT) – and describe the use of CHAT from a methodological and analytical perspective, showing also the methods and analytical approaches used in this study.

CHAPTER 4

RESEARCH METHODOLOGY AND METHODS

One of the most confusing developments in educational research over the past quarter-century has been the proliferation of epistemologies - beliefs about what counts as knowledge in the field of education, what evidence of a claim is and what counts as a warrant for the evidence. (Pallas, 2001, p. 6)

4.1 Introduction

This chapter discusses the methodology and methods used to conduct the study and generation of data from and with the research participants and other stakeholders. It also discusses how the data was transcribed, translated and analysed. It highlights the relationship between the research participants and the researcher throughout the research process. It further discusses linkages between the research participants and the researcher as people who reflexively and collaboratively worked together in an expansive social learning process. In this study, I worked as an interventionist researcher and my role was to mediate the interactions among stakeholders. I also tried to motivate all those who were involved in this study through the use of their own data which came from the interviews with continuous reflection from the past and present experiences in the fishery and be able to share and facilitate knowledge creation processes through an expansive social learning process to respond to a number of issues related to fisheries co-management.

Engeström (2011, p. 15) stated that, "The historical legacy of cultural-historical activity theory is one of theoretically and methodologically argued interventionism as methodology for studying expansive learning". This interventionist legacy has been picked up and systematically developed to support practitioners in attempt to engage in working out the contradictions in their work (Engeström, 2011). Engeström indicated further that this form of engaged research can be distinguished as a form of *formative intervention* research (ibid.) which differs from traditional interventionist research done within the framework of design experiments. He suggested that such *formative intervention research*, which defines this study, is characterised by the following features:

1) *Starting point:* In formative interventions, the participants … face a problematic and contradictory object, embedded in their vital life activity which they analyse and expand by constructing a novel concept, the contents of which are not known ahead of time to the researchers.

2) *Process:* In formative interventions, the contents and course of the intervention is subject to negotiation and the shape of the intervention is eventually determined by the participants. Double stimulation as the core mechanism implies that the participants gain agency and take charge of the process.

3) *Researchers' role:* In formative interventions, the researcher aims at provoking and sustaining an expansive transformation process lead and owned by the practitioners. (Engeström, 2011, p. 606).

Pihlaja (2005, p. 185) too noted that the role of an interventionist is to help practitioners undertake epistemic actions of analysing the need and possibilities for change in their activity. The mediatory process associated with my role as interventionist researcher occurred throughout the research process starting from individual interviews, focus group interviews and discussions and also during change laboratory workshops. This participatory social learning process allowed for the full engagement of different stakeholders to critically look at co-management and the current fishing practices with reference to the declining fish catches, the details of which are reported on in Chapters 5, 6 and 7.

4.2 Methodological framework of the study

As indicated above this research is primarily a piece of *formative intervention research.* The research methodology and goals were therefore based on this way of thinking about research, and were also based within the context of the study which was to investigate and expand learning for the sustainable co-management of fisheries resources. As noted in the previous chapter, and in the introductory paragraphs above, the study was based on an interventionist approach which was consistent with the intentions of a co-management approach using CHAT principles and formative intervention research approach (see sections 1.5.4, 2.4 and 3.4). In this way, the study was constituted as a participatory action oriented study that gives attention also to the emergence of agency amongst the research participants (see section 3.5). Working with this research approach was influenced by my research goals (see section 1.7.2), my research questions (see section 1.7.3), the complex object of co-management, and the associated conceptual and theoretical framework (see chapters 2 and 3) that was seen to be most appropriate for engaging with the context, object and questions. Danermark, Ekstrom, Jakobsen and Karlsson (2002) argued that the nature of the object of the study determines what research methods are suitable and also what kind of knowledge is possible of different phenomena in the world. Kothari (2004) defined research methodology as a way to systematically solve a research problem. The formative interventionist research approach in this study adopted a specific methodology that has been developed within the expansive learning phase of cultural historical activity theory, called *Development Work Research*

which is a methodology developed by Engeström and his colleagues to *formatively* intervene in a research site (see section 4.2.1 below). It also provides an enabling context for the development of the agency of the research participants.

4.2.1 Development Work Research (DWR)

As introduced above, Development Work Research is a methodology that has developed within CHAT. In applying this methodology as an interventionist researcher, my interest was to enhance the agency of co-management stakeholders by reflecting on co-management approaches to fisheries resources management to expand and transform the object of fisheries management. Development Work Research was developed by Engeström and colleagues to provide a framework in which learning is continuous and which allows for the creation of new forms of activity in which activities are learned as they are created (Warmington et al., 2005). Development Work Research employs the notion of radical exploration, which results in results of learning which are not pre-determined. Engeström (2001) proposed Development Work Research as a methodology for supporting and developing expansive learning in workplaces. I apply this approach to community-oriented learning situations. In this sense my research is similar to the work of Mukute (2010) and Masara (2011) who applied this approach in rural community learning situations in southern Africa. Expansive learning offers a framework for understanding forms of learning that 'do not adhere to standard model of vertical mastery in which a stable defined body of knowledge and skills is required by individual or organisation that then ascend through levels of increasing competence' (Warmington et al., 2005, p. 3). Engeström (1987) suggested however, that both horizontal and vertical forms of learning are possible in expansive learning, but 'which way is up' i.e. what is seen to be 'vertical' needs to be clarified and defined in context by the participants. In the case of my study, co-management (framed by sustainability principles) is seen to be a more 'advanced' object for fisheries management, the details of which need to be co-defined by the research participants *in situ,* as explained in Chapters 1 and 2, and thus it also requires horizontal learning interactions.

As an interventionist researcher, I kept on moving in and out of the activity systems by attentively listening to the participants in the research setting to learn what was being discussed and then reflecting on the insights gained to produce the mirror data which was later deliberated with participants in further research interactions. This allowed me to be both a co-learner and a co-facilitator in the activity systems. Apart from learning in the process, the methodology helped me to co-facilitate a process amongst stakeholders to question the way they learn and practice different fishing management practices in their activity systems. From my contextual profile and my own experience after working in the fisheries sector for

over 20 years (see section 1.3), I know the declining fish stocks have been and are induced by human activities. This is because the majority of the Malawian population living in rural areas heavily depend on natural resources to sustain their livelihoods, with few alternatives, creating a historically complex context for fisheries co-management (see Chapter 1).

4.2.2 Development Work Research as people-centred and expansive learning oriented

Development Work Research is a useful methodology for enabling the research participants to address some of the contradictions which may exist in, or between their activity systems. The Development Work Research process as described by Engeström in Daniels (2008, p. 133) involves:

1. Drawing on ethnographic evidence to questions existing practices (i.e. learning in and for interagency working)
2. Analysing the historical origins of existing practices and using this in analysing current dynamics within and across services
3. Modelling an alternative way of working (i.e. new model of learning)
4. Examining the model to understand its dynamics, strengths and pitfalls
5. Implementing the model and monitoring the process and impact of implementation in the dispositions and actions of professionals
6. Drawing on these data to reflect on the process and outcomes.

Developmental Work Research techniques were used in change laboratory workshops in both Lake Malombe and the south-east arm of Lake Malawi allowing for the dialogue and reflection of co-management stakeholders to deepen their roles and understanding of individuals and collective responsibilities (see section 4.4.5; see also Chapters 5 and 6).

In the case of this particular study the contradictions engaged within the expansive learning processes facilitated by DWR were the deep-seated contradictions that exist in the context of co-management (see Chapter 6). In CHAT methodology and DWR it is anticipated that engaging with these contradictions via an expansive social learning process could potentially allow people to build more resilient livelihood strategies (Mukute, 2010; Masara, 2011). Warmington et al. (2005) noted that when contradictions have been resolved, new contradictions emerge and this requires continuous engagement of stakeholders over time to develop more advanced activity systems.

Using the approach would potentially also allow me to understand learning processes and the origins of the existing contradictions influencing fisheries co-management and enable me to explore the potential implications for fisheries extension training (see Chapter 7 for a reflection on this). Developmental Work Research involves the creation of new knowledge and new practices for a newly emerging activity, that is, learning embedded in and constructive of a qualitative transformation of the entire activity system (Engeström (2004) in

Warmington et al., 2005). I further conceptualised the transformation taking place in such activity systems as specific cases of such transformations, as discussed below.

4.2.3 Multiple embedded case studies

Yin (2009) defined case study research as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the phenomenon and content are not clear. Emphasising the same, Stake (1995) noted that we study a case that is of special interest and we look for details on the case being examined. The strength of a case study is that it can take an example of an activity and an instance in action (Walker, 1986) and use multiple methods and data sources to explore it and interrogate it. In this study the CHAT unit of analyses and the historical context of fisheries co-management in Malawi (see section 4.2.1 above) helped to define the boundaries of the cases that I studied. The analytical frameworks of CHAT, as well as transformative agency and social learning lenses allowed me to have a deeper understanding of how fisheries co-management stakeholders learn from and with each other. This was achieved by using thick description (Geertz, 1973) of the phenomenon of fisheries co-management in order to present it from the fisheries co-management stakeholders' perspectives. Case studies typically provide thick descriptions of a phenomenon (Stake, 1995; Bassey, 1999).

Considering the above, and also the current interaction of different stakeholders in the study, the focus was to support mutual involvement, collaboration, deliberation and participation of all the stakeholders involved in the context of fisheries co-management. Being able to develop understanding of this within two case study contexts in Malawi (see section 3.5) allowed for the investigation of contemporary events, whose time-space configurations were not easily manipulated (Yin, 2003). Multiple embedded case studies (Yin, 2009) are also called nested case studies (Lotz-Sisitka & Raven, 2004) because they are made up of cases within a case. The figure below shows the multiple embedded cases in the two sites where co-management was first introduced in Malawi Fisheries, and where the formative intervention research in this study took place.

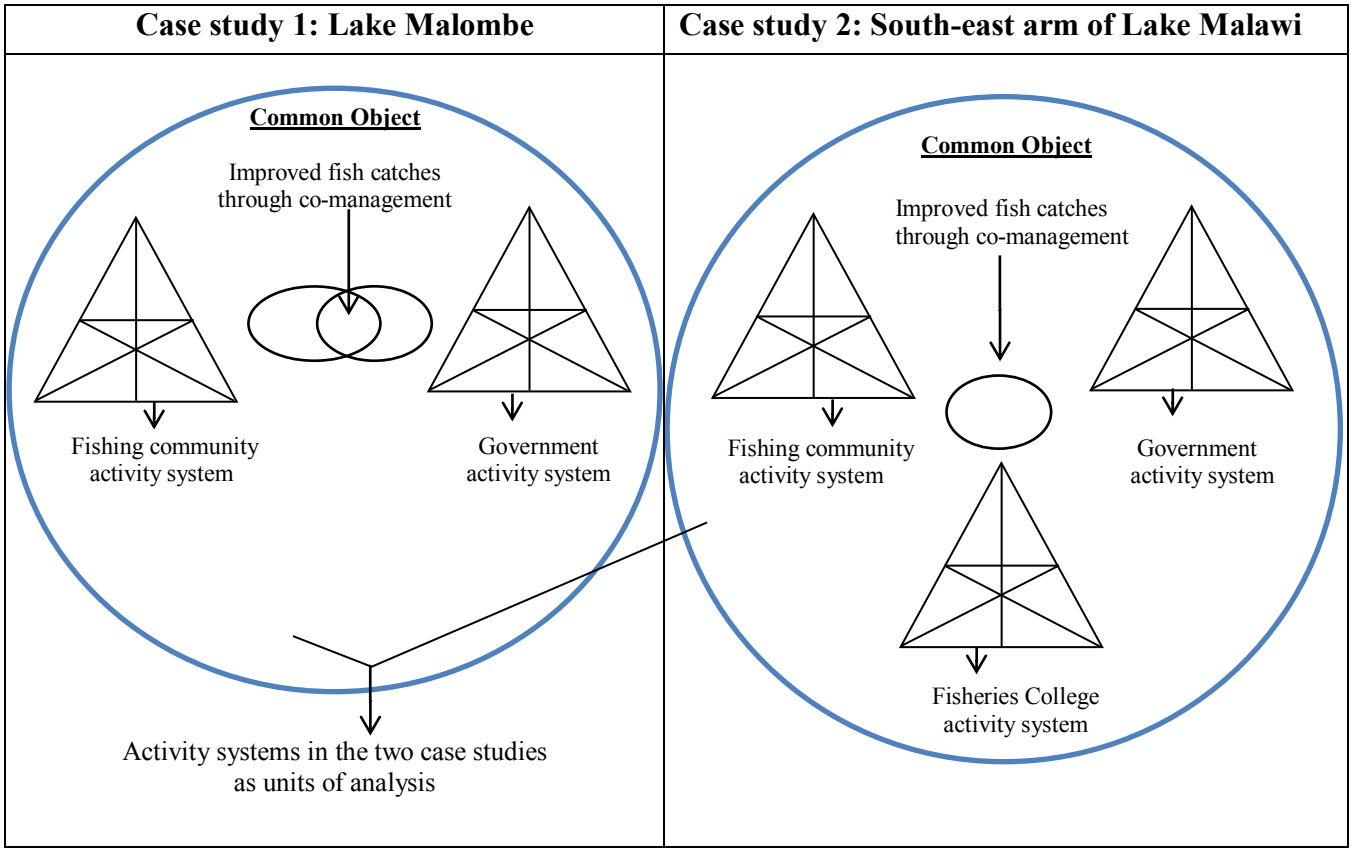


Figure 4.1: Multiple embedded case studies design in the study

4.2.3.1 Reasons for choosing case study research

Somekh and Lewin (2011) defined case study research as an approach that seeks to engage with and report complexity of social and educational activity, in order to represent the meaning of the individual social actors bring to those settings and the collective meanings they construct in them. According to Yin (2003; 2009) case studies are best used when one intends to answer the how and why questions which seek explanations.

A case study is richly descriptive and uses quotes from research participants (see chapters 5, 6 and 7), anecdotes and prose composed from interviews (Hancock & Algozzine, 2006), producing the means of thick description, which I mentioned above. The design of the study as cases of *formative intervention research* was appropriate because it allowed me to work deeply with co-management stakeholders in a way that reverberated with intensive research designs that involve intensive analysis and description of a single unit or system. Flyvbjerg (2001, 2006) argued that case study research produces practical knowledge to inform practical action. Emphasising the same, Tesch (1990, p. 39) defined a case study as an

intensive and detailed study of an individual or a group as an entity through observation, self-reports and any other means.

Berg (1998, p. 217) described three types of case studies: intrinsic, instrumental and collective. He further defined them as follows: intrinsic case study where the intention is to understand the intrinsic aspect of the particular entity; instrumental case study research that seeks to provide insight into particular issues or to refine some theoretical explanation, and collective case study as a form of case study research that involves some intensive study of several instrumental case studies in order to allow for better understanding or an enhanced ability to theorise about the larger collection of the case studies. Along the same lines, Bassey (1999) defined case study research as: theory seeking and theory testing (instrumental), storytelling and picture-drawing case studies (intrinsic) and theory generating case studies (collective). The case study research conducted in this study involved elements of all of the forms of case study discussed above. The case studies provide rich stories of the contextual and historical perspectives of fisheries co-management in the two contexts (intrinsic); it also focussed on the shared object of fisheries co-management, seeking to provide further knowledge of how to engage this object from a social perspective (instrumental); and it involved more than one case site, each with multiple activity systems, which helped with theory generation of expansive learning and transformative agency as a potentially emergent framework for extension education and training in the fisheries management sector in Malawi. These all contributed to situating my study as an educational and expansive social learning project in the fields of environmental education and natural resources management extension training in southern Africa.

The study was qualitative and according to Bryman and Bell (1988), qualitative design is an approach to the study of the social world which seeks to describe and analyse the culture and behaviour of humans and their groups from the point of view of those being studied. In accordance with Bryman and Bell's definition, Schutt (2004, p. 276) viewed qualitative study as seeking in-depth information from respondents' feelings, experience and perception on the subject. This was a key feature of this research in that it recognised the 'multi-voicedness' of the activity systems that I was engaged with (see Chapters 5 and 6). This required techniques of data collection that were commensurate with this intention. I now discuss the research processes that were followed to generate data.

4.3 Research processes

4.3.1 Choosing research sites

In line with the objectives and intentions of this research, the cases were chosen purposively and strategically. In selecting the case study sites, I drew on my knowledge of the sector, and the history of fisheries co-management in Malawi (see sections 1.5.3 and 1.5.4). Having previously participated in the fisheries co-management programme, I purposefully selected cases which had potential to help me answer my research questions. I sought to identify cases where the co-management programme was seen to be active, and where BVCs were actively engaged in the co-management process with other partners such as government officials and the Fisheries College. Flyvbjerg (2006, p. 230) called this information oriented selection, where "cases are selected on the basis of expectations about their information content". Site selection also relied on advice from the district fisheries officer who further sought confirmation from the locally based extension workers on the appropriateness of the two proposed areas. This kind of sampling was also guided by Engeström's (2007) approach to expansive learning. He indicated clearly that participants in cultural-historical activity theory research are not sampled randomly, but are determined by activity settings and their engagement with the object of activity (in this case co-management of the Lake Malawi fishery). The beaches that I selected were those that had a confirmed record of frequent meetings, had frequent contact with their extension agents and had a track record of being active BVCs. Through this approach, I was able to identify four BVCs in Lake Malombe and six BVCs in the south-east arm of Lake Malawi. The focus in both sites was on people who were involved in the shared object of fisheries co-management and also included those who had a historically informed experience of the fishery to provide the socio-cultural and historical perspective of the fishery and fishing practices (see Chapter 3).

In order to include research participants from both implementation and policy making levels, I included senior officers from the district fisheries office and the Fisheries College and this allowed for the clarification of policy issues which was an important part of the multi-voiced dialogue, since the shared object (co-management) was shaped by policy changes in fisheries management as described in section 1.4. I also involved some senior representatives from the district assembly like the Senior Chief for the Lake Malombe area to give guidance on the current policy implications at the district assembly level as he is a member of the district council committee where traditional leaders are seated. The research was also supported by both the district fisheries officer and the college principal who served as executive members at the district assembly level.

4.3.2 Case study site access procedures

In line with Yin's (2003) recommendation on case study research, I developed some procedures to help with the smooth running of my research with research participants in the Fisheries Department. These included: a) a letter of introduction from the University to the Department of Fisheries introducing the study, the focus area of the study and explaining why the study was being conducted within the fisheries sector (see Appendix 1); b) request from the university in the same introductory letter to allow me work with some officers as research assistants and some research participants in the Mangochi District where the two case sites are located (see section 1.2.1). This also meant working with fishing communities in the two sites (BVCs and traditional leaders and some selected fishing community members). I therefore had the opportunity to work with extension officers both at district level, and those locally based in both Lake Malombe and the south-east arm of Lake Malawi, research officers from the fisheries research station and lecturers from the Fisheries College which is located on the shores of the south-east arm of Lake Malawi in the Mangochi District.

To establish access to the case study sites and the research participants I started sharing the research processes and intentions with my research assistants and had several meetings with the district officers, the research officers and the college lecturers to agree on appropriate ways of approaching the study. Sample questionnaires were shared with the research participants for moderation and pilot testing before taking them into the field. The discussions with the research assistants allowed us to come up with guiding questions for both semi-structured face to face interviews and focus group discussions (see Appendices 2 and 3). We continued to reflexively modify these as was necessary to answer the research questions.

4.3.3 Phases of the study

The research process was divided in two phases: investigating and expanding phases (see Table 3).

4.3.3.1 Investigation phase

The investigation phase of the study responded to the first two research questions:

- What learning takes place among different stakeholder groups in the context of fisheries co-management that influences co-management practices?
- What are the learning and co-management practices that can be expanded in and through learning? (See section 1.7.3)

In the investigation phase I used a number of methods and techniques and these included: document analysis, semi-structured interviews, focus group discussions, and observations. This phase focussed on what different stakeholders in fisheries co-management learn from

each other, how they learn and also why they learn whatever they come across as they meet to discuss their fishing experiences. My starting point was the contextual profile data, where I did some interviews and focus group discussions to understand what was happening in the co-management programme and the issues around the implementation of co-management. The contextual profile process revealed the various systems in which stakeholders in the co-management operated and how they shared information within their systems. According to Sawchuk (2009), CHAT offers an explanation of learning through activity that helps to develop understanding of workplace learning, and in the investigation phase I concentrated on identifying existing processes of learning within these activity systems, which I later drew on to expand the learning across activity systems in the expansive phase (see section 4.3.3.2 below).

An important part of the investigation phase involved clarifying and capturing details of the different activity systems and how they were related to each other and the shared object. As explained in Chapter 3, I used Cultural Historical Activity Theory (CHAT) analytical tools to identify the main activity systems and produce a description and understanding of the activity systems and the multi-voiced nature of the activity systems involving different stakeholders. The CHAT units of analysis (as described in section 4.2.3 above) were used to identify the main activity systems. This initial careful analysis of the activity systems identified in both sites of this study revealed that the interaction of the elements within and across different activity systems have historical and emergent tensions and contradictions. These tensions are internal to specific activity systems and are therefore significant to the boundary crossing process of encountering a shared object as explained in third generation activity theory (see section 3.2.4, and Chapter 6), which I engaged in the expansive phase of the study (see below).

In this phase, a number of activity systems were identified in Lake Malombe and the south-east arm of Lake Malawi: a) Lake Malombe – *fishing community activity system* and *government activity system*. b) South-east arm of Lake Malawi – *fishing community activity system*, *extension and research activity system* and *Fisheries College activity system*. A brief introduction to the research participant groups involved in the activity systems that were engaged in the investigation phase follows, with further in-depth discussion on the activity systems, and their learning presented in Chapters 5, 6, and 7.

4.3.3.1.1 Lake Malombe Activity Systems

The *fishing community activity system* comprises gear owners, crew members, fish traders, fish processors, traditional leaders and people who are doing fish related businesses which are based in the areas where fishing activities take place. Also within the fishing community

activity system there are extension agents who are based in the areas where these activities take place and research officers who come to the areas for various research activities. Their core activity is managing fishing livelihoods.

The *government activity system* comprises government officers who are locally based in the areas, others who are from outside but come to work in the areas as well as those who are from other ministries or departments or NGOs who identify themselves as people working for the government. Their core activity is managing the fishery.

4.3.3.1.2 South-east arm of Lake Malawi activity systems

The *fishing community activity system* comprises gear owners, crew members (from commercial and artisanal sectors), fish traders, fish processors, and traditional leaders, church leaders, those from other community institutions and those doing businesses related to fisheries or those whose businesses depend on the fishery and are based along fish landing beaches. Their core activity is managing fishing livelihoods.

The *government activity system* is composed of local extension agents from areas where the activity systems exit, researchers undertaking research activities in the areas, other field officers doing various extension activities who sometimes work with the communities in other developmental activities, BVCs, traditional leaders and others from the district assembly. Their core activity is managing the fishery with reference to policy.

The *Fisheries College activity system* is composed of college lecturers and students who interact with the fishing communities doing different research programmes and also during the attachment period where students spend two to three months with the fishing communities. Their core activity is learning management and extension practices relevant to the fishery.

Peal and Wilson (2003) described an activity system as consisting of a group of people of any size pursuing a specific activity in a purposeful way. The investigation phase was therefore based on interactions with people within the identified activity systems.

4.3.3.2 Expansive learning phase

The expansive learning phase of the study responds to the third and fourth research questions:

- How can such learning be expanded amongst key stakeholders?

- How can expansive learning in co-management contexts inform the development of extension and training models, curriculum and approaches? (see section 1.7.3)

The expansive phase of the study also provides insight into question 1, viewed from an expansive learning perspective (see Chapters 6 and 7).

In this phase the Development Work Research methodology was used to facilitate an expansive learning process to allow stakeholders to debate and deliberate issues identified from the mirror data in change laboratory workshops (see section 4.2.1). Intervention / change laboratory workshops were set up using guidelines and tools from CHAT to enable research participants to jointly resolve selected contradictions in the two cases. The intention was to create a learning environment in which stakeholders could use the contradictions in and between their activity systems as fertile ground for learning. The approach also sought to enable research participants to analyse the historical contradictions and in a participatory manner trace the sources of the contradictions in fisheries co-management with an aim of building agency among stakeholders to reflect on their practices, and through this, develop their shared object (fisheries co-management).

The second phase of the expansive learning process involved a collective reflection workshop (called a 'way forward' workshop) where the researcher and the participants from the two sites (Lake Malombe and south-east arm of Lake Malawi came together to discuss the way forward after the modelling of solutions to the tensions and contradictions in the last intervention workshops (see section 7.5). During the way forward workshop, participants assigned each other responsibilities to drive the modelled solutions into action, effectively constituting an agency mobilisation and commitment process. The use of CHAT epistemologically provided both explanatory and intervention space, to improve organisational practice through interpreting practice as activity, and exploring the link between the event and context (Blackler et al., 2000).

The table that follows shows the design of the phases of the study and provides some explanation of the activities which were conducted in the research process.

Table 4.1: Research design in phases (investigation and expansive)

Phases 1	Research activities
Investigation phase	• Contextual profiling to identify research sites and activity systems, and to examine some perspectives on histories of the existing learning interactions which take place within and between interacting activity systems that share the object of co-management of the fishery • Develop deeper understanding of main activity systems that are engaged with the shared object of fisheries co-management which include fishing communities, government extension and research officers and college lecturers at the fisheries training college and explore how they are approaching the common object of fisheries co-management • Analysis of rules, mediating tools, subject, objects, division of labour (and interactions between these components of an activity system) of the different activity systems to understand how they interact within and across the activity systems and also how the stakeholders in the activity systems work together on the shared object of co-management • Identify tensions and contradictions that are arising within and between activity systems to see how these reflect new possibilities for expanding learning in co-management and participation in fisheries resource management *Reported in Chapters 5 and 6*
2. Expansive phase	
	• Expansive learning engaging the interacting activity systems in an expansive learning process and through change laboratory workshops using mirror data generated in draft form from the phase one research process. This helped to develop recommended solutions to fisheries co-management tensions and contradictions in order to find possible ways that can be used by the participants in the activity systems to enhance the co-management in the two sites • Critically review the proposed solutions with participants of the activity systems and investigate how these expansive social learning processes are potentially facilitating agency for co-management, and how these processes of engagement can inform extension and training programmes *Reported in Chapters 6 and 7*

4.4 Research methods used

A number of research methods were used to generate the kind of data required in the study. I used participatory and exploratory techniques in order to understand complex co-management activity systems and to mediate the development of agency among stakeholders. I used qualitative methods as discussed in more detail below.

4.4.1 Document analysis

Documented sources and literature provide an historical perspective of what has been happening and can therefore provide a good entry point for a study of this kind which is interested in culturally and historically shaped activities. In this research, I spent time reviewing documents related to fisheries co-management from the time it was established (see section 1.6.3) to more recent documents which reflect a stronger interest in co-management and collaborative forms of social learning among fisheries resource users and government extension officers (this informed the historical perspectives that I have been able to provide already in the thesis – see Chapters 1 and 2) and also helped with understanding the other sources of data generated through interviews, focus groups and workshops.

I also carefully reviewed various fisheries reports mainly on the co-management programme with specific reference to the two research sites (south-east arm of Lake Malawi and Lake Malombe) to obtain more specific historical perspectives and insights. According to Merriam (2009) documents carry the culture, history and context of practice. They are not dependent upon the whims of human beings whose cooperation is essential for collecting good data through interviews and observations. The document analysis process aimed at understanding how the co-management approach has become infused into the fisheries sector with focus on social learning processes in both extension and training programmes that focused on co-management and participatory fisheries management. The documents which were analysed during the document analysis process are listed in the table that follows.

Table 4.2: List of documents analysed

Case study	Documents analysed
Lake Malombe	1. Sampled reports from field extension officers and those compiled by the district fisheries officer to get an overview of the status of co-management from the grassroots 2. Co-management presentations in various workshops and conferences at national and international levels 3. Some minutes of staff and community meetings during the implementation of co-management 4. Research reports on proposed Lake Malombe management plans which were facilitated by GTZ project

	5. Published papers on Lake Malombe Fisheries Co-management Programme 6. Research reports on fisheries co-management programme in Lake Malombe 7. Management plan agreement report on the Chambo restoration for Lake Malombe 8. Fisheries and aquaculture policy
South-east arm of Lake Malawi	1. Sampled reports from field extension officers and those compiled by the district fisheries officer to get an overview of the status of co-management from the grassroots 2. Chambo Restoration Strategic Plan 2003-2005 3. National Environmental Policy 4. Revised Community Participation Fisheries Act 1997 5. Fisheries stock assessment report for south-east arm of lake Malawi 6. Annual statistical reports 2003-2013 7. Decentralisation process for Mangochi District and the local structures 8. The Millennium Ecosystem Assessment Report a. Ecosystem and human well-being – Biodiversity synthesis b. Living beyond our means – Natural Assets and Human Well-being
Malawi College of Fisheries	1. College curricula (old and revised) 2. Syllabi for the three programmes offered at the college (pre-service, in-service and user community) 3. Materials developed by the Community Outreach Unit established to develop extension materials for extension officers and communities 4. Previous curriculum review reports by external consultants 5. Fisheries and aquaculture policy

The documents listed above were collected from Mangochi District Office responsible for both Lake Malombe and the south-east arm of Lake Malawi. Extension officers from both sites submitted monthly reports to the District Fisheries Officer who compiled a district monthly report to the Director of Fisheries. My interest was to get an overview of fisheries co-management with a focus on learning that takes place among co-management stakeholders (see section 1.7.2). In order to ascertain the general status of co-management activities and with the aid of the District Fisheries Officer, we sampled monthly reports of the early, middle and current co-management programmes. I also looked at key reports from different projects which participated in the programme as well as key symposia reports and presentations. From the college I collected the previous and current curricula, some research reports conducted by the college, the fisheries and aquaculture policy and other relevant reports. With reference to the research questions I went through all the sampled documents, coded them by themes and

linked them to the four research questions (see section 1.7.3), to see how they were responding to the research questions.

Kaniki (2006) argued that a research project does not exist in isolation but must be built upon what has been done previously, and researchers should thoroughly review previous work in the field and/or knowledge of their research focus. The document analysis process prevented me from repeating what other researchers had done and also helped to provide some basic information about co-management and to identify gaps that this research would try to respond to. Documents provide first-hand information on what has been done in the context and what is significant to CHAT researchers as they capture important dimensions of the cultural histories and records of activity in and between activity systems. The analysis of the above documents was used for this purpose, in the same manner that the interviews and observations also helped in the capturing of important information on the cultural histories and activities. Merriam (2009) argued that data from documents can be used in the same manner as data from interviews or observations. My contextual profile (see section 1.7.1) further supported data from different sources of documents especially those on fisheries resource management. A number of research documents produced by other scholars from the Fisheries Department and researchers active in the region focussing on natural resources management informed the scope and direction of the study (see for example the reports on co-management in other lake areas presented in Chapter 2). I struggled to find materials on fisheries co-management in the fisheries libraries and I had to track such documents via individuals and through this strategy I often managed to get personal copies for my use. This in itself is an interesting finding for activity theory research in an extension training context: these would potentially be important mediating tools in Fisheries Colleges and education contexts, yet they appeared to be absent in the Malawian fisheries training context (see Chapter 7 for further reflection on this).

4.4.2 Semi-structured interviews

The second data collection research technique used in this study was the conducting of semi-structured interviews with key fisheries co-management stakeholders within the project areas who were associated with or active within the activity systems that formed the units of analysis for this study. The research interviews involved gear owners, crew members, government extension officers, local chiefs and BVC members in Lake Malombe and the south-east arm of Lake Malawi. This helped to facilitate the generation of multi-voiced perspectives from the activity systems. Interview results were recorded and transcribed. Video recordings were mainly for analysis and also provided stimuli for reflection (Engeström & Sannino, 2010) and allowed for further insight and understanding. A total of eight fishing community members, three extension officers and four lecturers from the

fisheries training college were interviewed. A small sample of co-management stakeholders was identified for more insight and in-depth understanding on what really takes place in fisheries co-management. Interviews lasted an average of twenty-five minutes and this allowed the participants to ask questions or gain clarification from the researcher (see Table 5 below for the details of the interviews. Hammond and Wellington (2013) noted that the value of interview is that it allows the researcher to probe an interviewee's account of events as well as their thoughts, values, feeling and perspectives more generally. The diversity of interviewees resulted in diverse information on the management of the fisheries resources in the two research sites (Lake Malombe and the south-east arm of Lake Malawi).

Figure 4.2: Semi-structured interviews with fishing communities and government extension officers on co-management

Terre-Blanche and Durrheim (1999) argued that conducting an interview was a more natural form of interacting with people than making them fill out a questionnaire, do a test or perform some experimental tasks, and therefore fits well with an interpretative case study approach to research. Interviews give researchers an opportunity to get to know people quite intimately, so that they can really understand how they think and feel (ibid.). Drever (1995) was of the view that in a semi-structured interview, the interviewer sets up a general structure by deciding in advance what ground is to be covered and what main questions are to be asked. The advantage of this method is that response rates are higher than in any other designs, and the interviewer is also capable of controlling the mode of questioning depending on the circumstances surrounding the respondent (Schutt, 2004, p. 258). As indicated by Drever above, using semi-structured interviews where interview schedules were developed in relation to my research questions provided some in-depth description of the historicity and current approaches to and thinking around learning processes in co-management and also provided insights into the activity systems and their dynamics. Semi-structured interviews are essential for qualitative data collection since they seek in-depth information regarding interviewees' feelings, experience and perception on the subject (Schutt, 2004, p. 276). In

semi-structured interviews, all questions are asked flexibly, but there is usually specific data required from all respondents (Merriam, 2009). Using a semi-structured face to face interview process opened up dialogue with the co-management research participants because apart from responding to the set questions, the process enabled explanations and debates on contradictions experienced in fisheries resource management in relation to co-management. There was flexibility in the use of face to face semi-structured interviews and the process helped me to gain knowledge and experience of how people in fisheries co-management learn from each other and the reasons behind their continuous interactions.

Confirming the importance of using semi-structured interviews in qualitative research Bloor and Wood (2006) indicated that an in-depth interviewing (semi-structure interviewing) process sacrifices reliability in pursuit of validity, and that such interviews give prominence to fully accessing social meaning at the expense of repeatability. I decided to interview a range of people in the two research sites in order to access a diversity of stakeholders' perspectives whose voices in most cases are less frequently heard in the fisheries co-management programme. Interviews allow the researcher to see an event or context from the point of view of the people participating in the research (Hammond & Wellington, 2013) and as observed from the study, interviews were more interactive allowing for clarification of questions and identification of new knowledge in fisheries co-management. Table 4.3 below contains the full list of people who were interviewed by gender, designation and experiences in fisheries management.

Table 4.3: List of people interviewed in the two research sites

Interviewee	Gender	Designation	Years of experience	Date of interview
Interview 1	Male	District Officer	17 years	January 2011
Interview 2 Interview 2 b	Male Female	Extension Officers	31 years 3 years	January 2011 January 2011
Interview 3	Male	Chief - Mbenji	Over 40 years	January 2011
Interview 4	Female	BVC member	7 years in BVC	December 2012
Interview 5	Female	MCF - Lecturer	7 years	December 2012

Interview 6	Female	MCF - Lecturer	16 years	December 2012
Interview 7	Male	MCF - Lecturer	19 years	December 2012
Interview 8	Male	MCF - Lecturer	23 years	December 2012
Interview 9	Male	BVC member	10 years in BVC	December 2012
Interview 10	Male	Chief - Malindi	Over 40 years	December 2012
Interview 11	Male	BVC member	7 years in BVC	December 2012
Interview 12	Male	BVC member	8 years in BVC	December 2012
Interview 13	Male	BVC member	4 years in BVC	December 2012
Interview 14	Female	BVC member	4 years in BVC	December 2012
Interview 15	Male	BVC member	Over 20 years fishing	December 2012
Interview 16	Male	Chief - Malombe	Chief – 40 years	December 2012

The use of video and audio recording[8] in the face to face interview process allowed me to refer back and forth to different parts of the interviews. During the analysis process I was able to listen and verify the captured information with the audio recording, a process that enabled me to check the validity of the information and where it was coming from.

4.4.3 Observations

Observation is a technique which is often used in case studies. In this research, I used observation during the entire research process as different co-management stakeholders were engaged in interactions within and across the activity systems. Observations were used to probe deeply and intensively into the kind of learning taking place and this allowed me to see and learn things that were not obvious during the deliberation process. This helped me to access what the participants do, rather than what they say they do, as noted by Bloor and Wood (2006). Through observation, I had the opportunity to see what took place *in situ* as people continuously interacted with each other (Cohen, Manion, & Morrison, 2007). I completed the following observation visits during the research period (see Table 4.4 below). In each observation visit I spent at least three days with the fishing communities and related stakeholders observing their practices, interactions and discussions.

[8] Both video and audio recording were used to serve as reference points during data analysis and provided a picture of the situation on the ground.

Table 4.4: Summary of observations made in the sites and reasons for observations

Observation site	Purpose of observation	Date of observation
Mwalija fish landing site (Lake Malombe)	To observe the fishing gear and fish landing sizes	January 2011
Mtambo fish landing site (Lake Malombe)	Interaction of BVC members, local leaders and extension officers during their meetings	January 2011
Makawa fish landing site (south-east arm of Lake Malawi)	Interaction of BVC members, local leaders, extension officers and fish traders during their meetings	February 2011
Mangochi District Fisheries Officers and Malawi College of Fisheries lecturers	Interactions during their monthly meetings to see how they relate what is taught at the college and what is experienced in the field both Lake Malombe and south- east arm of Lake Malawi	December 2012
Malawi College of Fisheries	Interaction among co-management stakeholders (Lake Malombe, south-east arm of Lake Malawi and college lecturers during way-forward workshop	September 2013

I used photographs to facilitate some of the observations and video recordings to capture deliberative processes. The recorded learning discussions and the field notes made during site visits were used for further analysis to understand how people learn, how they are engaging with the shared object of fisheries co-management, and the importance of such learning to sustainable fisheries management. Observation provided me with hidden information on how they react to the existing contradictions and confusions as they interact with each other. Observation was also a key strategy used in the Change Laboratory Workshops which I discuss in more detail below.

4.4.4 Focus group discussions

A number of Focus Group Discussions (FGD) were also held in each research site with gear owners, crew members, fish processors, fish traders and government extension and training staff. Cohen et al. (2007) defined focus groups as contrived settings that bring together a specifically chosen sector of the population to discuss a given theme or topic leading to data

and outcomes. Discussions focused on sustainable fishing practices through guided debates and deliberations among fisheries co-management stakeholders.

Figure 4.3: Focus group discussions with co-management stakeholders in the south-east arm of Lake Malawi and Lake Malombe

I decided to use focus group discussions to allow participants to interact among themselves with minimum intervention from me as a researcher. A set of guiding open questions were used to generate discussions on specific areas for some in-depth understanding of the set topic. According to Terre-Blanche, Durrheim and Painter (1999), when one works with a group of people one gains access to understanding differences between people who might previously have been thought of as a homogeneous group. On the same note Patton (2001) said that in focus group discussion participants get to hear each other's responses and to make additional comments beyond their own original responses as they hear what others say.

According to Kilzinger (1994), interaction within focus groups allows the researcher to determine how group participants view the issues with which they are confronted in their own terms. The posing of questions by fisheries stakeholders, and their agreements and disagreements helped to bring forward their views and the resolutions of the disagreements helped the participants to express their views. The process also provided an opportunity for facilitating the emergence of a multi-voiced engagement on the shared object of fisheries co-management.

Using focus group discussions allowed me to triangulate data from the three earlier methods and extend perspectives further where a number of issues were discussed and references made requiring further clarification. Terre-Blanche et al. (1999) confirmed that triangulation of data entails collecting materials in as many different ways and from as many diverse sources as possible. The technique therefore sought to provide a deeper understanding of the learning interactions where contradictions were identified for further discussions during

change laboratory workshops with representatives of stakeholders. Face to face interviews and focus group discussions allowed for dialogue with and among stakeholders during question and answer processes and also as people strove to elaborate on issues that needed to be addressed with all those involved. The focus group discussions drew people from all the fisheries co-management activity systems together, and the aim was to consolidate and get more insights into contradictions that emerged via use of the previous data generation techniques (document analysis, semi-structured interviews and observations). The issues (contradictions) that emerged from the focus group discussions were used as mirror data in change laboratory workshops where stakeholders from the two research sites were brought together to deliberate on these issues (see section 4.4.5 below).

Morgan (1998) recommended a smaller group for focus group discussions as participants are likely to have more chance to say what they think; he suggested that a typical group size of six to ten members is most appropriate. A total of five focus group discussions were conducted in the two sites and the compositions of members included BVC members, local chiefs, extension and enforcement officers and college lecturers. Members in the focus group discussions were selected based on knowledge of co-management, experience in co-management and gender. A maximum of ten people were selected for each focus group discussion. The table that follows gives details of the stakeholders that were involved in the focus group discussions.

Table 4.5: List of focus groups conducted

Focus group	**No of people**	**Case study area January and February 2011**
Malindi	8 (7 males, 1 female)	South-east arm of Lake Malawi
Makawa	7 (6 males, 1 female)	South-east arm of Lake Malawi
Kadewere	10 (6 males, 4 females)	Lake Malombe
Chimwala	7 (6 males, 1 female)	Lake Malombe
Malawi College of Fisheries	8 (6 males, 2 females)	South-east arm of Lake Malawi

Data collected during the five focus group interviews provided good insight into how co-management was perceived by different people from different institutions. The use of CHAT as analytical framework helped to frame thick descriptions of what learning occurs in fisheries co-management and the process also surfaced contradictions to be mirrored in change laboratory workshops.

As discussed above focus group discussions in the study provided well debated views on how people perceive co-management in the fisheries sector and some of the issues that stakeholders felt were constraining the proper implementation of co-management practices. However as I was facilitating the discussions I noted a number of limitations:

- During the semi-structured interviews people had very strong views about co-management because they were contacted as individuals unlike in the focus group discussions where people were able to debate and agree on a point as a group.
- It took me time to mobilise people to come for the discussions. Since most of the discussions took place in chiefs' homes, where according to cultural practices any meeting was to be controlled by the chiefs and BVCs, people may not have felt free to discuss all things; power relations in the research setting and interactions need to be considered. Some of the stakeholders felt that the focus groups should be held in a more 'neutral' place, away from the homes of the chiefs. They made reference to previous BVC training sessions which were conducted away from their areas to avoid bias and to create a more 'neutral' power relation space.
- Some of the focus group members were very vocal and some felt that they were given less chance to express their views. In some areas, for example in Kadewere (Muslim dominated) few ladies spoke regardless of efforts to encourage them to participate in the discussions. This again demonstrated the implications of cultural structures and power relations in influencing research processes, an issue which I reflect on in the final chapter of the thesis (see Chapter 7). These concerns made me think more deeply about the assumptions of 'multi-voicedness' in CHAT research, and how one might think about the concept of multi-voicedness in a southern African community-based research setting.

4.4.5 Change laboratory workshops

Change laboratories are tools for transforming activity, used by researchers within the broad theoretical and methodological framework of Developmental Work Research (Engeström, Lompscher, & Ruckriem, 2005 in Sannino, 2008; see section 4.3.2.2 above). Fleming (1997) defined a workshop as a participatory learning meeting that empowers people through active sharing of knowledge, skills and experiences. On the same, Moon (2000) argued that a workshop was a way of turning experience into knowledge. In this study, I conducted two change laboratory workshops, one in each case study site (one in Lake Malombe and one in the south-east arm of Lake Malawi).

A detailed presentation of the mirrored data with tensions and contradictions from the investigation phase was made. Workshop participants in the two workshops were given time to discuss the mirror data in small groups to critically assess whether it was a true reflection of what was discussed during the investigation phase of the study. This allowed a reflection of the mirror data and some additional inputs especially from those who might not have been part of the first phase.

Tensions and contradictions were identified, presented and discussed as these had emerged from within and across activity systems. As mentioned in Chapter 3, CHAT provides a theory and methodology to examine how groups of people with different perspectives working on the same object can work on a new problem and jointly develop new knowledge and tools to address the problems (Engeström, 1987, Daniels, 2008). On the same Engeström (1999b) proposed use of change laboratory workshops as a methodology for expansive learning that engages boundary crossing between activity systems (see section 3.2.4). The expansive social learning process (through the use of change laboratory workshop) focused on historically emerging tensions and contradictions in the three identified activity system. It aimed at seeking to expand the fishing communities' and fisheries extension officers' understanding through questioning, reflecting, utilising participants' multiple understandings (Engeström, 2003), through a vigorous reflexive deliberation that also focused on model solutions (Mukute, 2010).

Figure 4.4: Change laboratory workshop sessions with fisheries co-management stakeholders

The approach in the fisheries sector and during the workshop process was unique in that no one amongst the stakeholders, or myself as researcher, had answers to the contradictions which were identified during the investigation phase. As I was going through the list of contradictions, participants started to add more contradictions (often refining them in the process). They requested that the new perspectives on the contradictions be highlighted because they felt were very important and required thorough discussions.

The four Change Laboratory Workshop sessions used in the study were modelled on the layout developed by Engeström and his colleagues in Helsinki (Engeström, 2007) where the research intervention was based on expansive learning cycle consisting of DWR steps:

1. Drawing on ethnographic evidence to question existing practice
2. Analysing the historical origins of existing practices and bringing the analysis to bear in analysing current dynamics within and across services
3. Modelling an alternative way of working
4. Examining the model to understand its dynamics, strengths and pitfalls
5. Implementing the model and monitoring the process and impact of implementation in the dispositions and action of professionals
6. Drawing on these data to reflect on the processes and outcomes.

4.5 Expanding phase with management stakeholders – boundary crossing processes

The mirroring of data during the expansion phase followed the DWR processes outlined above with all the co-management stakeholders. The mirror surface was used in the change laboratory sessions (see the figure below) to examine the experiences from work practice, particularly problem situations and disturbances, but also to open up novel solutions (Daniels, 2008, p .134). The workshop process provided opportunities for different stakeholders to reflect on what was currently happening in different areas, the practices taking place, interactions among fishing communities, change in fishing practices and the support BVCs and the entire fishing community were receiving from local leaders and government in different areas. The discussions also examined past practices and their implications, as well as the present and the future (most of the stakeholders continuously alluded to conserving the fish stock for the future generation) (see Chapter 2). The involvement of stakeholders from different backgrounds was aimed at obtaining a diversity of views, ideas and suggestions through a concise workshop process. The DWR workshop layout was used with an intervention model where stakeholders were taken through the ideas, tools looking at the past present and the future and the mirroring of the data. Full recording processes supported a thorough deliberation process. The figure below outlines the mirror surfacing process.

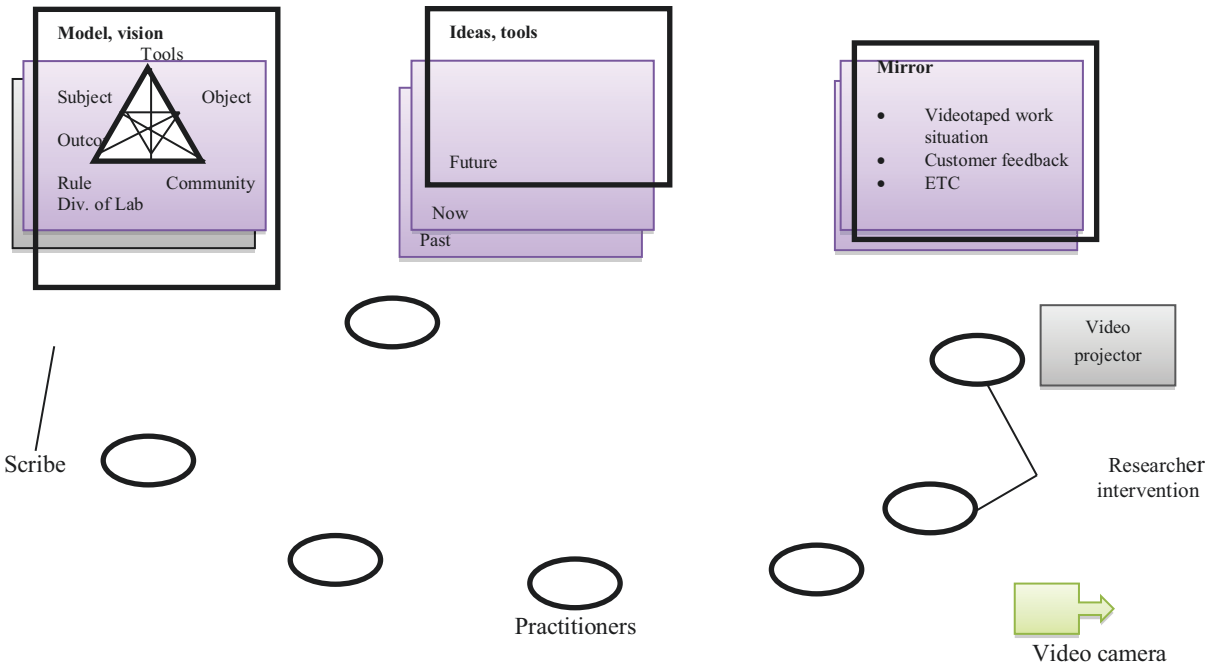


Figure 4.5: Typical DWR workshop layout (Adopted from Engeström (2007) in Daniels, 2008, p. 133)

Fisheries co-management practitioners during the change laboratory workshop process faced the surface and also faced each other. As an interventionist researcher, I was also present, and I was mainly responsible for giving directions and facilitating the deliberation process. Video recording took place throughout the workshop process and whatever was recorded on the first day was reviewed on the second day as part of the feedback session before continuing with the second day's deliberations.

The first day's interactions took two hours and 45 minutes. Because of the review session the second day's session took three and a half hours. In deliberating the contradictions workshop participants referred to:

- *Present practices in the fishing industry*: They deliberated on, and further refined the contradictions that I presented as mirror data and discussed possible causes with reference to the practices of fishers;
- *Past practices*: Practitioners deliberated best approaches and practices and discussed what could be learnt from the past by looking at the historical development of their working practices from their different perspectives;
- *Future practice*: Practitioners made suggestions on new forms of knowledge and practices that can effect sustainable fisheries management.
  (Applied from Daniels, 2008)

The intervention workshops for both Lake Malombe and the south-east arm of Lake Malawi took place in March and April 2013. The workshops for the two areas were run separately

with a two-day workshop in each site. The people involved were BVC members, local leaders, fish traders and processors, fisheries extension officers and lecturers from the Malawi College of Fisheries. The DWR process emanated from the findings of the first phase of the research where research interviews, focus group discussions and observation data produced the initial mirror data. This data documented observed and identified tensions and contradictions which were then further discussed and refined as outlined above. Participants were divided into mixed groups to discuss the tensions and contradictions (see Section 4.4.5 above). A total of 14 participants in the first site and 12 in the second site were present during the change laboratory workshops. Discussions on the identified tensions and contradictions took more than two hours as stakeholders engaged in deep analysis of the identified tensions and contradictions and people gave different views on the contradictions. After agreeing on the contradictions there was further discussion regarding the causes of the contradictions in mixed groups of BVC members, local leaders, fish traders and those from government. Solutions to the contradictions were suggested in plenary by all the stakeholders.

After lengthy discussions in groups and plenary sessions on the causes and solutions to the contradictions, there was still a lack of commitment for the mobilisation of transformative agency among co-management stakeholders. Engeström and Virkkunen (2007) defined transformative agency as participants' capacity to take professional actions to change their work action and this is discussed in Chapter 8 (section 8.6). A way forward workshop with selected co-management stakeholders from both research sites (Lake Malombe and south-east arm of Lake Malawi) was therefore organised to surface the agentive commitments required for transformative agency among members and to support them to take action towards their object (co-management).

4.6 Triangulation

Research methods are those methods/techniques used for collecting data or performing research operations (Bryman & Bell, 2007; Kothari, 2004). I used different data collection techniques in order to triangulate the data generated and to make claims. I present evidence of sourced in different ways to enhance triangulation and depth of interpretation. I used different sources of data generation to ensure the trustworthiness of the research findings. The reason for triangulation in research is to reduce false or inaccurate conclusions or claims by drawing data from sources that have different potential threats to validity.

The four methods of data generation used in this study provided me with data from diverse backgrounds and the use of CHAT allowed for formative intervention research, and also for analysis of primary, secondary, tertiary and quaternary contradictions. The tensions and contradictions were observed in all the activity systems and between them.

As indicated by the process descriptions above, this approach allowed for reflexive engagement with data amongst the research participants, leading to a number of changes after mirroring the data to stakeholders, as described in the next chapters of the thesis. Engeström (2005) noted that expansive learning is built on overcoming current contradictions and draws on the strengths of joint analysis and concrete transformation of current practices.

4.7 Data analysis

4.7.1 A layered approach to the analysis

The collection of data through interviews, observations, focus group discussion and change laboratory workshops was followed by data analysis, with some of the analysis being done after the first phase of understanding the existing situation in order to present mirror data for the second expansive phase (as explained above), thus representing a phased approach to the data analysis.

As indicated above, I made use of different data generating techniques to produce rich data. This was subjected to triangulation which was a strategy used to enhance the trustworthiness of the interpretations. Triangulation is an attempt to validate research findings by generating and comparing different sorts of data. Somekh and Lewin (2011) were of the opinion that data analysis is about creating new ways of seeing things, ways which are as unexpected as they are convincing. All five techniques used in this study were aimed at obtaining a common understanding of the learning that takes place as different communities of practice interact and learn from and with each other.

As discussed in Chapter 1, the study has three main research questions (see section 1.9.3) and the first phase of the study answers the first question: *what learning takes place among different stakeholder groups in the context of fisheries co-management that influence co-management practices?* The analysis in the investigation phase focused on:

- Understanding the interacting activity systems in fisheries co-management;
- Exploring learning interactions taking place in and between them;
- Identification of tensions and contradictions within and across the activity systems.

Findings from the contextual profile identified three activity systems where different players in co-management interacted within and across the activity systems (see Section 4.3.3.2 above, and Chapter 5). After going through the data associated with the different activity systems, I then developed research focus areas in relation to my research question 1. Using the focus areas, I coded all the data from document analysis, interviews, and focus group discussions using colour codes for easy identification. The identification of the three activity

systems helped me to categorise and code the learning taking place in relation to the activity systems and their dynamic elements as described by Engeström (see Section 3.2.5). The outcome of this analysis was the identification of the tensions and contradictions that were found in and between the activity systems in the two sites (see Chapter 6), which I then used as 'mirror data' to establish the interventionist dialogue in the formative intervention workshops (described in Section 4.5 above).

The second phase of the data analysis therefore was focussed on the process of engaging with the mirror data, where the findings from the first phase were mirrored in the DWR process, and expanded through the change laboratory workshop interactions with the fisheries extension officers and representatives from the fishing communities and college. The second phase answers the second, third and fourth questions of the study: *What are the learning and co-management practices that can be expanded in and through learning? How can such learning be expanded amongst key stakeholders?* Lastly *how can expansive learning in co-management contexts inform the development of extension and training models, curriculum and approaches?* As far as possible, data and analysis should be produced and treated as the property of all participants, mediating a crucial dialogue which transforms relevant cultural elements in participants' lives (Somekh & Lewin, 2011, p. 185). This was also a form of 'member checking' (ibid.).

Co-management stakeholders in the change laboratory workshops were asked to continuously reflect on the fishing practices of the past, the present and also of the future. The process allowed them to explore the current contradictions, and in relation to their shared object (co-management), model solutions towards sustainable fisheries resources. Using the historical and cultural context of fisheries co-management, solutions to the contradictions were taken further to a way forward workshop to build commitment for transformative agency among all the stakeholders (see Chapter 3). All these processes were documented and analysed through use of the DWR framework and the transformative agency perspective of CHAT (see Section 4.2.1, and Chapters 5, 6 and 7).

Following the analysis and reporting of the expansive learning phase, a third layer of analysis was undertaken in this study. This was done through a critical analysis exploration of the emerging issues in the first and second phases of this research *in relation to* the current context and trends in extension training as reflected on in Chapter 2. This allowed me to develop a model of learning for community based adaptation to fisheries resource depletion that can be used to guide extension education and training for sustainability in fisheries resources co-management.

Overall, this cultural historical approach to the data generation, learning expansion using data analysed, and engagement with contradictions involved a reflection on past fishing practices,

present practices and on how these differ from the past practices. It also included interpreting future fishing practices where stakeholders were engaged with clarifying where they would like to be in the future.

4.7.2 Modes of inference

Through reflecting on the aims of the study (see Section 1.7.2) I developed themes both abductively (where I used theoretical and contextual insights to recontextualise the data) and inductively (where I identified themes that were embedded in the data through induction using constant comparison of data). Danermark et al. (2002) explained abductive and inductive forms of analysis in more detail. There are few research methodology books that differentiate inductive and abductive approaches to making inferences, but this differentiation is very important in this study. Many of the research textbooks tended to focus more on the difference between deduction and induction as modes of inference, but this does not accommodate modes of inference that work closely with theory, but that do not seek to prove or disprove a theory (as in deduction). Abductive analysis allows for this process, hence I discuss it in more detail here, and differentiate it from induction as used in this study.

Induction is a mode of inference that involves a researcher drawing conclusions from a number of observations (Danermark et al., 2002, p. 80). The researcher seeks out similarities in a number of observations and relates them to each other. If a study is 'fully inductive' or only inductive, the researcher would draw the conclusion that the similarities found in the data apply to non-studied cases (ibid.). In my research, I used induction mainly to identify common themes related to learning within the activity system context, and the study was therefore not a purely inductive study.

I made much more use of abduction as a mode of inference in this study. Danermark et al. (2002) described abduction as follows:

> …to interpret and recontextualise individual phenomena within a conceptual framework or set of ideas. To be able to understand something in a new way by observing and interpreting this something in a new conceptual framework … [this] … provides guidance for the interpretative processes by which we ascribe meaning to events in relation to a larger context. (p. 80)

Abduction therefore involves "redescription or recontextualisation" (ibid., p. 89). In the case of my study, I redescribed the learning of those involved in fisheries co-management through the use of CHAT language of description, lenses and approaches. Danermark et al. (p. 90) went on to say that "What is common for all abductive inference … is that the conclusion provides new insight as an outcome of our interpreting or explaining something with the help of what Pierce called the 'rule' [or frame of interpretation]" (p. 90). They suggested further that this is always a 'fallible insight' … as the conclusion is one of many possible conclusions. For example, if I had interpreted the learning of those involved in fisheries co-

management through lenses of behavioural approaches to education and learning, I would have come to a different conclusion. For this reason it was important for me to justify *why* CHAT was an appropriate theoretical framework to guide this study, as I did in Chapter 3. Understanding the work of abduction in a study such as this is also important, and Danermark et al. (2002:91) explained, drawing on the work of Pierce, that "Abduction is to move from a conception of something to a different, possibly more developed or deeper conception of it". This accords with the intentions of CHAT which seeks to, through formative interventionist research, *contribute to the development of human activity,* offering a potentially more developed object of activity, in this case co-management. This would therefore also seem to be an important validity measure of this form of analytical work in a study such as this. Danermark et al. 2002:91 suggested that redescription takes place when theory is used to redescribe a phenomenon under investigation, and that recontextualisation takes place when something is observed, described, interpreted and explained "in the frame of a new context". They suggested further that these processes are "a central element in scientific practice", and they go on to say further that "Social scientists do not discover new events that nobody knew about before. What is discovered is connections and relations, not directly observable, by which we can explain already known occurrences in a novel way". In my study this is true, because much is already known about human learning, but what is new is the way in which I have sought to recontextualise insights on human learning to the context of fisheries co-management through understanding such learning processes in and between the activity systems concerned, and then relating this to trends in extension training.

4.7.3 Coding of data

Coding entails the reviewing of transcripts and or field notes and giving labels (names) to component parts that seem to be of a potential theoretical significance and or/and that appear to be particularly salient within the social words of those being studied (Bryman & Bell, 2007). In trying to sift through my data, organise it and explore the emerging relationships, I did what Miles and Huberman (1994) called data reduction which is the selecting, collating, summarising, coding and sorting into themes, clustering and categorising. I give an example of how I did this below to illustrate the abductive processes followed.

Analysing how different actors in the two case studies interacted with each other around the common object of co-management revealed that people work in *two main activity systems* in Lake Malombe (fishing communities and government) and *three activity systems* in the south-east arm of Lake Malawi (fishing communities; extension and research and also fisheries training). I used the concept of activity systems to make this analysis, redescribing engagement with the object of co-management using CHAT's unit of analysis framework.

In order to understand the roles of stakeholders in different activity systems and their engagement with each other, I developed an outline of what stakeholders did in the co-

management programme using thematic coding (to identify different kinds of roles) and I then abductively interpreted this using Vygotsky's mediational triad (first generation CHAT) and Leont'ev's work (second generation CHAT). In doing this, I described in some detail the way in which different people working closely with each other had different contributions to make. I could describe this with more insight from an activity systems perspective using the relational descriptors provided for in CHAT's activity system descriptions. This allowed me to then describe the activity systems, and learning interactions taking place within and across the activity systems, as well as contradictions and tensions arising within these activity systems (see Section 5.2). Using the first generation CHAT helped me to understand who the subjects among the many actors were, what these subjects were working on as their object and its outcome, and the tools they were using to mediate their object and outcomes in both case studies. Using the second generation CHAT I was able to further understand the rules that were influencing them as they worked towards the object, who the people were that were working together with the subjects, and how they shared responsibilities and divided up their labour as they worked on the object together, which in this study is co-management. By focussing on the relational elements within the activity systems and between activity systems, I was able to surface the contradictions and tensions that were then used for mirror data in the second phase of the research. This shows the abductive process at work, and more detail as to how this realised the interpretations in the study is provided for via empirical descriptions in the next chapters of the thesis.

4.7.4 Reflexivity

4.7.4.1 Reflexivity and the researcher's role

As I was engaged in the data generation process through interviews, focus group interviews, observation and change laboratory workshop, I recognised the needed to take note of a number of things which at times were overlooked and which affected the data collection process. Reflexivity refers to self-transformative capacity and involves the use of knowledge to create further knowledge (Delanty, 2005). On the same Woolgar (1988) defined reflexivity as the willingness to probe beyond the level of straightforward interpretation and to explore how the biases and characteristics affect the research process.

The study was a fisheries study which was done within my working area, Mangochi District, where I worked for more than 11 years as a college lecturer and also as a District Fisheries Officer (see Section 1.3). Some of the tensions and contradictions emerged when I was working in the area meaning they were part of the system then. It was therefore important to understand my role and position in the study as an interventionist researcher. I was conscious of my role not only to share and document events but also to comment on discussions related to practical interventions to help stakeholders to engage with underlying causes of the current

co-management practices. My role was to help all involved in this research to share and deliberate knowledge and facilitate knowledge creation through the deliberations at various levels to respond to a number of issues related to fisheries co-management (see Section 4.3). As noted above in Section 4.1, methodologically CHAT is a form of formative interventionist research that stresses the integration of basic theoretical work with empirical engagement (Somekh & Lewin, 2011, p. 185).

In order to take account of my role in the research and to make this more visible, I used thick description and included a number of direct quotes in the text (see Chapters 5,6 and 7). Direct quotes can also help the researcher to demonstrate reflexivity and awareness of the researcher-subject relationships. This on its own is not enough however, and the researcher needs to reflect on his or her awareness of the power relations that exist in the research setting, and that exist between the researcher and the people involved in the research. The researcher needs to show that he/she has sought to deal with this by giving voice to participants in a way that is not mediated by their own interpretations (Bryman & Bell, 2007, p. 714). This is reflected throughout the study and is highlighted in particular in Chapter 5 of the thesis.

4.7.4.2 Reflexivity and the fishery practice context

In the section above that describes the data generation process I outlined a number of research approaches used such as the interviews with different co-management stakeholders in the two case study areas and focus group discussions. However, what this section did not do, was explain how the context of practice influences how one can do such research. Interviews took a lot of time to set up, and I had to find ways of 'catching' fishers and BVC members when they were available, because fishing communities spend most of the day out on the lake fishing and when not out fishing, they tend to be busy maintaining their fishing gear. I therefore had to wait around until they could make time for me. Focus group discussions too had no specific pre-determined time allocated because the identified stakeholders could not easily be 'tied down' to a date, and I had to rely on their goodwill to come together and meet with me. In this regard, I was grateful that the BVCs used their organisational capacity to bring people together to meet with me.

For the change laboratory workshops some members came only on the first day while new members appeared on the second day. The workshop process took longer than expected because it had to provide a reflection of what took place the previous day particularly for the new members. This is not untypical of research in community contexts (e.g. Masara, 2011; Mukute, 2010) where research demonstrates that community members have many demands on their time. They are not generally regulated by modern institutional time regimes, but rather by the needs for livelihood construction and social engagement according to their

cultural and social norms and normalised practices. The researcher therefore needs to fit into these. The inclusion of other co-management stakeholders who were not in the workshops was noted as important by some participants and in subsequent workshops; efforts were made to include them. There was a mix of languages in all the workshops because of the diverse composition of participants and translations were made to make sure everyone understood what was going on.

4.7.4.3 Reflexivity in relation to the Fisheries Department and other institutions

At the end of the workshops I had an opportunity to meet the Director of Fisheries; he wanted to know about the progress of the research and about what was emerging from the research. An un-official reflection of the workshop deliberations was given and he requested that the department be given access to the recommendations to see if some of them could be dealt with. Some unofficial communications from colleagues who were present in the workshops gave further indications that the research might be beneficial to the department.

> Chris Nyasa: Yes brother. The work you are doing Fisheries is going to benefit a lot if they are serious with the management of fisheries. *Dzulo kunali meeting ya asodzi akuluakulu ndi Dept ndipo nkhani ngati zimene zija zamuworkshop yathu zinatulukannso*. It was a good meeting only that we lacked the approach to present the issues to semi commercials. As a result important issues were not responded adequately. (Facebook personal communication, June 7, 2013)

For more than two years, I worked as a district fisheries officer in Mangochi where I was controlling the activities in the two current research areas (Lake Malombe and south-east arm of Lake Malawi). This meant that I was at that time the implementer of the co-management activities and the tensions and contradictions surfaced in the study were reflecting the work I was part of. However, it was very important to remember that now I was working as an interventionist researcher and my position and role in the research were very crucial. It was important to take into consideration my role as an interventionist researcher and acknowledge that I too look forward to new knowledge and ideas emerging from the study.

4.8 Research ethics and validity

The research process carried out during this study prioritised and was based on social research ethics principles which include:

4.8.1 Autonomy

Terre Blanche and Durrheim (1999, p. 62) discussed the need to respect the autonomy of all persons participating in the research work. This research observed issues such as:

i. Voluntary participation;
ii. Informed consent of research participants; and

iii. Freedom of participants to withdraw from the research at any time and participants' rights to anonymity in any publication that might arise out of research.

All the research participants who were involved in this study participated in the study on voluntary a basis, and were free to leave at any stage of the research process. I endeavoured to show my respect for the research participants throughout the study. Wellington (2000) argued that participants in a research study have the right to be informed about the aim, purpose, findings and their potential consequences. Before the study commenced, I organised a briefing of all the research participants where I explained the aim and purpose of the study including some of the benefits the study might bring to the fishing communities in terms of better understandings between the government and the communities as well as sustainable fish catches as a long term benefit.

The research process also took into account the following three research values in social research: respect of person, respect for truth and respect for democratic values by recognising participants' contributions in the workshops, including and clarifying their views to reflect the truth and allowing people to express their democratic principles without fear or favour (Bassey, 1995). I asked for permission to take pictures, videos, audio recording of all the discussions in the two case studies and also permission to use the names of research participants and pictures in the research report (see Appendix 1). In all the meetings I organised with stakeholders they were assured of full use of materials and any evidence obtained in the study and I indicated throughout that they would be fully acknowledged for their contributions to the study. Terre-Blanche and Durrheim (2002) argued that in a research process there should be freedom for research participants to withdraw from the research at any time depending on the interest of individuals. I offered this freedom to my research participants.

4.8.2 Non-maleficence

Macklin (2002) stressed that the researcher should ensure no harm to research participants as a direct or indirect consequence of the research and that deception is fundamentally wrong and should be avoided wherever possible. This is associated to any harm that can arise and/or affect respondents during the research. In this research, I made sure that there was no element that could cause harm to research participants, any other person or the community at large. The central contention of the research has potential benefits outweighing any risk of harm since all the findings will be used to develop better practices for the sustainability of the fisheries resources.

4.8.3 Beneficence

The research explored ways of bringing the learning interactions that exist between the resource users, Fisheries College and the government together so that both sides could learn and benefit from each other. Wassenaar (2006) noted that the research participant's risks cannot simply be offset by the payments of large sums of money; there must be more direct benefits such as better access to health facilities, better skills, better knowledge of the topic in question and so on. The study explored ways of enhancing social interactions amongst stakeholders including the fishing communities which may result in informing and improving extension and training that will recognise and make use of both explicit or concrete knowledge and tacit knowledge for the sustainability of the fisheries resources.

4.8.4 Validity and trustworthiness of the research

Durrheim (2002) described the concept of validity by referring to the degree to which research conclusions are sound and/or trustworthy. The design, methodology and data analysis applied in the study were rigorously and carefully constituted. I paid particular attention to internal coherence, in that I sought to find a theoretical and practical approach to the research that would align with the core object of the study (co-management) as well as the emerging trends in agricultural extension training (namely co-learning / social learning) in the natural resources management context. I also needed an approach that would work with diverse stakeholders, which the CHAT / social learning approaches provided. During the change laboratory workshops, for example, participants were able to rework and restructure the contradictions which were obtained in the first phase of the study to represent and reflect real issues on the ground. I considered this as another way of triangulating raw data obtained from research participants through participatory learning processes where the data was considered and deliberated – a form of member checking.

This led to the defining of aligned data generation techniques, which were qualitative in nature, as the object of the research and the goals of the study required such data. In doing this, I sought to ensure that this was thorough, and that I used a range of different data sources to facilitate triangulation. Through the research design, data was also member checked and deliberated in depth by research participants.

I was also mindful of the two main threats to validity in qualitative research: researcher bias and participant reactivity (Durrheim (2002)). As someone who worked in the organisation before, and was involved in a number of research programmes before embarking on this research, I drew on my previous experience to make sense of what was being discussed, avoiding bias by capturing the data carefully and then reflecting carefully on it afterwards, and through using theory and contextual analysis to provide wider referents through which I could read and work with the data. I also considered advice from Cohen et al. (2007) who

suggested that researcher bias may be overcome by the researcher's declaration of personal values and beliefs that he/she brings into the study, and by researcher reflexivity (see Section 4.7.4 above). I therefore sought to avoid participant bias through triangulation of data sources, respondent validation, long term involvement with participants, researcher reflexivity and comparison of tools developed by different groups during the data generation process, and through careful abductive analytical work. I also had in mind that I needed to constantly ask myself 'how could I be wrong?', 'how I can do it better next time?' and 'how do I manage my position as an interventionist researcher to ensure on-going research reflexivity?' (Lather, 1986). I also kept notes on and constantly reflected on power relations in the research process, which I reflect on at the end of the study (see Section 8.6.2.4).

4.9 Conclusion

This chapter discussed the methodological framework used for the study, showing the methodological implications of Cultural Historical Activity Theory (CHAT) research, especially as this relates to expansive learning using the DWR framework. The chapter also discussed the case study approach and how abductive analysis of activity systems helped to surface tensions and contradictions that aimed at facilitating expansive learning in fisheries co-management. This chapter also outlines the methods used to generate data to respond the research goals outlined in the first chapter and how data was analysed. The methods are informed by the field-based and contextual analyses presented in Chapter 1 and 2 (literature review) and the theoretical framework presented for socio-cultural / cultural historical learning presented in Chapter 3 (features of social learning in fisheries co-management). The research project was a learning process which took place over a number of years in order to have a better understanding on how learning takes place in the fisheries co-management context (see Section 1.7.2). A systematic methodological framework was followed as shown in the table that follows.

Table 4.6: Summary of research activities over a period of time

No	Research Activity	2010	2011	2012	2013	2014
1	Contextual profile of social learning in fisheries co-management	■				
2	Research proposal writing and submission	■	■			
3	Data collection and literature review (interviews, focus group discussions)	■	■	■	■	
4	Data analysis (change laboratory workshops) and			■	■	

	start writing up			[redacted]	
5	Co-management stakeholders way forward workshop			[redacted]	
6	Writing up continues and submission of thesis			[redacted]	

The chapter that follows explores learning in fisheries co-management, and shows the first layer of analysis of the study.

CHAPTER 5

INVESTIGATING SOCIAL LEARNING INTERACTIONS AND THE EXISTING CHALLENGES IN FISHERIES CO-MANAGEMENT

Social learning is a process in which people are stimulated to reflect upon implicit assumptions and frames of reference in order to create room for new perspectives and actions. (Wals, van der Hoeven, & Blanken, 2009, p. 11)

5.1 Introduction

This chapter explores social learning interactions and associated challenges in fisheries co-management drawing on data generated in both the investigation and expanding phases of the study. The chapter provides insights into how data generated through document analysis, semi-structured interviews, focus group discussions and change laboratory workshops (described in Chapter 4) provided new thinking in fisheries co-management to facilitate change in practice among different stakeholders to achieve sustainable fisheries management. It provides evidence of how the research questions were responded to.

The discussion in the chapter explains why different stakeholders are interested in sharing their experiences and how an interest in the shared object of fisheries co-management brings them together across activity systems. In order to answer the first research question (on what learning takes place among different stakeholder groups in the context of co-management that influences co-management practices), I started with the identification of fisheries co-management activity systems in both case studies as explained in Chapter 4. In this chapter I describe the composition of the different activity systems, the interactions of stakeholders within and across activity systems, and the learning that takes place in the activity systems.

The chapter uses thick description which provided me with a deeper understanding of stakeholder interactions, and this helped me to understand the learning that takes place as they interact among themselves within and across activity systems. The use of Cultural Historical Activity Theory (CHAT) as a methodological and analytical framework (described in Chapters 3 and 4) and social learning theory (described in Chapters 1 and 2) provided a language of description that also helped me to develop an understanding of how people learn, what they learn and how such learning can be used to inform better fisheries co-management

(see Chapter 4). The use of CHAT analytical framework helped to identify the activity systems (see section 4.4) and the levels of interactions as people come together around a shared object, co-management.

According to the social learning theory of Lave and Wenger (1991, pp. 54-58), learning involves a process of reproducing culture and social structure, as embodied in the participatory practice of the community. As different fisheries co-management stakeholders continuously interact on different aspects of co-management, they bring into discussion their experiences, knowledge and expertise as learned in their various practices. These have potential for shaping further learning (i.e. through expansive learning) for a successful co-management programme. Unlike Engeström and his colleagues, Lave and Wenger did not provide a means of expanding learning, except through a theory of legitimate peripheral participation, which indicates that such learning takes place via the sharing of expertise between more experienced and less experienced others. They do not propose formative interventionist research as a possible approach for expanding that which has become part of the culture and practice already. Clancey (1995a, p.16) suggested that knowledge is dynamically constructed as we conceive of what is happening and that our action is situated in our role as members of a community. I was able to investigate and share insights into how this occurs using the activity theory framework of Engeström, as outlined in the chapter below and in the chapters that follow.

5.2 Identification of the activity systems in the two case studies

As mentioned in Chapter 1, the two case study areas (Lake Malombe and the south-east arm of Lake Malawi) had started implementing fisheries co-management at different levels and hence were selected for this research as explained in Chapter 3. The co-management programme started in Lake Malombe in a pilot phase in 1993 to try to respond the collapse of Chambo fishery (FAO, 1993). A Chambo Research Project was initiated in Lake Malombe to investigate the collapse of Chambo fishery and its recommendations were meant to help restore fish habitats, protect juveniles and breeding fish and also reduce fishing effort which involved limiting the amount of fishing gear (seine nets and nkacha nets) which were dominant in Lake Malombe. A few years later the programme was extended to the south-east arm of Lake Malawi which is the main breeding area of *Chambo* because of its shallowness and the abundance of natural food for fish found in the area (see section 1.2.1). The aim of the Malawi Government in introducing co-management was to persuade the fishing communities to allow fish stocks to recover to levels experienced in the mid-80s when production was highest and to revert the recovered fishery to one based mainly on the high value *Chambo* which was to be harvested sustainably (Hara, Donda, & Njaya 2007).

The identification of activity systems in this context was crucial to inform a more in-depth exploration of the interactions and learning among stakeholders and the challenges they experience as they interact and share fisheries knowledge and practices in the two case studies (Lake Malombe and the south-east arm of Lake Malawi), as per my research goals (see section 1.7.2). As briefly noted in section 4.2.3, five activity systems were identified in the two case study areas (described in detail in section 5.3.2 below). Crucial for interpreting learning in activity systems is their historicity, as already discussed, and also an understanding that different elements in the activity systems interact within the activity system and also across different activity systems (see sections 3.5.1.1, 3.5.1.2 and 3.5.1.3).

In this study, the central activity system was that of the fishing community where the BVCs and the local leaders (as representatives of fishing communities) are the subjects that use different kinds of tools to achieve their objective (co-management for successful livelihoods). Some of the tools are formal and informal meetings, workshops, local gatherings happening in the community, visits to other areas or visits from people in other areas to share experience. BVC members and local leaders are working on the sustainable management of the fisheries resources through co-management practices. The BVCs and the local leaders have sets of rules that help them to function in the management of the fisheries resources. As discussed in Chapter 2, these come from government, but some of the rules are developed locally by BVCs with support from local leaders. They do not work in isolation but also work with the fishing communities, government officers and other NGOs operating in the area where a particular BVC is operating. The fishing community activity system is a complex system because it is comprised of people from different backgrounds (see section 1.5.4) and for them to work effectively there is division of labour on who is to do what, when, how. This division of labour allows for provision of support and engagement required in the system.

5.3 Learning taking place among fisheries co-management stakeholders

In order to respond to the first research question on what learning takes place among different stakeholder groups (see section 1.7.3), it was important to gain an in-depth understanding of stakeholder interactions, what makes them interact and the levels of interaction, as they strive to find solutions to the existing problem of declining fish catches. This was evident during the research processes with different co-management stakeholders as they were reflecting on the current fishing practices and the impact such practices are causing to the fish stocks and the livelihoods of the rural people. As co-management stakeholders critically looked at the state of affairs in the fishing industry and the reflection of the past and the future of the fisheries, it was noted that the trends in the management of the fisheries resources might have contributed to the current state of the fishery. Fisheries co-management stakeholders noted that fishing

communities were moved away from the management process without reflecting on how cultural norms and traditions played a role in the management of the fisheries resources. By not involving the fishers, fish processors, fish traders and the other resource users in the management of the fisheries resources, fishing communities saw the resources close to their homes as 'the government's' and nobody cared about who did what to it because the assumption was that the resources now belonged to the state.

A critical understanding of stakeholder's historical background and practices provided me with the opportunity to understand the historicity of the stakeholders' practices and interests, and the type of management regimes they have lived through. It also helped to develop deeper insights into co-management, when it started and what was already there before its introduction. Roth (2007 argued that activity theorists should spend more time trying to understand and articulate the differences that exist between different conceptualisations of the relationships between mind, culture and activity. On the same, Daniels (2007, p. 124) noted that an activity system is always a nexus of multiple points of view, traditions and interest. The identification of the activity systems gave me the opportunity to identify and fully understand the learning which shapes the current practices. Peal and Wilson (2001) claimed that an activity system consists of a group, of any size, pursuing a specific goal in a purposeful way.

Examining interactions across the activity systems helps to provide insights into learning that occurs when stakeholders come together. Engeström, Engeström and Kerosuo (2003 noted that boundary crossing offers a potential means of conceptualising the ways in which collaboration between the workers from different professional backgrounds might generate new professional practice; this is the focus of the study as it engages with different stakeholders' learning in fisheries co-management.

In order to understand stakeholders' learning, it was important to understand the culture in which the co-management understudy was situated. Zald (1996, p. 262) defined culture as the "… shared belief and understanding, mediated by and constituted by symbols and language of a group society". Keesing (1981) viewed culture as knowledge: systems of shared ideas, concepts, rules and meaning that underlie and are expressed in the ways that people live. In the two case studies, there was therefore a need to take into account people's culture as reflected by how they value and share knowledge and ideas. Culture also shapes what is meaningful to them, and reflects and encompasses their and society's histories, beliefs, values, skills, experiences and actions.

5.4 A broad description of the fisheries activity system and learning possibilities

In the fisheries sector in Malawi (as observed in the two case study sites) different people play different roles in the management and implementation of the co-management programmes. The sector is dependent on those who own fishing gear; they are generally referred to as 'gear owners'. These are often managers of different fishing units who may have started fishing businesses by first being employed and slowly progressing to owning their own fishing gear. Then the gear owners employ other people, who are mostly experts in fishing, to work for them. They are generally called 'crew members'. When co-management was introduced a local institution called the Beach Village Committee was instituted and comprised of some of the gear owners, crew members, and those involved in fish related businesses, including village heads and chiefs as ex-officio members of the BVCs.

In this study, members of the BVCs and the local leaders are referred to as **subjects** because they are the primary agents who are working towards the sustainable management of the fisheries resources so that fish production can improve via co-management, which is their **object**. Through this, they hope to increase income generation from the fishery as their intended **outcome**. They also have **artefacts or mediation tools** which mediate the interaction between the subjects and the object. Examples of such artefacts and mediation tools include the hardware used for fishing such as boats and nets, as well as concepts and understandings of the co-management (e.g. closed seasons, open seasons etc.). For the activity system to have direction it has some **rules** which either tend to originate from government policy, or from customary or historically constituted fishing practices and experience. Some of the rules are locally instituted by the BVCs and the local fishing communities. In a fishing community activity system on the shores of Lake Malawi, the BVC members and local leaders in that particular area will generally consult with the entire fishing community to develop a recommended list of rules. In most cases rules in the fishing community activity system are similar to the ones from government because the system, together with the other activity systems, implements government policies at a local level together with the locally based extension officers. In a fishing community activity system there are people who work with the subjects towards the object and these can be from the community or outside the community. They play important roles in the implementation of co-management. These are called **community** in the activity system and these include the rest of the gear owners, crew members, business people, and government officers working in the area where the particular BVC is located. In order for the stakeholders in the activity system to know who is going to do what, when how and where, they have **division of labour** which involves the sharing of roles and responsibilities in the activity system.

The same description and identification of elements applies in the other activity systems. Where different elements in the systems do not agree or where conflict arises, this shows up **contradictions**. Through social learning, people working in such activity systems strive to find solutions to the existing contradictions or problems. Where such solutions are developed and implemented it is possible to see that learning and human activity has **expanded**. This occurs as people concerned with the common object, debate and deliberate the contradictions, with the possibility that they can develop tools and understandings that allow them to work together to develop new practices or activity. Engeström's work and his emphasis on formative intervention research suggests that such a process can be **mediated using double stimulation**, allowing for new knowledge creation in which stakeholders become part of the process. However, such a process as outlined above still remains quite generic and it is necessary to develop case specific insights into this process to develop deeper insights into such possible learning processes and how learning is and can be mediated to expand human activity.

5.5 Activity systems in case study 1, Lake Malombe

Lake Malombe is the third largest lake in Malawi and has a surface area of 390 km² with the Shire River as its outlet to the Zambezi River. Lake Malombe is a highly productive lake with a multi-species fishery with about 40 species currently dominated by *Haplocromis* species. The Lake serves a large population of rural marginalised fishing communities and all the fishing activities are small scale with a large number of different fishing gear in use. There are approximately 400 gear owners, 3 000 crew members, and over 1000 fish traders and processors (GoM, 2011). The dominant type of fishery in Lake Malombe is artisanal and fishers use planked boats without engines or dugout canoes. Figure 5.1 shows a planked boat commonly used for fishing in Lake Malombe

Figure 5.1: A planked boat commonly used for fishing in Lake Malombe

The main fishing gear used in this area include the Nkacha seine net which is only allowed in Lake Malombe, *Kambuzi* seine nets, gill nets, long lines, hand lines, and fish traps. Lake

Malombe used to produce high yields of fish, for example in 1988 it produced 15 500 tons of fish harvest (GoM, 2000). The most common species caught in Lake Malombe include:

- *Haplochromis* species locally known as *Kambuzi*;
- *Clarias gariepinus* locally known as *Mlamba*;
- *Oreochromis* species locally known as *Chambo;* and
- *Bagrus meridionalis* locally known as *Kampango.*

Figure 5.1 below shows a sample of the *Haplochromis* species locally known as *Kambuzi.* This fish species replaced the *Oreochromis* species (locally known as *Chambo*) as the most widely caught fish after the *Chambo* collapse in Lake Malombe.

Figure 5.2: *Haplochromis* species (*Kambuzi*) from Lake Malombe

Donda (2001) argued that in order to understand fishing communities that are involved in co-management, culture matters, in the sense that it influences the way people understand the situation they are in and defines their views, goals, interests and action repertoires. Unlike case study 2 (the south-east arm of Lake Malawi), Lake Malombe (east and west bank) is composed of mostly one ethnic group – the Yao tribe. Most of the fishing activities in the area are undertaken by people who have their origin in the area and they share similar fishing methods and practices. Inter-BVC meetings which are facilitated by the Department of Fisheries and the movement of fishers from one area to another searching for better fish catches have facilitated sharing of new fishing practices, techniques and experiences and to a large extent have facilitated change in fishing practices. Hanna and Jentoft (1996) confirmed the importance of understanding culture as one strives for in-depth understanding of the interactions of fishing communities in a co-management context:

As evident from the interviews with fishing communities along the shores of Lake Malombe, most of the cash income for rural communities comes from fishing. Fishing communities, including women, depend on the fishery for their life support and any disturbance of fisheries negatively affects the lives of many rural Malawians. This explains why the dependency on the fishery is very high. This is shown in these citations from my interviews:

> ***Interview with individual IIM 3****: Our great grandparents were here years and years back and they all depended on the lake for their livelihoods. We were also born here and since we were born we have been depending on the resource and there is no where we can get support from apart from the fishery. The lake is all we have in our life. The damage caused by people who come from far and our own relatives puts all of us in difficult situation. Where do we go to get support?*

> ***Interview with individual IIM 1:*** *The houses you see in this whole area came from fishing and this was possible because we had good fish catches. We were able to build houses, had other businesses that came from the same fishing and a few people had cars from the fishery. No one can afford to build a house from fishing because the fish is not there and we cannot go anywhere because we belong here and the lake is our only resource.*

In order to understand why people face several challenges when the fishery is the only source of living, we need some in-depth understanding of the systems in which they operate and the factors that influence their practices in different activity systems. Sannino et al. (2009) noted that activity theory seeks to analyse development within practical social activities and that activities organise our lives and it is within these activities that we develop our personalities, skills and consciousness. Through the activities we also transform our social conditions, solve contradictions, generate new cultural aspects and artefacts and create new forms of life (ibid.). Some evidence from my research data shows how people's livelihoods, identities and experiences in the Lake Malombe area are closely tied to fishing activities:

> ***Focus group data FGM 1:*** *People from the shores of Lake Malombe are known by the skills and talents they have in fishing. There is nothing people think of in this area apart from fishing because we do not have any other activity outside fishing. We all want to be good fishers and we want to catch as much fish as we can so that we get more money to support our lives and families*.

> ***Focus group data FGD 4:*** *Getting less fish catches means starving our families because fishing is the only source of income in this area. The little income we get from fishing is used to support our families in the whole of Lake Malombe.*

5.4.1 Fishing community activity system

The establishment of co-management in 1993 facilitated continuous interactions across the activity systems where the government and communities started working together and this led to the establishment of the first locally accepted institutions, the Beach Village Committees

(see section 1.5) which, as indicated above, are representative of the fishers. Data generated in the context of the Lake Malombe case study showed the following dimensions of the fishing community activity system (see Figure 5.2) below.

The fishers and crew members form the main **subjects** in this activity system. Their main **object** is co-management of the fisheries resources. They work with fish traders, fish processors, local leaders, BVC members and extension officers in their **community**. Their activity is shaped by the following rules: closed season regulations, minimum takeable sizes of fish, recommended mesh sizes of fishing nets and authorised fishing gear in particular fishing areas. There is also a clear **division of labour** that shows the management of fishing units, marketing of fish after landing, maintenance of fishing gear, payment of fishing licences, gear design and construction, fishing, monitoring of fishing activities and research.

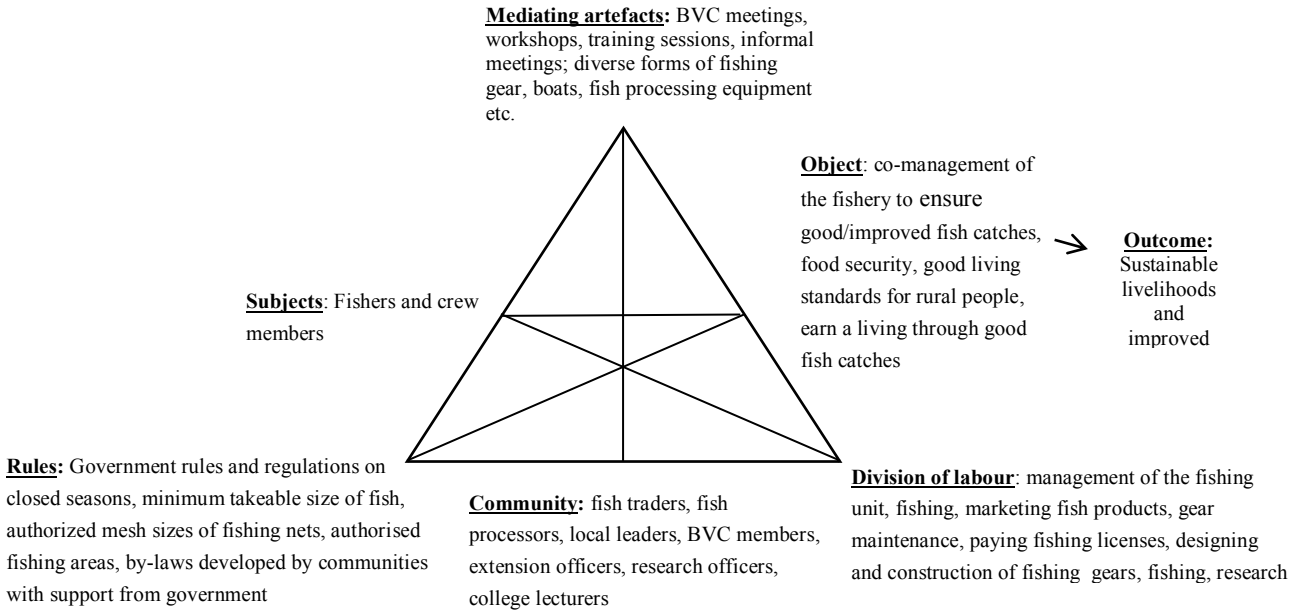


Figure 5.3: An illustration of Lake Malombe fishing community activity system

Changes over time: However, as explained by Engeström and other cultural historical activity theorists, the activity system as it appears today is not static; it is historically formed, and is also continually changing. Interview and focus group data shows evidence of the changing and dynamic nature of this activity system. Since the start of the co-management programme there have been improvements in the way stakeholders have interacted and from the interviews I noted people have appreciated the existing forums where they are able to discuss issues of fisheries management together with government. Other changes and dynamics discussed by the fishers, as shown in the data, are:

> ***Interview with individual IIM****: The coming of co-management in Lake Malombe has changed the way we used to interact when the government was in control of the fisheries activities. As people who have similar interests we are able to sit, discuss and agree on certain issues. We can say with co-management, fishers are able to discuss and agree on better ways of managing the fisheries resources and people share past experiences and map for the future as resource users. However we need to continue interacting as people with the same interest and needs.*

Partnership formation: Data also showed that government extension and research officers have, on different occasions, worked with fishing communities through BVC training programmes, awareness campaign meetings, licencing and enforcement programmes, workshops, consultative meetings during evaluation of other programmes and other research programmes conducted in the area. The Government of Malawi (2005) suggested that the participatory fisheries management process should be considered as a cycle of working in partnership, planning, and implementation of monitoring and learning to continuously improve practice and provision of services to improve the well-being of people and the fisheries resources (GoM, 2005). Evidence of such a partnership approach was found in the interviews and focus groups with fishers in Lake Malombe, as shown by the citations below:

> ***Focus Group Data FGM 2:*** *The working relationships that are in existence with the establishment of fisheries co-management has helped to bring stakeholders from government, us fishers and those who are working with us in the rural areas together to discuss issues of fisheries management. We work together to plan some of the co-management activities.*

> ***Interview with individual IIM 4:*** *We used to experience some problems when the arrangement of co-management started because we were not trained on how to work together. After several training sessions we saw that our relationships with fellow fishers and those from government were getting better. Things are getting clearer and every time we meet we learn new things and everyone strives to improve practices.*

Cultural influences and power relations: I also found evidence of cultural influences and experiences in the activity system. This related to the way that the fishers were engaging with traditional authority, and also how they were using traditional knowledge, and tacit knowledge experienced and learned through being involved in practices over time. Cultural practices were also related to **power relations**, as reflected in this citation below.

> ***Focus group data FGM 1:*** *As BVC members we work with our traditional leaders in the proper management of the fisheries resources. When a fisher is caught doing illegal fishing or fishing during closed season we take him to the chief for trial. Our traditional chiefs have the history of the practices and apart from giving trials they also give advice to the offenders by giving them a picture of the particular practice and how over time they have affected the fishing industry in Lake Malombe. We make sure that the trial is fair. Since the chiefs are the overall custodians of land their*

judgement is final. Sometimes we as BVC members are not satisfied with the chief's judgement and when that happens we inform our extension officers to help and talk to the chief.

5.4.2 Government activity system

I found that in the Lake Malombe area, the government activity system comprised mainly extension and research officers as **subjects** working on fisheries co-management to improve fish catches as their object aiming at improving people's livelihoods and to manage the sustainability of the fishery and its biodiversity as their outcome. In order for them to achieve their objective, they use different mediation tools or artefacts such as meetings, BVC training, workshops with user communities, radio and TV programmes, production and distribution of awareness materials such as brochures, exchange visits and tours. They also follow rules which mediate interaction between the subjects and the community who are working together as stakeholders in the activity system and also between the subjects and the object they are working on. Currently these rules are formulated by the government through different research programmes, e.g. regulations on closed seasons during fish breeding season, recommended mesh sizes, non-use of illegal fishing gear etc. The Lake Malombe government activity system has people who are working with the subjects and these are from other offices of government (district extension office, district enforcement office, state media services e.g. community radio, research officers from government and those from universities), NGOs, other fishing companies, BVC members and other fishing communities, and are referred to as the **community** in this activity system. For the stakeholders in the government activity system to work well, they share roles and responsibilities. I found that in the Lake Malombe context, this involved production of awareness materials, issuing of licences, charging offenders in the court of law, supporting fishing communities in the repair and maintenance of boats and engines, reflecting the **division of labour** in this activity system. The figure that follows illustrates the government activity system in Lake Malombe.

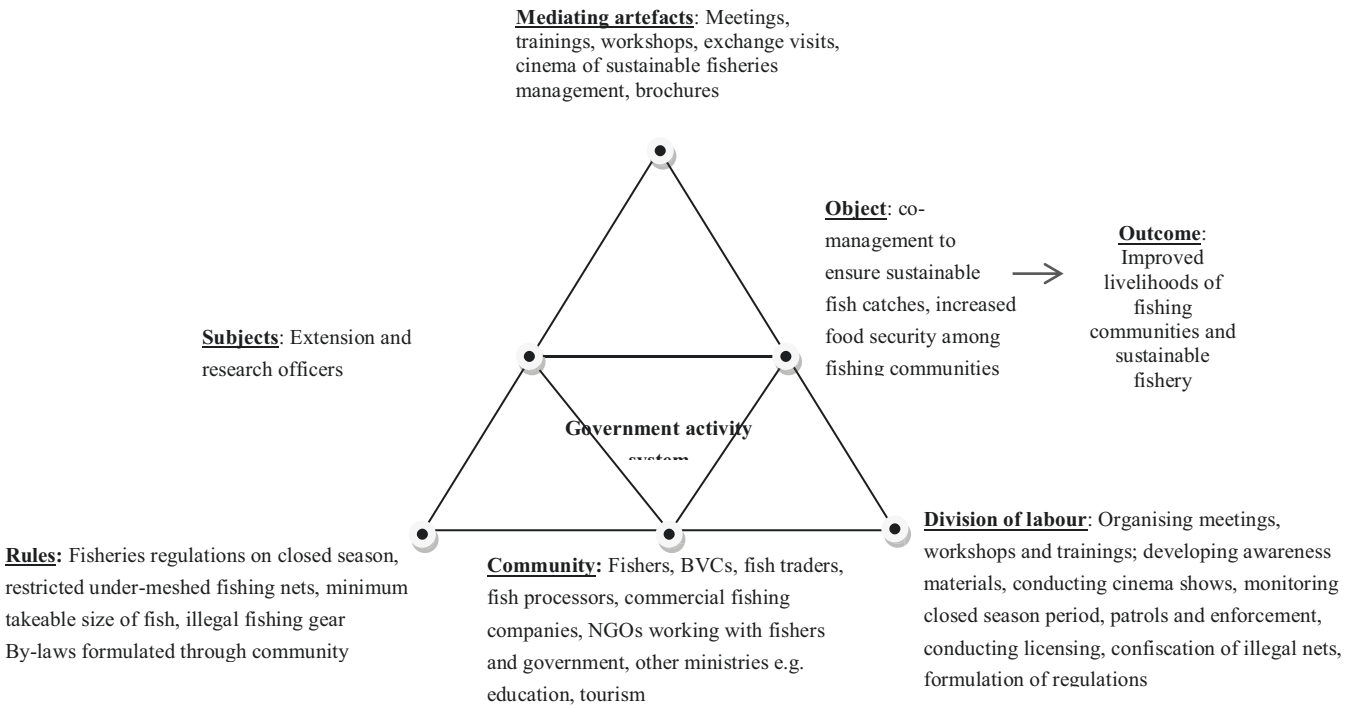


Figure 5.4: An illustration of Lake Malombe government activity system

Change over time: As in the case of the fishers' activity system, historicity shows dynamism and change in this activity system. Co-management in the fisheries sector in the Lake Malombe area shows a remarkable shift in the way the fisheries resources are now managed with the two main actors (fishing community and the government) joining hands as shown by the following data:

> ***Change laboratory data CLM 1****: One is able to see the changes in the way fishing communities and government work different from the time when fishers were not involved in the management of the fisheries resources. There is evidence that the government and us BVCs are working together. We are free to go to the extension worker here in Chimwala and ask anything if we are not sure of what is happening. Sometimes we send our extension worker to pay for our licences at the district office.*

Prior to the introduction of the co-management approach in the area, conflicts between government and fishing communities were very common. Fishing equipment was confiscated and those caught fishing were taken to court where they were tried and fined but this did not stop illegal fishing as shown by the following data:

> ***Focus group data FGM 2:*** *Co-management has changed the way we used to interact between government and us as fishing communities. Fishers who were caught fishing with illegal nets had problems with government, some were being arrested and their nets confiscated. Although people were being arrested, there was more and more illegal fishing taking place and we continued to experience decline in fish catches.*

Most of the fishers here in Lake Malombe lost their fishing gear and we never knew that government and us fishers will sit together to discuss fisheries issues.

Partnerships and power relations: As different players in the activity system have sought to work towards a common object of increased fish catches through participatory fisheries management, the approach has attempted to balance partnerships in which government and fishing communities share power and responsibility. This allows for mutual learning and the sharing of skills, expertise, knowledge and experiences among stakeholders in the two activity systems, as shown in the data:

Change laboratory data CLM 2: *Now that we are able to sit and share ideas on how the fisheries resources can be managed through the existing co-management agreement is an indication that we now have a common purpose to work as people of the same interest. When co-management started most of us as BVC members were not sure of what fisheries officers were saying. But now we discuss with them without fear. BVC members and extension workers share responsibilities in the current co-Management arrangement. We are now working as partners and each one has responsibility over the fishery here in Lake Malombe.*

However, there is also evidence of failure to share and explore the meaning of new knowledge and techniques that relate to the fishing communities' knowledge and experiences in Lake Malombe, which creates a gap between the fishing communities and the government extension officers, as shown in the data:

Change laboratory data CLM 2: *As extension workers who are working closely with BVCs and fishers along Lake Malombe, we have observed that we are not sharing enough knowledge between fishing communities and us from government. From experience I have observed that there is a lot we can learn from each other. Fishers have lots of experiences relating to fishing and we also have some knowledge on conservation that if properly discussed can help in the proper management of the fisheries resources. As an extension worker I think the knowledge gap that exists between fishing communities and us extension workers on the fishing practices result in continuous decline of the fisheries resources.*

5.5 Activity systems in case study 2, the south-east arm of Lake Malawi

As indicated in section 1.2.1, the south-east arm of Lake Malawi is the shallowest part of the Lake and because of its shallowness provides an abundance of natural food for fish e.g. plankton feeders like *Oreochromis* species (*Chambo*). It lies in the most southern part of the lake and stretches 80 km from the northern end to the southern outflow to Lake Malombe and then into Shire River (see Figure 1). The south-east arm has over the years attracted fishers from all over the shore of Lake Malawi because of the abundance of *Chambo* which is the

most favoured fish species locally and internationally. Current fisheries regulations were formulated to protect it from being over-fished (GoM, 2003, see also section 1.6).

Figure 5.5: *Oreochromis* species (*Chambo*) – most well-known fish species in Lake Malawi

Fishing gear used in the south-east arm include gill nets, long lines, beach seines, open water seines, fish traps, hand lines, scoop nets, cast nets and set hooks (GoM, 2011). The south-east arm of Lake Malawi is identified as a breeding area for *Chambo* because of its shallowness, and the abundance of natural food (see section 1.2). No intensive fishing activities, e.g. trawling, are allowed. The most common fish species caught in the area include:

- *Oreochromis* species locally known as *Chambo*;
- *Copadichromis* species locally known as *Utaka*;
- *Engraulicypris sardella* locally known as *Usipa*;
- *Haplochromis* species locally known as *Kambuzi*;
- *Clarias gariepinus* locally known as *Mlamba*; and
- *Bagrus meridionalis* locally known as *Kampango.*

The three activity systems which were identified in the area are the **fishing community**, government **extension and research** and the **Fisheries College** activity systems. Due to the large population of fishers and other stakeholders from different parts of the country, the south-east arm of Lake Malawi has a diverse range of stakeholders from different parts of the country who use diverse fishing methods and practices influenced by their cultural histories. Unlike Lake Malombe, the south-east arm of Lake Malawi is comprised of different tribes with different cultural backgrounds. Some of the tribes found in the area includes: Chawa,

Yao, Tumbuka, Tonga, Lomwe, Nkhonde and Ngoni. Most of the fishing practices in the area were brought into the area by people from other parts of the lake. Given the above complexity of cultural background, it was important to have a deep understanding of the socio-cultural interactions of the stakeholders and the kind of knowledge that influences their practices. The diverse composition of stakeholders, as in the south-east arm of Lake Malawi, adds complexity to forms of collectivist learning which take place when a group of people with different experiences and perspectives working on the same object seek to work on a new problem and jointly develop new knowledge or tools to address the problem (Lave & Wenger, 1991; Engeström, 1999 b; Edwards, 2005; Daniels, 2007). In more culturally homogenous contexts, such as Lake Malombe (described above) the complexity may be less pronounced as there are fewer mediating tools in evidence. As noted above, the Lake Malombe fishers use similar fishing methods, whilst the fishers in the south-east arm of Lake Malawi use a much wider range of fishing gear and methods which can be traced back to cultural diversity and associated historical experiences of fishing (see below).

5.5.1 Fishing community activity system

The fishing community activity system in the south-east arm of Lake Malawi consists of gear owners and crew members who are the **subjects** of the activity system. They are all working on the co-management **object** towards increased fish production and sustainable livelihoods through co-management practices with a view to improve their income and food security. As discussed earlier in the chapter, the subjects have mediation tools which they use to work towards the object and also have rules which mediate the tools and the subjects as well as the object. In the case of the south-east arm of Lake Malawi, these mediating tools include seine nets that use light at night, gill nets, trawl nets, engines, cages, beach seines, hand and long lines. The subjects work with other concerned community members from within or outside the activity system. In the case of the south-east arm of Lake Malawi the community working with the fishers on their object include fish traders, fish processers, BVC members, extension officers, college lecturers, fisheries researchers and other commercial fishers. In order for them to be able to work efficiently they share roles and responsibilities in what CHAT refers to as **division of labour**. The division of labour defines who does what in their activity system and in the case of the south-east arm of Lake Malawi fishers' activity system this involves the management of fishing units, selling fish, maintenance of fishing gear, designing and construction of fishing nets, payment of licences, conducting research, teaching and conducting awareness programmes.

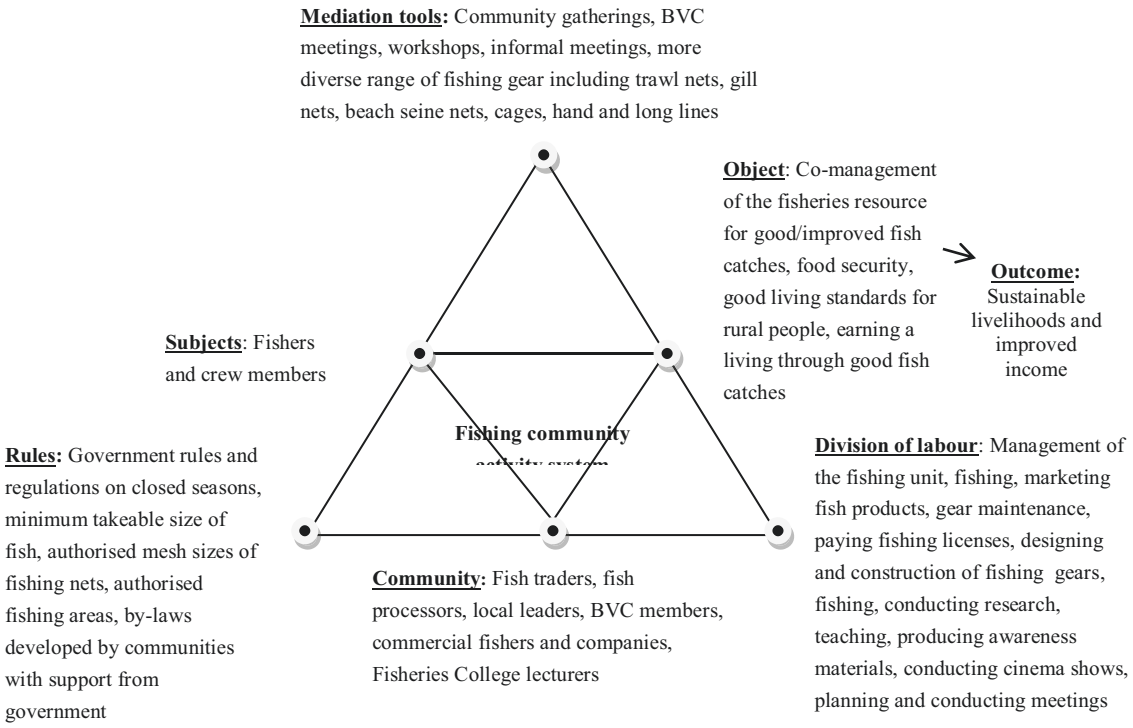


Figure 5.6: An illustration of the south-east arm of Lake Malawi fishing community activity system

Change over time: The abundance of fish in the south-east arm of Lake Malawi motivated fishers from different parts of the lake to establish their fishing businesses here. As is alluded to in Engeström's cultural historical activity theory, the fishing practices have changed over time due to migration of fishers who arrive with different fishing expertise and experiences. Evidence from interviews and focus group discussions showed that the integration of people in the area has also influenced change in the activity system. The introduction of the co-management programme in the area has led to improvements in the way fishers, BVCs, local leaders interact and make decisions on the current fishing practices. Evidence of this is shown in the data below:

> ***Interview with individual IILM:*** *People who are coming from other areas have taught us new methods of fishing and I should say these have improved our fishing business. We have also benefited from the current co-management agreement where fishers, BVCs, local leaders and those from government meet to discuss fisheries management issues. We all know that there was fear of each other even your neighbouring fisher could report you. In our groups we are able to listen and advise each other and this is happening because of co-management. Of course there are problems here and there but it's unlike before co-management was put in place. Maybe what remains is to be more open so that we help each other more.*

Partnerships: In a number of cases, BVCs and government extension officers have been working together in awareness campaign meetings in the area. There have been various training programmes where fishing communities and extension workers in the south-east arm

have worked closely together. Co-management stakeholders are now able to consult each other when they are involved in unfamiliar fishing practices in their areas. The current relationship of stakeholders in the activity system has improved the process of planning, and monitoring of activities to allow for better provision of services in the area. This was evident during focus group discussions with stakeholders:

> ***Focus group data FGD 3:*** *Working in partnership with the other members e.g. government extension workers and the local leaders in the co-management arrangement has shown that we can achieve things we did not think of. Over the past weeks we have managed to hold meetings in two areas together with our extension officer and our two village heads were present. Maybe we can think of holding similar meetings in the other areas but I think the most important thing is to have representatives from the other groups so that people see our togetherness and in that way we will be supporting each other in the meetings.*

Cultural influences and power relations: The south-east arm of Lake Malawi has a mix of cultures because people come from all over the region. The cultural mix in the area has greatly influenced change in the activity systems. Fishers who come from north of the lake bring with them traditional knowledge and tacit knowledge used in other parts of the lake. Data obtained from individual and group discussions indicated that the current fishing practices are influenced by the integration of different cultures in the south-east arm of Lake Malawi as shown in the data below.

> ***Focus group data FGD 1:*** *We have seen over the years that we are no longer people belonging to one group. We now have people from the north who have come with different fishing practices which have also brought in different cultures and understanding in the fishery. If we were to take TA Msosa's example, he only accepts those who comply with him and those who do not are not allowed to do fishing in the area. We can gain a lot from the knowledge they bring but we also need to respect our systems. Our groups have rules to follow and I think those should be followed.*

> ***Interview with individual IILM 1:*** *I was very surprised one time when I went to see my relatives in Mozambique not far from here when I saw our friends catching lots of fish that we used to catch here some time back. When I asked them they said they have rules that govern their fishing practices and that everyone who comes from outside the area follows that. We have mixed cultures here and this is good in our systems because we learn from what is good for us. Because we have people of different cultures there is diversity of knowledge but what is important is to make sure that those do not conflict with ours. What I saw in Mozambique was respect of different cultures and as a result they are still enjoying good fish catches.*

5.5.2 Government activity system

Government extension and research officers in the south-east arm of Lake Malawi are, as in the case of Lake Malombe, the main government **subjects** working on co-management as their object in this context. Their object is to use co-management approaches to achieve sustaining of fish stocks in order to facilitate good living standards for rural fishing communities, and to ensure that the ecosystems and biodiversity of the Lake are sustainably utilised as per government mandates and policies. They use a range of mediation tools to work on their object which include meetings, training workshops, awareness programmes using cinemas, and village meetings. They also draw on rules that are similar to those that are used by the extension and research officers in the Lake Malombe case which shows that government rules govern more than one activity system. They work with district assembly members like forestry officers, agriculture officers, teachers, community workers and other institutions working with people in the area which forms their **community.** However their work also links with the research officers who conduct different research programmes as shown by the data that follows:

> ***Focus group discussions FGD 2:*** *As extension officers we disseminate information from fisheries research. Researchers go round to do their research sometimes with the help from us extension workers and BVCs. We sometimes conduct joint meetings with research officers where they brief us on some of the research programmes but most of the time they do their programmes alone and give us feedback during research extension meetings.*

The two face many challenges and at times bring contradictory messages to the fishing communities (Kachilonda, 2005). This was also shown in the data from the south-east arm of Lake Malawi (see below). The lack of well-co-ordinated research programmes where both the extension officers and the fishing communities can be involved, has been a challenge for many years, which was confirmed in data from this case study site:

> ***Interview with individual IILM 4:*** *The challenge we have is that fishers complain that our messages are not the same with those from research. As extension workers we are supposed to disseminate the information to the fishing communities and sometimes become difficult to respond to questions from the fishers and BVCs. Knowledge about the research activities require our involvement in the actual research processes so that we know what is involved and also the results of the actual research.*

> ***Interview with individual IILM 1:*** *We sometimes get confused when people from government come with different messages yet are coming from the same office. Messages about the recommended fishing gear to use have been different from one person to the other. Even closed season dates have changed from one person to the other. As BVCs we need right information because we also extend the same information to fishers.*

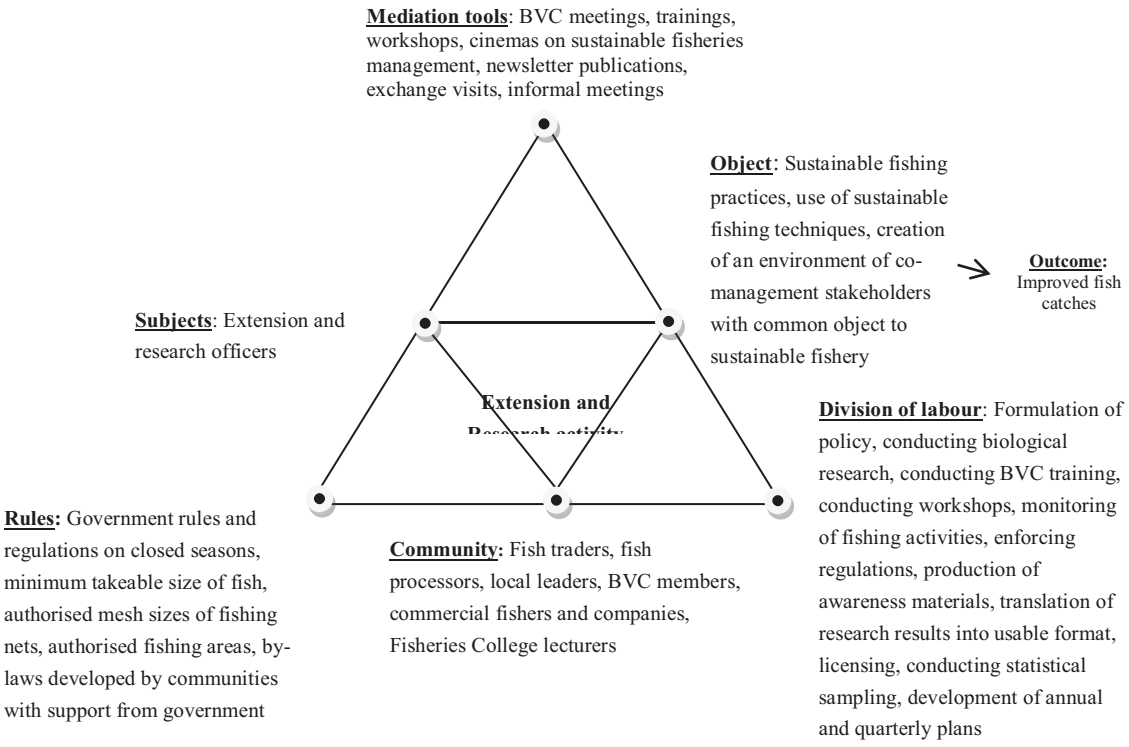


Figure 3.7: An illustration of south-east arm of Lake Malawi extension and research activity system

Change over time: As was seen in Lake Malombe activity system, fishing activities in the south-east arm of Lake Malawi are managed by three actors: fishers, extension and research and also the Fisheries College. Historically there has been a positive shift in the management of the fishery: now stakeholders in the three activity systems are able to sit together and discuss issues relating to fisheries management. History has shown that with introduction of co-management cases there has been a reduction in gear confiscation and trials by traditional leaders and the courts as shown in the data that follows:

> ***Focus group data FGDLM 2:*** *Less people are taken to court these days unlike the time when the government was in full control of the fisheries activities and management. We used to have many cases especially during the closed season and some of colleagues lost their gear. Of course we have a few of those cases because some are still giving problems to us as BVCs but at least the numbers have declined.*

> ***Focus group data FGDLM 1:*** *We still have some who are giving problems especially in areas where the beaches are impassable but at least the number has reduced. Our frequent meetings as BVCs have helped to reduce the numbers of illegal fishers unlike the old days when our chiefs were working alone in the management of the fisheries resources.*

Roles, responsibilities and power relations

Before the establishment of co-management in the south-east arm of Lake Malawi the government was the only institution that ran the affairs of fisheries management and conservation. The Fisheries Department, through extension workers, had the responsibility to ensure that rules and regulations set by government were being observed and followed (see Chapter 2). The situation changed after the introduction of co-management where it was noted that the effectiveness of fisheries management was that of sharing of roles and responsibilities between government and fishing communities (see section 2.3.6). Sharing of roles and responsibilities brought a sense of ownership and responsibility among stakeholders as reflected in the citations above. The tensions that were there between the government extension workers and the fishing communities have reduced because of the introduction of co-management which facilitates discussion of issues. This is evident in the data below:

> ***Interview with individual IILM 5:*** *As BVC members, we see changes in the way things are happening now as compared with the past. If the chief sees something strange in the area, he calls us and we all agree on what to do. With the current arrangement we work as a team and no one fears someone and this is different from the previous system when everyone was suspected. We interact with the extension worker for the area and if there are problems we let him know together with the chief.*

5.5.3 Fisheries College activity system

The Fisheries College is situated in the south-east arm of Lake Malawi. It is where extension officers, both at certificate and diploma level, are trained in fisheries management. Students at both levels, in their second year and middle of the year respectively, are attached in the field where they work with fishing communities in the management of the fisheries resources. The Fisheries College activity system comprises lecturers and students as **subjects.** They work on the production of better extension officers who are knowledgeable about sustainable fisheries management (including co-management approaches and the implications thereof for extension work) as their **object** with an aim of training good fisheries training officers to facilitate better fisheries resource management through the co-management approach.

In order for the lecturers and students to be able to teach and learn, they use different mediation tools/artefacts which include posters, fish samples and specimens, fishing gear, manuals and literature on fishery. They have rules which mediate the college lecturers as subjects as well as the community who work together with the subjects. These rules include a closed season, illegal fishing gear, authorised mesh sizes, student's requirements for the college and by-laws developed by communities with government support.

Different people are involved in the Fisheries College activity system and form the **community** of the system and these include fish traders and processers, local leaders for the

area, BVC members, extension officers, commercial fishers and fishing companies, fisheries research officers. Sannino et al. (2009) noted that a community begins to form when there are many agents who relate to each other with respect to a certain cluster of objects and a shared class of beneficiaries. The subjects and the community in the activity system have a **division of labour** for their roles and responsibilities. The division of labour in the Fisheries College activity system is structured according to the educational tradition and education institution structural system, and involves specialised teaching areas, maintenance of plants and engines, production of awareness materials, translation of scientific research information into understandable format, as well as production of radio programmes. The activity system is summarised in Figure 5.7 below.

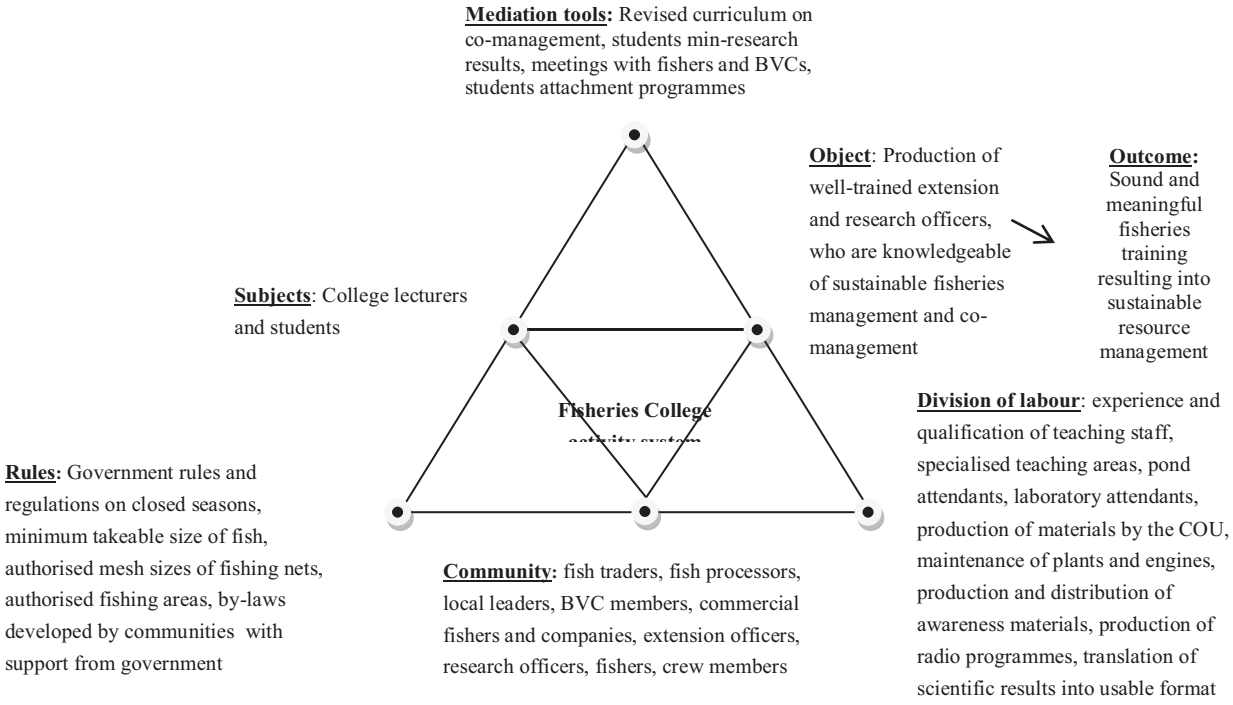


Figure 5.8: An illustration of south-east arm of Lake Malawi Fisheries College activity system

Changes over time: Before co-management started, teaching and learning programmes at the Fisheries College were top-down where the teacher was the source of all knowledge and the learner was the receiver. The development of the college curriculum, for example, was expert driven: experts from outside came to develop it and lecturers were expected to implement it (Kachilonda, 2005). The introduction of co-management brought in a change in teaching and learning in that participatory curriculum development processes were identified. Consultations with different fisheries stakeholders became key to meaningful teaching and learning. This led to participatory teaching and learning with knowledge sourced from all those involved in fisheries resources management (Kachilonda, 2005) as evident in the data below:

> ***Interview with individual IIFC 1:*** *When I first came here as a lecturer, each one was given a syllabus to use for teaching and we were expected to teach what was provided. Sometimes it was difficult to use because the language was not familiar but we had to do it. When we started co-management, we participated in various workshops to provide input to the curriculum and we were also involved in the consultations with fishers. Things started changing and teaching became a bit easier because we are able to give local examples which can be seen by the students.*

***Partnership and power relations*:** Partnership within and across the college activity systems have improved because different players in the activity system are now working together towards a common object of producing well-trained extension and research officers, who are knowledgeable of sustainable fisheries management and co-management skills to help increase fish production through participatory fisheries management. Timely joint meetings with research and extension meetings have greatly improved the implementation of courses at the college. This partnership has improved the delivery of courses and also built capacity of extension and research officers from the college to deal with real issues in the field as seen from the data below:

> ***Focus group data FGDFC 1:*** *As lecturers, we are now working together with our colleagues from research, and extension officers. We have also been working with fishing communities and students in a number of research programmes and also during the attachment of students in the field. This partnership has improved the relationships with stakeholders working on co-management.*

5.6 Learning processes in Case study 1 (Lake Malombe)

5.6.1 Learning within activity systems

As indicated in the description of the activity systems above, there are three key features of these activity systems that indicate that there is ongoing learning taking place in the activity systems. These are 1) partnership formation and working with others in relation to the key object, 2) evidence of change over time in the activity systems, and 3) the influence of policy, cultural history, traditional practices and power relations. I have synthesized these three findings below, highlighting how this provides perspective on learning processes.

Partnership formation and working with others in relation to the key object*:* With regard to partnership formation in the activity systems in Lake Malombe, stakeholders within the fishing community activity (gear owners, crew members, fish traders and processors, BVC members and traditional leaders) now interact amongst themselves in an effort to deal with the existing unsustainable fishing practices. The introduction of co-management has facilitated co-engagement of different actors in the two activity systems (see section 4.3.3.1.1). This has facilitated different actors' roles in the two activity systems' ability and

willingness to shape their roles (see section 3.4.1). In the case of the Lake Malombe fishing activity system, for example, fishers indicated that when they formed the BVC, they agreed to involve all that were benefitting from the fishery. This created a context in which those that were benefitting from the fishery could interact and learn from each other.

Change over time as evidence of learning: With regard to change over time in the activity systems, it seems clear that this has occurred as the subjects in the activity systems have interacted with each other and with others over time, learning new practices, concepts and approaches. Stakeholders in the activity systems have, over the years, been able to come together and critically look at their own practices and how these are negatively affecting their fishing enterprises as fish catches continued to decline (IILM5). The change in the approach to fisheries resources management has created a learning platform for effective co-management within and across the activity systems, although there are still areas for improvement as noted in the citations above. The change in approach from centralised fisheries management to co-management has brought people closer to each other as is evident from the data below:

> ***Focus group data FGD LM 2:*** *Although we are still experiencing challenges with declining fish catches but should say we are currently able to talk to each other and as a group discuss on why the fish catches are declining. The difference with the previous system was that we were kept out of the systems and we had no chances to give in our views. We now have chances to interact with the students from the college and they also learn from us from the rural areas.*

The influence of policy, culture, tradition, and power relations on learning in the activity systems*:* With regard to cultural histories and traditional practices in the activity systems, it seems clear that cultural factors have a strong role to play in what is learned and how. In the Lake Malombe fishing activity system, for example, the cultural homogeneity influenced the types of fishing practices used and favoured. Use of indigenous knowledge has, in most of the meetings, been central to alternative ways of managing the fisheries resources. Policy and power relations also influence what is learned and how, as shown by the focus group data from Lake Malombe:

> ***Focus Group Data FGDM 2:*** *Unlike in the other lakes, Lake Malombe uses similar fishing gear and most of the people are descendants from here. This has in a way helped us to have similar fishing practices and it is easy to check illegal fishers who may come from other areas. We are the first to introduce by-laws because our local chiefs understand our needs. When the traditional chiefs see something is not going on well they quickly invite us and this allows us to work together.*
>
> ***Focus group data FGM2:*** *We have a number of people who work with us, the fisheries assistant who is based here, we also receive other government people who*

come from the office to do enforcement and licencing of fishing nets and many others from government. Some of these people come here after a long time and when they come they have something to do either with us or on their own but still ask us some questions. Some come to do their research in the lake and we have seen some going round our villages and asking us different questions. During the closed season some from fisheries come with their cinema shows here and they contact us as BVCs to work with them when they are showing their cinema shows.

As discussed in Chapter 4, an activity system has a minimal meaningful context for understanding individual action (Sawchuk, 2003). As shown here, not only does the activity system allow for understanding individual action, but it allows for understanding how interactions in the activity system influence learning possibilities, processes and outcomes. The use of CHAT in identifying the activity systems helped because it helps to explain how learning in the activity systems is related to activity (Sawchuk, 2009).

5.6.2 Co-learning that takes place across the two activity systems

The sections above have provided detailed insight into the two main activity systems that share the common object of co-management of the fishery as found in the Lake Malombe case study area. I also provided an analysis of those features and processes that appeared to be significant for learning within the activity systems. Looking from a wider perspective, it is easy to see that fishing communities in the Lake Malombe case context are vital for securing the resource, and government is crucial too, as shown by this citation:

> ***Interview with individual IIM5:*** *As a village headman in this area, I always tell people that the lake belongs to us as people who originally are from this area. We cannot expect someone from uphill to come and manage the lake for us. I tell them we have a responsibility to protect our fish and that the Fisheries Department is there to guide and support us. I tell them that these people come and go because they are employed but we are not. Most of the extension workers you see here in Lake Malombe are from upland areas and they only come here because they were trained but this is our own.*

The interaction and active engagement of all stakeholders in the two activity systems allows for a gradual replacement of centralised management of the fisheries resources to a more participatory type of management where there is shared responsibility and creation of new relationships among different stakeholders in the fisheries sector, as can be seen from the citation/s below:

> ***Focus group data FGD2:*** *We are seeing differences in the way we used to interact with each other when the government was managing the fisheries resources alone. We are now able to contribute to the process unlike years back when everyone was seen as an enemy. No one these days doubts each other and this is what we have benefited as BVC members in this area.*

In this section, I consider the **co-learning** that has taken place *across* the two activity systems in the Lake Malombe case. As shown above, the formation of partnerships is a significant aspect of learning within the activity systems and was reported on above as such. However, this also allows for boundary crossing *across activity systems.* I share three important dynamics of such co-learning as evident in the data:

1) The content of co-learning as shown by what is allowed by the co-learning process across activity systems
2) How the co-learning interactions are structured
3) How socio-cultural tensions, knowledge, and power relations influence co-learning across activity systems

Each of these is discussed in more detail below.

1) The content of co-learning interactions across activity systems:

A question on what gets discussed when different stakeholders from the different activity systems get together revealed some interesting insights into the ***contents*** of the ***co-learning process*** that occurs across activity systems, as indicated in the citations below. These have been grouped according to some of the main co-learning interactions across activity systems.

- ***Co-learning allows for learning of practices and how to deal with challenges:***

  Focus group data (FGDM1): *When people come to a meeting usually there are a lot of things which are discussed and every time we meet we discuss new things. I learn a lot from the fellow fishers because I have seen that whatever is discussed touches what we are doing. We learn about some of the practice because we are facing a lot of challenges. People are now using lots of undersized fishing nets and most of the fish they are catching are small.*

  Focus group data (FGM4): *We usually call each other mainly when we have come across challenges. We call each other to discuss what has been experienced at that particular time. We do not meet as it is required [i.e.] that after every three months or every quarter we should meet, no. This is because some of the BVC members are new and have not been trained [so that they] know their roles and responsibilities. We need to train these new BVC members. What I am saying is that the current BVC members do not know their job, they are just acting because those who were trained are very few and most of them are not BVC members any more. For someone to go and do work that he/she has not been told [how to], fails to do it.*

- ***Co-learning allows for understanding the importance of regulations for sustainability***

  Focus group data: (FGM3): *We teach each other about the importance of observing closed season and the importance of maintaining the current fish stocks for our children who should also benefit from the same resources.*

  Interview with individual (IIM1): *There are a lot of things which we discuss and learn as we meet and some of these meetings are done with the extension officers and all the BVC*

members we have in the area. We look at what people are using for fishing because most of the people now are using illegal fishing nets.

- ***Co-learning allows for understanding of diverse roles, feedback and reflexivity***

  Interview with extension officer (GEM1): *The learning has no limit because as extension officers we also learn a lot when we meet fishing communities. They know more about fishing practices and coming together with them helps to understand some of the practices that other fishers are doing in the area. We know how fishers exchange ideas when they interact with each other. Sometimes we also get some feedback on how some of our regulations are perceived by the fishing communities and through interacting with them we know who is not following them and why. Those fishers who are doing illegal fishing don't often come to our meetings and what we do is we visit them individually to help them with some management ideas.*

- ***Co-learning allows for intergenerational learning and new knowledge acquisition***

  Interview with individual (IIM3)*: As fishers, we also learn from each other because some fishers have been fishing for a long time. There are some crew members who are really experts in both fishing and designing different fishing nets. When we go fishing together with other fishers we actually know that others have more expertise especially the crew members because you will see that in the same area some come with no fish but someone who is able to read the current that comes with fish will catch a lot of fish. We also learn some of the techniques through chatting with fellow fishers on some of the new fishing practices because in most cases we are not sure if we will catch fish or not.*

- ***Co-learning allows for dealing with contemporary concerns and/or relevant practices***

  Interview with individual (IIM2)*: When we have a meeting with our extension officers and us as BVCs we already have a list of things to discuss and in most cases the BVC chairman together with our extension officer are the ones who develop the list. The discussions are based on what we are experiencing at that particular time, for example if it is during closed season then our discussions will be based on closed season. We also organise large meetings with all fishers to discuss issues of illegal fishing, closed season, payment of fishing licences and many other things.*

From the evidence provided above, stakeholders involved in the activity systems learn a considerable amount from each other when their activity systems interact. Most of what they appear to be learning is focussed on things which affect their day to day business, but there is also evidence that such learning deals with common concerns (e.g. such as how to deal with challenges, or how to implement regulations, or ensure fish stocks for future generations).

Their learning ranges from communities learning among themselves (e.g. amongst the Lake Malombe fishing activity system and other fishers) and also learning from the government extension and research officers. It is evident from the data shared above that the government extension officers learn from the fishing communities especially about the fishing practices, and moreover that they are willing to learn from them, and obtain feedback on their practices,

and engage reflexively. The data above also shows the importance of the co-learning interactions for learning of new practices, and for solving problems.

Wals (2007) has suggested that successful participation for sustainability involves a wide range of stakeholders to build a shared vision, and to develop a great sense of unified purpose and community identity. As shown in the data above, through the interactions with different stakeholders, fishers across activity systems, fishers and extension officers, BVC committee members, and others involved in the activity systems are able to reflect on their practices and see which ones constrain the proper management of the fisheries resources and also which ones enhance the sustainable management of the fisheries resources.

2) How co-learning across activity systems is structured

In response to a question on 'what is learned' when stakeholders come together, further insight was gained into the contents of the co-learning process and ***how this learning is structured***. Data on this is shared below, mainly in terms of providing insight into how the learning is structured.

- ***Co-learning is structured by agreed upon priorities and by the mediating capacity of the extension services***

  Interview with extension officer (IEM1): *It depends on what the fishers and the government sees as important to discuss. For example if its towards closing season the extension officer will outline programmes where the emphasis will be on closed season so that the fishers should be aware and should get prepared for the closed season. In most cases the extension officer is seen carrying all the problems from the fishers because on one hand he stands for the fishers and on the other hand stands for the government so that if women fishers for example want to have loans the extension officer has to link them to lending institutions. In some areas the same extension officer has to do a number of things now that we are decentralised the extension worker has a lot of things to do in that if there is no social worker the fisheries extension officer takes all the issues to the district commissioner or village development committee for action and some of the issues do not necessarily relate to fisheries like lack of hospitals, schools and many others. So the extension worker becomes a general player. In order for the fishing community to learn together with you as an extension worker one has to get information from different sectors.*

- ***Co-learning is structured by mobility and interaction with others outside of the immediate context, and via sharing of new knowledge and experience gained in this way***

  Interview with extension officer (GEM2)*: People learn all the time and in fishing, things are changing all the time. We can learn from our fellow fishers, for example, when we cross the lake to Likulungwa we see other fishing methods and gears which are not here at Chapola. Fishing with them there we learn how they are using the new fishing nets and their methods and when we come back here we start developing ours and they can also learn from us.*

- ***Co-learning is structured by experience, the politics of the fishery and regulations***

  Interview with extension officer (GEM1): *There are times when even extension officers or government officers learn from fishers for when we are discussing during closed season fishers bring in very important points like the importance of also ensuring a closed season for commercial fishers. Fishers usually complain that as small fishers we accept and follow closed season but commercial fishers who catch lots of fish using illegal fishing methods are allowed to fish throughout the year. Points raised by artisanal fishers gives us ideas to re-look at some of the regulations and find possibilities of reviewing them or think of doing more research to see the impact of commercial fishery during the closed season.*

  Focus Group data (FGM3): *... Fishers also bring what they know from their experiences for example when we go fishing soon after opening our closed season we observe small sizes of fish in our nets and this why you have heard our fishers and BVC saying we need to review our regulations. All these things are discussed and shared during our BVC meetings.*

- ***Co-learning is structured by new knowledge arising from research findings***

  Focus Group data (FGM3): *There are many things that we learn from each other. The Department of Fisheries conducts research in many areas and some of the things from the research are shared with us during our meetings. Things like new closed season for fish to breed, new regulations from government, what our friends from other areas are doing...*

- ***Co-learning is structured by opportunities for exchange visits***

  Focus Group data (FGM3): *... Sometimes fisheries take us to see what others are doing. I remember we have been going to Salima to see what TA Msosa is doing at Mbenji Island.*

As can be seen from the above, co-learning across activity systems is and can be structured in different ways. A critical look at what stakeholders learn, and how this learning is and can be structured, is crucial in the study since the learning that is taking place is taking place in the context of everyday activity. As shown above, there are important co-learning processes occurring, structured in diverse ways, and focussing on a range of dynamics of the fishery and the associated shared object of co-management. Understanding how such learning processes *are already occurring* as shown in this analysis, can be helpful for informing further expansion of such learning. The analysis above also shows that there is a richly interactive co-learning process *already in operation both within and across the Lake Malombe co-management activity systems,* where people are generating and sharing knowledge that can improve and also constrain fisheries resources management. Engeström (2001) noted that expansive learning offers a framework for understanding forms of learning that do not adhere to standard models of vertical mastery. The insights shared above show that the 'standard model' of vertical mastery (i.e. learning from the extension officers or researchers on how to implement the co-management regulations) is not characteristic of how

the fishers are learning in the Lake Malombe area. Instead, **there is a richly textured reflexive learning process** going on, involving various dimensions and ways of co-learning as shown above. Thus, considering an expansive learning process in such a context (the next phase of the study) should take account of this, especially when the object is complex, as is the case with co-management in a context where the fisheries resource is so closely associated with direct livelihoods and immediate food security for millions of people. The use of expansive social learning processes where the above stakeholders deliberate the above practices towards expanding their shared object in more systematically constituted ways, is an important paradigm shift in fisheries resources management where the contradictions faced are engaged with through a dialectical process of solution creation through a participatory learning process, and where assumptions of vertical learning are also challenged by existing learning practices, as is shown in the analysis above.

3) Co-learning as influenced by socio-culturally constituted views, tensions, power relations, knowledge and experiences

Additionally, as pointed out in the discussions on learning in the different activity systems, ***historical and socio-culturally constituted views, knowledge, power relations and experiences*** also influence co-learning across the activity systems, as shown by the data below, organised according to some of the tensions arising.

- ***Co-learning is shaped by the tensions that exist between no other alternatives, demand for the resource, and legislative demands***

  Interview with individual (IFM1): *The Fisheries Department knows that we do not have any other alternative to fishing and that we have been fishing in this area as a source of living. What I do not understand is that we are made to pay high licences for our fishing gears. One depressing thing is that we are not getting good fish catches but the licences keep on getting high. As BVC members when we go to our fellow fishers to remind them about licencing their fish gears we get all sorts of questions and we are not able to answer them. How do we pay high licences when we are coming with no fish from the lake?*

- ***Co-learning is shaped by the time it takes for responsive engagement***

  Focus group data (FGDM3): *Sometimes we do not understand each other with the fellow fishers because there are a lot of things which are not clear and every time we bring them to the extension officer they take time to get answers. Learning could have been more if we had responses from government.*

- ***Co-learning is shaped by diverse perceptions of the issues and problems***

Focus group data (FGM2): *In our discussions we as BVC members, fish traders and other fishers, we sometimes disagree on a number of things and some of them are:*

1. *Rules and regulations which we are saying we need them so that we tell our friends who are involved in fisheries.*
2. *Closed season seem to be a challenge to us. We have been discussing with our leaders in this area that we should revisit our regulations especially the closed season one.*
3. *Some of the fishing gears have been introduced now and we see them as destructive to our lake but our friends fishers do not agree with that point.*

Interview with individual II LM2: *I always tell people that the fishing practices then were more sustainable because we were using traditional materials to make nets and they had less damage. Now the lake is full of modern fishing nets and most of them are under meshed. There is more destruction now than when we were using traditional fishing nets. People have introduced heavy engines and we end up fishing all the fish.*

- ***Co-learning is shaped by power relations, mandates and identity issues***

  Focus group data (FGM2): *We see fishers doing all these but we fail to go to them and we need fisheries to give us powers and we are ready as BVC members to work with our fellow fishers. We are not been supported by fisheries. We asked them to give us identity cards so that we are known as people working for government but up to know we are working without any identity. Sometimes the fishers challenge us and we have no power.*

  Interview with individual IIM 2: *Because of co-management agreement as a chief in the areas I make sure that I support government rules and regulations because when we go to the district assembly, people ask so many questions. The government is supposed to support us as well because we are working as one. Government bring regulations to assist us monitor our resources and as a chief I am supposed to support government.*

The data presented above, shows that the co-learning processes occurring across the different activity systems in the Lake Malombe case are not without tension or contradiction. It also shows that power relations play an important role in shaping what is learned and both within the activity systems and also *across* the activity systems. Making sense of the purpose of co-management and how it relates to immediate needs for food security and livelihoods seems to represent a key tension in the Lake Malombe context, which reflects the complexity of the object. Tensions and contradictions will be discussed in more detail in the next chapter.

As can be seen in the citations above, the presence of tensions and contradictions in the co-management process brings instability among stakeholder groups who are keen to see changes in the fish catches. Engeström (1999a, p. 6) argued, however, that instability and contradictions are regarded as a motive force of change and development and that contradictions within and between activity systems are driving forces to change (Engeström,

2001, see section 3.2.3.1), a perspective which will be examined in more depth in the forthcoming chapters of this thesis.

5.7 Evidence of co-learning between activity systems in case study 2 (south-east arm of Lake Malawi)

The interaction of co-management stakeholders in the southeast arm gives other interesting insights on the learning that occurs as a result of such interaction. In this section therefore, I provide an analysis of what actually happens in these interactions and the processes that show evidence of co-learning across the activity systems. As was indicated in Lake Malombe case, co-learning across the activity systems allows for boundary crossing. I therefore discuss some important features of co-learning looking at two main features that appear in the data from this case study site:

1. Content on co-learning interactions across the activity systems; and
2. Socio-cultural knowledge and power relations that influence co-learning across the activity systems.

1. Content of co-learning interactions across the activity systems

When different stakeholders from different activity systems meet, a number of issues are discussed and these give details of the content and process of co-learning across activity systems. The use of in-depth data collection methods (see Chapter 4) provides rich evidence on what learning take place in south-east arm of Lake Malawi and how such learning influences fishing practices among diverse fisheries co-management stakeholders. The data below shows that a key area of knowledge dealt with in the co-learning process relates to challenges associated with fish catches, especially the decline in fish catches:

- ***Co-learning allows for learning about current challenges associated with fish catches, including through comparative analysis of fish catches from own and other areas, and consideration of the legality of fish catches***

  Interview with extension officer IELM1: *A lot of people are working with BVCs and we work with gear owners, crew members, fish traders and processors and business people who are in our landing beaches. Most of our discussions whenever we meet are towards the current challenges in fish catches because everyone knows now that we are not catching as much as we used to do some 10 years ago. For us to catch more fish we feel we need to come together and share skills.*

  Interview with extension officer IELM2: *We also work with people from fisheries, those who are always with us like our extension officer here. We also meet those who*

come to weigh our fish every month and whenever we have problems we ask them or discuss with them on issues of fisheries. During these meetings we mostly discuss why we are getting less fish catches here when our friends on the other side of the lake in Mozambique catch more fish yet it is the same lake. Most of the fishers who do their fishing in the Mozambique side catch more fish than this size.

***Interview with individual IILM2**: Some of our friends who go fishing in the south west part of the lake especially those areas near Lake Malawi National Park come back with more fish. This is because no fisher is allowed to fish there and those who go there poach and those who are caught are arrested by game rangers. We always learn from our friends who fish in different areas.*

- ***Co-learning allows for learning about traditional means of managing the fisheries***. In the Lake Malawi context, there was a deep respect for traditional leadership, and Chief Chindamba was regularly consulted on the fishing practices which were used before government took over the management of the fisheries resources, how the fishing gear was designed and also how they were conserving fish species amongst other matters, as shown in this citation:

  ***Interview with individual IILM2:** We used to control our fishing activities with our own traditional means when there was no research and things worked. People used to come to me to ask people used to conserve fish because there were more fish species which were found those days than now. No fisher was allowed to go fishing during rainy season because people were told to go farming and in the process fish was given chance to grow.*

2. *Socio-cultural knowledge and power relations that influence co-learning across the activity systems*

Wals (2007) described social learning as the increased capacity of the social systems to manage tensions; this can be through actions where social learning can be linked to a process of social action and through reflection where social learning triggers a process of reflection inside and outside the social system. The activity systems in Lake Malawi have a greater diversity of stakeholders compared to Lake Malombe because of the inter-cultural composition of stakeholders as explained above. The inter-cultural composition in the activity systems brings diverse interactions and more contradictions among stakeholders. Wals (2007) saw contradictions and the diversity of opinion and perspectives as providing a good opportunity for social learning towards sustainability in the context of Education for Sustainable Development, which is similar to what Engeström suggests. The diverse composition of stakeholders in the south-east arm of Lake Malawi brings with it diverse knowledge and skills in and across the activity systems and as in the case of Lake Malombe, co-learning is also shaped by tensions as shown in the data below.

- **Co-learning is shaped by tensions in the governance systems (between traditional leadership and governance, and local government systems of governance)**

  FGLM2: *There are some conflicts between local chiefs and the government because even the BVCs respect the chiefs more than the local extension officer based in the area. Sometimes we feel the BVCs cannot operate without the authority of the village headman. When fishers are caught fishing illegally they are taken to the chief for trial and the BVCs only act as policemen or law enforcers. I think there is need to clearly come up with roles and responsibilities for stakeholders. Culturally the local chiefs are the owners of the beaches and everyone respect them.*

- **Co-learning is shaped by diversity in culturally historically constituted practices which differ from area to area**

  Interview with individual IILM 6: *Here we have met people from different areas and each one here has brought different fishing skills because in the northern part of the lake e.g. Likoma people use their own skills different from those used here in the south. Meeting here help us to learn each other's culture and skills. What happens here is that we pick those that are effective for example we did not do light fishing here but because our friends from the north came with the skill we have learnt almost everyone is doing light fishing.*

- **Co-learning is shaped by rules and regulations**

  Interview with extension officer IELM1: *Some of the issues we normally discuss are: rules and regulations and how they affect our lives, use of different mesh sizes of fishing nets, safety at sea looking at the boats and dugout canoes we use and number of people who go fishing, current fish catches and what they tell us about the future, fishing practices especially commercial fishers who from our experience catches lots of fish in a day. When we are meeting during closed season our discussions are based on what type of fishing gears should we allow people to use because they are some that catch young fish and also destroy some breeding areas of fish. We as BVC members are always keen to see that during the closed season no fishing net which is not allowed to operate is used by fishers and this is the time where our Group Village Headman was saying we need our friends from fisheries to help us. We also remind fishers' that it is time to pay tax for their fishing nets.*

  Interview with extension officer IELM3: *We advise them time to licence their fishing gears. Usually they have a lot of things to say because they only depend on the lake for their livelihoods and become difficult for them to listen to us not to go fishing. The biggest complaint we are getting from fishers is that the licence fee has gone very high from K600 to K10,000*[9] *and wherever we go fishers have this same complaint. They say the government has not helped them because licence costs for seine net, open seine net, gillnets have gone very high now that there isn't more fish caught.*

- **Co-learning is influenced by declining fish stocks**

  Interview with individual IIM1: *The discussions vary because we also discuss some of the fishing practices here and we all agree that they are destroying our fish stocks.*

[9] 1 US dollar = 400 Malawi Kwachas

Fishers have learned other strange practices from other areas and we have a lot of fishing methods here which are destructive. The problem is that if we as fishers talk about those things we may be seen as being jealous to those who are practising such kind of fishing. We need the government to come forward and tell us that what is happening is not good.

- **Co-learning is influenced by research activities**

Interview with individual IIM2: *When students come from the college we also tell them what we do in fishing and the fish species we catch. When those from Mangochi and those doing research come to weigh our fish, we also tell them the type of fish we get from different fishing gears. Sometimes they ask us where the fish is caught and we tell them.*

Focus group data FGD1: *We interact with fishing communities and extension officers in a number of ways. We sometimes go to different fishing sites to carry out some research activities with students. We also attach out students to different fisheries stations where among other things they go and work with fishing communities for them to experience what they are expected to do when they graduate from here. So I could say we have more interactions with the fishing communities and also the extension officers.*

Stakeholders within and across the activity systems discuss a wide range of issues within the co-learning processes that occur. From the evidence cited above, it seems that there are a number of issues that do not have easy solutions, and these are a central part of the co-learning and the engagement and **motivation to learn from others**. The discussions range from fishing practices, declining fish catches, fisheries management issues and teaching and learning at the Fisheries College. Fishers also acknowledge the importance of getting assistance from the government ***in addition to*** the knowledge they get from their fellow fishers, the chiefs, their fishing communities, and fishers from other areas. Dean (2006) suggests that everyday knowledge which is also called common sense knowledge or *knowing how* is not enough in present day complex societies; local knowledge and experience needs to be augmented by scientific knowledge. According to the interviews that I conducted with the fishers however, the most common motive for fishers' co-learning is the sharing of knowledge and experience related to practices and experiences. The fisheries indicated that such knowledge and learning is difficult to document but they themselves know that the knowledge they have is very useful and important in their fishing. It could not proceed without this, especially given new challenges that have to be navigated (e.g. the decline in fish stocks).

- **Co-learning is also shaped by political economies and the politics of who is allowed to fish when**

The evidence above gives an indication that historical and socio-cultural constituted knowledge tensions and practices among stakeholders exist, and that these influence co-learning possibilities and practices. There are tensions between the local extension officers and the local chiefs on ownership. Traditionally, local chiefs are responsible for all the

activities taking place in a BVC and the fish landing beach where the BVC is situated. Roles and responsibilities for different stakeholders are not clear and this constrains learning among them. Participation can be understood as the involvement of people in joint analysis, planning and control of local resources. Wals (2007) argued that it is a way of recognising the value and relevance of local of context specific knowledge and that the knowledge developed becomes part of the decision making process and that solutions are developed relevant to each community or stakeholder. However, this is not always a simple matter as political economies are often not easy to resolve at a local communicative interaction level, even across the activity systems present as shown in the data below which refers to discriminatory rules for small scale fishers compared to commercial fishers. The data shows that fishers are knowledgeable of, and aware of these power-laden double standard problems, but are not fully empowered to resolve them; hence they turn to government to 'act fairly'.

> ***Interview with individual IILM1:*** *What is important for the government to know is that we do not have any other source of earning a living apart from fishing. We were brought up here and we found our parents and grandparents fishing and that has been part of our life. Stopping us from fishing is very difficult but I think what we should do is allow us to fish while observing the regulation from government. The problem is that we are told to stop fishing when those operating big fishing vessels are allowed to fish throughout the year. If it is conserving the fish stocks why are others fishing? Also if we compare the fish catches those ones catch you will see that they catch more than us and we are here struggling to survive. We need to be clear on the regulations that allow others to fish when we are stopped not to fish in the same lake.*

5.8 Analysis of social learning interactions in the two case studies

As discussed in Chapter 3 and Chapter 4, the introduction of fisheries co-management facilitated interactions among different stakeholders. Nielsen (1997, p. 223) argued that community based management is not simply about community participation in a management or conservation programme. It is about local community authorship and ownership of marine management in which outsiders may be invited to participate. It is based on the premise that local communities have the right and responsibility to manage their own resources and spaces. The data above shows that co-learning within and across activity systems is a central part of this process. The idea that one could generate unequivocal and uncontested knowledge and understanding of a situation as a basis for rational planning has eroded rapidly since the 1980s and has been replaced by the idea that it is essential to deal with multiple realities in social problem solving efforts Leeuwis & van den Ban, 2004). The data presented above shows that this requires an understanding of the activity systems at play in different contexts, their socio-cultural histories, changes over time, and the politics and power relations that shape interactions within and across the activity systems.

The data presented above also shows that the mobilisation of co-management stakeholders brings people who have different perspectives on resource management together and their different views and understanding on the management of the fisheries resources can facilitate co-learning of content that is of common interest. Such co-learning is also structured in particular ways that resonate with power relations, the context and how people are interacting in this context.

The data on engagement with co-management processes through various forms of co-learning presented above, also suggests that as fishing communities strive to deliberate crisis of declining fish catches, the state should assist them to build robust institutions by providing them with management legal authority, expertise and financial means (Hersoug et al., 2004). It also suggests a need to bring the decision-making responsibility closer to those that are affected by management decisions, the concerned fishing communities who have valuable experiences and knowledge of working with fisheries resources. It also shows, however, that political, economic and sustainability contradictions need to be more fully engaged by all concerned, as will be discussed in more depth in the next chapter. See the application of second generation CHAT in the figure that follows

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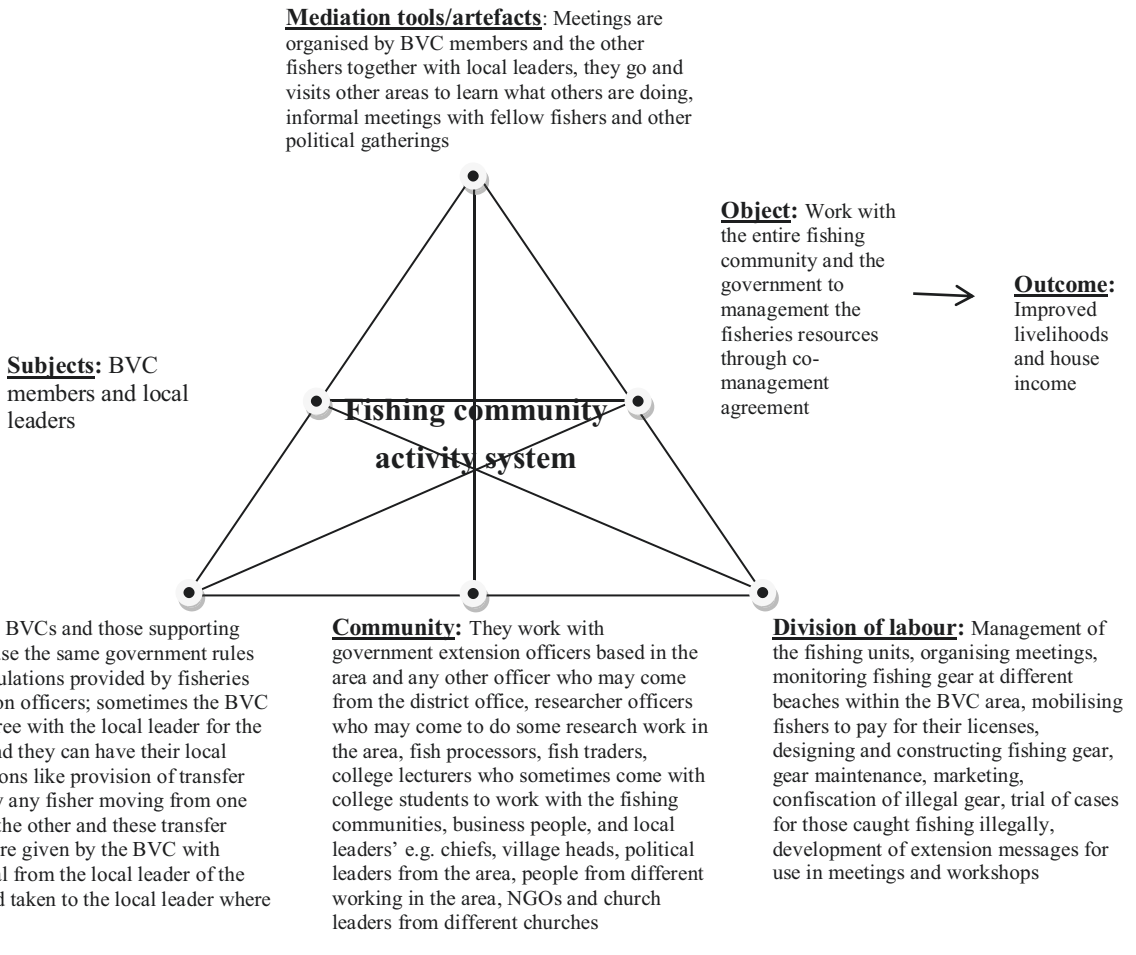

Figure 5.9: Application of second generation of CHAT activity theory to fishing communities (Adapted from Engeström, 1987)

The analysis presented in this chapter aimed to provide a deeper understanding of how different elements of the system function as an activity system and what happens as they interact within and across elements in the activity system. Roth and Lee (2007) claimed that diverse activity systems are the result of continuous historical processes of progressive job diversification and collective division of labour at a societal level. As shown by the data in this chapter, people's understanding of their common object differs, confirming the possibilities for co-learning, and the noted tensions and contradictions outlined above.

As shown in this section, the existing contradictions which occur when fishing communities interact occur within the elements of an activity system (e.g. amongst fishers or extension officers) or across the elements in the activity system (e.g. between the rules and the mediating tools or the rules and the object).

As shown also by the data in this chapter, fishing communities come from diverse backgrounds and therefore have different views and understandings of co-management. Working together in an activity system brings different perspectives of what co-management is all about and what needs to be done in trying to address the issues of declining fish catches. The deeper way of integrating the existing knowledge gaps by using CHAT helps to work across disciplines where everybody is involved through integration, reflection and collaboration.

Fishing communities in the two case studies have different ethnic, cultural and religious backgrounds and different histories. Lake Malombe is dominated by Muslim people whose tradition and culture was greatly influenced by the Arabic invasion during the slave trade era (Donda, 2001). Fishing communities in the area are mainly indigenous and have inherited fishing as a way of life from their parents from one generation to the other. As discussed earlier in this chapter, the dominant fishing gear used in Lake Malombe included open seine nets, beach seine nets, gill nets, long lines and fish traps (see section 5.2.1). Fishers in Lake Malombe are mobile and as they go round the lake searching for better catches, they learn other fishing techniques and methods from fellow fishers.

According to the Chambo Project findings (FAO, 1993), the decline and collapse of the fish stocks was due to over capitalisation, increased use of illegal fishing gear/ illegal methods and government's inability to enforce the existing regulations effectively, indicating tensions between the object and the mediating tools and division of labour. The government hoped that the introduction of the co-management approach in Lake Malombe would satisfy both the government's and the user community's objectives of biologically-sustainable

exploitation of the resource for the former and continued economic viability of the resource for the latter (Hara et al., 2007).

The long-term objective was to develop and have in place a management regime that would require inputs from the Fisheries Department, while at the same time ensuring sustainable economic viability of the resource for the fishing communities (Njaya, 2007). In the case of the south-east arm of Lake Malawi, the fishing activities are from a mix of different tribes and cultures because fishers came from all over the lakeshores due to the abundance of fish in the area. The descriptions above provide some indication of the urgency of the engagement with the object as it is closely related to daily livelihoods, and this provides a strong motivation for a) learning from each other, b) accepting and seeking to appreciate different roles and distribution of responsibility, c) on-going respect for certain aspects of traditional leadership, and d) engagement with new structures such as the BVC. All of these are important to co-learning, as outlined above in the data.

At the centre of all of the social engagement and learning related to co-management is the harsh reality that due to high levels of poverty in Malawi, with limited economic opportunities available elsewhere, crop failure and drought, more and more people go fishing, especially in the south-east arm of Lake Malawi. This places further pressure on already vulnerable fish stocks (Kachilonda, 2005). Reflective of the risks people in the two case studies face due to the declining fish catches and the current fishing practices, is the argument of Beck (1992) who suggested that if one is in a risk society, risks are unknown and there are unlimited consequences. In poverty stricken communities the risks are both societal (at a broader macro level) and immediate (at the household survival level) effectively exposing people in poverty to extreme levels of risk. Beck (1992) argued for reflexive learning in such contexts, but he did not provide methodological guidance on how such reflexive learning could be mediated. Engeström's work however, *does* provide such guidance (see Chapter 3), and suggests that it is useful to deepen our understanding of contradictions (some of which were alluded to in the data reported above) as these provide for possibilities for expanding learning. However, contradictions are not merely tensions, and they require careful structural and cultural analysis to more fully understand the possibilities for learning. As indicated in this chapter, there is already a vibrant and reflexive learning process going on in the context of fisheries co-management in the two case study sites (these share some similarities, but also some differences). In the next chapter, I will consider the issue of contradictions in more depth, and outline how these can become possibilities for further learning in the two case study sites.

5.9 Conclusion

Evidence of people's social learning processes in co-management of the fisheries resources was traced in the data obtained from the range of research methods (interviews, focus group discussion, observation and workshop data). Through semi-structured questioning and probing, different stakeholders were able to interact and deliberate on issues that influence implementation of fisheries co-management in the two case studies. Their statements are reflective of what they have learned about the object of co-management. As indicated above, the activity systems identified in the two sites are diverse, multi-voiced, and have diverse origins, rules and practices. Some rules, forms of division of labour, mediating tools and relational dynamics are similar (e.g. the government regulations on closed seasons govern both the south-east arm of Lake Malawi and Lake Malombe), even though the actualisation of these may differ in the different contexts. In both contexts, changes over time, partnerships and socio-cultural power relations, especially the role of chiefs, played an important governing role, but their roles and how they were actualised in the two different contexts differed. In both cases, government was being called on to help with resolving core contradictions. Mediating tools also differed, and in some cases were the same. Thus, it is not surprising that different perspectives on co-management were voiced in the two different activity systems, whilst in some cases what was being said seemed similar. These issues of diversity and similarity in activity systems would seem to be an important factor influencing learning.

This chapter discussed learning processes which are taking place among stakeholders in fisheries co-management, emphasising the content and the structuring of co-learning already taking place in the two sites within and between activity systems. The chapter focused on the first question of the study which sought to examine what learning takes place among different stakeholder groups in the context of fisheries co-management that influences their practices. In order to be able to understand the learning in each activity system, I used second generation CHAT to see what elements of the particular activity system interact within it and how they interact. Then I used third generation CHAT to examine interaction across the activity systems and to explore the content of the interactions. I also illuminated historicity and power relations as these influence learning significantly as also shown in the data above. The chapter illuminated what the shared practices are and what learning takes place, as well as how the learning takes place in stakeholder's historical socio-cultural contexts.

The next chapter surfaces the contradictions within and across activity systems in case study 1. It shares the deliberations on the surfaced contradictions which led to identification of solutions by stakeholders, and provided evidence of expanded learning in the multi-voiced cultural historical activity context of co-management.

CHAPTER 6

CONTRADICTIONS ARISING IN AND BETWEEN FISHERIES CO-MANAGEMENT ACTIVITY SYSTEMS

Dialogicality is the ontological characteristics of the human mind to conceive, create and communicate about social realities through mutual engagement of the ego (i.e. self or selves) and alter (i.e. others). All the understanding and all the symbolic activity of humans are found in dialogue between different minds expressing multitudes of multi-voiced meaning. (Markova, 2003, p. 83)

6.1 Introduction

This chapter discusses contradictions in the two case studies (Lake Malombe and the south-east arm of Lake Malawi). It surfaces the existing contradictions within and across the activity systems. It further explores some of the underlying generative mechanisms that shape the contradictions. The in-depth discussion of contradictions in each case answers the second research question: what are the learning and co-management practices that can be expanded in and through learning? The chapter uses the theory of boundary crossing to locate the source of contradictions, tracing co-management as an object within and across the activity systems in Engeström's (2001) model of identifying primary, secondary, tertiary and quaternary contradictions.

6.2 Boundaries emerging in the form of contradictions in fisheries co-management

Boundary crossing is used to denote that there is a movement across or a co-location of practices across activity systems. According to Akkerman and Bakker (2011), boundary crossing allows for mediational means to trigger a dialogical engagement and invite others to explore a certain perspective and the identification of this creates possibilities to learn. Boundary crossing carries learning potential e.g. it allows for the renegotiation of relationships and the connection of new perspectives (Broberg & Hermund, 2007) that can lead to a collective third space and hybrid practices (Gulierrez, 2008). Edward and Fowler (2007) argued that boundaries are sites for expanding mutual understanding of shared tasks and problems and the development of expertise. Boundary crossing refers to work and learning in which actors step outside their customary domain of authority and expertise to find new ideas and solutions together with other actors; boundary crossing typically entails

risks and requires efforts at building a shared language between actors (Engeström, Engeström & Kärkkäinen, 1995) However, for boundary crossing learning to occur, there is a need to identify contradictions between activity systems, which is the focus of this chapter.

As indicated earlier, co-management was introduced in Lake Malombe and the south-east arm of Lake Malawi to bring fisheries resource users closer to the management of the fish resources. The assumption was that by involving them there would be less overexploitation and that the fish catches would improve (see Chapters 1 and 2). The introduction of co-management in the two areas allowed fishing communities and the government extension and research officers to start talking to each other (see section 1.5.4). However, extension officers gave contradictory messages to the fishing communities about fisheries management and there were also some contradictory messages which were shared among fishing communities as they interacted among themselves (see section 6.3.1.3). This shows the existence of contradictions that shape the common object of co-management.

As shown in Chapter 5, there is evidence that sharing of fisheries knowledge and skills *is* taking place across the boundaries of the government and the fishing communities and also from the fishing communities back to the government through workshops, meetings, BVC training and other informal gatherings. Learning and collaboration processes reflect horizontal and vertical engagement across and between distinct practices (Engeström & Kärkkäinen, 1995) providing a richly textured co-learning environment as shown in Chapter 5. Engeström and Kärkkäinen (1995) argued that horizontal and vertical learning processes, for example, what we study in school, at work or between school and work, reflect boundary crossing processes.

In this chapter I focus more on deepening understanding of boundary crossing processes as identified in this study, through examining contradictions as possibilities for new learning and change. This is in accordance with third generation CHAT which sees boundaries in the form of contradictions between activity systems as vital forces for learning, change and development (Roth & Lee, 2007). As pointed out earlier (see Chapters 1 and 2), the interactions among fishing communities and also between fishing communities and the government have been characterised by complex political, socio-cultural, socio-economic and social-ecological contradictions that have existed in the fisheries sector for a long period. In my literature review work I found that while these contradictions were noted in various ways (see Chapters 1, 2 and 3), *there was no work that examined contradictions as potential for new learning and change in the fisheries co-management context.*

In this chapter I therefore illuminate these contradictions in more depth as they were generated from the data in the first phase of the study (see section 4.8). In the case of Lake Malombe thirteen contradictions were identified, and in the case of the south-east arm of

Lake Malawi ten contradictions were identified (see Table 6.1 and 6.2 for summaries of these). These were then mirrored to all the stakeholders to confirm and deliberate in expansive learning workshops in Phase 2 of the study (see section 4.8.5, and Chapter 7 where the expansive learning process is described in more detail). As explained in section 4.4.5, these intervention workshops were conducted in each research site (Lake Malombe and the south-east arm of Lake Malawi) with government extension and research officers, BVC members and local leaders and also other fishers.

As indicated earlier (see Chapters 3 and 5) people learn through interaction where they explore possibilities together of addressing the existing issues or setbacks. If they face particularly complex issues or concerns, or want to avoid the issue, they may be unable to work it out themselves; which is partly why Engeström and his colleagues worked on a methodology for interventionist research (Engeström, 1987). This methodology also helps to cross boundaries between interacting activity systems. As explained in Chapter 4, in this study I followed a systematic research process as recommended by Engeström and his colleagues (Engeström et al., 2003) to uncover the contradictions and to mobilise these as a source of learning and change. As discussed earlier (see Chapter 3), Daniels (2008, drawing on the work of Engeström, 2005) summarised contradictions on four levels: primary, secondary and tertiary and quaternary.

Engeström (1987) defined **primary contradictions** as those that occur when activity participants encounter more than one value system attached to an element within an activity that brings conflict. **Secondary contradictions** occur when there is tension between one element and another in the activity system (Engeström, 1999). Importantly, and as also observed in this study (see below), Engeström (2005) argued that primary contradictions evolve and take the form of specific secondary contradictions which in turn also shape and influence tertiary and quaternary contradictions, thus one can find that contradictions are often closely related. **Tertiary contradictions** occur when the object of older activity systems clashes with the object of what can be seen to be a more advanced activity system, while **quaternary contradictions** occur when elements of the central activity clash with elements in any neighbouring activity systems (Engeström, 2005; Mukute, 2010)

During the investigation phase of the study, thirteen contradictions were identified and these were mirrored to stakeholders during the change laboratory workshop (see section 4.8.5 and Chapter 7). Chapter 7 recounts how participants discussed the contradictions and developed a prioritised list of which contradictions were to be discussed and worked on further. Of the thirteen contradictions surfaced and reported in the section below, participants prioritised seven (see Chapter 7). It was further agreed that extension officers together with BVC members should give attention to the remaining contradictions at a later date for them to also

agree on their solutions (see Chapter 7). Here I describe the thirteen contradictions as surfaced from the phase one data analysis in the Lake Malombe case.

6.3 Contradictions in case study 1 (Lake Malombe)

In Lake Malombe contradictions were surfaced in two activity systems – fishing community and government (see section 5.3.1). As reported in Chapter 5, stakeholders in the fishing community activity system include BVC members, local leaders, gear owners, crew members, fish traders, fish processors, and those doing fish related businesses, and stakeholders in the government activity system include government extension officers, research officers, fishers, BVC members and traditional leaders.

6.3.1 Primary contradictions constraining co-management

The contradictions were surfaced through analysis of responses to a range of questions during the phase one data generation process. One of the questions asked was: *Why do you think we have continuous decline of fish catches while implementing co-management?* This question was asked to probe the link between co-management and what is happening with the fish stocks and why there are declining fish catches when the assumption was that introducing co-management would improve the fish catches. Another question was asked to probe how fishers see how they relate to the rest of the activity system and other associated activity systems: *What are some of the issues that constrain the implementation of co-management practices in Lake Malombe?*

One of the difficulties in identifying contradictions in a fisheries co-management context amongst those in the fishing community activity system is that fishing is practice-based, where fishers are socio-materially involved in the practice of fishing, and they learn the practice through observing what others do in the fishery. The knowledge about fishing is usually passed from one generation to another and as they get involved in the practice they develop skills and become more skilful (see section 1.10). Thus, one of the challenges with fishing practice is that it is not documented and those who practise it do it through skills that evolve over a period of time. In trying to understand knowledge in a community of practice, Brown, Hanson, & Meredith (1987) argued that knowing and doing are reciprocal – knowledge is situated and progressively developed through activity and one should abandon the notion that concepts are self-contained entities; instead there is need to conceive them as tools, which can only be fully understood through use. Learning is understood as a process which is often tacit and takes place through shared or joint action and has a generative effect on the pattern activities in which it occurs. It was evident from the data in this study that the more the catches declined, the more people developed new skills for fishing using modified fishing gear and also engaged with new practices that allowed them to catch more fish. More

and new technical survival strategies were being learnt through their engagement with fellow fishers who were facing the same challenges and it was not easy for the fishers, or me as formative interventionist researcher, to identify these practices as contradictions, since they were also characterised by necessity (see section 6.3.1.1).

However, I was able to observe that as people explored various practices taking place in the fishery they were also able to draw on knowledge of the history of the fishery prior to co-management being established in Lake Malombe in 1993 (see also Chapter 5). This helped to surface the contradictions that existed in the fishing community activity system. This is another process that helped with surfacing contradictions in the fishing community activity system: while members of the fishing community activity system had problems reflecting on individual practices during the face to face interviews, they were quick to point at the other stakeholders as the ones constraining co-management initiatives. Most of the fishing communities pointed at the government extension officers as failing to control overfishing and also for illegal fishing in Lake Malombe, and it therefore seemed as if all contradictions were tertiary or quaternary contradictions.

With deeper probing however, and through the responses given to the more open discussions and elaboration on fishing practices and co-management in the focus group discussions, members of the fishing community activity system were able to reflect on the current fishing practices and the status of the fishery and were able to respond to the questions on *why there is continuous decline of fish catches during co-management programme* and *what was constraining co-management process*. These responses indicated that while many of the contradictions are in fact tertiary or quaternary contradictions (see below), there are also elements of these contradictions that can be seen as primary and secondary contradictions as described below. This relationship between the primary, secondary, tertiary and quaternary contradictions as outlined below shows **that there appears to be deep-seated and difficult to resolve structural contradictions that exist at the poverty, natural resource use, sustainability and governance interface in the co-management system**. **This reflects a core tension characteristic of sustainability where economy-society-environment relations are often in tension, and which also relates to tensions that exist between short term use of the natural resource, and a longer term need for sustainable management of the fishery for ongoing use of the natural resource for both current and future generations** (see also Chapters 1 and 2). Mukute (2010) also found this to be a core tension in sustainable agricultural practice in a rural southern African context. As explained in Chapter 4, contradictions are reflective of deep-seated structural tensions that are historically shaped over time.

The data revealed two primary contradictions in the rules of the fishing community activity system, and one primary contradiction in the division of labour. These are related to the secondary, tertiary and quaternary contradictions as discussed below.

6.3.1.1 Contradiction in the rules and governance of the rules in the fishing community activity system reflected in a tolerance of modification of fishing gear that continues to exploit fish stocks in spite of awareness of explicit rules to the contrary

This contradiction was revealed in the following research interactions:

> ***Researcher:***
> *Why do you think we are continuously experiencing low catches in Lake Malombe in the midst of co-management?*
>
> ***Individual Interview IIF****: There are many things happening and to be honest we are not doing our job and we just talk like this in meetings but are doing nothing. People are fishing with lots of illegal fishing nets, they fish during the closed season but BVCs do nothing. We do not hold meetings here as BVC members and we do not have one voice.*
>
> ***Researcher:***
> *It looks one of the problems is the use of some illegal fishing gear. What is this fishing gear and why is it used when it is illegal?*
>
> ***Focus Group Data FGD1****: One of the things that we have seen we need to focus on as BVC members and all the fishing communities in the area is the number of strange fishing gears which many fishers are using here in Lake Malombe. After seeing that fish catches have declined and are continuously declining, some fishers have and are designing fishing gears with small mesh sizes that are catching small fish against the rules. I think we need to find a way of discouraging the use of fishing gears that have small meshes. The fisheries resources belong to us and we are the only people to find a way of controlling the illegal gears.*
>
> ***Focus Group Data FGD2****: People are getting wiser every day and when they see are not catching enough fish, they start modifying their fishing gears so that they can catch more fish even the immature ones. They make fishing nets with small meshed sizes. We need to find a way of monitoring these under-meshed fishing nets and as BVC members we should confiscate these and encourage fishers to use recommended fishing nets.*
>
> ***Researcher****:*
> *Why should we say these fishing gear are constraining our work as BVC members in Lake Malombe?*
>
> ***Focus Group Data FGD3****: As BVCs members we have rules that govern our duties and if there are some people who are not following those rules then our job is compromised or we are not doing our job. I personally feel as BVC members, we must work as a team and encourage the rest of the fishing communities to work together*

and discourage the use of these illegal fishing nets. Our chiefs and local leaders should also work with us to address this issue because everyone is seeing what is coming out of the lake. There was no time in my whole life here when we experienced such low fish catches. We used to have lots of fish some 10 – 15 years ago and where have all that fish gone and where do we think we are heading to?

Focus Group Data FGD1: *Our meetings with fishers should emphasise the dangers of using these fishing gear because they also know that those who are using them are catching small fish and it will not be difficult to discuss with them because they see the fish catches are getting less and less and also small in sizes. What I think is important is what the previous speaker has said that we should work with our chiefs and village heads and that we should all have same voice because all these people are under them and whatever the chief says no one is going to refuse or be against. In our meetings the BVCs and the chiefs and other local leaders should have one voice discouraging the new destructive fishing gear and those using them will know that no one will accept them in our areas and the whole of Lake Malombe. People can use the usual legal fishing gears and we all know that they can catch less now but if we continue using the legal gear, we will eventually start catching big fishes because they will have grown to the recommended size.*

From the evidence above, the contradiction of modified fishing gear is touching on the two questions which were asked of the members of the activity system on the continued decline of fish catches and also regarding the constraints on co-management. The data reflects a primary contradiction within the rules of the activity system because the explicit rules as known by members of the fishing community activity system clearly stipulate that any under-meshed fishing net is prohibited and use of illegal fishing gear is contravening the rules, yet this is implicitly accepted within the fishing community activity system as shown by the discussions above. Members of the fishing community activity system are aware of the contradiction in these 'rules' or in how the rules are playing out, as they know that the use of illegally modified fishing gear not only causes declining fish catches but also constrains co-management initiatives in Lake Malombe and poses a risk to future potential catches. As can be seen from the above citations, some of the members of the fishing community activity system interviewed, strongly advocated for a collective effort in monitoring of the explicit rules within the activity system to address this contradiction; yet it seemed that while they desired this, it was not being actualised in practice.

After the above interviews on the increased use of new under-meshed fishing gear, I wanted to get the views from the chief of the area because the rules which govern the fishing communities are also endorsed by the chiefs who form part of the fishing community activity system, and who also hold trials governing the practice of those who contravene them. The ways in which the rules in the fishing community activity system were administered was therefore relatively complex as it appeared to involve the power structure of the chief, and the

governance roles and responsibilities of the BVCs, as well as peer regulation amongst fishers themselves.

In commenting on the new fishing gear, the Chief outlined a number of things which were not very different to those provided by the BVC members and other members of the fishing community activity system, as shown in the research interaction below:

> **Researcher:**
> *Chief what is your comment on the new fishing gear which are in your area?*
>
> ***Individual Interview with Chief IIF**: We have been talking about these fishing gears for a long time and people have been warned not to continue using them but some are still fishing with them. It is important that this issue has come out again and BVC members have voiced their unhappiness on this issue. I am the first one to complain about these fishing gears and have been telling people in different meetings that I don't want these gears in my area. As a chief for this area I will not be happy to finish all the fish because our parents took care of the fish before us and this is why we found them and we also want our children and grandchildren to find the fish as we did ourselves. We need to work as a team, BVC members, chiefs, fishers and the other people in the area to make sure that these illegal fishing nets are no longer used and that anyone who is believed to have them should no longer be allowed to fish in this area. As a chief I have powers to refuse any fisher to operate from the area but I don't want to be seen victimising anyone for no reason and to do that I want to ask all of us to work as a team and first advise them and then follow with actions. We all know the dangers of using these nets and our interests is to see that our fish stocks have regenerated and this can only happen if we all work together as enforcers in the area. We have a lot of poverty in this area and this poverty can end if we work together because having good fish catches will yield us more income in our families.*

The evidence given above shows that modification of fishing gear by some of the fishers, and tacit or implicit condonement of this practice is a primary contradiction within the rules because every fisher knows that the explicit rules prohibit the use of under-meshed fishing gear and any use of it is a contradiction within the rules. In trying to increase fish catches fishers modify their fishing nets by reducing mesh sizes, making them light to increase the speed of the net when in operation. Of interest in the probing of this contradiction is the awareness amongst all of the problematic nature of this practice, and the historicity of it, as well as its future implications; yet there is an implicit or tacit process allowing the practice to continue amongst the members of the fishing community activity system members. There is also awareness that working together amongst members of the fishing community activity system (BVCs, fishers, and the Chief) to monitor the explicit rules could resolve the problem, making this a possible area for ongoing expansive learning within the fishing community activity system itself.

In CHAT primary contradictions happen when there is a clash within elements of activity systems and serve as potential driving forces of change and development and learning (Engeström, 2005). They provide a starting point for reviewing the tensions and creating opportunities for analysis and problem solving during which more learning and meaning making could occur (ibid.). As shown above in the data, interviewing different stakeholders within the activity system gives a broad perspective on how this primary contradiction associated with the modification of fishing gear and the governance thereof occurring in the rules of the fishing community activity system can be dealt with. This contradiction is related to the open access system of fishing which is problematic in fisheries resource management because no one fully acknowledges the responsibility and ownership and the common feeling is 'if I don't go fishing someone else will'. In a context of poverty and food insecurity, this also becomes a necessity, especially amongst small scale artisanal fishers. This facet of the contradiction will be discussed in more detail below, and it also shows how this contradiction in the rules of the fishing community activity system is shaped by the deep-seated contradiction associated with natural resource use and management within a sustainability framework in a context of poverty described above and in Chapters 1 and 2.

6.3.1.2. Contradiction in the rules of the fishing community activity system reflected in contestation about the duration and appropriateness of the open and closed fishing season

One of the rules of the fishing communities is that of a closed season where no active fishing gear is allowed during the fish breeding period. The aim of the rule is to allow fish to hatch. Fishing can start again when the young ones have grown to recommendable sizes, as this allows the fish stocks to replenish. It is an important strategy for sustainability of the fish stocks and is a rule governing the practice of fishing that can be found within traditional fisheries management, and also in modern legislation. Insight into this contradiction emerged from the following research interactions:

> ***Focus Group Discussion FGD2:*** *People are not catching as much as they expect when the lake is open for fishing. We used to have good catches before and all these drying racks were getting full soon after opening the lake for fishing but see now there are no fish and it's like that even when the Lake has just been open. There hasn't been much improvement on the catches over the years especially when you look at the sizes of fish. What is worrying us is that we still get small fish even after closing the lake for two months and this tells us that the period for closing the lake is not enough. Why should we get small fish sizes even soon after opening? That is what we have been discussing with fellow BVC members. We are very familiar with catch composition in the lake for a long period of time and we can actually tell that this fish is not matured enough. As fishers and BVC members we would like to see and experience better fish catches especially soon after closed season in January. If we cannot see better fish catches in January then what does that tell us? The fish we see*

during that time still remains small in size and even the catches are not as better as we used to have some years back.

***Focus Group Discussion FGD2**: Maybe we also need to look at the time when we have closed season here in Malombe. If we still get young fish soon after opening the lake then it means we open early or we close early and that has to be taken into account. The ideas need to start from us as people who are doing fishing because I am sure whatever we can agree here can be taken seriously if taken to another level. As BVC members and as fishers we have evidence that we get less and small sized fish when the lake is open and that could be our starting point to look at what could be done with the period of closed season.*

***Focus Group Discussion FGD1**: The aim of co-management is to see to it that the fish stocks in Lake Malombe are well managed and this is our responsibility as BVCs because remember we were elected to be the eyes of the government at village level. Now if we are seeing these things and we do not act on them then we will be responsible any mismanagement of the fisheries resources. It is the job of everyone who is benefiting from the lake especially us as BVC members to see to it that management measures are taken.*

***Focus Group Discussion FGD4:** I personally don't think we should fear being accountable to anyone on the declining fish catches because everyone knows that the fish catches have declined. What I think we must be cautious of is that the decline of fish catches is continuing and maybe the question we should be asking ourselves is: how are we going to survive? We all know that we all depend on the same resource. We are the ones doing fishing and it means we are aware of the situation and that if anything we should be the ones to start thinking of what next. Our togetherness in the management of the fisheries resources is very important. We as BVC members can start talking with our fellow fishers and get their views on the period for closed season. I know some will disagree with us in the first place but if we continue talking to them and them seeing the sizes of fish caught during open season will understand. After agreeing here as fishers then we can also start talking to people from fisheries but I think it will be good for us to start it because we are the ones observing this. What is also important to know is that if things continue like this, we will end up getting less and less fish and this affect us as people benefiting from the lake.*

***Focus Group Discussion FGD3**: As fishers we all want to get more money from fishing and this is why I think we have problems with illegal fishing. Everyone wants more money but what we must tell our colleagues is that fishing illegally will give us money for a short time but we will suffer for the rest of our life. Who would want to catch less or who would want to stay long months without going fishing? We should also get prepared to get questions from our fellow fishers because I remember it was us who influenced the change of closed season from November to December and it was accepted that we change to October-December. I agree we catch less and small fish during open season but we should also think of what we will be doing if we want to close the lake for a longer period. I am sure you all agree with me that we used to close the lake from November to December and it was during one of the meetings where we said the closing dates are not in line with the breeding season for fish. This is why we now have closed season from October to December and the lake is opened from January.*

As can be seen from above, fishers have observed that they still catch small sized fish during the open season and this means that there is a contradiction between the anticipated catches based on the current closed season, and the current rules of the closed season which, as shown above, were decided by the fishers in collaboration with the government. This contradiction may be related to the current timing or duration of the closed season and may therefore be related to opening of the fishing season before the young fish have had enough time to grow to an appropriate size. It may also be related to fishing gear with under-meshed sizes (outlined in the contradiction above) which results in fishers catching small fish. As in the contradiction discussed above, fishers appear to be conscious about the contradictions in the rules of the activity system, but are yet to address these contradictions, making this another fruitful opportunity for expanded learning and development of co-management activity.

6.3.1.3 Contradiction in the division of labour of the fishing community activity system, reflected in contradictory messages on fisheries conservation and co-management and authority role confusion in the fishing community activity system

A further contradiction identified in the fishing community activity system was linked to the division of labour element of the activity system, which – as can be seen below – is strongly influenced by historicity and power relations related to governance in the fishing community activity system. This contradiction was surfaced through understanding the contradictory messages that are shared on fisheries conservation and co-management by different members of the fishing community activity system, especially the BVC members and local chiefs. This contradiction became evident in the following research interactions:

> **Researcher:**
> *How do you get and share fisheries co-management messages in your area?*
>
> ***Individual interview IIF2:*** *We have two types of people who give messages about the management of fisheries resources. We have BVCs who were elected by fishing communities to represent government and monitor fishing practices. But we also have chiefs who are the owners of the land by tradition and they also have control over the fishery. BVC members organise and conduct meetings with fishers and they discuss issues of fisheries management but they also fear the village heads because they are the ones with authority over the lake. As fishers we most of the time get confused and we do not know who to listen to. Chiefs say they are the owners of the areas and we have to listen to them and BVCs say they are representatives of the government and we have to listen to whatever comes from the government.*

Focus Group Discussion FGD1*: There are times when both BVC members and local leaders organise joint meetings especially when we are approaching closed season and they all talk about the period of closed season. Whenever we have such joint meetings we achieve a lot in terms of the messages because we talk the same messages to the fishing communities. But there are times when we work independently each one with different messages about the same fisheries resources and we confuse our fellow fishers. Sometimes the government call us BVC members and the chiefs for workshops and when we come back we do things differently each one of us working as individuals. When we started the co-management programme we were told we are supposed to work together and that if BVCs are holding meetings we need to be together with our chiefs but much of what we were told when we started the programme is not followed.*

Focus Group Discussion FGD4: *I think the question is coming to us as BVC members and also people who are working with government to manage the fish stocks but also to our chiefs because they are the ones who are keeping all of us. We are supposed to work together as people who have the same aim of managing the fisheries resources but also as eyes of the government here in the rural areas. The problem is that we were not told who is to do what between us and our chiefs. As a result we find ourselves doing the same things and confusing ourselves and the fishers. There are areas where we are doing well like giving and receiving transfer letters for fishers who are leaving our areas and those who are coming to the areas. The letters come to the BVCs and then we take them to the village headman as the owner of the land. We submit the transfer letters with recommendations to the village head on the kind of the fishing gear that has come and the village head accepts it following our recommendations. This is an example where messages are moving well between the BVC members and the local leaders then to the fishing communities. I think we have some of the knowledge as fishing communities and BVC members and what responsibilities we are supposed to share amongst ourselves but we don't. For example if we see someone fishing using illegal fishing gear sometimes as BVC members we are afraid to tell our friend that fishing using that particular net is bad. Sometimes we don't even report the one doing illegal fishing to the BVC or the chief.*

Focus Group Discussion FGD5*: Apart from getting messages from BVC members and our local leaders we also share different messages on fishing. Fishers do not stay at one place because we follow where we can get fish so as we move to different areas we also learn from others and these from different areas also learn from us. What is bad in fishing is when we learn things that are not accepted by government for example most of the illegal gears have been taken from other areas to Lake Malombe which means we learnt bad fishing practices from elsewhere. As BVC members we need to check some of the things we learn from other areas because now that everyone wants to catch more fish and the fish is not there people will be using different methods and gears so that they can at least catch something.*

Individual Interview IIF3*: BVCs and village heads get messages from government and they call us and tell us what is required. Sometimes it's about closed season, or if they have seen fishers from other areas coming to fish in the area with illegal fishing gear. Sometimes they call us to tell us that we must licence our fishing gear. When we are called by the BVCs we also give our messages to them because there are also some things that we believe need to be taken to them and if they do not have answers*

they take them to the government. In short we have our way of communicating to the BVC and then the chief,

As discussed earlier in Chapters 1 and 2, BVC members and local leaders are supposed to work together in the management of the fisheries resources as per the co-management agreements. As can be seen from the data above, there is a high level of awareness of the need to work together in this way. However, at times they send different messages through formal and informal meetings where all the fishing communities are called and they are told about the conservation measures; this leads to confusion as noted in the citations above. Most of the time the power relations between the BVCs and the chiefs in the area affect the way in which things are done and the way in which messages are conveyed to the fishers and other members of the fishing community activity system. Chiefs say they are fully responsible for any activity taking place in the areas including fishing activities and BVC members say they are government representatives with the responsibility of overseeing fishing activities. Both therefore claim authority over the fishery and its practices which results in mixed messages and a lack of a clear line of authority and/or accountability in the fishery. Fishers do not know who is responsible and who they should listen to because the two key groups, the chiefs and the BVCs, are both responsible for fisheries management but have with different responsibilities (traditional and government-based). Fishing communities get confused when the two give different messages.

It is evident from the citations above that this impedes the effective sharing of conservation and management knowledge among fishing communities. There are power conflicts between the BVC members and the local leaders who have more power because traditionally they are the owners of the land and even the BVCs require permission (explicit or implicit) to operate in their areas. This contradiction within the division of labour in the fishing communities' activity system plays out in tensions and lack of clarity as to who is responsible and for what. This results in mixed messages to fishing communities on co-management. As also reported earlier via the literature review and contextual profiling conducted for this research, conflicting messages from the BVC members and the local leaders are some of the challenges in fisheries co-management (see section 1.4). The mismatch of information from BVCs and the local leaders is due to unclear lines of authority directing their responsibilities and a lack of clearly defined interaction between existing regimes of power (traditional authorities and modern government representatives).

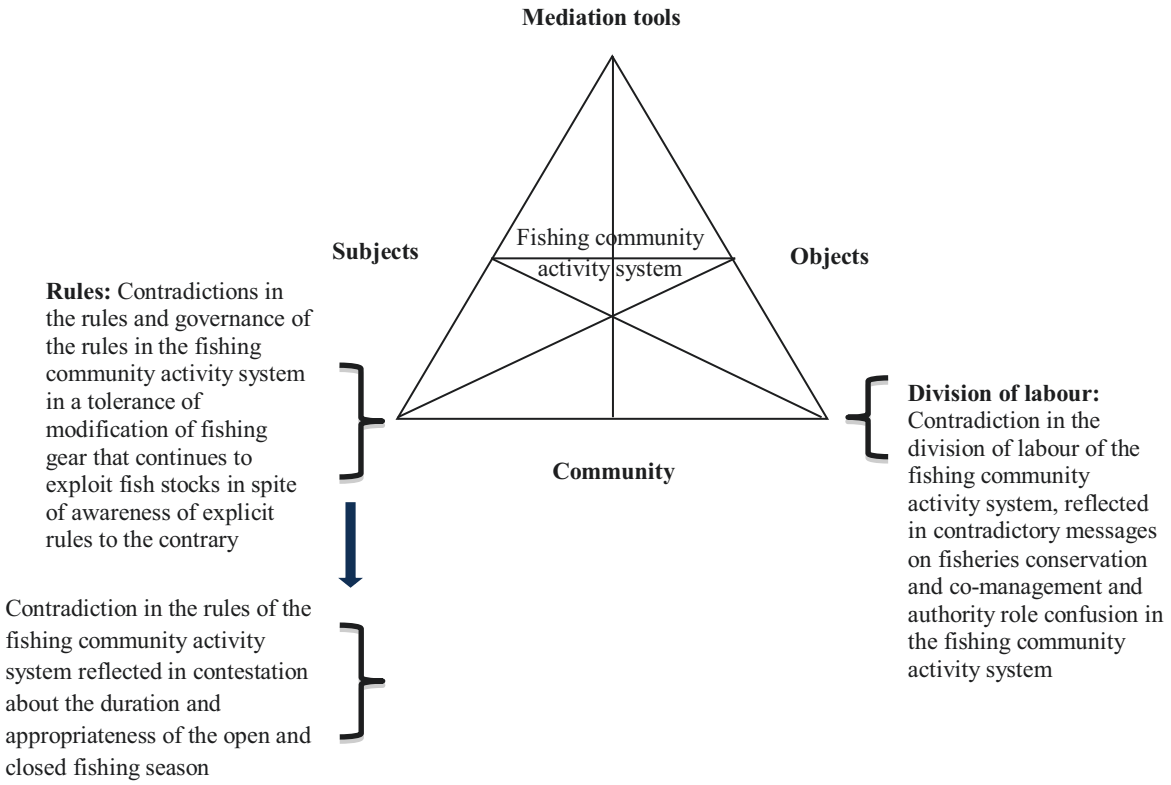

Figure 6.1: Primary contradictions within the elements of fishing community activity system

6.3.2 Primary contradictions in the government activity system

As described in Chapter 5 (see section 5.3.2) the second activity system identified as having a core interest in co-management as a shared object in Lake Malombe is the government activity system (see section 5.3.2). In this activity system I was able to surface two primary contradictions (within the rules, and within the tools), both of which are related or have an effect on the primary contradictions of the fishing community activity system reported on above, but which have their own internal features within the government activity system itself.

6.3.2.1 Contradiction in the mediation tools surfaced through the issue of a mismatch of fisheries co-management messages

This contradiction was surfaced through the following research interactions:

> ***Researcher:***
> *As government extension officers how do you put messages across to the fishing communities?*
>
> ***Individual Interview IIG 1****: As government officers and according to co-management arrangement, our entry point to the fishing communities is the BVCs and the local leaders. So if we have any message we do not go straight to the fishers or the fishing communities but we contact BVCs and local leaders. There are some programmes like monthly fish sampling where the fish scout of the extension worker goes straight to the*

fishers at the beach because this is well known to everyone and has been happening for a long time.

Focus Group Discussion FGG1: *There are some sensitive activities that we just go to a particular beach for example when we are conducting enforcement activities we do not tell anyone because we want to check whether the fishers are fishing legally or not and with that even some of the BVCs and local leaders might not know the programme. In the same inspectorate section when we are conducting licensing campaigns we go through the extension worker of the area who notifies the BVC chairperson and then the village heads. With co-management all messages are supposed to follow the right procedures.*

Researcher:
How do you see the procedures because some fishers have expressed that they get inconsistent messages?

Focus Group Discussion FGG1: *We are supposed to develop messages as government officers and these are supposed to have the same message we all have. Because we are from different offices - research and extension - we also have different approaches to this. Our messages are supposed to come from our policy document and we all know that. What is giving us problems is that we do not have time to come together and then discuss these. As researchers they have the information but maybe when it comes to the development of messages then we might be doing different things. We need to develop a spirit of working together to have these messages discussed before we take them out.*

Focus Group Discussion FGG3*: We are supposed to train the BVC members so that they understand the role of government in this co-management arrangement and what they are supposed to do. We have done a few training programmes but most of the BVCs especially those who have just been elected to the committees have not been trained. So yes we can accept that our messages have not been consistent. BVCs are just elected from the rural areas and some of them may not be conversant with fisheries activities apart from being active fishers which in most cases is what makes people choose BVC members.*

Focus Group Discussion FGG 2*: Apart from the BVC members taking contradictory messages to the fishing communities I also think we also have some trainings on co-management with the extension workers who take these messages to the fishing communities. There are some who have not been oriented to co-management for a long time and they might also be giving contradictory messages to the BVCs who take the same wrong messages to the fishers.*

Focus Group Discussion FGG 1*: Co-management is a new concept and we are all learning from it so apart from the BVCs and local leaders we also need to be clear about what we are supposed to do and what messages need to be taken to the BVCs and local leaders who are then supposed to extend the same message to the fishing communities. I remember in a number of staff meetings we have had lots of debates on co-management because we have seen in most areas the BVCs are not seen but we see the village heads controlling the BVCs. We need clear messages on what is a BVC and how should co-management be implemented.*

The data above shows that there is a contradiction within the element of the mediating tools within the government activity system where extension officers have different and inconsistent messages that lead to confusing understandings of co-management within the activity system. This is related to poor communication between researchers and extension agents, and inadequate engagement and interpretation with policy, as well as insufficient training of BVCs. This, however, is also linked to the contradiction reported on above in the fishing community activity system rules which relates to governance of the fishery by traditional leaders and government agents in the form of Department of Fisheries extension services and the representative body of government, the BVCs. This shows a primary contradiction within the mediating tool element of the government activity system, which is also related to the 'newness' of the concept of co-management, as expressed in the citation above.

6.3.2.2 Contradiction in the rules of the government activity system surfaced through dissatisfaction amongst communities in relation to the current closed season

A primary contradiction within the rules of the government activity system was surfaced through the following research interactions:

> ***Researcher:***
> *How are the rules formulated because there have been concerns among BVC members and local leaders that they catch small fish after the closed season?*
>
> ***Individual Interview IIG2:*** *The current rules were revised some years ago and Lake Malombe is closed for two months every year from October to November which are the breeding months of fish in the lake. The rules were discussed with the fishing communities around Lake Malombe. Since then we have not had chance to review them because to do that we need to involve the fisheries research unit to do some research programmes and see whether what the BVCs and local leaders are saying is true.*
>
> ***Focus Group Discussion FGG1:*** *I think we should agree that the rules about closed season in Lake Malombe were reviewed long time ago and if BVC members and fishers are seeing small sized fish in their nets, it means something has to be done. Even among government officers sometimes we do not agree on the exact period for a closed season in Lake Malombe. I remember extension workers in the area have, during staff meetings, reported that when the lake is open the catches are comprised of immature fish and I remember one of the officers expressed the need to take the observation to the research unit for action. We should be happy that BVC members are able to note what is coming out of fishing in terms of the sizes of fish.*
>
> ***Focus Group Discussion FGG 3:*** *I personally think we have two things here. The closed season was changed from November and December to October and November. We all know that fish in Lake Malombe have been over-fished and what fishers are doing is getting as much as they can. It will be helpful for us as government to go in*

with a bit of research and see if the set closed season is still valid and if we are getting small fish after closed season it might be due to the use of under-meshed nets. We need to establish the truth on why we are getting undersized fish after closing the lake for two months. We might end up with a recommendation to increase closed season period so that we allow the young ones to grow to recommended sizes.

From the above extracts, it is evident that there is contradiction within the rules element of the government activity system. The regulations on the closed season were reviewed a long time ago, and despite reports on small fish being caught after closed season by both BVCs and extension officers, the government activity system has not as yet responded with up-to-date research to confirm the nature of the concern. Like the other fisheries rules, the closed season rule was a scientific recommendation and for it to change will require an updated scientific analysis to prove that the observations of the BVCs and the other fishing communities is valid. The primary contradiction appears therefore to be related to a lack of responsiveness to arising concerns related to the effective implementation of the Fisheries Department rules, or mandate of the government and actualisation thereof.

This primary contradiction may also be related to a secondary contradiction between the rules and division of labour within the government activity system, since it seems that the research and extension services need to work more closely with each other to resolve it. I discuss secondary contradictions in the next section.

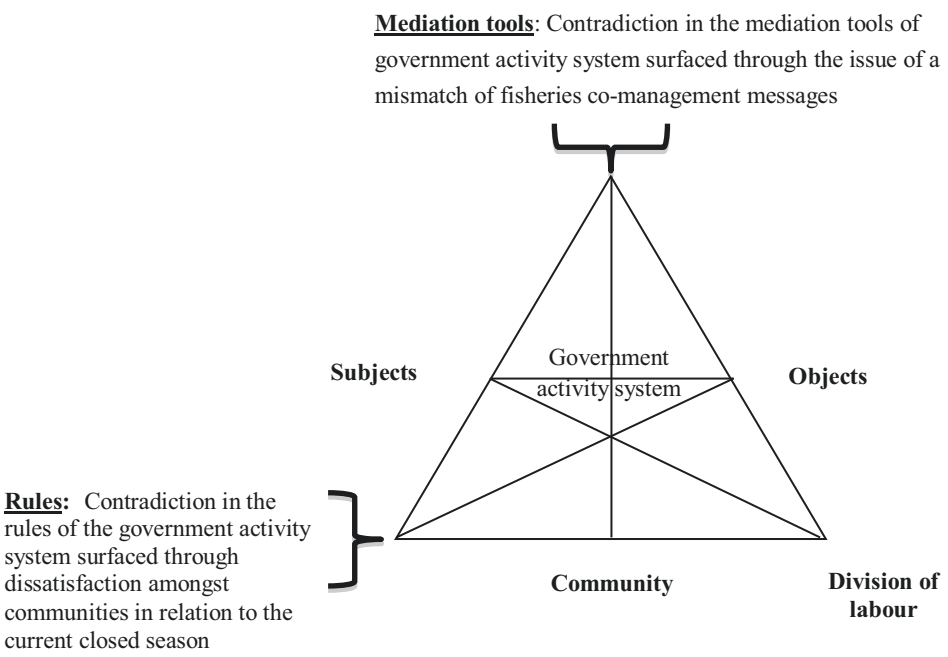

Figure 6.2: Primary contradictions in Lake Malombe government activity system

As outlined above, there are primary contradictions within both the fishing communities and the government activity systems relating to rules, mediating tools and division of labour. As discussed above (see section 6.3.1.1) they form the starting point for reviewing the tensions and also creating opportunities for analysing them and for expansive learning that can be oriented towards solving the existing problems related to co-management in Lake Malombe.

Importantly, the data shows that the subjects in the two activity systems agree that there are contradictions within the elements of the rules and division of labour in the fishing community activity system and the mediation tools and rules in the government activity system. This provides a fertile platform for expansive learning where the richly textured co-learning processes outlined in Chapter 5 can potentially be expanded (see Chapter 7).

6.3.3. Secondary contradictions in Lake Malombe

Confirming Engeström's (2005) view on the related nature of primary and secondary contradictions, in this study it was clear that the secondary contradictions actually emanated from the primary contradictions. It was interesting to see how the primary contradictions, which were within the elements of the two activity systems (described above), were also affecting the other elements in the activity system. As more probing was done on what were seen as primary contradictions, more interlinkages from one element to the other were noted and stakeholders provided more evidence of these interlinkages.

6.3.3.1 Contradictions between rules and the object of co-management in the fishing community activity system surfaced through the practice of continuing to modify fishing gear despite knowledge of the over-exploitation of the fish stocks

In section 6.3.2.2 above I described the primary contradictions in the rules of the fishing community activity system as related to the practice of condoning the use of modified fishing gear, and as related to governance rules and practices in the fishing community activity system. Further analysis of these primary contradictions shows up a secondary contradiction between the rules of the fishing community activity system and the object of co-management, surfaced through the following research interactions:

> ***Researcher:***
> *We have been discussing the new fishing gear which people say are specially designed to over-exploit the fish stocks. Why do we think the use of these fishing gears constrains co-management?*
>
> ***Individual Interview II2****: Failure of us as BVCs to monitor and control the use of these illegal fishing gears has resulted in over-exploitation of the fish stocks in the lake and this is impacting negatively on our lives as people who depend on fishing for our livelihoods.*
>
> ***Focus Group Discussion FGD1:*** *The use of these under-meshed fishing gears is defeating the whole purpose of having co-management programme in the area. For those of us who were in different BVC trainings and meetings which were organised by the Fisheries Department, it was emphasised that all fishing gears which have small mesh-sizes are not allowed in the lake and that anyone found using them should have them confiscated. These fishing nets catch small fish and we have been seeing them being sold very small!!*
>
> ***Focus Group Discussion FGD2****: Those fishers who do not use these gears are always complaining that us as BVC members are not doing enough to stop them and they are the ones suffering because others continuously use them and they don't care about what happens next. Our rules in the BVC are not followed and this is why everyone is doing whatever can be done to get more fish. Our job in co-management is to control illegal fishing so that we improve our fish catches otherwise we catch everything today and continue getting less fish catches.*
>
> ***Researcher:***
> *We have been discussing the new/ modified gears and methods being used by some fishers. Are these fishing gears covered in the fisheries regulation that fishers use?*
>
> ***Focus Group Discussion FGD3****: Most of these fishing gears are coming up now and are not in the regulations or if are there could be in the new regulations. As I said at the beginning fishers are becoming more innovative with their fishing business so for them to catch more fish they think of ways of designing their fishing nets.*

Focus Group Discussion FGD1*: Even if the new fishing gears are not in the regulations if we are from the area guided by the chief who says we don't want these fishing nets to be used here no one will use them. BVC were given powers to make sure that the fish stocks are conserved and we know the government is behind us so we can tell those who are using the illegal fishing nets to stop. Everyone in Lake Malombe is aware that fish are no more there and we can all conserve the remaining fish stocks by working together and on the other hand enforce the regulations.*

Researcher:
What I want us to discuss further is whether the new fishing gears are in the fisheries regulations so that if they are not there then we can discuss what needs to be done.

Focus Group Discussion FGD4: *These new gears are not in the regulations and maybe we need to discuss what needs to be done because we all agree that they are destroying fish stocks by catching young ones which would have been better fish in future. One thing that I have noted is that our regulations are old and if we see other fishers coming up with destructive fishing nets and methods our regulations are supposed to be reviewed so that they can also include them. We are all working towards proper management of the fisheries resources of Lake Malombe and I am sure no one, even those fishers who are not here can allow people to destroy the fish stocks. All our families depend on the same lake and we need to conserve it.*

Focus Group Discussion FGD3*: I think we need to have the new fishing gears in the fisheries regulations because then we know we can enforce them. Maybe the other way is to put them in our by-laws so that even if the government is late to put them in the government regulations we can still enforce them as BVC members. The problem with government is that things take long and we will be destroying our fisheries resources here. The regulations should go together with the fishing gears fishers are using and we will be able to check them against the regulations*

Researcher:
Our chief you have heard that the new fishing gears are not in the regulations. What do you think can be done to make sure that fishers don't continue using the illegal fishing nets?

Response from the Chief: *As BVCs we continue telling people that we do not accept the use of these under-meshed fishing nets and that anyone found using them will have the nets confiscated. Then we need to make sure that we have them in the regulations even by starting with our own local laws that we are following here. We cannot wait for government to put them in the regulations because people are already using them and are destroying the fisheries resources. So I would say we start here while government is doing the other part.*

The data above shows clearly that the new fishing gear is not covered in the regulations and that for BVCs to fully enforce this gear requires incorporation in the fisheries regulations. The problem however, is that despite the fact that there is agreement on the problem, there is an issue with the responsiveness of legislation at the level of the by-laws and national government system. The Chief's regulatory system appears to be more easily responsive, but he himself notes that there needs to be consistent in regulation and implementation at the

local level. The research interactions cited above also show that there is general consensus that the issue needs immediate attention and that BVCs and the other fishing communities need to consider measures to have the emerging fishing gear checked so that there is consistency between the rules (regulations) and the object of co-management. The use of the new fishing gear contradicts with the object in the fishing community activity system because its use threatens the sustainable fishing practices which, it is believed, will result in improved fish catches.

The primary contradiction which was discussed earlier (see section 6.3.1.1) goes beyond a single element in the activity system. From the above evidence people clearly link the contradiction on the emerging modified fishing gear to the rules and also how it affects the subjects of the activity system, and how inadequate rule following and monitoring could affect both the fish stocks and people's livelihoods in future.

The data above shows that both the BVCs and local leaders who are the subjects in the activity system are concerned that allowing continued use of the destructive fishing gear defeats the objective of co-management which is to ensure conservation of the fish stock in order to allow for more sustainable fisheries (larger fish now, and enough fish in future). From this data it is clear that the strength and resilience of co-management lies in the cohesiveness of the social, kinship, linguistic and cultural interconnections among the owners and users of the fishing grounds as also explained by Olomola (1998, p. 121). The data also shows that they *do* have various regulatory powers at a local level (via the Chief's traditional leadership and via the by-law system), but that this is not being adequately used or implemented. Again, this provides an interesting possible opening for further expansive learning and change in the fishing community activity system.

6.3.3.2 Contradiction between the subjects and the division of labour in the fishing community activity system, surfaced through analysis of power relations and conflicts that exist between BVCs and local leaders

As in the description above, this secondary contradiction is related to the primary contradictions that were surfaced in the fishing community activity system. Insights into this secondary contradiction were gained through the following research interactions:

> ***Researcher:***
> *How do you work together BVCs and local leaders in the areas as you implement the co-management programme?*
>
> ***Individual Interview II5****: We are all working towards conservation of our fisheries resources and we work hand in hand with local leaders (village heads and chiefs).*

Sometimes we go to meetings together and when we come back we hold joint meetings to tell fishing communities what we have got from the meetings.

Focus Group Discussion FGD1: *We could say we work together because when this programme came, we were advised that we should be doing things together. However there are things that we do not agree at times. Some members in the BVCs feel they can do things on their own without chiefs and they go to various beaches to do their own things. When you try to advise them they think you are going into BVCs business. There have been times when we as chiefs or village heads have been forced to replace BVC members because we see some of them are corrupt.*

Focus Group Discussion FGD2: *We work together with our chiefs and village heads because we are all working on the same. However we have a number of problems and these have been there for some time. Chiefs and village heads are ex-official in the BVCs but sometimes are so powerful that BVCs are not seen. Some village heads have even replaced BVC members and put those who are related to them in position. We do not know what the boundaries are in the BVCs between the chiefs and the BVC members.*

Individual Interview IIF4: *When we started this programme we were moving well and chiefs and BVC members were always working together. Later the chiefs started working on their own and some BVC members just left it because some of the practices were not what we agreed to be doing. So there are some areas which are not going on well in that we do not know who is to do what in the BVC.*

The evidence above shows the contradiction between the subjects and the division of labour in the activity system especially BVC members and traditional leaders and chiefs and their roles. The data shows that some BVCs and local leaders have some areas where they are in conflict in terms of agreeing who is supposed to do what within the BVC. Both individual interviews and focus group discussions show that when the co-management programme started, the two were working together but later confusion came when each did not understand who was to do what. The above observations were also alluded to during the evaluation of the co-management project (see section 1.8). Unclear roles and responsibilities of the two actors in the co-management arrangement has been a concern for some time because it affects the running of the activities at BVC level and as a result the objective of co-management is negatively affected. Again, this provides a potential opportunity for expansive learning and development of the activity system.

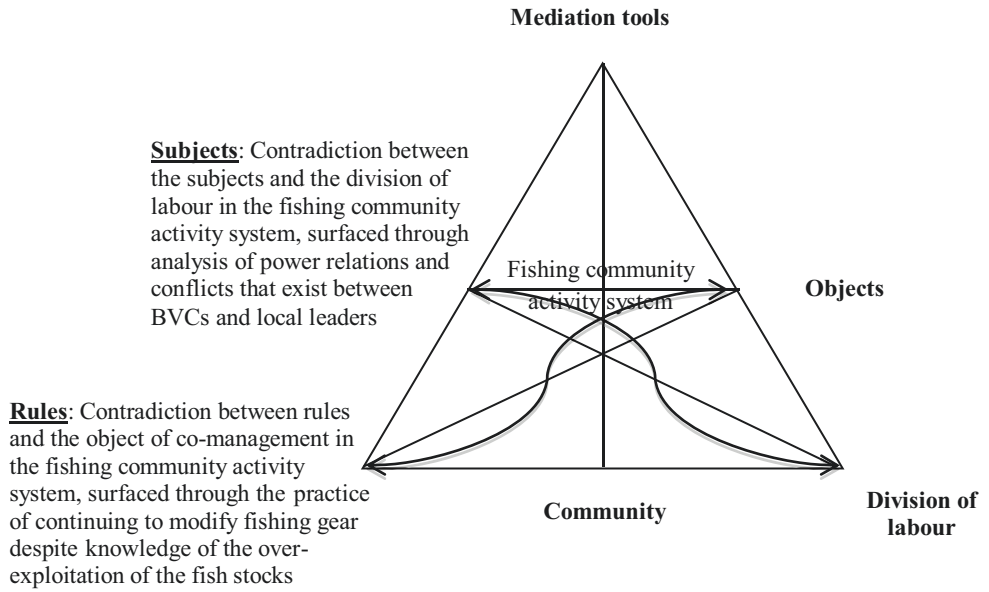

Figure 6.3: An illustration of secondary contradictions in the fishing community activity system

6.3.3.3 Contradiction between the subjects and mediating tools in the government activity system surfaced through the problem of contradictory messages on fisheries co-management

This contradiction between the subjects and mediating tools in the government activity system, as with the secondary contradictions above, was related to the primary contradictions identified, and was surfaced through the following research interactions:

> ***Researcher:***
> *How do you coordinate the development of messages about co-management?*
>
> ***Individual Interview IIG5****: We get most of the messages from research because they are the ones who conduct different research programmes on fisheries conservation and management. These messages are then supposed to be oriented to extension officers before taking them to fishing communities. What is happening in most cases the orientation is not done so we end up getting messages which are not fully understood.*
>
> ***Individual Interview IIG3:*** *As extension officers we rely on our research unit to develop technologies and messages that we should use. But some of the messages need more explanation from the researchers because they are scientifically written which makes them difficult for us to interpret. We are not scientists and for us to use the information we need full understanding.*
>
> ***Focus Group Discussion FGD2:*** *Most of the information which is used in extension comes from research recommendations and for them to give those recommendations researchers are involved in a number of research programmes. What has been lacking is a forum where researchers and extension officers could come together to discuss the messages so that if there is anything which is not clear then it can be explained better because the researchers will be present to explain. Most of the information that comes from research needs more clarification and this can only be done by sitting together.*

Focus Group Discussion FGD2: *Most of the information that comes from the research unit is used by us from the outreach unit because we develop different messages. For us to develop the messages we need clear information because sometimes we also do not understand what the information means. It is easy to develop a message on closed season because it is clear in the regulations but it becomes difficult to have new messages which are not very clear. So I think we need to have some forums where we can be meeting and agree on how we want the messages to be so that we do not confuse these who will receive them.*

As noted above, the extension and research officers have been working with contradictory messages about co-management and also fisheries management because they lack forums for communication and have not been able to work together in the development of messages. Alroe and Kristensen (2002) noted that by stimulating stakeholders to gain new insights and perspectives, scientists can enable the development of negotiated knowledge by stakeholders on the basis of which they may engage in complementary courses of action. The observation highlighted above is valid because, as can be seen from the case of the government activity system outlined above, those working on the same object (especially if they are from the same institution) need to have the same voice and same message. Berkes (2009) suggested that the problems coming from the field and the extension officers (e.g. the problems being reported on relating to the size of fishing nets and the size of catches after the closed season) must be transformed into a significantly valid question in the course of an exchange between concerned societal actors and the scientific actors. The transformation referred to here is a prerequisite for determining to what degree research can contribute to problem solving and, in the case of the government activity system, it is clear from the data above that there is a need for closer communication between the researchers and the extension services in the government activity system as the data provided above indicates that there is contradiction in the government activity system between the subjects (research and extension officers) and the mediation tools (information used and produced) that results in the provision of contradictory messages among themselves which affects the shared object of co-management. Again, this provides potential for expansive learning and development of the government activity system.

6.3.3.4 Contradiction between the rules and the object of co-management surfaced through dissatisfaction with the current closed season

This secondary contradiction was surfaced through the following research interactions and, like the others above, it is related to the primary contradictions identified.

Researcher:

How do you compare the amount and sizes of fish caught when the lake has been opened as compared to those caught illegally during closed season?

***Individual Interview IIF1**: The differences are not much especially when people are using under-meshed fishing nets such as Nkacha fishing nets. When fishers were using recommended fishing gears fish catches used to have all mature and recommended fish. These days even the time when the lake has just been opened fishers bring small immature fish. The co-management programme was introduced to conserve the fish stocks and not to allow people to catch immature fish but all we see now are immature fish. People are not following the set regulations which we as BVC members continuously talk about. Everyone is aware that fishing with under-meshed fishing nets is prohibited but people still use them because they want to catch more fish.*

***Focus Group Discussion FGD2:** We have been discussing as BVC members that we are continuously observing immature fish caught during the opening season and this shows that by the time we open the lake for fishing, the fish are still small. There are a number of things that need to be looked at: people are using more illegal fishing nets which have small meshes and because of that they end up catching immature fish which is not fully grown; the other point is that if when using recommended fishing nets we continue observing small fish in our catches, then we need to think about the closed period.*

***Focus Group Discussion FGD1**: We need to consider our closed season because we are all seeing what is happening – the catches have dropped badly, people come from the lake with almost nothing and then on top of that we are continuously getting small fish even when we have just opened the lake for fishing. This shows that we open the lake when the fish have not grown to the recommended size. The regulations need to be re-considered and also we need to be strict with the under-meshed fishing nets. Those who are still using fishing nets with small meshes should be brought before the chief so that others will learn from the few who will be caught. There are a lot of fishers who are using illegal fishing nets around the lake and if a few are caught and brought before the chief and tried then we will see changes.*

***Focus Group Discussion FGD4**: Yes I think we should focus much on the size of the meshes because if the fishing gear has recommended sizes of meshes then all the young fish will go through and what the fisher will end up with will be recommended fish sizes. The problem is that these new gears are not in the rules and regulations to show that they are illegal by law. As long as they are not there in the regulations people will be using them. We need frequent reviews of the regulations.*

***Focus Group Discussion FGD2:** I would say we need to consider both cases because a lot of things are changing. May be the fish starts breeding late now than when the dates were set to be in January. If we can stop fishing during the breeding period we will also protect the breeding area and the eggs of fish which are not ready. So I would suggest we look at the closing period and also control those who are fishing using under-meshed fishing nets.*

As outlined in the primary contradiction, and now in this discussion of the secondary contradiction, there is a clash between the rules and how they are implemented and monitored

in the government activity system, and the object of co-management to achieve a more sustainable fishery. The data shows clearly that there are two possible solutions that are being put forward, but there is some ambivalence as to the real cause of the problem. The complexity of the above contradiction requires a moderated expansive social learning process where stakeholders in the activity system will collaboratively identify solutions and a way forward. Engeström (2005) noted that expansive learning was developed as a methodology to overcome current contradictions and draws on the strengths of joint analysis and concrete transformation of current practices, making this contradiction yet another possible focus for expansive learning and development of the government activity system.

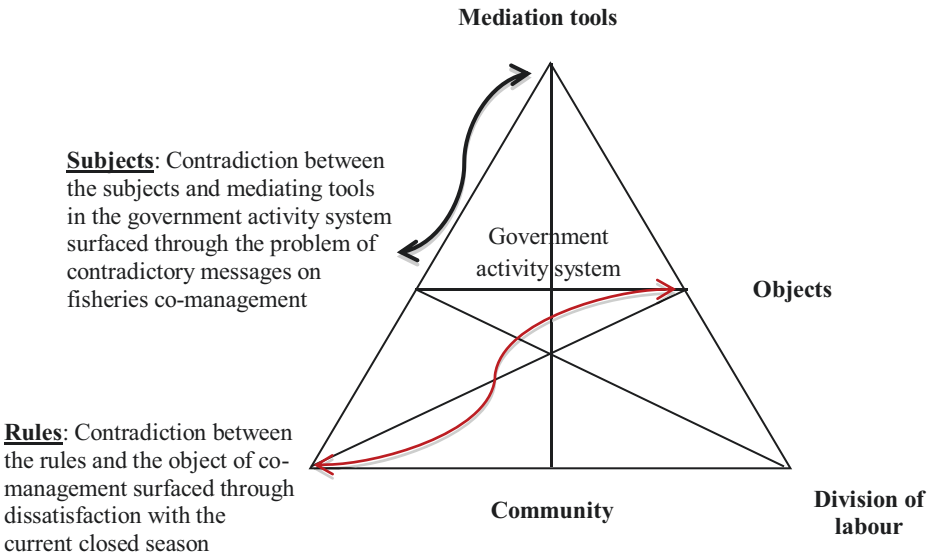

Figure 6.4: An illustration of secondary contradictions in the government activity system

The secondary contradictions both in the fishing community activity system and the government activity system are centred on the rules, the mediation tools, division of labour and the objects. As discussed earlier on in the chapter (see section 6.3.3), some of the secondary contradictions emanate from the primary contradictions and as one probes them deeper they are seen affecting the other elements of the activity system. When an activity system adopts a new element from the outside (for example, a new technology or a new object) it often leads to an aggravated secondary contradiction where some older activity system elements collide with the newly introduced ones (Daniels, 2008). Such contradictions not only generate disturbances and conflicts but also drive attempts to change the activity (ibid.).

6.3.4 Tertiary contradiction in Lake Malombe between the earlier *object of the fishing community activity system* and the more recently introduced *object of co-management* by the *government activity system*

According to Engeström (2001, p. 135), a tertiary contradiction is apparent when a more sophisticated external object attempts to supplant an existing object within the main activity system. In the working through of these tertiary contradictions, the designed or given new model is gradually replaced by another new one, firmly grounded in practice through the resolving of the contradictions between the given new and existing forms of the activity (Daniels, 2008). In the case of Lake Malombe, this can be seen where the government activity system is introducing the object of co-management for sustainable management of the fisheries, and where the fishing community activity system is having to adjust to this recently introduced object.

This tertiary contradiction between the object of catching fish, mainly for sustenance and profit (the traditional object of the fishing community activity system), and the object of co-management, introduced by the government into the fishing community activity system, is causing much deliberation on how to best manage the fishery and is also driving the emergence of primary and secondary contradictions in both the fisheries and government activity systems as described above. As explained by Daniels, this is also driving changes within the activity systems, and in the case of Lake Malombe, this contradiction between the objects of the fishing community activity system (accommodating co-management for sustainability of the fishery from an earlier focus on fishing for profit and sustenance only) and the government activity system (promoting co-management for sustainability of the fishery and associated well-being of people) was surfaced through, and reflected in, the discussions that were taking place on the review of the regulations related to the closed season and use of the legal fishing net sizes as outlined in the data above, and as elaborated further in the research interactions cited below:

> ***Researcher:***
> *Have you ever thought of changing the way you do your fishing practices in order to improve the status of the fishery?*
>
> ***Individual Interview IIF3****: When we started co-management, closed season was from November to December and the lake was open in January. Then BVC members, local leaders and the fishing communities sat down and agreed that the dates needs to be changed because fishers noticed lots of immature fish being caught that time. The Fisheries Department accepted us and the dates were changed.*
>
> ***Focus Group Discussion FGD2:*** *We had closed season from November to December but after seeing that the immature fish were being caught during the open season especially soon after opening then the dates were changed and I think this was good because it showed that we were responding to what was happening. Now we have also observed the same thing and there is need to revisit our regulations.*

Focus Group Discussion FGD2: *If we want to change the closed season then it will have to go through fisheries who are going to investigate if what we are saying is true or not. We might go back to the original closed season from November to December or may be increase the number of closed periods.*

Individual Interview IIF2*: I think there is no need to keep on changing period for closed season. What is now happening is that fishers are using under-meshed fishing nets and that is what is causing the catching of immature fish. If we can be strict with the sizes of mesh sizes you will see the issue of immature fish will not be there.*

Focus Group Discussion FGD1: *For us to be sure that we have the right closed season maybe we should go for the option of allowing fisheries to research on the appropriate period to have closed season the way they did last time. If they can accept to do it then we have no problem because things are changing and breeding time for fish might have changed as well.*

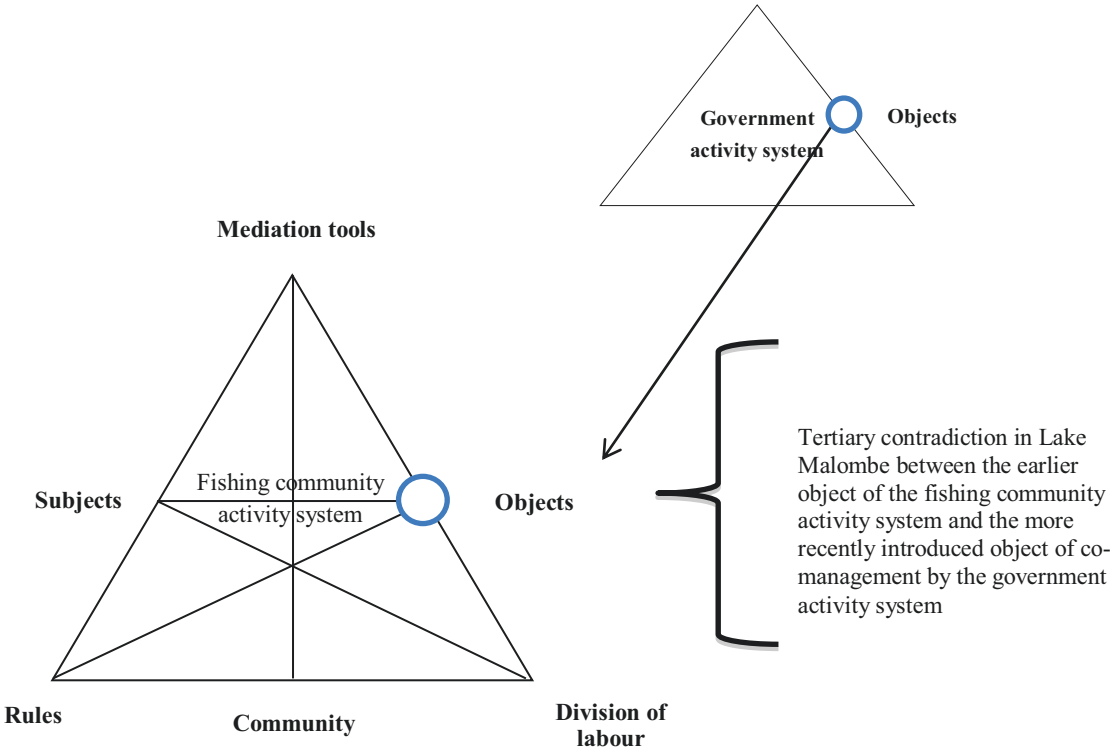

Figure 6.5: An illustration of tertiary contradiction in the fishing community activity system

Of interest in the expression of this tertiary contradiction is a) an acute awareness of what needs to be done and by whom (i.e. division of labour across the two activity systems); b) a willingness to work together to address the problems across the activity systems; c) a realisation of the need for local knowledge and experience to come together with scientific knowledge to inform decision making; and d) for power relations and governance structures to be aligned to address the tertiary contradiction.

Of interest too is the existent experience of having worked together before on a similar problem, which provides historicity to the new possibilities for change. The potential for this change also emerged within the research-based interactions, especially during the focus group discussions, pointing to the role of the interventionist researcher. The data shows that in the focus group discussions, when the fishing communities and the government started to talk to each other, they started to critically reflect on the practices. From this it is possible to see that as subjects from different activity systems meet to discuss tertiary contradictions a number of things happen: the opportunity to share their stories or practices and concerns emerge, they reflect on their practices and are also challenged by their current practices, and new opportunities for expansive learning emerge as contradictions are surfaced in research interactions as is shown in the research interaction data shared so far in this chapter. In this regard, Ballard (2005) suggests that in order to ensure an adequate learning response four necessary and inter-related conditions are needed: 1) awareness of what is happening and what is required; 2) agency and ability to find a response that is meaningful; 3) the ability to associate with other groups; and 4) new opportunities for engagement for problem solving must exist. Data shared in the discussion of primary, secondary and tertiary contradictions above shows that the research process of surfacing contradictions has also indicated that conditions 1, 2 and 3 are present in the Lake Malombe case area. Condition 4 is provided for in Phase 2 of the research (see Chapter 7).

Conditions 1, 2 and 3 are reflected in the data that shows that fishing communities learnt that the closed season was not adequate because they were still observing immature fish after closing the lake for two months and this was against the recently introduced co-management objective to sustainably manage the fish stocks for better fish catches ultimately. They opted for a review of the closed season to help in achieving their objective. The first option was there to promote the recovery of the fish stocks through co-management and this was, however, not achieved because of changes in the fishing practices among the fishing communities and because of poor enforcement of regulations, and a lack of responsiveness of the regulations themselves and the prevalence of mixed and contradictory messages, as well as power relational issues in the governance of the fishery. The assumption related to the change of closed season from November and December to October and November was to achieve better results and enhance the recovery of the fish stock. This shows that the object in the central activity system was already forced to change once, and this has subsequently brought in a tertiary contradiction within the fishing community activity system due to the ongoing need for food security and provision of livelihood security with few other means or options available to replace fishing as the main source of livelihood security. The suggested second major change to review the dates of the closed season in Lake Malombe was aimed at resolving the contradiction which was expressed in the practice of using illegal fishing gear

that was leading to the catching of immature fish, paradoxically counteracting the sustainable fisheries management objective of co-management.

To understand how this difficulty in resolving tertiary contradictions may be effectively addressed through expansive learning possibilities, it is necessary also to analyse and describe the quaternary contradictions, which I turn to next.

6.3.5 Quaternary contradictions in Lake Malombe

Quaternary contradictions occur between elements of the central activity system and elements of the neighbouring activities. As described in Chapter 5 and above in context of the primary, secondary and tertiary contradictions, different stakeholders within and across the activity systems have continued to interact and this has created various tensions and contradictions which for a long period of time have constrained the management of the fisheries resources. These contradictions are as a result of the diversity of co-management stakeholders who bring with them diverse interests, skills, knowledge and experiences about the fishery. As they share experiences and practices they end up with a mixture of information about fisheries management which at times is also contradictory, as already alluded to in the discussion of the contradictions above. As discussed in Chapter 2, Wals (2007) saw contradictions and diversity of opinion and perspectives as providing a good opportunity for social learning towards sustainability in the context of Education for Sustainable Development. In the Lake Malombe site, I identified three quaternary contradictions which are also related to the primary, secondary and tertiary contradictions, and which were surfaced as follows in research interactions.

6.3.5.1 Quaternary contradiction between subjects in the fishing community activity system and rules in the government activity system as surfaced via the problem of a lack of timeous review of fisheries regulations

This contradiction became evident in the following research interactions:

> ***Researcher:***
> *How often are the fisheries regulations reviewed to make sure that the increasing fishing technologies are taken care of?*
>
> ***Individual Interview IIG2:*** *The fisheries regulations we are using have been there for a long time and we have not yet reviewed it. What the district office does sometimes is to organise refresher courses or workshops where we as extension workers are taken through the regulations so that when we are working with BVCs and other fishing communities we can also explain to them what is required.*

Individual Interview IIG1*: Apart from the workshops we are also given copies of the regulations and we have been extending these messages for a long time now that we know what to tell the fishing communities: when closed season is, recommended fishing gears, illegal gears, fish licensing and many others.*

Focus Group Discussion FGD1*: We have taken long time since we reviewed the fisheries regulations and this is why we are having lots of challenges because most of the fishing gears which are currently used are not included in the regulations. BVCs and local leaders will report that there are illegal gears used in their areas but we cannot take them to court or confiscate them because we will have no backing from the regulations. It we can have a review of the rules then most of these problems will be solved.*

Focus Group Discussion FGD2*: Failure to review our fisheries regulations makes it difficult for us as extension workers to advise BVCs and fishing communities and we most of the time are unable to answer some of the questions from people. In order for a co-management programme to be effective, we need to respond to the current practices because fishers keeps on bringing new practices and skills because they want to catch more fish and make more money for themselves.*

Focus Group Discussion FGD1: *As BVCs we would like to have our regulations covering the newly introduced fishing gears because they are really destructive and we don't stop them then our interest to conserve the fish stocks will not be achieved. What we need is for fisheries to bring the rules and empower us and we are going to enforce them.*

Focus Group Discussion FGM1: *Let me remind you that when we were at Mpwepwe for a similar meeting where we reflected on Lake Malombe and Lake Malawi. We had visitors from Norway and during that meeting I requested for some discussions that in Lake Malombe there are rules on the use of Nkacha with specific mesh sizes and measurement of the nets. I therefore asked if there could be similar regulations for Lake Malawi instead of burning all the nkacha nets. This has caused a lot of nkacha nets operating in Lake Malawi illegally. What I wanted was to have regulations on the sizes and measurement of nkacha nets rather than burning it completely which has resulted in lots of nets operating in Lake Malawi.*

What usually happens is that people who avoid rules do not have programme to conserve but to get as much as they can and if you meet him/her will tell you yes I respect regulations while not doing so. What I have seen is that cars always respect rules of the road because there are traffic officers everywhere on the road.

I remember when I was at school was told that in Germany there was one car and because there was only one car, the rules which were made were for one car. When more cars started coming they did not want to sit down and revise the rules of the road to say now that we have more than one car how do they drive on the road? How do they pass each one and on which side should they be passing? There were lots of accidents and cars smashed each other. This is why I am saying that there should be rules and regulations for Lake Malawi to allow Nkacha nets to operate but with specified regulations and not just allowing them to fish illegally there.

6.3.5.2 Quaternary contradiction between the mediating tools in the fishing community activity system and the object of the government activity system surfaced via discussions on the lack of training for BVCs

This contradiction became evident in the following research interactions:

> ***Researcher***
> *Have you attended any workshop or training to be able to work effectively as a BVC member?*
>
> ***Individual Interview IIF3****: There are BVC members who were elected when the programme of co-management started. Those were trained and they know what needs to be done but there are some who were elected after that group and those have never been taken for training. We have been asking our extension officer here to organise training for those who have not been trained but also those who had their training long time ago because a lot of things have changed.*
>
> ***Focus Group Discussion FGMB1****: Fishers know that we have not been trained as BVC members and whenever we go to the beach to advise them or discuss with them on their fishing practices they talk bad about us and sometimes we get demoralised because they tell us we are not concerned and fisheries do not know us. What we need is for us to have that required training so that we know what our roles are and that whenever we go and advise fellow fishers, we have something to tell them. The Department of Fisheries have just put us as pillars or sign posts for us to wait for regulations to tell fishers. We were told that our friends from fisheries will come to train us on some of the regulations and up to now they have not come.*
>
> ***Focus Group Discussion FGD 2:*** *A lot of things are changing and we cannot work effectively without being trained. Even those of us who started when the programme started we need to be trained because we have a lot of new things which have come in between that we also need to know. We have been asking Fisheries to organise BVC and local leaders training.*

Working together on resolving this contradiction could also provide a productive opportunity for expansive learning and development of co-management, as is advised by those involved in the focus groups and interviews above.

6.3.5.3 Contradiction between the mediating tools of the government activity system and the object of the fishing community activity system surfaced through insight into a lack of support for BVCs and local leaders from the government

Despite there being a strong commitment to co-management within the government activity system based on the policy approach as defined by government (as shown in Chapter 5 and in the data shared above), there was a contradiction between the mediating tools used by government and the object of contributing to sustainable fishing by the fishing community activity system. This was surfaced through insights into a lack of consolidated and carefully mediated support from government to BVCs and local leaders as shown by the following research interactions:

Researcher
How do you support each other (BVCs and government) in the implementation of co-management?

***Focus Group FGI**: When the programme started we had support from government. We were taken to different workshops in Liwonde, Mpwepwe and in Mangochi. But now all those things stopped. People from fisheries were coming along the beaches to conduct meetings with fishers and BVCs had a lot of support. Now BVCs are working alone and the only person who come close to BVCs are the extension officers who are based here.*

***Individual Interview IIF1:** Fishers used to fear BVC members because the government was always close to them. We were working together with local leaders and BVCs and the extension officers together with people from the district were coming for meetings. Nowadays even our extension officers lack transport to work in all these beaches with BVCs.*

***Focus Group Discussion FGD2:** We do not have the support we used to have when this programme started. For example we used to have extension workers who were moving from one place to the other all the time running workshops, meetings. All the BVCs were very active because they were being supported all the time. People were advised to licence their fishing gears and closed seasons were respected. Now all that is not there and as a result people are just doing what they want.*

As can be seen from the above research interactions, there seems to have been a decline in the support offered to the BVCs and local leaders, and a decline in co-operative activity in implementing the co-management approach in the Lake Malombe site. What is encouraging, however, is that the respondents see value in working together and are interested in obtaining support from government for their activities, making this another possibility for expansive learning and for the development of the co-management collective activity.

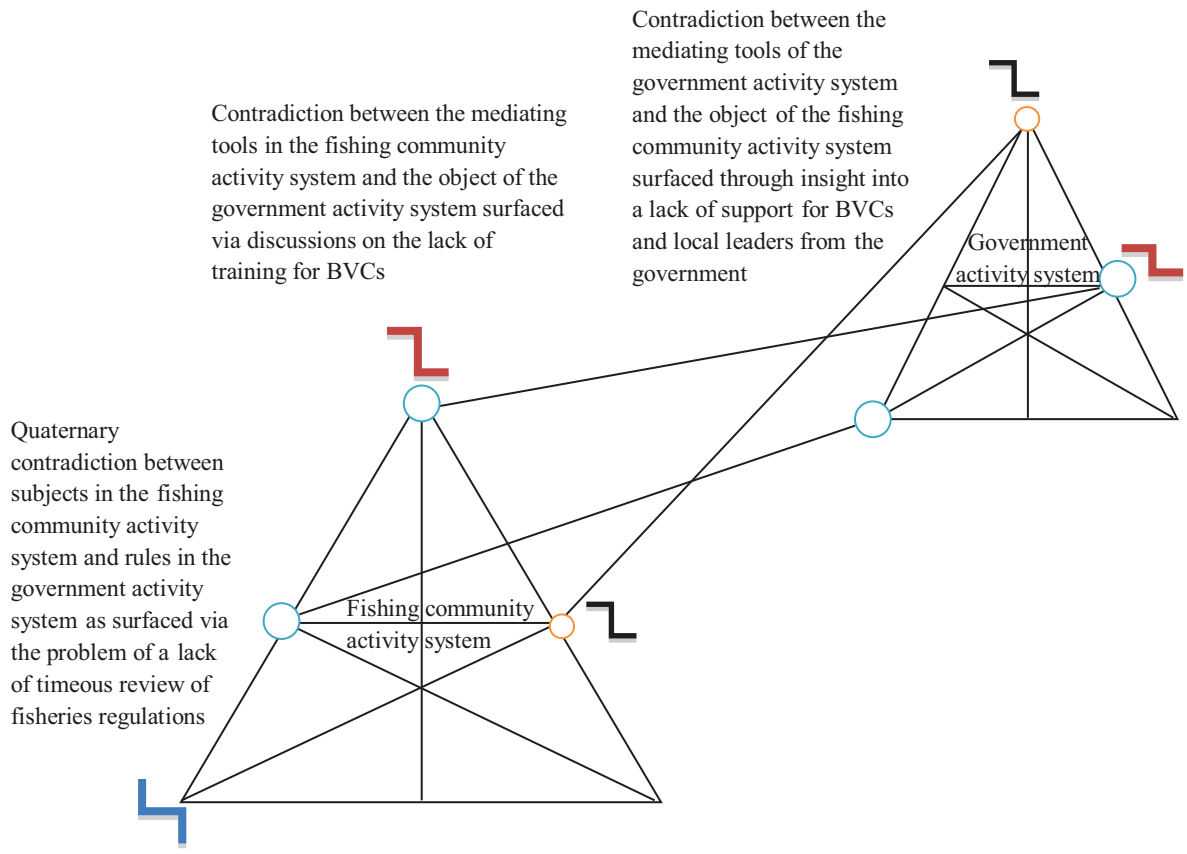

Figure 6.6: Quaternary contradictions between community and government activity systems

The Government of Malawi's (2005) policy suggests that the fisheries co-management approach should be referred to as a 'cycle' of planning, working in partnership on implementation, and monitoring and learning to continuously improve practice and provision of services to improve the well-being of people and the fisheries resources. In this sense the Government recognises that the development of co-management activity is a process that must improve over time. Thus, the reduction in government support to BVCs and local leaders appears to be a cause for concern within this developmental policy framework. As already mentioned across this thesis, the co-management approach was introduced to improve the partnership between the resource users and the government so that they can learn from each other and in the process improve the management of the fisheries resources and the lives of people. If key sources of support are in decline, yet in demand, then there appears to be a need to address this as it is affecting the cycle of reflexive policy implementation as envisaged by government and as also recognised as being important by the fishing community activity system.

As can be seen from the discussion of the tertiary and quaternary contradictions above, the engagement of stakeholders across the two activity systems have influenced the development of contradictions and these contradictions provide spaces for expansive learning (Engeström 2001). It is especially encouraging that there appears to be a high level of reflexivity and

awareness of the need for changes in the co-management activity system amongst all of those involved in the two activity systems which provide a fertile environment for potential expansive learning and change (see Chapter 7).

6.3.6 A summary of contradictions in Lake Malombe

The contradictions discussed above, are summarised in Table 6.1 below. These provided the basis for the mirror data that was used for prioritising of contradictions in the change laboratory workshops, discussed in the next chapter (Chapter 7).

Table 6.1: A summary of contradictions in Lake Malombe

Explaining the aspect of the contradiction	**Evidence from the data source and the source**	**Locating primary contradictions**
Failure to follow rules in the fishing community activity system leading to further modification of fishing gear and fishers continuing to exploit fish stocks.	*People continuously modify their fishing gear when they see are not catching enough fish, they start modifying their fishing gears so that they can catch more fish even the immature ones. They make fishing nets with small meshed sizes. We need to find a way of monitoring these under-meshed fishing nets and as BVC members we should confiscate these and encourage fishers to use recommended fishing nets. (Focus Group Discussion FGD2)*	Contradiction in the **rules** and governance of the rules in the fishing community activity system reflected in a tolerance of modification of fishing gear that continue to exploit fish stocks in spite of awareness of explicit rules to the contrary.
Fishing communities in Lake Malombe demand the review of rules and regulations arguing that rules were reviewed long time ago and with the changes in fishing practices there is a lot that is not reflected in the rules.	*The current rules were revised some years ago and Lake Malombe is closed for two months every year from October to November which are the breeding months of fish in the lake. The rules were discussed with the fishing communities around Lake Malombe. Since then we have not had chance to review them because to do that we need to involve the fisheries research unit to do some research programmes and see whether what the BVCs and local leaders are saying is true. (Individual InterviewII2)*	Contradiction in the **rules** of the fishing community activity system reflected in contestation about the duration and appropriateness of the open and closed fishing season.
BVCs and local	*We have BVCs who were elected by fishing*	Contradiction in

leaders from some areas are in power conflicts on who is in control of fishing activities and this has paralysed some co-management initiatives in the areas in Lake Malombe.	*communities to represent government and monitor fishing practices. But we also have chiefs who are the owners of the land by tradition and they also have control over the fishery. As fishers we most of the time get confused and we do not know who to listen to. Chiefs say they are the owners of the areas and we have to listen to them and BVCs say they are representatives of the government and whatever they come from the government. (Individual InterviewII2)*	the **division of labour** of the fishing community activity system, reflected in contradictory messages on fisheries conservation and co-management and authority role confusion in the fishing community activity system.
Contradictory messages about co-management between the extension officers and research officers due to lack of consultative meetings to agree on what messages are needed and how they can be packaged and disseminated.	*We are supposed to develop messages as government officers and these are supposed to have same message we all have. Because we are from different offices research and extension we also have different approaches to this. Our messages are supposed to come from our policy document and we all know that. What is giving us problems is that we do not have time to come together and then discuss on these. As researchers they have the information but may be when it comes to the development of messages then we might be doing different things. (Focus Group Discussion FGD1)*	Contradiction in the **mediation tools** surfaced through the issue of a mismatch of fisheries co-management messages.

Explaining the aspect of the contradiction	**Evidence from the data source and the source**	**Locating secondary contradictions**
The rules of the newly designed gear which is very common in Lake Malombe are not in line with co-management principles in the fishing community activity system.	*Most of the rules are not in line with co management. As I said at the beginning fishers are becoming more innovative with their fishing business so for them to catch more fish they think of ways of designing their fishing nets. (Focus Group Discussion FGD3)*	Contradiction between **rules** and the **object** of co-management in the fishing community activity system, surfaced through the practice of continuing to modify fishing gear despite knowledge

		of the over-exploitation of the fish stocks.
BVCs were established in the rural areas where there were already other traditional local structures like village heads and chiefs. Their existence in the areas has in a way reduced the powers local leaders had on fishing activities.	*We work together with our chiefs and village heads because we are all working on the same. However we have a number of problems and these have been there for some time. Chiefs and village heads are ex-official in the BVCs but sometimes are so powerful that BVCs are not seen. Some village heads have even replaced BVC members and put those who are related to them. WE do not know what the boundaries are in the BVCs between the chiefs and the BVC members. (Focus Group Discussion FGD2).*	Contradiction between the **subjects** and the **division of labour** in the fishing community activity system, surfaced through analysis of power relations and conflicts that exist between BVCs and local leaders.
The extension and research officers produce contradictory messages on co-management due to lack of consultation and joint implementation of co-management.	*As extension officers we rely on our research unit to develop technologies and messages that we should use. But some of the messages need more explanation from the researchers because they are scientifically written which makes them difficult for us to interpret. We are not scientists and for us to use the information we need full understanding. (Individual Interview II3)*	Contradiction between the **subjects** and **mediating tools** in the government activity system surfaced through the problem of contradictory messages on fisheries co-management.
The rules they are using were reviewed some time back and this has resulted in some of the newly designed fishing gear not being included in the rules.	*Yes I think we should focus much on the size of the meshes because if the fishing gear has recommended sizes of meshes then all the young fish will go through and what the fisher will end up with will be recommended fish sizes. The problem is that these new gears are not in the rules and regulation to show that they are illegal by law. As long as they are not there people will be using them. We need frequent reviews of the regulations. (Focus Group Discussion FGD4)*	Contradiction between the **rules** and the **object** of co-management surfaced through dissatisfaction with the current closed season.

Explaining the	**Evidence from the data source and the**	**Locating tertiary**

aspect of the contradiction	**source**	**contradictions from the activity system**
A change of closed season from November and December to October and November was agreed by both communities and government to improve fish catches. The fishing communities are requesting another change which may also affect the object.	*When we started co-management, closed season was from November to December and the lake was open in January. Then BVC members, local leaders and the fishing communities sat down and agreed that the dates needs to be changed because fishers noticed lots of immature fish being caught that time. The fisheries department accepted us and the dates were changed. So there is nothing wrong to review what we currently have because of what we are seeing lots of young fish in our nets. (Individual Interview II3)*	Tertiary contradiction in Lake Malombe between the earlier **object of the fishing community activity system** and the more recently introduced **object of co-management by the government activity system.**

Explaining the aspect of the contradiction	**Evidence from the data source and the source**	**Locating quaternary contradictions from the activity systems**
There are no rules to control the use of newly designed fishing gears and the fishing communities are demanding the review of the rules by the government.	*We have taken long time since we reviewed the fisheries regulations and this is why we are having lots of challenges because most of the fishing gears which are currently used are not included in the regulations. (Focus Group Discussion FGD1)*	Quaternary contradiction between **subjects in the fishing community activity system** and **rules in the government activity system** as surfaced via the problem of a lack of timeous review of fisheries regulations
BVCs and other	*A lot of things are changing and we cannot*	Quaternary

fishing communities have not been trained on co-management affecting knowledge of what is expected of them as they implement co-management together with government.	*work effectively without being trained. Even those of us who started when the programme started we need to be trained because we have a lot of new things which have come in between that we also need to know. We have been asking Fisheries to organise BVC and local leaders training. (Focus Group Discussion FGD2)*	contradiction between the **mediating tools in the fishing community activity system** and the **object of the government activity system** surfaced via discussions on the lack of training for BVCs.
Lack of government support to BVCs and local leaders in the implementation of co-management.	*We do not have the support we used to have when this programme started. For example we used to have extension workers who were moving from one place to the other all the time running workshops, meetings. All the BVCs were very active because they were being supported all the time. People were advised to licence their fishing gears and closed seasons were respected. Now all that is not there and as a result people are just doing what they want. (Focus Group Discussion FGD2)*	Contradiction between the **mediating tools of the government activity system** and the **object of the fishing community activity system** surfaced through insight into a lack of support for BVCs and local leaders from the government.

6.4. Contradictions in the south-east arm of Lake Malawi

In the south-east arm of Lake Malawi contradictions were surfaced in three activity systems: the fishing community activity system; the extension and research activity system; and the Fisheries College activity system (see section 5.3.1). Stakeholders in the fishing community activity system include BVC members, local leaders, gear owners, crew members, fish traders, fish processors. In the extension and research activity system, stakeholders include government employed extension officers and research officers, fish scouts, and NGOs working in the areas. Stakeholders in the Fisheries College activity system include lecturers, students and college support staff (see section 3.5.1). Co-management is a partnership in which the government agencies, local communities and resource users, non-governmental organisations and other stakeholders share, as appropriate to each context, the authority and

responsibility for the management of a specific set of resources (World Conservation Congress,1996).

Contradictions in the south-east arm of Lake Malawi have emerged in the interactions of different stakeholders and activity systems as they strive to manage and also to survive on the fisheries resources. As reported in Chapter 5, the level of interaction has increased since co-management started. There has also been an increase in the fisher interaction due to the movement of fishers from one area of the Lake to the other because fish catches have been erratic and fishers have been moving around the south-east arm of Lake Malawi following specific fish species. As also reported on in Chapter 5, it has been observed that the migration of fishers has influenced the change in fishing practices. As is the case with the Lake Malombe experience with co-management, engaging with sustainability issues in the south-east arm of Lake Malawi is not without its complexities and contradictions. Tilbury and Cook (2005) noted that sustainability is essentially an ongoing social learning process that actively involves stakeholders in creating their visions, acting and reviewing changes. In order to explore the expansive learning potential of contradictions, it was necessary for me to identify and surface the contradictions in the south-east arm of Lake Malawi, as I did in the Lake Malombe case (reported on above). I used a similar approach, and found that there was also a relationship between primary, secondary, tertiary and quaternary contradictions in this context, and that these posed opportunities for expansive learning in the south-east arm of Lake Malawi. As in the case of Lake Malombe, it seemed too that these were related to **deep-seated and difficult to resolve structural contradictions that exist at the poverty, natural resource use, livelihoods, governance and sustainability interface in the co-management system.** This reflects a core tension in the difficulty of resolving **environment-society-economy relations** in sustainability and co-management approaches.

I discuss the primary contradictions first, and then move on to a discussion of secondary, tertiary and quaternary contradictions in more detail below.

6.4.1 Primary contradictions constraining co-management in the south-east arm of Lake Malawi

As in the Lake Malombe case context, contradictions were surfaced through analysis of responses to a range of set questions in phase one of data generation. A number of questions were asked to learn from the fishing communities' understanding on the status of the fishery. The questions were also aimed at linking what is happening in the fishery to co-management assumptions. One of the questions asked to understand the state of the fishery was: *Why do you think we are still experiencing low fish catches while implementing co-management in the south- east arm of Lake Malawi?*

As was indicated earlier in the Lake Malombe case study, one of the difficulties in identifying contradictions in a fisheries co-management context among stakeholders in the fishing community activity system is that fishing is practice-based where those involved learn through practice and this is passed from generation to generation (see section 6.3.1). This was also evident in the south-east arm of Lake Malawi during data generation, and it was evident that people were able to draw on knowledge of the history of the fishery before co-management to the time when co-management was introduced in the south-east arm of Lake Malawi. This understanding helped me to have a deeper understanding and to surface the contradictions that exist in the fishing community activity system. I also found in this case that stakeholders from one activity system were quick to point at others as being responsible for the declining fish catches e.g. fishers in the fishing community activity system were pointing at government as responsible and, as in the case of Lake Malombe, this was helpful to examine more carefully as it helped to surface the contradictions. Careful and deep probing of what stakeholders were saying showed that most of the contradictions are at tertiary and quaternary levels, but they had roots in primary and secondary contradictions (see section 6.3.1).

6.4.1.1 Contradiction in the rules and governance of the rules in the fishing community activity system surfaced via continuous decline of fish catches despite the existence of rules and regulations in the co-management context

This contradiction was revealed in the following research interactions:

> ***Researcher:***
>
> *Why do you think we are still experiencing low fish catches while implementing co-management?*
>
> ***Individual interview IIF2****: One of the reasons why we still experience low fish catches is that there are a lot of fishing gear used in the lake and most of them are illegal. Our rules are not working any longer and BVCs and local leaders no longer use the rules which were set when BVCs were formed. BVCs and local leaders have internal conflicts about who manages fishing activities in the areas and this has negatively affected our work to control and manage fisheries activities.*
>
> ***Focus Group Data FGD2****: When co-management was introduced here in Lake Malawi, we agreed that all the activities need to be coordinated by the BVCs and the local leaders who are the owners of the land where all the BVCs and landing sites are. Over the years we have not done joint meetings where chiefs and we as BVCs call fishers to remind them about the importance of observing the regulations on better fishing practices and in the absence of those meetings people forget their roles.*
> ***Individual Interview II5****: Some BVC members are corrupt and they do not help in the management of the fisheries resources. As people who were entrusted by the government we are supposed to do our job well but there have been lots of corruption*

cases among BVC members. Not only BVCs there are also some village heads who are corrupt. They receive money and fish from fishers who are doing illegal fishing. Behaviours of these people are constraining co-management activities.

From the evidence above it seems that the rules that are meant to regulate and govern the fishing community activity system exist, but are not being adhered to by everyone. In the south-east arm of Lake Malawi, this is also related to corruption, which is said to exist amongst BVCs who are meant to implement and oversee the rules, and by traditional leaders too. Thus it would seem that there is a virtual collapse of the rules and how the rules are being used in this activity system. What is important for the possibility of expansive learning is that there is a reflexive awareness of this, as shown in the citations above.

6.4.1.2 Primary contradictions in the mediating tools of each of the three activity systems (fishing community activity system, the government activity system, and in the college activity system) surfaced through inadequate understanding of the concept of co-management

It was evident from the data that the continuous decline of the fish catches was linked to another primary contradiction, this time in the mediating tools of *each of the three activity systems* (the fishing community activity system, the government activity system, and the fishery college activity system). This is related to lack of clarity on the concept of co-management, and was surfaced through reports on confusion, mixed messages, and inadequate knowledge of, and orientation to the concept. Concepts are important mediating tools, and having a good understanding of a concept such as co-management is important for the successful implementation of co-management approaches.

This primary contradiction, present in all three of the activity systems, was surfaced in the following research interactions:

Researcher:
How do you get and share messages on co-management?

Focus Group Discussion FGD1 [Fishing community activity system]*: Messages that come from BVCs and village heads are most of the time those that deal with conservation of the fish stocks. However there are times when these messages are not the same and we most of the time confuse fishers. BVCs and village heads are supposed to come with same message but is not the case. Messages that come from BVCs and our village heads are different and sometimes when fishers are conducting meetings the village heads are not there to hear what they are saying. There is less coordination between the BVCs and local leaders. We are all working on co-management and our messages are supposed to be the same to try and find means of protecting the fish stocks so that we can improve our fish catches.*

The primary contradiction reflected in the data above, exists in the mediating tools of the fishing community activity system and is related to poor communication between the BVCs and the village heads. In the case of the fishing community activity system, messages of co-management reaching the fishers via the BVCs and village heads are divergent and are said to be confusing.

> ***Focus Group Discussions FGD2 [extension and research officers]:*** *We as extension and research officers have different understandings of co-management. Most of the information on the proper management of the fisheries resources comes from research. In most cases the researchers have a better understanding of what they mean but are never communicated properly to us as extension workers. Because of that our understanding on fisheries conservation is different.*

The primary contradiction reflected in the data above, exists in the mediating tools of the government activity system, where there is said to be no shared concept of co-management amongst research and extension officers. This is related to a lack of adequate communication between research and extension officers in this activity system.

> ***Focus Group Discussions FGD2 [college lecturers]:*** *As lecturers we are also supposed to be conversant with the concept of co-management for us to be able to teach properly. But some of us have never been oriented to this new concept. We read in books but the understanding is different. We also need to have better understanding of the concept. Our curriculum has some topics on co-management but it's in few subjects and those who are teaching other subjects do not have a full idea about co-management.*

This primary contradiction reflected in the data above, exists in the mediating tools of the college activity system, where there is said to be a poor understanding of the concept of co-management, and it is also poorly represented in the curriculum, and lecturers are inadequately prepared to teach the concept. Lecturers appear to mainly derive their understanding of the concept from books, and from orientating training and curriculum requirements.

6.4.2 Summary of primary contradictions in the south-east arm of Lake Malawi

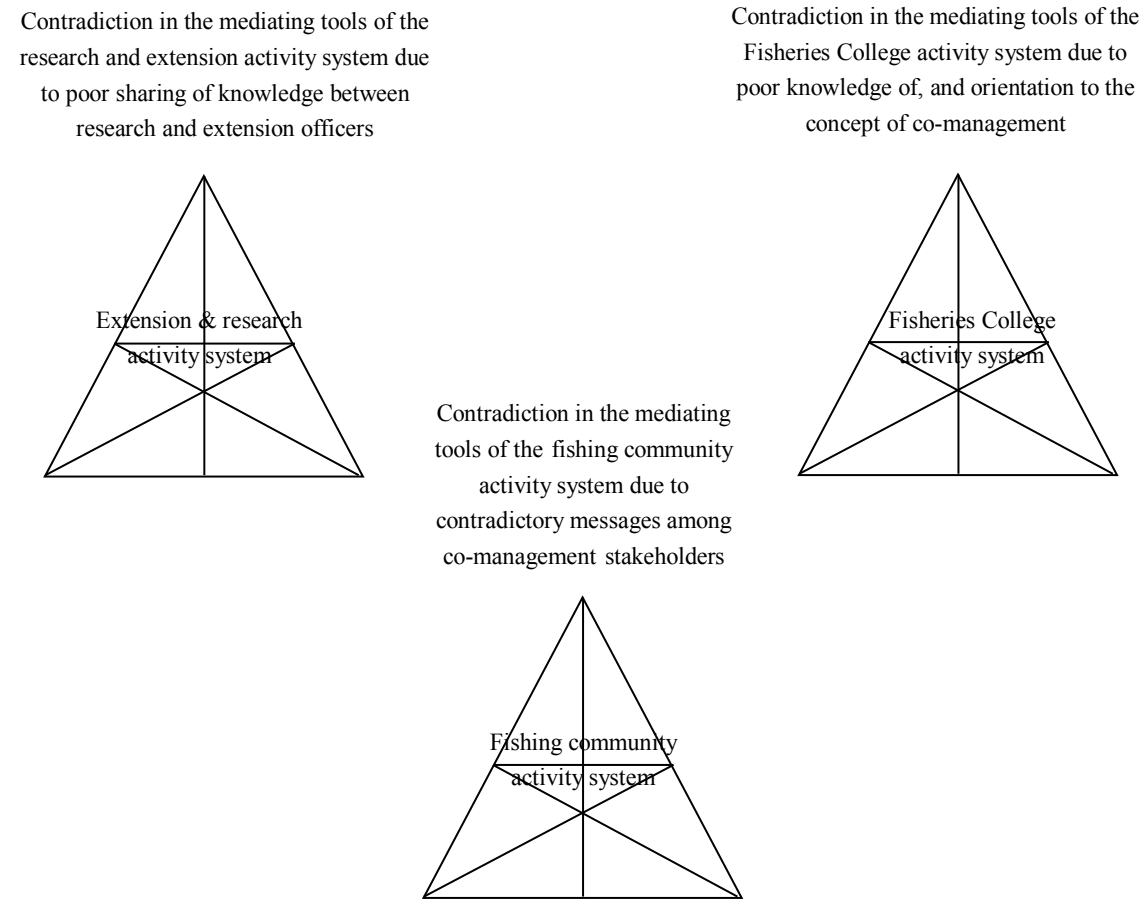

Figure 6.7: An illustration of primary contradictions in the south-east arm of Lake Malawi

The contradictions highlighted above were discussed as some of the issues that constrain the implementation of co-management in the south-east arm of Lake Malawi. Of interest in this case was that in each of the activity systems there was a contradiction in the mediating tools. It related to poor understanding of the concept of co-management, and in each of the activity systems, the root of the poor understanding of the concept was different. In the fishing activity system it was due to poor communication amongst BVCs and village heads on the rules and approaches to fishery conservation in the co-management framework; in the research and extension activity system it was due to poor communication and sharing of knowledge between research and extension officers in the same activity system; and in the Fisheries College activity system the same poor understanding of the concept of co-management resulted from inadequate literature, inadequate inclusion of the concept in the curriculum and lack of preparedness of lecturers to teach the concept.

6.4.2 Secondary contradictions in the south-east arm of Lake Malawi

As discussed in the previous section when discussing the Lake Malombe case (see section 6.3.3) some of the secondary contradictions emanated from the primary contradictions and this was revealed through in-depth questioning and discussions. It was interesting to see how primary contradictions in the second case affected the other elements in the same activity system. Evidence of this is shown in the data below.

6.4.2.1 Contradiction between the *subject* and the *division of labour* in the fishing community activity system leading to lack of commitment among BVCs and local leaders affecting the object

Evidence from the data shared above and further analysis of the contradictions showed links from the primary contradictions to the secondary contradictions as shown above (see section 6.4.2). In a co-management context where there is clear division of labour, lack of commitment of the subjects can affect the co-management programme thereby affecting the entire activity system. This is evident from the data below:

> ***Researcher:***
> *How are BVCs and local leaders working together in the implementation of co-management activities?*
>
> ***Focus Group Discussion FGD1:*** *We used to work together as one team when co-management started and were able to discuss many important things about fisheries conservation and this helped in making the BVCs together. Co-management was brought in this area because people saw that the fishing activities were getting bad and that bringing people from the areas was going to improve the situation. Things are slowing down because we do not meet very often and this has an effect on co-management activities.*
>
> ***Individual Interview II4:*** *When people come together they learn a lot of things. For example the rules that we use in the BVCs were developed through such meetings and these have helped in the management of the fishery. Now we need to revisit the rules and for us to do that we need different ideas and we can get these ideas through meeting and sharing ideas.*
>
> ***Focus Group Discussion FGD2****: Whenever we meet as BVC members we learn from each other and we also discuss on what our friends from other areas are doing because there are other places where co-management is doing well like at Mbenji Island. So coming together helps us to learn from each other. However there are times when we take long to meet and this has some effect to our purpose to conserve the fisheries resources. Also some of the fishing practices that fishers are using are learnt from other areas and when we meet with other people from other areas for example when we go to Mbenji we meet people from other areas and as we discuss we share some of the practices and people discuss lots of ideas. BVCs have been places where we have been discussing a lot of conservation and management issues and for some time people have been getting messages on fisheries conservation. What has been happening lately is lack of proper coordination among BVC members and our*

village heads. This lack of coordination has affected our activities in the BVCs and we seem to have forgotten our mandate to monitor and protect the fish stocks

Individual InterviewII1: *We as BVC members we sometimes do not work well with our village heads. We do not get the support that we need from our village heads and that sometimes contribute to our activeness [or inaction] in the BVC. We have a lot of fishers who are using this illegal fishing gear but some of them will tell you that the authority to fish in the areas has been given by the chief. As a BVC member sometime you just get discouraged because we are supposed to have the same message.*

The relationship between the subjects of the fishing community activity system affects what they do (the division of labour) and how they work together, as is clearly shown in the data above, and thus also the object of co-management. The data above shows that more clearly defined division of labour within the activity system and commitment of the subjects in the activity system to these roles and responsibilities is important for interaction and sharing of skills, knowledge and experience among co-management stakeholders in a co-management context. In particular the data above shows that there are issues with continuity of commitment to roles and responsibilities, and also issues to do with power relations that affect roles and responsibilities in the fishing community activity system.

6.4.2.2 Contradiction between the *rules* and the *mediation tools* in the fishing community activity system surfaced through the problem of use of illegal fishing gear

This contradiction was surfaced through the following research interaction:

Researcher:

Why is it that we are still having low catches after being in co-management programme for this long period?

Focus Group Discussions FGD2: *We used to have legal fishing gear when our fish catches were good but due to the situation in which we are now fishers have started re-designing their fishing gear to be able to catch more fish. This has led to reduction in mesh sizes and also production of completely new fishing gear which are illegal. There are many reasons why we are still experiencing low fish catchers while implementing co-management. The rules that we are currently using were reviewed long time ago and fishers are changing their fishing gear and fishing practices all the time. Review of the regulations will help us to check on the illegal gear that are being introduced and that will that will help to reduce illegal fishing.*

Individual Interview II2*: I personally feel we have left the BVCs on their own and this lack of support from government is what is causing all these. Co-management is supposed to be joint effort. Fishers are very difficult people because they aim at getting more fish and to do that sometimes they become very aggressive to the BVC members. We are supposed to continuously work with BVCs and local leaders and give them the support they need.*

***Focus Group Discussions FGD2**: What I see is that we just talk of co-management as government but we do not clearly understand what needs to be done to make sure that we are all in line with what needs to be done in co-management programme. For example here at the college how many people understand the approach well? We all talk about it but may be the extension officers who are practising it know better. Disagreements are sometimes there as you know a BVC comprises of many people and their understandings are not the same all the time. People have different interpretations on why we are still having less fish catches while implementing a co-management programme. The fishers are very complex because they come from different cultural and historical background. Their understanding about fisheries management is different. But as we meet during our meetings those who have some issues raise them and usually there are some who are strong and some are weak but as people who have been in fishing for a long time we help each other. Our discussions as BVC members together with the fishing communities helps us to learn more areas because people discuss a lot of things and continuously we help each other but the problem is what we are saying here that we need government to help us.*

6.4.2.3 Contradiction between the *rules* and the *object* in the government activity system surfaced via irregular review of regulations and uneven application of regulations

This contradiction is similar to the same secondary contradiction identified in the Lake Malombe case, and it relates to the government regulations that are not up to date, and do not include the new fishing gear being used by fishers, but which is illegal. It relates to a problem of slow revision of the regulation, and manifests as a contradiction between the rules and the object in the government activity system. As will be discussed in more detail below in the tertiary contradiction, there is another manifestation of a contradiction between the rules and the object of co-management in the government activity system which relates to uneven application of the rules to artisanal and commercial fishers. This contradiction is visible in the following research interactions:

***Focus Group Discussion FGD 1**: There are many reasons why we are still experiencing low fish catches while implementing co-management. The rules that we are currently using were reviewed long time ago and fishers are changing their fishing gear and fishing practices all the time. Review of the regulations will help us to check on the illegal gear that are being introduced and that will that will help to reduce illegal fishing.*

***Focus Group Discussion FGD2**: Fishers who are using trawl nets are not told to stop fishing during the closed season.*

***Individual Interview II2**: ... during the closed season we all stop fishing from November to January. Why is it that our friends with trawl nets continue fishing throughout the year?*

The data above shows that the regulations are a) out of date, and are not timeously revised, and b) that they appear to be unevenly applied to artisanal and commercial fishers. This causes many problems with the implementation of the regulations, and hampers the

government activity systems policy intention to implement a co-management approach. This provides an opportunity for expansive learning in the government activity system.

6.4.2.4 Contradiction between the *subjects* and the *object* in the Fisheries College activity system surfaced via reports on how a lack of enough knowledge about co-management by the lecturers constrains teaching of co-management skills and practices

This contradiction of a lack of adequate conceptual understanding of co-management approaches in the Fisheries College activity system was reported on above in relation to the mediation tools in the college activity system as a primary contradiction. However, this primary contradiction manifests as a secondary contradiction between the subjects and the object in the Fisheries College activity system, affecting the efficacy of the college lecturers to offer relevant training for co-management. The contradiction is surfaced in the following research interactions:

> ***Focus Group Discussion FGD2:*** *What I see is that we just talk of co-management as government but we do not clearly understand what needs to be done to make sure that we are all in line with what needs to be done in co-management program e.g. few people here at the college understand co-management We all talk about it but may be the extension officers who are practising it know better.*

Since college lecturers are responsible for the training of extension services, this represents a complexity in the co-management system that needs to be resolved, especially since it is also clear from the data that the extension services are not adequately accessing knowledge of co-management from within the government activity system as pointed out above in section 6.4.2.4. This also presents a possibility for expansive learning in the Fisheries College activity system (i.e. the training of college lecturers to fully understand and learn how to teach co-management – see also discussion on the importance of extension curriculum re-orientation towards more participatory, co-management approaches in Chapter 2, and recommendations in this regard in Chapter 8).

6.4.2.4 Summary of secondary contradictions in south-east arm of Lake Malawi

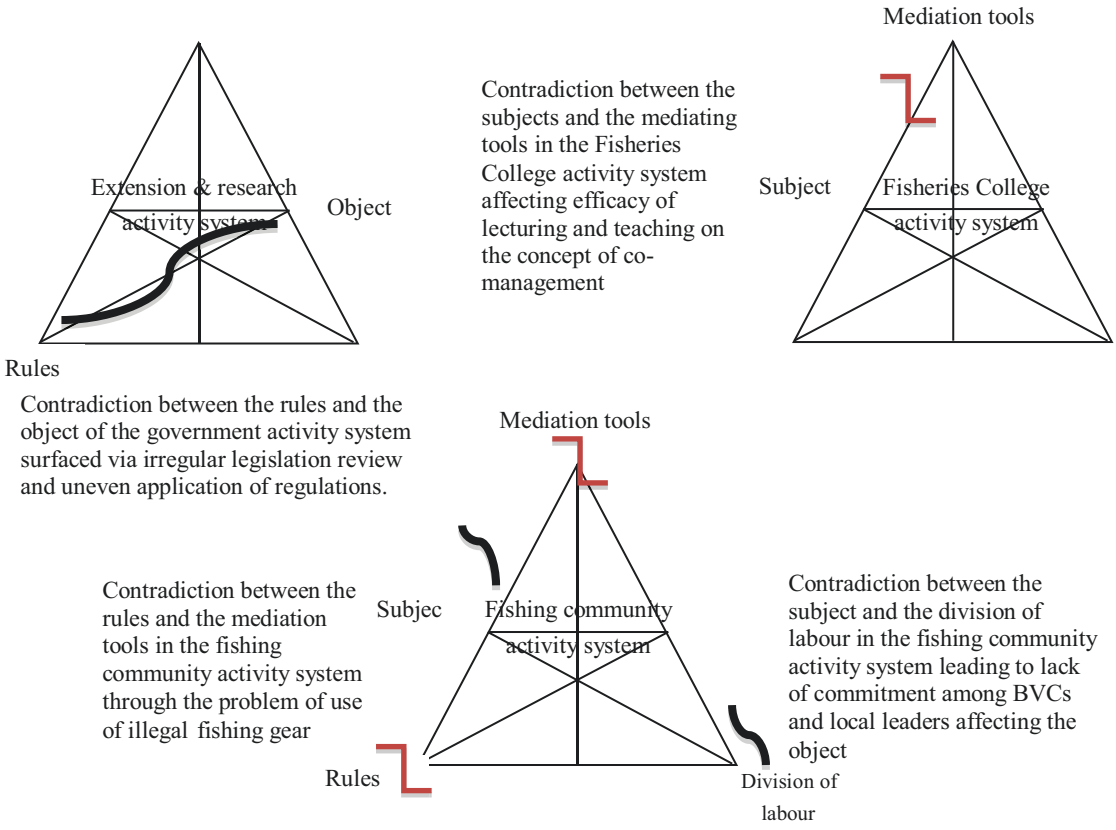

Figure 6.8: An illustration of secondary contradictions in the south-east arm of Lake Malawi

6.4.3 Tertiary contradictions in the south-east arm of Lake Malawi between the fishing community activity system and the government activity system with the introduced object of co-management

Engeström (1987) noted that tertiary contradiction happens when there is tension between the object of the central activity system and the object of a more advanced system. The object of the central activity system (fishing community activity system) has been to increase fish catches ostensibly through adherence to co-management approaches, but data shows that fishers tend to interpret this mainly in terms of ensuring adequate fish catches. However, the co-management object introduced via government policy drives changes in these practices as BVCs and other fishing communities are to work together with government to monitor and make sure that sustainable fisheries management practices are observed. A number of unsustainable practices have been observed by the fishing communities and the declining fish catches have been due to the practices, of which they show awareness. The object of co-management in the south-east arm of Lake Malawi was introduced by government (see

Chapter 1) to address the challenges of declining fish catches which facilitated stakeholder interactions on the best practices for managing the fishery.

During the review of regulations for both Lake Malombe and the south-east arm of Lake Malawi, it was evident that the government aim in introducing co-management was to promote it and the sustainability of the fisheries resources and the well-being of the people who depend on the fishery for their survival.

Evident from both individual and focus group discussions, small scale fishers agreed to sustainably manage the fisheries resources through a number of rules and regulations which included a closed season during the fish breeding period (see Chapter 1). Contradictions between the fishing community object of co-management and the government activity system's object of co-management and how it is implemented affected the implementation of co-management.

6.4.3.1 Contradiction between the object of co-management in the fishing community activity system and the object of co-management in the government activity system surfaced through the application of uneven 'rules' for artisanal and commercial fishers in implementing the co-management approach

This contradiction was surfaced through the following research interactions:

> ***Researcher:***
> *In the process of sharing fishing practices as co-management stakeholders what has been the major learning?*
>
> ***Individual Interview II2:***
> *We have been discussing a lot of things in the BVCs especially now that our fishing business is facing a lot of challenges. One thing we have noted is that during the closed season we all stop fishing from November to January. Why is it that our friends with trawl nets continue fishing throughout the year? Commercial fishers do not stop fishing and yet we are told to stop fishing to protect the fish during the breeding season.*
>
> ***Focus Group Discussion FGD1:*** *We have been complaining about non observance of closed season by our friends in the commercial fishing sector. We all want to improve our fish catches so that we can start realising more income but we see our friend coming even close to the shore during the closed season pulling their net. Should we say we are protecting fish during the breeding season or we are only giving chances to commercial fishers to catch more?*
>
> ***Focus Group Discussion FGD2****: Fishers who are using trawl nets are not told to stop fishing during the closed season and as BVCs we feel we are not conserving our fish stocks because they are the ones with powerful engines and they use very large*

fishing nets with under-meshed fishing gear. Our objective of improving the fish catches so that we start realising better catches is not observed.

***Focus Group Discussion FGD1**: I just want to ask our friends from fisheries, when the lake is closed for fishing we agreed that no one should be found catching fish but we always see those fishers with trawlers fishing. We see a lot of trawlers coming to our areas fishing close to the shores here. Why are we failing to stop them? We as BVC members we tell our friends to stop fishing during the closed season because that is the time when fish is breeding but government allow commercial fishers with big boats and engine to come and fish here. Why are they failing to stop them? Those are some of the things which cause us to disagree with fisheries and as BVC members we also get questions from fishermen.*

From this data it is clear that there is an uneven application of rules for open season fishing for artisanal fishers and commercial fishers, resulting in a contradiction in the co-management object of the fishing community activity system and the object of co-management in the government activity system.

Note, while this has not been detailed above as such, this tertiary contradiction also reflects a primary contradiction in the rules of the government activity system, which allows for diverse application of their rules for co-management amongst different fishing groups, to a secondary contradiction in the government activity system which is situated between the rules and the object of co-management, and to a quaternary contradiction between the rules and subjects of the fishing activity system and the rules and subjects of the government activity system, showing how tertiary contradictions are shaped by, and also shape primary, secondary and tertiary contradictions.

6.4.3.1 Summary of tertiary contradictions in the south-east arm of Lake Malawi

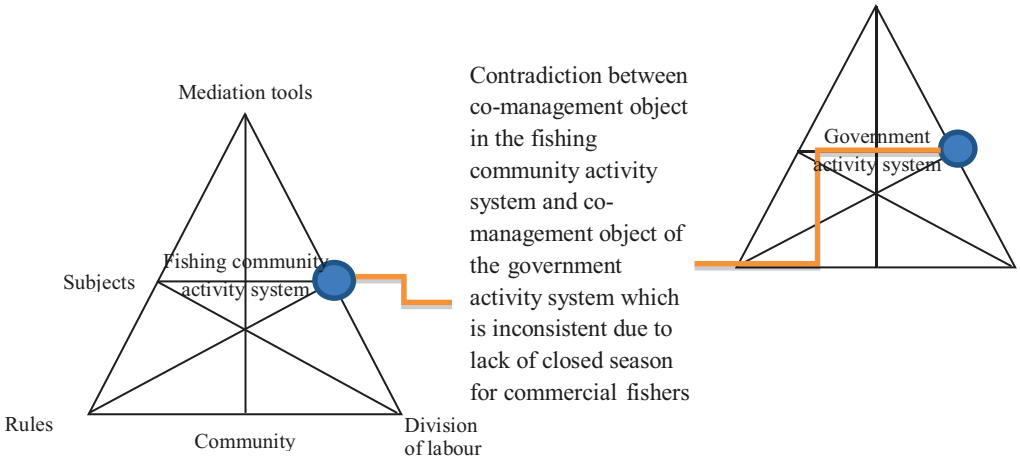

Figure 6.9: An illustration of tertiary contradictions in the south-east arm of Lake Malawi

The fishing community activity system stakeholders observe a mis-match in the way that the object of co-management is practised in the government activity system, which relates to the way that regulations are observed and implemented by the government activity system. While the objective of closed season is the same, only small scale fishers are forced to observe the closed season while commercial fishers are allowed to fish even during the breeding season. From the evidence above, fishing communities expressed concern about the fishing practices taking place in the area where all the artisanal fishers are required to stop fishing during the fish breeding season from November of January in order to allow *Chambo* fish to breed and to protect the young ones. This closed season is in line with the object of co-management in their activity system which is to increase fish production through co-management practices and be able to get more income. However commercial fishers are not restricted from fishing and while artisanal fishers observe the closed season, commercial fishers come heavily equipped with fishing gear and fish in the same areas where artisanal fishers are not fishing, producing a contradiction in the object of co-management in the fishing community activity system and the government activity system.

The data shows that the fishing community activity system has a better understanding of the reason for a closed season and sees the contradiction between the object of co-management in their and the government's activity systems, showing that the fishing community object of co-management appears to be more advanced than the government activity system object. This is ironic as it is the government that initially introduced the more advanced object of co-management. Wals (2007) noted that learning for sustainability focuses on encouraging people to think about why certain decisions are being taken and what the real alternatives available are. We learn through experiences throughout our entire lives. Learning happens

consciously and subconsciously and we learn by interacting with people and the environment. People's observation on practices and their co-management objective allowed them to demand change in the regulations so that they were aligned with their objective.

From the data quoted above it is evident that stakeholders in the fishing community activity system question why commercial fishers are not observing closed season as a way of giving juvenile fish a chance to grow. In order to effectively address the existing contradiction, an in-depth and more critical analysis of the object of the government activity system is needed, and the object of co-management in the fishing community activity system. This presents a potentially interesting and complex area for co-learning through an expansive learning process.

6.4.4 Quaternary contradictions

The complexity of a co-management approach with stakeholders from diverse backgrounds brings with it knowledge, skills and experiences that are complex and some of them do not reflect sustainable practices as can also be seen from the analysis presented above. As discussed earlier in the case of Lake Malombe (see section 6.3.5), the interactions of co-management stakeholders (primary, secondary and tertiary) within and across activity systems create various tensions and contradictions. Wals (2007) argued that not all experiences lead to learning. Learning occurs mainly when there are conflicts between expectations and experiences or between ideas and desires. Engeström (1987) defined quaternary contradictions as contradictions that occur between the central activity system and the other relating systems.

6.4.4.1 Contradiction between the subjects in the fishing community activity system and object in the government activity system as surfaced via lack of other income generating activities

This contradiction was surfaced via the following research interactions:

> ***Researcher:***
> *What do you think can help to increase fish production in the south-east arm of Lake Malawi?*
>
> ***Individual Interview IILM3:*** *We have been asking the government to find us something to do apart from fishing because the number of fishers is increasing every time. People go fishing because they don't have anything to do in order to get income. People have to survive and they do that through fishing.*
>
> ***Focus Group Discussion FGD1:*** *Most of the people along the shore in this area depend on fishing and fishing businesses and they have been depending on these for a*

long time. There is no alternative activity along the shore where people can go and work to earn money. I think the most important thing to emphasise is increasing number of fishers also influences the number of fishing gear. People are only depending on fishing businesses and this is the biggest reason why we are having all these problems.

Individual Interview II4: *Fishers and other people earn their living from fishing and this is exerting a lot of pressure on the lake. There is no source of employment or business where people can go and work. The government should find something for fishers to be attracted to so that they give less pressure to fishing.*

Focus Group Discussion FGD1*: The other weakness which I see among us as BVC members is lack of support to do other businesses so that we have other things to do rather than relying all our lives on fishing. It would help if we were able to access some loans from other organisations because we are not getting anything from fishing. May be if we can leave fishing and do other businesses for two to three years maybe the fish will come back. We have been talking to fisheries about this and they have not helped us. We want them to recommend us to people who can give us loans.*

Individual Interview II5: *We have been taking about possibility to have other businesses for fishers because it is difficult for fishers to stop fishing if there nothing to do. We all depend on fishing and stopping fishing means killing our children. We all know that we are over-fishing and that we need to give the lake a break but what are we going to live on? If we can get something to depend on, the pressure we are putting to the lake will be released.*

This contradiction shows that for the object of co-management to be fully realised it needs to be more widely interpreted by government in relation to the needs of the fishing communities, especially in relation to the need for alternative income generation opportunities. However, the emphasis of the government seems to mainly be on the production of research, and extension to inform fishers of regulations and practices related to fishing and management of the fisheries. This shows that the object of co-management from the government's perspective may need to be conceptualised in a multi-sectoral approach, and not only as a responsibility of the Fisheries Department.

6.4.4.2 Contradiction between subjects in the fishing community activity system and rules in the government activity system as surfaced via the problem of a lack of timeous review of fisheries regulations

As I continued interacting with the co-management stakeholders in the three activity systems this quaternary contradiction became evident as shown in the following research interactions:

Researcher
What other things have you learnt are influencing declining fish catches which is contrary to the assumptions you had when the programme started?

Focus Group Discussion FGD1: *There are a number of things and one of them is lack of regulations that are functional. We have rules that we are supposed to follow*

as BVC and fishing communities but none of those rules is followed. Fishers use any type of fishing gear legal or illegal, they fish even during closed season and we have been reporting to fisheries but we have not been assisted. In co-management we are supposed to work together which means if we call government to come and assist they should be there so that even those doing illegal fishing should see we have government behind us.

Individual Interview II4: *What we have been asking fisheries is to empower us to support us when we want to work as BVC members. Some time back we used to confiscate illegal gears and fisheries was always there whenever called. That is the kind of support we need because if people see us enforcing the regulations they will not do them.*

Researcher:
Ok we have heard about enforcing the regulations. What else have we learnt is constraining co-management programme?

Focus Group Discussion FG2: *As people working together in co-management we are no longer holding meetings with fishers and because of that some of the fishers think the programme is no longer there. We all remember that when the programme started we used to hold meetings together with local leaders and all the messages about fish conservation were put across to all.*

Focus Group Discussion FGD1: *Meetings with all fishers are important because they remind them about what is supposed to be done. Yes they all know about the regulations on closed season, illegal gears and practices but it is always important to hold meetings where BVC members and also extension officers will emphasise on these things. Other fishers think there are no rules now or the programme of co-management finished since we rarely meet as BVC members and the extension officers.*

Individual InterviewII1: *Meeting a few individuals to remind them about some of the things that are not supposed to be done and also hearing their comments are very important. But also we used to have workshops where people from fisheries used to come and teach us what needs to be done and those things are no longer there. Those workshops were very important because apart from hearing from fisheries we were also learning from those who were coming from other areas.*

This data shows that there is currently a lack of regular engagement between the subjects in the fishing community activity system and the government activity system, particularly pertaining to the review and revision of the regulations and how they are implemented and monitored. This also shows up in some of the data presented in the other contradictions identified above, especially also in relation to the data reporting on the uneven approach to applying the regulations by government for artisanal and commercial fishers. Working together as co-management stakeholders was seen as one of the opportunities to have timely review of the regulations because people could report on what is not working on the ground and why things are not working as per their expectation of the co-management process.

6.4.4.3 Contradiction between the subjects in the fishing community activity system and mediating tools in the government activity system surfaced through the problem of contradictory messages on fisheries co-management

This contradiction was surfaced via the following research interaction:

> ***Researcher:***
> *What else is constraining co-management?*
>
> ***Focus Group Discussion FGD3:*** *One other thing is that as extension workers we do not have power over certain individuals. For example an extension worker cannot go and advise commercial fishers. We are told that commercial fishers are dealt with at headquarters and even if you see them fishing illegally you cannot advise them. If you try to talk to them they say they deal with the head office. This is holding back co-management and artisanal fishers feel we are not doing our job as extension workers.*
>
> ***Focus Group Discussion FGD2:*** *Lack of coordination meetings among government officers is also constraining the co-management programme. Fisheries department has extension, research and the college who have different responsibilities but we don't sit together to discuss some of the issues that are affecting the implementation of co-management and also see how we can work together from these institutions.*
>
> ***Focus Group Discussion FGD1:*** *Most of us here at the college do not have full understanding of co-management because we have not been teaching co-management in our subjects. We hear people talking about co-management but we do not understand it fully. Meetings with those from extension, research and us at the college will also benefit us to learn about co-management. In some of the workshops that we used to have all government departments were being represented. We used to have BVC, some village heads, extension workers, those from research in Monkey Bay, and also a few from the college. We were discussing a lot of things and most of what was discussing that time helped us in our BVCs. This time we are told there is not enough money to do those meetings but we see our fish catches are getting finished.*
>
> ***Individual Interview II4:*** *The reason why co-management was to improve the production of fish in all the water bodies and that should be what we should be aiming at. As government extension workers we continuously discuss with BVCs and the fishing community about the importance of sustainable management of our fish stocks. However there are a number of areas that need to be addressed: better understanding of co-management among government officers, and government regulations that speak to what is on the ground.*

As reported on in section 6.4.1.2 above, there was poor understanding of the main concept of co-management in all three related activity systems. Here this problem shows up in a quaternary contradiction, where the inadequate understanding of co-management and approaches of sharing knowledge on co-management amongst the related activity systems is hampering the achievement of the object, and it affects all subjects. Extension officers do not feel empowered to do their job well, BVCs feel they need more information, college lecturers

are not confident about the concept and how to teach it, and there are inadequate links and engagement between all the subjects around the mediating concept of co-management and how to practise it. What is encouraging is that it is evident from the respondents above that all the stakeholders in the co-management activity systems in the south-east arm of Lake Malombe see the value of coming together to address the existing contradictions. This creates further possibilities for expansive learning, which will be discussed in the next chapter.

6.4.4.4 Summary of quaternary contradictions in south-east arm of Lake Malawi

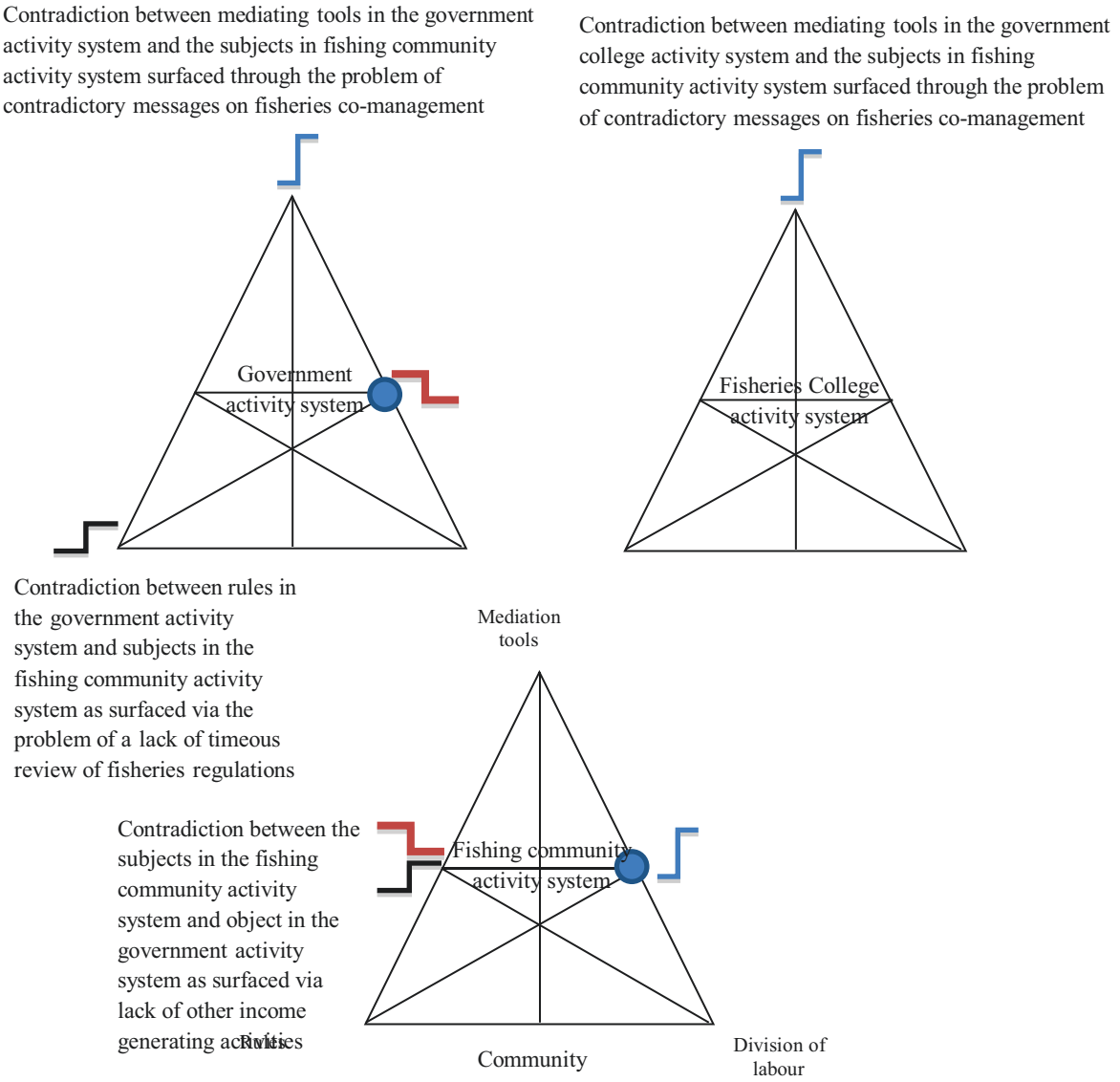

Figure 6.10: An illustration of quaternary contradictions in the south-east arm of Lake Malawi

6.4.5 Summary of contradictions in south-east arm of Lake Malawi

The contradictions above are summarised in Table 6.2 below. These ten contradictions formed the basis of the mirror data that was used for prioritising of contradictions in the change laboratory workshops, discussed in the next chapter (Chapter 7).

Table 6.2: Summary of contradictions in south-east arm of Lake Malawi

Explaining the aspect of the contradiction	**Evidence from the data sources**	**Locating primary contradictions**
There is continuous decline of the fish stocks despite the existing rules and regulations in co-management context.	*One of the reasons why we still experience low fish catches is that there are a lot of fishing gear used in the lake and most of them are illegal. Our rules are not working any longer and BVCs and local leaders no longer use the rules which were set when BVCs were formed. (Individual Interview II2)*	Contradiction in the **rules** and governance of the rules in the fishing community activity system surfaced via continuous decline of fish catches despite the existence of rules and regulations in the co-management context.
Fisheries co-management stakeholders give contradictory messages that lead to contradictory rules, practices, and poor knowledge and implementation of co-management.	*Messages that come from BVCs and our village heads are different … We are all working on co-management and our messages are supposed to be the same to try and find means of protecting the fish stocks so that we can improve our fish catches. (Focus Group Discussion FGD 2)* *We as extension officers have different understandings of co-management … In most cases researchers have a better understanding of what they mean but are never communicated properly to us as extension workers. Because of that our understanding on fisheries conservation are different. (Focus Group Discussion FGD2)* *As lecturers we are also supposed to be conversant with the concept of co-management for us to be able to teach properly. But some of us have never been oriented to this new concept … (FGD2)*	Contradiction in the **mediating tools of each of the three activity systems:** fishing community activity system, the government activity system, and in the college activity system; surfaced through inadequate understanding of the concept of co-management.

Explaining the aspect of the contradiction	**Evidence from the data sources**	**Locating secondary contradictions**
BVCs and local leaders are most of the time in power conflicts on the responsibility of fishing activities and are less committed to the overall management of the fisheries resources.	*BVCs and local leaders have internal conflicts and about who manages fishing activities in the areas and this has negatively affected our work to control and manage fisheries activities. (Individual InterviewII1)*	Contradiction between the **subject** and the **division of labour** in the fishing community activity system leading to lack of commitment among BVCs and local leaders affecting the object.
The rules and mediation tools currently used do not link well with the fishing gear currently used.	*We used to have legal fishing gear when our fish catches were good but due to the situation in which we are now fishers have started re-designing their fishing gear ... this has led to production of completely new fishing gear which are illegal ... (Focus Group Discussion FGD2)*	Contradiction between the **rules** and the **mediation tools** in the fishing community activity system through the problem of use of illegal fishing gear.
The current rules do not cover newly designed fishing gear with under-sized meshes used to catch immature fish against the object and regulations guiding of co-management. Closed season regulations are applied differently for artisanal and commercial fishers.	*There are many reasons why we are still experiencing low fish catches while implementing co-management. The rules that we are currently using were reviewed long time ago and fishers are changing their fishing gear and fishing practices all the time. Review of the regulations will help us to check on the illegal gear that are being introduced and that will that will help to reduce illegal fishing. (Focus Group Discussion FGD1)* *Fishers who are using trawl nets are not told to stop fishing during the closed season. (Focus Group Discussion FGD2)*	Contradiction between the **rules** and the **object** in the government activity system surfaced via irregular review of regulations and uneven application of regulations.

College lectures do not have enough knowledge about co-management and this affects effective teaching and learning of co-management concepts.	*What I see is that we just talk of co-management as government but we do not clearly understand what needs to be done to make sure that we are all in line with what needs to be done in co-management program e.g. few people here at the college understand co-management We all talk about it but may be the extension officers who are practising it know better. (Focus Group Discussion FGD2)*	Contradiction between the **subjects** and the **object** in the Fisheries College activity system surfaced via reports on how a lack of enough knowledge about co-management by the lecturers constrains teaching of co-management skills and practices.

Explaining the aspect of the contradiction	**Evidence from the data source**	**Locating the tertiary contradictions**
Commercial fishers do not have closed season which artisanal fishers have and this contradicts with the principles of co-management.	*Fishers who are using trawl nets are not told to stop fishing during the closed season and as BVCs we feel we are not conserving our fish stocks because they are the ones with powerful engines and the use very large fishing nets with under-meshed fishing gear. Our objective of improving the fish catches so that we start realising better catches is not observed. (Focus Group Discussion FGD 2)*	Contradiction between object of co-management in the fishing community activity system and the object of co-management in the government activity system surfaced through the application of uneven 'rules' for artisanal and commercial fishers implementing the co-management approach.

Explaining the aspect of the contradiction	**Evidence from the data source**	**Locating quaternary contradictions**
Lack of other income generating activities (and lack of government support for these) which leads to over dependency on fishing.	*Most of the people along the shore in this area depend on fishing and fishing businesses and they have been depending on these for a long time. There is no any activity along the shore where people can go and work to earn money. (Focus Group Discussion FGD1)*	Contradiction between the **subjects in the fishing community activity system** and **object in the government activity system** as surfaced via lack of other income generating activities.

Delays in the review of fisheries rules and regulation and lack of BVC support allows for the use of more illegal fishing gear thereby affecting the objective of the fishing community.	*There are a number of things and one of them is lack of regulations that are functional. We have rules that we are supposed to follow as BVC and fishing communities but none of those rules is followed. Fishers use any type of fishing gear legal or illegal, they fish even during closed season and we have been reporting to fisheries but we have not been assisted. In co-management we are supposed to work together which means if we call government to come and assist they should be there so that even those doing illegal fishing should see we have government behind us. (Focus Group Discussion FGD1)*	Contradiction between **subjects in the fishing community activity system** and **rules in the government activity system** as surfaced via the problem of a lack of timeous review of fisheries regulations.
There is no joint planning among all the stakeholders in the co-management arrangement in the south-east arm of Lake Malawi and this is negatively affecting the dissemination of messages in co-management. This also relates to the poor understanding of co-management in the separate activity systems outlined above in the primary contradictions.	*In some of the workshops that we used to have all government departments were being represented. We used to have BVC, some village heads, extension workers, those from research in Monkey Bay, and also a few from the college. We were discussing a lot of things and most of what was discussing that time helped us in our BVCs. This time we are told there no enough money to do those meetings but we see our fish catches are getting finished. (Focus Group Discussions FGD1)*	Contradiction between the **subjects in fishing community activity system** and **mediating tools in the government activity system** surfaced through the problem of contradictory messages on fisheries co-management.

6.5 Conclusion

This chapter discussed contradictions faced by fisheries co-management stakeholders in the fisheries sector. It was evident from the data that contradictions occur within the element of the activity system, others between elements in the activity systems and between interacting activity systems. The contradictions are from both government and community systems.

The contradictions identified in both Lake Malombe and the south-east arm of Lake Malawi show that in both cases the contradictions are related to the deep-seated structural tensions associated with poverty and reliance on natural resources for livelihoods, and sustainable management and use of the resources for current and future well-being of people and ecosystems. The two cases show some similarities in the contradictions across the two cases, especially as these relate to the way that the government activity system functions (e.g. poor communication between research and extension services, inadequate regulation reviews, and inadequate support to BVCs), but the contradictions also show differences i.e. it is not possible to suggest that contradictions are the same in all of the fishing communities along the lake. There does, however, appear to be a similarity across the fishing community activity systems which relates to power relations and the complexity of governance of the resource and fishing activity by both the state and traditional leaders.

Tracing the history of the fisheries activities, it is evident that the contradictions become more complicated as people in the fisheries sector face more challenges, as is the case at present. People become more creative as they are faced with challenges of declining fish catches because they strive to find strategies to catch fish for them to survive. The introduction of co-management in the fisheries sector also provided an opportunity for different people to start working together, share ideas, skills and views on how the challenges of declining fish catches can be addressed. The concept of co-management was new to the sector and both communities and government officers (including the Fisheries College lecturers) did not have a full understanding of the concept, or enough knowledge about it. Lack of coordination among government officers and also between government officers and BVCs resulted in contradictory messages which in most cases confused both the government officers and fishing communities.

As more and more interactions occurred through meetings, trainings, workshops and visits to other places, people learnt both sustainable and unsustainable practices, some of which constrained co-management approaches to fisheries management. Identifying the contradictions that relate to the shared object of fisheries co-management in the two case study sites has revealed rich potential for expansive learning. As noted in this chapter, diverse insights on the identified contradictions shows that they require a careful deliberative learning process to provide solutions to the surfaced contradictions (see Chapter 7).

CHAPTER 7

EXPANSIVE SOCIAL LEARNING PROCESSES IN THE TWO CASE STUDIES

Expansive learning involves the creation of new knowledge and new practices for a newly emerging activity: that is, learning embedded in and constructive of qualitative transformation of the entire activity system. (Daniels, 2008, p.127)

7.1 Introduction

This chapter discusses the expansive learning process that took place in the two case studies (Lake Malombe and the south-east arm of Lake Malawi). It shows how contradictions that were outlined in Chapter 6 were deliberated, prioritised and analysed through an expansive social learning process in change laboratory workshops. It further discusses how the research participants in the two cases reacted to contradictions mirrored during change laboratory workshops. The chapter responds to the third research question of the study: *How can the learning and co-management practices be expanded among key stakeholders?* (see section 1.12.2). The change laboratory workshops provided the intervention platform where interactions among stakeholders could be facilitated, and where they were able to analyse contradictions and find solutions.

The expansive learning process combines the three components of CHAT based enquiry: the system component, the learning component and the development component (Dick & Williams, 2004). This occurs when participants construct meaning from the work situation, learn from those meanings and expand the meanings towards actions (ibid.). The expansive social learning process helped to develop some conceptual tools that allowed different stakeholders to have a better understanding of co-management. The process also created opportunities to further develop a common understanding of their shared object (co-management) and in creating new knowledge as will be shown in this chapter.

Warmington et al. (2005) defined expansive learning as learning that leads to change in organisational practice, in the case of this study, the change in organisational practice relates to practices that may facilitate sustainable management of the fisheries, increase fish production and improve the livelihoods of people. Engeström and Sannino (2010) suggested that in learning people come together to explore new objects and concepts for their collective activity and implement new objects and concepts in practice.

As explained in Chapter 4, in this study change laboratory workshops were used as the main methodological tool for mediating and supporting the expansive learning processes in Lake Malombe and the south-east arm of Lake Malawi. One important aspect of CHAT is that it emphasises that human capabilities develop in collaboration with others and that through interaction people act upon their immediate surroundings (Blackler et al., 2000). Co-management is a joint enterprise but development of practices starts from individual practices and then through interaction and learning they are shared amongst the rest of the community as was shown in the data reported in Chapters 5 and 6. As shown in Chapter 6, such interactions are not without tensions, which are often fuelled by deep-seated contradictions. Engeström et al (1995) noted that change laboratory provides a method for developing work practices on the job in a room or space set aside where practitioners do the analysis and development of practices, typically involving a natural team work unit.

In the Change Laboratory workshops discussed in this chapter, participants were open and reflexive and this allowed for in-depth analysis of the tensions and contradictions surfaced through the engagement of different expertise (see section 7.2.1 below). Through this, they were able to develop new knowledge from different stakeholders. The third research question was used to stimulate the discussions during the change laboratory workshops: *How can the learning and co-management practices be expanded among key stakeholders?* Deliberations took place in two local languages (Chewa and Yao) and the data that was mirrored to participants (based on the analysis in Chapter 5 and 6) was also translated into the two languages and put on flip charts but in a more accessible form (i.e. the essence of the insights, tensions and issues were shared as mirror data with more detail being contained in the thesis text).

The design and sequencing of the change laboratory workshops drew on key elements of Engeström's conception of Development Work Research (DWR) (Engeström, 1987, 1999, 2001 and 2004) as explained in Chapter 4, which include:

- Facilitating practitioner's reflexive systemic analysis as a vehicle for examining and promoting change in professional thinking, practice and organisational cultures.

- Promoting systemic change by focusing systemic analysis upon a) collective learning challenges facing practitioners and organisations in the drive towards multiagency working (see Chapter 5) and b) the surfacing of contradictions in the past and present practice that might point towards new forms of professional practice (future objects) (see Chapter 6).

- Producing strong conceptual resources for practitioners to use when engaging in the new practices demanded by the change in policy towards co-management.

7.2. Expansive learning in Lake Malombe

As reported in Chapters 4 and 5, in the Lake Malombe case study, I identified two activity systems: fishing community and government (see Chapter 5). The change laboratory workshop involving representatives from these two activity systems took place on one day. It drew the following participants: BVC members, local leaders, gear owners, fish traders and processors. Following recommendations in third generation activity theory, I combined stakeholders from the two activity systems to promote interaction and sharing of skills and knowledge. I was also interested in understanding how they would interact with each other in response to the challenges of fish depletion and co-management (i.e. the contradictions outlined in Chapter 5). The workshop took more time than planned because of two main reasons: a) the approach was new to stakeholders and more time was needed to explain the purpose of the workshop and how it was linked with the earlier research interactions and investigation into the challenges and contradictions as found within and across the two activity systems; b) initially the workshop was planned for two days but was later changed to one day due to practical realities of fishers' activities. A key reason for running the workshop over one day instead of the originally planned two days was because some of the key BVC members were moving to the eastern part of the lake where they were experiencing better catches and the workshop over two days would have disturbed their activities. As a result some of the activities were squeezed into a day, which also made for a very long session. This was not ideal: Engeström's colleagues, Virkkunen and Newnham (2013) suggest more extended interactions for change laboratory workshops over a longer period of time (ideally around five one to two hour sessions), but challenges of drawing fishers from their daily practice, and distances from the research site necessitated this approach. I did, however, follow up with a second process, which I called a 'Way Forward' workshop to consolidate some of the outcomes of the change laboratory workshop (see also Chapter 8 for further reflections on the process followed).

Participants' invitations to the workshop were sent out by the District Fisheries Office and through consultation with the local extension worker, suitable participants were selected. Most of those selected were participants who had taken part in the investigation phase of the research. This was done in order for continuity of the process and also to verify some of the issues discussed in the first phase. The workshop process followed the structure of extension meetings where the BVC members ran the formal meeting procedures and I, together with the two research assistants, ran the technical part of the workshop. The workshop was opened and closed by the village head. In his opening remarks he asked participants to make use of the workshop to raise issues that had continuously constrained the management of the fisheries resources in the area. He pointed out that due to the collapse of the fishery; people in his area were getting poorer and poorer. He requested participants to come up with

recommendations that would strengthen BVCs and improve their fish catches and livelihoods.

The government officers who were part of the workshop (extension and research officers) provided policy direction on the management of the fisheries resources. What was pleasing about the workshop was that all the expected stakeholders in both the community and government activity systems were present.

7.2.1 Introduction to the workshop

I started with an overview of the investigation phase by outlining the processes we went through in the data generation processes (interviews and focus group discussions) and reminded participants what had emerged from the various meetings in different BVCs in Lake Malombe. After the overview, I went on to explain the purpose of the workshop and why it was important to have the particular participants present. The start of the workshop was a bit difficult as the approach was new and participants were used to a 'technology transfer' type of workshops where facilitators come with an already developed agenda and in most cases there is less engagement with the workshop a participant.

In order to connect the change laboratory workshop with what we had done with the participants in phase 1, I decided to go back to the investigation process and narrated the process we had gone through together, conducting interviews. I recalled the questions I had asked and the responses I had received and explained how I had developed the data that I now mirrored in the workshop. I then went back and introduced the goals of the study and what we were aiming at as research participants. I emphasised the purpose of the workshop and stressed that the workshop was a continuation of what we started; the data they had shared with me before was what informed this workshop. I assured them that there was no one with solutions or answers to the issues or contradictions that had been surfaced and that the solutions were to come through participation and engagement. Bulkeley and Mol (2003) noted that participation and deliberation are often understood to create different forms of rationality and civic virtue, which together can form the basis of better environmental decisions. Informed by this insight, I therefore requested participants to keep on reflecting on what we had discussed in the first phase of the study.

Data from the change laboratory workshop showed that participants deliberated the purpose of the meeting, debating also what was appropriate to deal with in such a change laboratory workshop, as shown by the citation that follows and which shows such deliberation amongst two of the workshop participants:

> *Change Laboratory Workshop Discussion CLWD2: I am not sure if this forum is the right one to rule out that the newly designed fishing gear are illegal because if*

anything, it is Fisheries Department that have the mandate to declare a fishing gear illegal.

Change Laboratory Workshop Discussion CLWD2: *No but I think things should start from us here because we are the ones who are seeing the effects of using these under-meshed fishing gear. We don't have to wait for someone from outside to tell us. What we are doing here is raising an alarm to say things are not right here and then people will support us.*

I saw these opening deliberations as empowering because it clearly showed that people were both critical and self-motivated and committed to what they could do to address some of the contradictions that constrain the management of the fisheries resources. As Roth and Lee (2007) suggested, learning becomes expansive when it contributes to an enlarged room for manoeuvre for the individual whereby new learning possibilities are formed. It seemed to me that it is the kind of discussions cited above that could potentially contribute to more learning among stakeholders and that continuous engagement among them could facilitate further change in practice. As indicated in Chapter 5 there was already co-learning taking place in the Lake Malombe context, and as indicated in Chapter 6, there are key contradictions that could allow for further expansion of such learning.

As can be seen from the citation above, the discussion on the purpose and potential of the workshop reflects a primary contradiction within the elements of the fishing activity system (see section 6.3.1), as the subjects were debating their actions regarding illegal gear within the element, and also pointed to the possibility for boundary crossing between the fishing community activity system and the government activity system which could address the tertiary and quaternary contradictions as outlined in sections 6.3.4 and 6.3.5. As such, discussions were oriented towards resolution of primary, secondary, tertiary and quaternary contradictions, as these were all related as outlined in Chapter 6 and as will be described in further detail below.

7.2.2 Change Laboratory Workshop process in Lake Malombe

The Change Laboratory Workshop (CLW) process was framed as follows:

1. **First session**: Participant introductions and introduction to the objective of the workshop.

2. **Session two:** Introduction of the tools and methods to be used in the workshop to facilitate expansive social learning in and through the workshop

3. **Session three:** Mirroring the data which was generated in the investigation phase of the study for the participants to confirm and prioritise for further deliberation

4. **Session four:** Identification, further refinement and prioritising of contradictions from the mirrored data by all the participants in a plenary session

5. **Session five:** Analysing contradictions and developing solutions in mixed groups of fishing communities and government officers

6. **Session six:** Sharing of solutions developed in groups and critical discussions on the solutions to see their relevance to the context of Malawi fisheries co-management

7. **Session seven:** Action planning and way forward

All the identified contradictions from the initial phases of the research (described in detail in Chapter 6) were summarised and written up in the local language and put on flip charts. Participants agreed with the identified 13 contradictions and later combined those that were similar and ended up with nine. I divided the participants in groups again to prioritise the contradictions and five were chosen as the most crucial (see Box 7.1 below). The remaining four were to be dealt with later. The list of prioritised contradictions is listed in the box below:

1. Modification of fishing gears (see section 6.3.3.1) *Secondary contradiction, but also related to quaternary contradiction* (see section 6.3.5.1)
2. Fishing communities not satisfied with the current closed season (see section 6.3.3.4) *Secondary contradiction, but also related to tertiary contradiction* (see section 6.3.4) *and quaternary contradiction* (see section 6.3.5.1)
3. Conflicts of power between BVCs and traditional leaders (see section 6.3.3.2) *Secondary contradiction, but also related to tertiary contradiction* (see section 6.3.4)*, and quaternary contradiction* (see section 6.3.5.1)
4. Contradictory messages on fisheries co-management (see section 6.3.3.3) *Secondary contradiction, but also related to quaternary contradictions* (see section 6.3.5.1 and 6.3.5.2)
5. Lack of BVC training (see section 6.3.5.2) *Quaternary contradiction*

Box 7.1: Prioritised contradictions in Lake Malombe

I then divided the participants into three mixed groups (two groups of four and one group of five) to discuss the prioritised contradictions and identify solutions. I purposefully suggested mixed participant groups to allow for more interaction and sharing of knowledge as the participants all had different backgrounds, and as the contradictions prioritised involved all stakeholders. One of the participants suggested that each group discussed two contradictions and the last group discussed the last contradiction and any of the four. She justified this proposal by arguing that taking a few contradictions would allow participants more time for in-depth discussions and in this way they would not have to rush the discussions. They agreed that during the plenary presentation the other groups would add to what might have been left out by the others or raise questions for more debate and discussion. The two research assistants were part of the groups and my role as a formative interventionist researcher was to visit each group and monitor the understanding of the process and, wherever applicable, encourage in-depth discussions. As Wals (2007, p. 17) explained, the role of a facilitator in social learning is to "... keep the process open and transparent, protect participants against risk of participation, deal effectively with conflicts, monitor progress, ensure adequate stimuli and a sense of agency and keep the focus on the choices that have been made and the path that has been chosen" (Wals 2007, p. 17). I also continuously reflected on the solutions that were being discussed in various groups in relation to the research question and the core interest of the study. This helped me to keep the workshop focused.

Figure 7.1: Focus group discussions during the change laboratory workshop

The group interactions led to rich discussions, as will be reported further below as engagement with each of the contradictions is discussed in more detail below. Here I share one example of the interactions that were taking place to make more explicit the dynamics

and potential for interaction and boundary crossing learning made possible by the Change Laboratory Workshop format. This example is taken from the discussion on Contradiction #5 in Box 7.1 above, focusing on BVC training concerns:

> ***Change Laboratory Workshop Discussion CLWD1:*** *BVC trainings are important and when we introduced co-management we made sure that all BVC members were trained so that they are conversant with BVC and co-management duties. However, we later realised that running those training programmes required a lot of funding and the department cannot afford to take BVC members to the college or any other place for training as we did before.*

> ***Change Laboratory Workshop Discussion CLWD1****: But Sir we are not demanding that BVCs go to the college or any other place for them to be trained. We all understand the financial problems. Is it not possible to have locally organised training sessions where the extension officers can meet BVC members in their local areas and ask for a classroom during school holidays to run the training? We should all remember that a lot of things have changed after the first training when co-management was introduced years back and we need to come together and learn more things that suit this time.*

The discussion above shows that the engagement between the government members and community members on the quaternary contradiction between the mediating tools of the government activity system and the object of the fishing community activity system (see section 6.6.3.5.3) both a) raised some of the problems that are causing the contradiction (lack of resources), and b) proposed solutions (another model for training that is less expensive). This reflects the point made by Engeström (2008) who suggested that the purpose of the change laboratory workshop is to address challenges through new forms of learning by:

- Encouraging the recognition of areas in which there is need for change in working practice (through mirroring, prioritising and focusing in on a recognised contradiction - in this case Contradiction #5 in the list above); and
- Suggesting possibilities for change through re-conceptualising the objects that professionals are working on, the tools that professionals are to use in their multi-agency work and the rules in which professional practices are embedded (in the case example above, the change suggested was in the approach to training i.e. better mediating tools).

As can be seen from the example above, the government appears to assume that for BVCs to be trained there is a need to be taking them from their areas to another place, such as the college, as was the historical and culturally accepted practice when co-management was introduced in 1993. However, this taken-for-granted approach used in the past, could be changed, as indicated by the community representative, who suggested that BVCs could

easily be, and would also prefer to be, trained within their locality and that this could reduce costs but achieve the same goal. Through this process a model solution was proposed that could further enhance the object of co-management if implemented.

Of significance to the focus of this study, and also the trends in support for co-learning in natural resources management extension contexts, the process illustrated above allows for such co-learning. As discussed in Chapters 1 and 2, co-management strongly advocates for a more bottom-up approach, where more of the management ideas could originate from and be generated amongst the communities themselves in collaboration with government and other agents who share an interest in co-management (Hersoug et al., 2004). The example above shows that it is important for learning forums and / or opportunities for continued dialogue among co-management stakeholders as was facilitated via this change laboratory workshop process. Fisheries co-management is a participatory approach between government agencies and the resource users and as shown by the illustrative example above, it is vital that learning interactions between the two actors allow for opportunities for them to explore possible ways of enhancing co-management practices together. As discussed in Chapters 1 and 2, co-management in the management of fisheries resources has two core elements: authority to execute and shared or participative decision making. As also discussed in Chapters 1 and 2, there is little discussion in co-management on how to facilitate co-learning. The example above demonstrates such a possibility. I now illuminate other such possibilities as they emerged from the change laboratory workshop as participants deliberated the contradictions and generated model solutions to guide future action. In Chapter 8 I discuss the potential for such learning to lead to transformative agency and a re-orientation of extension training approaches.

7.2.3 Discussion of contradictions and modelling of solutions

7.2.3.1 Process of reporting back and coming to the modelling of solutions

The three groups discussed above (see section 7.3.1) spent over an hour discussing two of the contradictions. Each group was given a flip chart to consolidate the discussions and one member was nominated to report to the rest of the participants. The groups used the time to actively discuss the contradictions and to reach consensus. After listening to the discussions going on in the three groups, which I report in more detail below, I observed that most of the time in the groups was spent on identifying the causes of the contradictions. Discussion focused particularly on who was responsible for the mismanagement of the fisheries stocks between fishing communities and the government. This resulted in lively discussion.

Wals (2007, p. 187) suggested that competing opinions and evidence creates conditions for generating knowledge. He also proposed that every stage of a social learning cycle or process requires participants to embrace dialogue that addresses conflicts over ideas, potential

solutions and practice. Muro and Jenoft (2008) suggested that there are a range of processes that can foster social learning including: careful facilitation, small group work, repeated meetings, and an opportunity to influence the flow of events in a given process, open communication, diverse participation, understanding thinking and the inclusion of multiple sources of knowledge.

Drawing on these insights into the facilitation of social learning, and in order to further facilitate progress of the group discussions, as an interventionist researcher I intervened, and asked participants to reflect on the purpose of the workshop and why different stakeholders were important in a social learning process. After a short discussion we agreed that we were all responsible and that the purpose of the workshop was to find ways to address the challenges through everybody's engagement and that the workshop was a forum for correcting the mistakes of the past. Through this, participants then started to focus not only on the causes of the problems and who was responsible, but also on potential solutions and how they could work together to achieve these. I share the main contours of the discussions on each of the contradictions below, sharing also the model solutions that were proposed.

7.2.3.2 Contradiction #1 which focuses on the modification of fishing gear that threatens sustainability of the fish stocks

It was evident from the initial phase data (reported on in Chapters 5 and 6) and from the change laboratory workshop data that the emerging fish gear designs are complex and constitute threats to the sustainability of the fisheries resources. The new fishing gear results in the harvesting of immature fish and this negatively affects the economy of the country because of the importance of the fishery to the country (see Chapter 1). The development and design and spread of the new fishing gear has been the result of fishers' interactions as they move from one place to the other (see Chapter 2 and Chapter 5). This led to primary and secondary contradictions within the elements of the rules and within the element of the mediation tools in the fishing activity system and also between the rules and the subjects respectively (see Chapter 6). In the CLW further discussion took place on *the causes of this problem* as seen in the citations below:

However, there was also discussion on *solutions* in the CLW and the need to undertake timely review of the fisheries regulations was seen as the most appropriate way of monitoring the use of illegal gear. It was said that review of the regulations would justify why the gear was illegal and that would give the BVCs and other local leaders the powers to enforce regulations (see also section 6.3). Suggested model solutions to the contradiction emphasised the need for:

- Coordinated efforts by all the stakeholders to work together and to empower BVCs and traditional leaders to use by-laws to monitor the new fishing gear, and to raise awareness of the problems associated with the new fishing gear;
- The Fisheries Department to facilitate the review of the regulations, and especially to undertake more frequent reviews of legislation;
- The Fisheries Department to lead and facilitate improved communications and relationships among stakeholders to improve co-management practices; and
- All to work together to ensure that there were improved relationships between BVCs and village heads to address issues of corruption and distrust.

Table 7.1 below summarises the outcomes of the CLW discussion on Contradiction # 1.

Table 7.1: Summary of discussions on Contradiction #1

Contradictions	Causes	Effects	Suggested solutions
Modification of fishing gear over exploiting the fish stocks in Lake Malombe	▪ Declining fish catches means fishers striving for survival strategy ▪ Fishers learning the skills and designs from other areas ▪ Untimely review of fisheries regulations makes the gear legal ▪ Lack of by-laws within the BVCs to enforce and regulate the gear ▪ Lack of coordination between BVCs and village heads increases chances of exploitation	▪ Continuous decline of fish catches ▪ Increased depletion of the fish stocks leading to vulnerability of poor people to poverty ▪ Less or no fish for local consumption and high price at the market ▪ Reduction in the country's economy ▪ Increase in crime due to lack of people's livelihoods	▪ Empower BVCs local leaders to have by-laws and awareness programmes in all BVCs ▪ Frequent review of the regulations to include the emerging illegal gear ▪ Improve communication and extension messages regarding illegal gear and its impact on fish stocks ▪ Improve the relationship between BVCs and village heads to address issues of corruption and distrust

7.2.3.3 Contradiction #2 which focuses on dissatisfaction with the closed season for fishing

The second contradiction discussed relates to the primary, secondary, tertiary and quaternary contradictions as described in Chapter 6, sections 6.3.1 6.3.3, 6.3.4 and 6.3.5. The contradiction is most commonly expressed as fishing communities being unsatisfied with the period for the closed season. This dissatisfaction shows how concerned fishing communities are with the status of the fishery in Lake Malombe. Initially the government had imposed a closed season from November to December (see Chapter 1, and section 6.6.3.3.4) and the

interaction of fishing communities and the government extension workers facilitated the review of the closed season as discussed in Chapter 6.

However, as reported in Chapter 6, fishers observed the catching of immature fish and confirmed that it was their responsibility to initiate a review of the regulations. As such, fishing communities demanded active participation in investigating the appropriate period for the closed season. This was made possible through the discussions that took place in the CLW.

In the discussions, it seemed that BVCs and traditional leaders opted for an increase in the closed season period but referred the suggestion to the Fisheries department to find out the appropriate period for the closed season. As reported in Chapter 1, one of the key elements of fisheries research in the Fisheries and Aquaculture Policy is the provision of demand driven research, research that will respond to the needs of the fishing communities (GoM, 2001) and BVCs and traditional leaders were aware of this and raised it in the CLW. The interaction among fisheries co-management stakeholders in the CLW therefore provided further opportunity for stakeholders to deliberate the issues reflecting on the guiding principles of the fisheries policy as shown by these discussions:

> ***Change Laboratory Workshop Data CLW1:*** *As fishers who are involved in the fishing business on daily bases has some knowledge through experience because as we fish we also learn new things that we would like to be covered in the government rules. We have for many years observed more new things that if considered would help the management of the fishery and one of those is the current closed season as we have said it over and over. We need to re-look at it and if possible give better advices to the government. We need to change the current closed season and to do that we need to work together with the government so that we can also give our experiences.*

In modeling solutions to the contradiction, the need to do the following was proposed:

- Fisheries research, extension and the communities should conduct joint research on the right breeding season for fish;
- All stakeholders should monitor the fishing gear used because some is under-meshed and catches immature fish;
- The Department of Fisheries should support BVCs and local leaders' suggestions to increase the closed season period; and
- Co-management stakeholders should also be exposed to other CBNRM best practices like Mbenji Island to learn other management strategies.

It was evident from the discussions in the CLW that the request from the fishing communities to participate in the research process can potentially allow for more empowered BVCs to discharge their duties with better information. Participants in the workshop were able to cite other community-based natural resources management (CBNRM) best practices from Mbenji Island where fishing communities and other stakeholders led by their chief and other local leaders introduced their own closed season. This was done after observing that the imposed closed season by government had a number of shortfalls. They did this using locally developed rule and by-laws through which fish stocks were regenerated and stakeholders have sustained their management practices (see citation below). This shows that model solutions in one context can be mediated and facilitated by knowledge from another site where best practices are being implemented.

> ***Change Laboratory Workshop Discussion CLWD1:*** *It is important that BVCs and Fisheries Department should work together and wherever possible help each other. As people who are involved in fishing activities in Lake Malombe, I feel we can contribute to some of the things we learn as we do while fishing to some of the research our friends do. For example why do we still catch juvenile fish after the closed season? We should look into that and make necessary changes.*

Table 7.2 Summary of analysis of Contradiction #2

Contradictions	Causes	Effects	Suggested solutions
Fishing communities not satisfied with the current closed season because they observe immature fish in their catches	▪ Catching of immature fish soon after closed season is over ▪ Use of under-meshed fishing gear that does not allow immature fish to escape from the fishing nets ▪ Concerned with the future of the fishery with the current status of the fisheries sector	▪ The fish stocks will continue declining which will lead to a negative impact for rural poor ▪ Co-management objective will not be achieved ▪ Acceleration of poverty in rural poor ▪ The co-management programme will collapse due to lack of trust by the fishing communities	▪ Fisheries research, extension and the communities to conduct joint research on the right breeding season for fish ▪ Monitor the fishing gear used because some is under-meshed and catches immature fish ▪ Fisheries should support BVCs and local leaders' suggestions to increase closed season period ▪ Co-management stakeholders should also be exposed to other CBNRM best practices like Mbenji Island to learn other management strategies

7.2.3.5 Contradiction #3 focusing on the power conflict between BVC members and village heads/chiefs

As reported in Chapter 6, the power conflict between BVC members and village heads / chiefs was identified as a secondary contradiction between the subject and division of labour in the fishing community activity system (see section 6.3.3.2). It is also related to the tertiary contradiction (see section 6.3.4) and the quaternary contradiction related to how BVCs are supported or not to engage with the legislation (see section 6.3.5.1). Data in Chapter 6 also showed that the introduction of Beach Village Committees in Lake Malombe led to and was experienced as a source of power conflict between the BVCs and traditional leaders. Traditionally village heads and chiefs are considered as legitimate leaders in rural societies and are the final decision makers in their areas of jurisdiction. Chiefs and village heads are indigenous people of the areas and before BVCs were introduced, and before colonial and post-independence state power, they had power over all the fishing activities. They could ban or send away fishers from operating in their areas. As reported in Chapters 1 and 2, the establishment and empowerment of BVCs to co-manage the fisheries resources brought in new power structures and dynamics (Donda, 2001) influencing the fishing communities along the shores of Lake Malombe. When BVCs were introduced into the local structures, the BVCs were seen to be on the same level of power and authority as village heads and other traditional decision making structures. Initially among the BVCs, decision making was dependent on the members' composition of the committee, and this created parallel structures with the authority structure of the village heads or chiefs. Essentially the BVCs are introduced structures established by the state and its partners into a context where other structures already existed and the process of establishing these structures did not take into consideration the modalities of how these could work together. These conflicts have also been noted in other water bodies in the region (see section 1.5), and have deep-seated structural dynamics that are related to the introduction of modern legal and governance systems in Africa under colonialism (Mamdani, 1996).

Commenting on the conflicts arising from this tension during the plenary discussion in the CLW, one of the participants said:

> ***Change Laboratory Workshop Discussion CLW1****: Yes we can discuss a lot of things here about the work relationship between BVCs and village heads. What we should understand is that before the BVCs were introduced, we used to have beach chairmen and these were not doing things on their own but were consulting the village heads. Now we have BVCs which are independent and the powers of the village head used to have are not there anymore. I think for BVCs and village heads to work together, there is need to clearly show what each one's responsibility is so that they focus on that. If we can't work together as people working on fisheries conservation then nothing is going to work.*

CLW discussion also revealed that in some areas where the BVCs were not cooperating with the village heads, members of the appointed BVCs ended up being replaced by members loyal to the village heads. During the plenary discussions participants expressed concern with the reactions from other village heads and indicated that such practices constrain co-management activities because the members who are put in the BVCs are not chosen democratically by the fishing communities, and consequently the practice of replacing BVC committee members by those loyal to the chiefs' practice has induced corruption. However, there were deeper historically located issues which were not so much about democratic representation, but which were related to the replacing of traditional power structures via state interventions. Here people cited the introduction of BVCs as the cause of the conflict because the local leaders were demoted from their original positions in which they used to exercise powers over and benefit from the fishery, as fishing is one of the prominent activities that have been taken over by BVCs. This introduces immense complexity in the governing structure of the fishery. One of the participants commented:

> ***Change Laboratory Workshop Discussion CLWD2:*** *What our friends should know is that the conflict is more now because there is no support from the Fisheries Department. These were not seen when the programme started because we were travelling together with village heads and chiefs to different meetings and workshops. Now those benefits are no longer there and everyone is looking at the other person thinking there are corrupt activities happening.*

The data also revealed that the effects of these conflicts are quite alarming because some BVCs no longer have functional structures. Contradictory messages affect the implementation of fisheries management programmes and fishers who have illegal gear take advantage of the non-functional BVCs. Conflicts among the subjects within the fishing community activity system negatively affect the whole co-management programme because it is the central activity system that is affected and, as shown in Chapter 6, the contradictions in one activity system affect other activity systems and the overall functionality of working on a common object, in this case co-management.

Findings such as this one in this study, confirm the point made by Giller et al. (2008) who argued that the multiple levels and multiple scales of conflicts over natural resources require that solutions cannot be limited to the introduction and management of new technologies. They also require a focus of institutional arrangements and alternative models of thinking among stakeholders operating at different levels of governance. It was evident in the study that the issue of lack of transparency and accountability in the co-management programme which was highlighted during the evaluation of the programme (see section 1.9) could be exacerbated by inadequate engagement with the kinds of socio-political issues that prevail in

the fishery in relation to effective governance, power relations (and the historicity of these) and associated structures and efficacy of the structures and how they are related.

However, as is the intention of the expansive learning process, model solutions were also proposed to further develop the activity of co-management as shown in this dialogue:

> ***Feedback Workshop Discussion FWD1****: For us as to realise the change we are discussing here there is need for BVCs, fishers, traditional leaders, and government officers to join hands and work together through meetings where we can share our different thoughts and views on the management of the fisheries resources.*
>
> ***Feedback Workshop Discussion FWD1****: I agree with the last speaker, apart from all of us coming together at frequent intervals, I suggest as government officers (extension and research) should also get organised and have our meetings to analyse what comes out of the bigger meeting that will help us to have organised feedback to the BVCs and local leaders.*

In relation to Contradiction #3, the modeling of solutions pointed to the need for:

- The introduction of coordination meetings with the Fisheries Department to clarify the roles of BVCs and local leaders in co-management;
- Regular joint planning to develop tools for the co-management programme;
- Regular locally organised meetings between BVCs and village heads to review co-management practices in the areas; and
- Regular joint meetings with fishers, local leaders, BVCs and the local extensions workers to also get views from the fishing communities.

The solutions identified by participants (outlined above, and summarised in Table 7.3 below) were crucial for the effective running of a fisheries co-management programme. As was noted, BVC members and village heads hardly come together to plan for meetings with the fishing communities even in the midst of illegal fishing, and the emphasis on more regular meetings and joint meetings seemed to be an attempt to address this problem. Through proposing this solution, there appeared to be an understanding that more regular meetings and interactions among stakeholders could facilitate joint efforts and appropriate messages that would enable BVCs and traditional leaders to work efficiently with the rest of the fishing communities.

Table 7.3 Summary of discussion on Contradiction #3

Contradictions	Causes	Effects	Suggested solutions
Conflicts of power between BVCs and local leaders (village heads and chiefs) due to unclear roles and responsibilities between the two groups	▪ Chiefs and village heads are culturally the owners of the land ▪ BVCs were local structures which were imposed without looking at the already existing structures ▪ Privileges which belonged to the chiefs and village heads were no longer there when BVCs were put in place ▪ No clear roles and responsibilities were developed for the two parties, village heads do not have recognised position in the BVC apart from being ex-officials ▪ Corrupt chiefs and village heads were exposed with the introduction of BVCs	▪ Contradictory messages on fisheries co-management ▪ BVCs have less or no support from chiefs and village heads ▪ Some of the BVCs have been less functional and some of them have been replaced by village heads or chiefs ▪ Tensions between the chiefs, village heads and the BVCs ▪ Implementation of co-management has been negatively affected	▪ Need for the introduction of coordination meetings with Fisheries Department to clarify the roles of BVCs and local leaders in co-management ▪ Joint planning to develop tools for co-management programme ▪ Continuous locally organised meetings between BVCs and village heads to review co-management practices in the areas ▪ Joint meetings with fishers, local leaders, BVCs and the local extensions workers to also get views from the fishing communities

7.2.3.6 Contradiction #4 focusing on the problem of contradictory messages on fisheries conservation and co-management

As reported in Chapter 6 the issue of contradictory messages in fisheries management manifested as a secondary contradiction between the subjects and mediating tools in the government activity system (see sections 6.3.3.3, 6.4.1.2), but was also related to the tertiary contradiction and the quaternary contradiction on regulations (see section 6.3.5.1). In chapter 2 it was also noted that lack of coordination among co-management stakeholders in the implementation of co-management programmes contributes to the development and dissemination of contradictory messages (see section 2.2.3.5). As indicated in the table below (see Table 7.4) contradictory messages on fisheries conservation and co-management are caused by a number of things. Co-management stakeholders need up to date information on fisheries management and this can only be possible through frequent interactions where they are able to share views and learn from each other. As reported on in Chapter 6 and as further discussed and confirmed in the CLW, contradictory messages come from different activity systems (BVCs and government). Discussions on this contradiction during the CLW indicated that different stakeholders bring contradictory messages because people do not

work together. It was observed in the CLW and in data reported on in Chapter 6 (see section 6.4.4.3) that even within the government activity system, extension and research officers do not work together to discuss and agree on the right messages to discuss with BVCs and the fishing communities. Confirming the observation, one of the participants said:

> ***CLW Plenary Discussion****: I want to agree with those who are saying even the government officers do not meet to discuss about fisheries management. Here we are from research and extension and to be honest we take long time to come together to discuss on the latest research findings for example or to hear some of the challenges experienced by extension officers. Sometimes as extension officers we have problems to come up with the right information because we do not know what our colleagues have developed.*

The discussion reveals that lack of coordination is evident from both activity systems. While government officers were concerned with lack of regular meetings, one of the BVC members from the fishing community activity systems said:

> ***Change Laboratory Workshop Discussion CLWD1****: We give contradictory messages because we are not working together as people who have the same objectives. Each one of us is doing our own things. As BVC members we meet after a long time and sometimes we come together when there is something crucial like the call we received about this meeting. I am sure some people forget about us because as BVC members we are supposed to be seen chatting with the fishers so that they remember that we are there as people who monitor fishing activities. Our failure to meet contributes to the messages we take to different people because our messages are supposed to be the same.*

The discussion concluded that failure to coordinate and interact among co-management stakeholders results in the production and dissemination of contradictory messages. It was evident that failure to come together as co-management stakeholders was a problem in both activity systems and that this has over the years negatively impacted on the messages disseminated to fishing communities. As indicated in the table below contradictory messages have diverse effects. Fishing communities get confused and the implementation of co-management becomes difficult. It is important for the stakeholders who are involved to come together and deliberate on the messages and work towards the development of appropriate messages in the management of fisheries resources.

The modelling of solutions for Contradiction #4 pointed to the need for:

- Stakeholders to work together to develop tools for the co-management programme;

- Frequent meetings to deliberate fisheries management issues and wherever possible together call for fishing community meetings to ensure that the same messages are shared; and
- Research and extension should work together and whenever appropriate work together with BVCs and village heads to ensure clearer communication of key messages relevant to the co-management objectives.

As for Contradiction#3, solutions modeled for Contradiction #4 were social in orientation and mainly emphasised the need for closer working together amongst all – within activity systems and between activity systems, involving the holding of more regular meetings, improved communications and shared conceptual development work and tool development for co-management.

Table 7.4 Summary of discussions on Contradiction #4

Contradictions	Causes	Effects	Suggested solutions
Contradictory messages on fisheries conservation and co-management	▪ Lack of coordination among co-management stakeholders ▪ Lack of updated knowledge on fisheries conservation and co-management ▪ Power conflicts between BVCs and village heads/chiefs ▪ Use of inappropriate tools for fisheries conservation and co-management implementation	▪ Fishing communities are confused with fisheries management messages ▪ Implementation of co-management programme becomes difficult ▪ Stakeholders do not have the same object and no improvement on the fish stocks	▪ Stakeholders should work together to develop tools for co-management programme ▪ Frequent meetings to deliberate fisheries management issues and wherever possible together call for fishing community meeting ▪ Research and extension should work together and whenever appropriate work together with BVCs and village heads

7.2.3.7 Contradiction #5 focusing on a lack of training for Beach Village Committees

As indicated in Chapter 6, this contradiction manifested as a quaternary contradiction between the fishing community and government activity systems (see section 6.3.5.2) which is also linked to primary and secondary contradictions. As already noted and as confirmed in the CLW, BVCs are central actors in the fisheries co-management programme in Lake Malombe because they are a link between the fishing communities and government (see section 1.5.4). During the introduction of co-management, it was assumed that BVCs would represent the interest of the fishing communities and it was with this assumption in mind that

BVCs participated in training to learn about co-management and what was expected of them in the co-management programme. The first sets of BVCs were trained by the Fisheries Department with donor support and since then, BVC members have been leaving with new members joining who have not received training. BVC training included roles and responsibilities of BVC members, their roles in co-management and also group dynamics preparing for them to be able to work in groups and learn from each other. A number of BVCs were clustered together for training and apart from the formal training they were encouraged to learn from each other through interaction.

The main challenge with the initial training was that they depended on donor support and when the funding stopped the whole programme stopped because the government had no funding to continue the training. As time went by, some members started leaving BVCs and were replaced by new members who also wanted to be trained (see section 7.3.1). One of the participants commented:

> ***Change Laboratory Workshop Discussion CLWD1:*** *We have been discussing this issue with our extension worker for a long time. Our friends got trained and they knew what to do in the programme but those who came in as new members do not have enough knowledge about co-management and fisheries management. We cannot expect people who have not been told what to do to perform as we expect. Even those who were trained it was done long time ago and a lot of things have changed. We can come up with modalities to reduce some of the logistical requirements but the most important thing is for us to be able to get the training.*

As with the other contradictions, solutions were also modeled and solutions for Contradiction #5 pointed to a need for the:

- Fisheries Department to try and source funding for training to avoid continuous mismanagement of the fisheries resources;
- Fisheries Department to liaise with BVCs to plan for less costly BVC training; and
- All stakeholders to explore other means of getting funding for the training in case the Fisheries Department fails to raise funds.

As can be seen from the above, these solutions suggested a need for rising funding for the training and also to seek out less costly approaches to training.

Table 7.5. Summary of discussions on contradiction #5

Contradictions	Causes	Effects	Suggested solutions
Lack of BVC training	▪ Lack of funding to conduct the training for all the BVCs ▪ Lack of government commitment to implement co-management requirements ▪ Lack of understanding between the government and fishing communities on the logistics of the training	▪ Challenges in the implementation of co-management programme ▪ BVCs are ignorant of what is expected of them in the programme ▪ No improvement in fish catches, BVCs do not have the required motivation	▪ Fisheries Department to source funding for the training to avoid continuous mismanagement of the fisheries resources ▪ Fisheries Department to liaise with BVCs to plan for less costly BVC training ▪ All stakeholders to explore other means of getting funding for the training in case Fisheries Department fails to raise funds

It was evident from the discussions in the CLW that training for BVCs was important as it would allow them to contribute more to the co-management process and that ongoing training is seen as an essential part of the success of the co-management programme. People commended the government for the well-organised training when co-management programmes started in 1993; because of this the fishing community knew what co-management was all about. However, as mentioned above, the training and workshops that were run when co-management was introduced were supported by donor funds and no sustainability plans were put in place after the donor support. It was also evident from the CLW discussions that the Department of Fisheries has over the years experienced challenges in trying to resume BVC training due to financial constraints. There have been many BVC members who have left and new members were elected in who needed training. As indicated in Table 7.5 above, the effects of untrained BVCs are significant and contribute to the failure to implement the co-management programme successfully in Lake Malombe. It was therefore agreed that BVCs and locally based extension workers should come up with plans for less expensive training so that it would be more feasible for the government and others to source the funding.

7.2.3.9 Reflection on change laboratory workshop in Lake Malombe

As can be seen from section 7.2 above, the Lake Malombe expansive social learning process showed how stakeholders from the two activity systems (fishing community and government) were able to deliberate contradictions, identify their common object and model solutions to enhance the sustainable management of the fisheries resources. The change laboratory

workshop also allowed stakeholders from both community and government to critically examine current practices and discuss how these could be shared among stakeholders. The deep analysis of contradictions in the change laboratory workshop provided learning space for all the participants as they debated issues, shared experiences, and knowledge and skills of how they could improve the current crisis of declining fish catches. Commenting on the workshop process, a representative from the BVCs said:

> ***Change Laboratory Workshop Discussions CLWD1****: We would like to urge you to continue this kind of meeting where we don't come to listen to others but contribute what we know about Fisheries Management. We have not learnt from someone telling us but from our discussions where at times could not agree with others but learnt from the arguments. The fish stocks have disappeared because we have not been free to argue on what is happening and this is a good starting point for us. What I have learnt personally through what we have gone through today is that learning is not only through agreeing on what the government is saying. I saw here there were times when we disagreed with our colleagues from Fisheries but as they explained issues we got the ideas. It will be important for us to continue with such kind of meetings because we have discussed issues that have been constraining our co-management programme.*

As an interventionist researcher, I see the above message as crucial for expanding social learning among fisheries co-management stakeholders. This statement reflects that learning occurs when people engage one another, sharing diverse perspectives and experiences to develop a common framework for understanding as a basis for joint action, as also proposed by Schusler et al. (2003). The citation from the CLW also shows that an expansive social learning approach motivates participants to be part of the process as they share views and knowledge and also learn from others and develop actions based on consensus.

The expansive social learning process as stimulated by the CLW in Lake Malombe was unique in the sense that it was a new approach to new knowledge creation which allowed all the stakeholders involved in the research process to follow the steps, from the investigation phase to modelling solutions from the contradictions. The approach saw the process growing from a list of unresolved issues which in most cases were forwarded to government for answers to new knowledge creation through stakeholders' own participation and contributions. Participants confirmed that the process was a significant shift from the usual meetings where they continuously give contradictions to government to solve in their own discussion forum.

As shown in the report on the CLW above, people were able to analyse primary, secondary, tertiary and quaternary contradictions and they were also able to trace the sources of the contradictions with everybody's participation during the change laboratory workshop. The

debates allowed them to develop acceptable tools for them to work with as they sought to work on their object and continue learning more from the process.

Working with them closely throughout the change laboratory workshop process, it was evident that the solutions identified were reached through a very rigorous process and that what was concluded at the end of the workshop was satisfactory to all present. In addition there was commitment that would hopefully lead to new and sustainable fishing practices to enhance fisheries production. I reflect on this further in section 7.5 below, when these intentions were taken further through a collective 'way forward' workshop that followed the CLW, and in Chapter 8 where I reflect more on the transformative agency dynamics of the expansive learning process.

7.3. Expansive learning in south-east arm of Lake Malawi

As reported in Chapter 5, I was able to identify three activity systems in the south-east arm of Lake Malawi: fishing community activity system; the extension and research activity system (mainly made up of government research and extension officers); and the fisheries training college, which is also a government institution (see Chapter 5). As in the case of Lake Malombe, the Change Laboratory workshop was conducted over one day with stakeholders from government institutions (including the Fisheries College) and the fishing communities. The workshop which lasted for 4½ hours (9 a.m. to 1.30 p.m.) had 15 participants (ten men and five women) composed of BVC members, local leaders, artisanal gear owners, crew members, fish traders and processors, extension officers, research officers and college lecturers. Learning from the previous change laboratory workshop in case study 1, I combined the three activity systems to enhance interaction among stakeholders. As discussed earlier (see chapter 5) the south-east arm of Lake Malawi is one of the very busy fishing areas (see section 1.2.1), and it was not easy for people to leave their fishing related activities to come to workshops so it was important to do as much as possible within the limited time available. As mentioned in Chapter 5, people in the Lake Malawi area are from different parts of the country and have migrated there because of better fish catches. This results in a diverse fishing community which also has complexity. The diversity of members in the change laboratory workshop, however, provided an opportunity for rich and complex discussions.

Figure 7.2: Participants of the south-east arm of Lake Malawi Change Laboratory workshop

Most of the participants had participated in the investigation phase. This was to ensure continuation in the research process and also to allow them to connect the change laboratory process to the processes of social learning from the investigation to expansion phases. There were a few new participants who were not part of the investigation phase and included in the Change Laboratory workshop to strengthen the deliberation process.

Learning from experiences in case study 1, I observed that running the change laboratory workshop over more days would result in different participants because some would leave and new ones would come; this would make it difficult to ensure continuity. Unlike in the cases used by Virkkunen and Newnham (2013) in their book on CLWs, rural fishing community members are not confined to formal workplaces, and it is therefore more complex to arrange regular meetings involving the same group of people for CLW sessions, hence I decided to do it on one day with all present. Others represented in the change laboratory workshop came from more formal workplaces and included extension and research officers and lecturers from the Fisheries College.

The workshop was held at the Malawi College of Fisheries and was officially opened by the College Principal. In his opening address, the Principal urged participants to make use of the time in the workshop to discuss issues that would help to promote the proper management of the fisheries resources. The Fisheries College was identified as an activity system because the discussions during the investigation phase linked co-management with the Fisheries College. I decided to include it as an activity system t gain an in-depth understanding on how learning takes place at the college, and also because a key part of this study is focused on the

education and training of extension officers (see Chapter 2). Participants from the Fisheries Department provided policy direction especially on the introduction of co-management and how the ideas were conceived. They could also share the vision of co-management as anticipated by policy. However, participants expressed concern with other players who were not represented at the workshop. Representatives from commercial fisheries were not available and only one village head came. People urged organisers and extension officers to include them in future meetings because they form an important part of the interacting co-management system.

7.3.1 Introduction to the workshop

The introduction of the workshop was similar to the one in the Lake Malombe case study. I started by reflecting on the investigation phase outlining the processes we went through with some of the participants (interviews, focus group discussions) (see section 7.2.1). Based on the previous challenges in understanding the concept, I decided to give the process more time explaining the concept of expansive social learning and how the approach differs from technology transfer workshops (where the facilitator comes with expected outputs to the workshop). Participants were told that no one had solutions or answers to what was to be discussed and that whatever came from the workshop depended on their active participation. Participants spoke the local language and this made it less complex in that we had a single translation from English to the Chewa language. One of the biggest challenges in the south-east arm of Lake Malawi case was that the area had hosted many researchers and people did not have a high level of interest in participating as most felt that they had not benefitted anything from earlier research programmes. Thus, attracting research participants and convincing them to participate in the research required an approach that would motivate them to want to be part of the research.

The expansive social learning approach to the workshop was new to them and its uniqueness was that participants were able to deliberate issues and develops solutions to the issues without much influence from outside. On the other hand their exposure to different research programmes allowed them also to understand the objective of the research and I had fewer problems in explaining the research and its approach than in the Lake Malombe context. We had a few questions of clarification especially on what participants were expected to do in such a workshop. More clarity was given as I went round from one group to the other checking progress and guiding the progress of the discussions.

I also introduced the goals of the study, the process and the question we were trying to respond to through the workshop (see section 7.1). I explained the purpose of the workshop and as in the Lake Malombe case, I confirmed that the workshop was a continuation of what we had started with and that the data we generated during the first phase was what informed

the workshop (see section 7.2.1). As in the Lake Malombe case, participants were assured that no one in the workshop had the right or wrong answers and that everyone's contribution was important in contributing to sustainable fisheries management. I further explained that the workshop would involve critical engagement with the issues they raised in the first phase and that solutions were to come from their interactions and deliberations. Wals (2007) argued that learning based change can potentially occur when members of the community come together to plan for a better quality of life within their local area and I therefore encouraged all the participants to reflect on the issues raised during the investigation phase and to discuss possible solutions. The change laboratory workshop process was the same as the one used in the Lake Malombe case (see section 7.2.2).

7.3.2 Mirror data and identification of contradictions

The ten contradictions that were generated from the data in the investigation phase were mirrored to the workshop participants for confirmation, prioritisation and comments as was the case in the Lake Malombe workshops. I then asked those who took part in the previous data generation process to comment on the data that I had mirrored to them, and those who were in the workshop for the first time to give their views.

Figure 7.3: Deliberation and presentation of group discussions during Change Laboratory workshops

After some discussion on the data, the ten contradictions were refined and reframed as was the case in the Lake Malombe workshop. Commenting on the contradictions and the need to refine them and/or add to them, one of the participants said:

> ***Change Laboratory Workshop (CLW2):*** *I was one of the people who were interviewed and I was also in the other meeting where we were recorded as groups of BVCs. I have two comments: I feel we have left out some very important issues that time and that again are affecting the management of our fisheries resources. The first one is that there is lack of commitment to us as stakeholders*

to support the management of the fisheries resources. The second one is that government is not committed to improve the management of the fisheries resources.

I felt the above citation was particularly meaningful because it showed that people were following the fishing practices taking place and realised the interconnections between the different players and activity systems for the sustainable management of the fisheries resources.

Participants agreed that we add the two new contradictions to the list of those previously identified. The total number of contradictions thus rose from 10 to 12. Participants were then put in small groups of three to discuss and develop the most crucial contradictions for the CLW process. After some intense discussion participants prioritised six contradictions. Participants agreed to discuss the remaining contradictions at a later stage. The prioritised contradictions are shown in the box below.

1. Lack of other income generating activities (see section 6.4.4.1) *Quaternary contradiction*
2. Lack of closed season for commercial fishers (see section 6.4.3.1) *Tertiary contradiction, related to a secondary contradiction in the government activity system* (see section 6.4.2.4)
3. Contradictory messages on fisheries co-management (see section 6.4.1.2) *Primary contradiction in all activity systems linked to secondary and tertiary contradiction* (see section 6.4.3.1) *as well as quaternary contradictions* (see section 6.4.4.3)
4. Power conflict between BVCs and traditional leaders (see section 6.4.2.1) *Secondary contradiction*
5. Fisheries College curriculum does not have enough coverage of co-management issues (see section 6.4.2.3), *Secondary contradiction linked also to primary contradiction* (see section 6.4.3.1)
6. Emergence of new fishing gear which is catching immature fish (see section 6.4.4.2) *Quaternary contradiction*

Box7.2: Prioritised co ntradictions in the south-east arm of Lake Malawi

After confirming and agreeing to the list of contradictions to be discussed, we went through the norms of participatory workshop requirements which included: full participation of all members, respect of each one's views, everyone being a learner and educator in the workshop, acceptance of constructive criticism for more learning among participants. Wals (2007) argued that participation is the involvement of people in joint analysis, planning and control of local resources. It is a way of recognising the value and relevance of local or context specific knowledge and that the knowledge developed becomes part of the decision making process and solutions are developed relevant to each community or stakeholder group. Wals' observation was at the heart of the change laboratory workshop where stakeholders' deliberations aimed at joint analysis, planning in order to control the fisheries resources and this was made possible by recognising value and relevance of the context in the south-east arm of Lake Malawi. The analysis of the context and contradictions in Chapters 5 and 6 provided detailed mirror data on the context, which helped to facilitate the discussions.

The group was divided into four mixed groups (three groups of four and one group of three). For more integrated views and discussions, I made sure that every group had representation from each activity system (fishing community, extension and research and also Fisheries College). Participants agreed to share out the list of contradictions for discussion with other groups adding if something had been left out. The first three contradictions were discussed by groups 1 and 2 and the last three were discussed by groups 3 and 4. Like in the Lake Malombe case study the expansive social learning process was responding to the third research question of the study: *How can the learning and co-management practices be expanded among key stakeholders?*

Figure 7.4: Focus group discussions during the Change Laboratory workshop in south-east arm of Lake Malawi

The research assistants were all placed in various groups to support the deliberations and they also helped to guide the discussion with the experiences they had from phase 1 and the insights that we had gained from the previous workshop. I moved between groups, clarifying issues and also giving support where necessary. I now share the insights gained into the contradictions and the proposed solutions generated by the groups.

7.3.2.1 Contradiction #1 as surfaced via lack of other income generating activities

This contradiction was described in more detail as a quaternary contradiction in section 6.4.4.1. This contradiction was articulated as a lack of other income generating activities that could offer alternatives to fishers reducing their dependence on fishing. Participants expressed concern that despite poor catches in the area fishers are forced to continue fishing because they have no other means of survival. They continuously lamented that despite knowing that the fish stocks are collapsing, they don't know what to do as fishing was their only source of livelihood. Discussions in the CLW further expanded on this contradiction as shown in the data below:

> ***Change Laboratory Workshop Discussion CLWD2:*** *One thing that I feel sorry of is the fact that we look like people who do not understand the situation in which we are. To an outsider we look like we do not appreciate the pressure we are all putting to the area. We are using illegal gear, fishing even when the lake is closed, adding more fishing gear to the lake when we actually know that the lake is over-fished. We would like to leave fishing and do other businesses but we cannot find the businesses that can sustain us. If we had other things than fishing I am sure our fish stocks would have regenerated.*
>
> ***Change Laboratory Workshop Discussion CLWD2:*** *As a department we tried because we understood what is being said here and what we did was to initiate a vegetable growing project where BVC were loaned some money to start growing vegetables and sell. Ask me what happened we continued to have incoming fishing gear in the area and the project did not continue. So yes we can be taking about other activities apart from fishing but in practice fishers will still go fishing.*
>
> ***Change Laboratory Workshop Discussion CLWD2:*** *We need to clarify here because when we are planning to introduce other income generating activities apart from fishing we need to see how related they are to fishing. Farming is another difficult business. Vegetable growing takes a long time for someone to get started and to get some income from the business and it also depends on where you sell your produce. People tried but failed because the business was not the right one.*

This debate between BVC members and the extension officers was important in trying to address the lack of alternative income generating activities as a strategy to reduce dependency on fishing. The discussion showed a high level of reflexivity on the realities of

dependency on fishing, and also the need for viable alternatives. Fishers and BVCs present in the workshop confirmed that they had no other sources of earning a cash income apart from the fishery, and those businesses that took a long time to establish such as the vegetable growing business noted above, were not ideal. They also showed an understanding of the contextual complexities associated with certain businesses, which were both socio-cultural and social-ecological, as shown in this discussion:

> ***Change Laboratory Workshop Discussion CLWD2:*** *We stay in these areas because we are used to be here. We cannot afford to live in area far away from the lake because our lives are connected to the lake. The other problem is that there not enough land for people to farm here and also we do not have good rains and these have made us depend on fishing. Other business will help us to get settled because now there is no fish in the lake and for us to get a bit of fish we have to move from one area to the other.*

As indicated earlier (see Chapter 1) the south-east arm of Lake Malawi is highly populated because people have moved from different parts of the lake to the area for fishing. This has left the area with small land holding sizes for farming. According to Jazairy (1992) 80% of poor people in developing countries live in rural areas where they directly harvest ecosystem goods. Over 80% of Malawians depend on renewable natural resources for their livelihoods and fish is the cheapest source of protein providing 70% of animal protein and contributing 4% to the GDP (see section 2.2.2). Sustainable management of these resources which includes fish stocks and land requires an interdisciplinary or multi-sectoral approach where a range of related factors interact and feed into each other to function and benefit the rural poor. Provision of appropriate income generating activities is one of the key solutions to addressing the challenge of dependency on the already exploited fisheries resources. As shown in this discussion, there is also a need to review income generation activities that have been tried out in the area to establish their success rates, viability, uptake and realism. This will help learning, and will help with not repeating the same mistakes.

While this contradiction is clearly not easy to resolve, the group was able to model some solutions to Contradiction #1 which include:

- The Department of Fisheries should further explore appropriate income generating activities for fishers and link them to the appropriate institutions;
- Extension workers should consult other institutions on appropriate income generating activities;
- Motivate fishers to embark on other fish related activities e.g. fish farming; and
- Continuous training and awareness on possible and sustainable income generating activities should be offered.

Table 7.6: Summary of discussions on Contradiction #1

Contradictions	Causes	Effects	Suggested solutions
Lack of income generating activities among fishers	▪ No commitment from government to help fishers ▪ Lack of consultations and networks with other organisations who can help fishers ▪ Lack of knowledge and expertise to explore Income generating activities	▪ Increased pressure on the fishery ▪ Continued decline of fish stocks ▪ Increased instances of illegal fishing among fishers ▪ Collapse of the fishery and increased poverty	▪ Department of Fisheries to explore appropriate income generating activities for fishers ▪ Extension workers to consult with other institutions on appropriate income generating activities ▪ Motivate fishers to embark on other fish related activities e.g. fish farming ▪ Continuous training and awareness on possible and sustainable income generating activities

7.3.2.2 Contradiction #2 focusing on the lack of closed season for commercial fishers

This contradiction was explained in Section 6.4.3.1 as a tertiary contradiction, but is also related to a secondary contradiction in the government activity system relating to fishing regulations and how these are applied (see Section 6.4.2.4). This sensitive contradiction drew participants' attention in the CLW and led to considerable debate. The south-east arm of Lake Malawi's official closed season is from 1 November to 31 December. Workshop participants confirmed that the regulation for the closed season is only applied to artisanal fishers and that the commercial trawlers fish throughout the year. Participants could not justify why the commercial fishers, who have over the years also replaced their fishing nets with under-meshed nets and are catching immature fish, are allowed to fish throughout the year while the artisanal fishers have stopped fishing.

> **Change Laboratory Workshop Discussions CLWD2:** *I just want to ask our friends from fisheries, when the lake is closed for fishing we agreed that no one should be found catching fish but we always see those fishers with trawlers fishing. We see a lot of trawlers coming to our areas fishing close to the shores here. Why are we failing to stop them? We as BVC members we tell our friends to stop fishing during the closed season because that is the time when fish is breeding but government allow commercial fishers with big boats and engines to come and fish here. Why are they failing to stop them? Those are some of the things which cause us to disagree with Fisheries and as BVC members we also get questions from fishermen.*

Participants discussed this further noting that the regulations favour the commercial sector because the regulation prohibits them from fishing in Area A which is part of the south-east arm of Lake Malawi and that in those areas allocated to them, they are not supposed to fish 100 metres from the shores. Most of the people who spoke confirmed that most of the commercial fishers have been seen fishing in Area A close to the shores, which is a threat to the small fish. People also expressed concern on the fish species caught by commercial fishers; they are currently catching *Engraulicypris sardella* locally known as *Usipa* and other small cichlids, an indication that the mesh sizes of their fishing gear are small. Justifying why commercial fishers are allowed to fish throughout the year a representative from the government said:

> ***Change Laboratory Workshop Discussion CLWD2:*** *As for closed season, let me I explain why we have closed season. We close the lake to protect the fish that is in the process of laying eggs or have just hatched so that we protect the young fish. We also protect some critical areas like those breeding areas so that the fish that are breeding are not disturbed. For these two things we clarify to fishers by giving them specific distance from the shore to about one and half kilometre inside the water for the young ones and the brooders not to be disturbed. So those fishers who use trawl net are not supposed to fish within that distance and if they do then are contravening the rules and regulations. As for closed season no one is allowed to fish 100 meters from the shore with the same reasons not to disturb fish that is breeding or the newly born fish. Because those who fish using trawl nets already are not allowed to fish in shallow waters where fish breed that is why we do not give them restrictions to stop fish during closed season. This is why closed season regulations only affect us small scale fishers because our operations are always along the shore where it is shallow and where breeding fish and young ones are. Mostly commercial fishers catch fish in deep waters while small scale fishers fish along the shallow waters where our Chambo fish normally breed. So we do not allow small scale fishers to operate during closed season for fear of them dragging their nets where our Chambo fish is breeding.*
>
> *This is why closed season regulation mainly affects small scale fishers. But also the population of commercial fishers is far fewer in comparison to small scale fishers. The total landing of fish caught by commercial fishers is less than 10% to the total landing small scale fishers catch here in Mangochi for example. This means that the impact we are putting on the fisheries and the environment is more than the commercial fishers. You will also notice that in most cases commercial fishers catch small cichlids while small scale fishers target Chambo which is the fish we protect as people implementing co-management.*

The phenomenon of 'elite capture' is evident in almost all the co-management programmes (Béné & Neiland, 2004; 2006). The most influential actors are not fishers whose voice and interest are ignored or poorly represented, but commercial actors who pull strings in various ways through various channels. BVC members and village heads argued that the objective of closed season as pointed out by the fisheries officer is to protect the fish that are breeding and that the Fisheries Department is responsible for the monitoring of the heavily mechanised trawlers in the same shallow waters; not regulating them defeats the purpose of a closed season. In their debate one of the participants said:

> ***Change Laboratory Workshop Discussion CLWD2:*** *The discussion is good and interesting in that we close the lake to protect the fish that are breeding and the young ones yet we go back in the same area with some selected individuals to fish out and destroy all the breeding areas. Are we conserving anything there or we are just penalising certain individuals who at the expense of the small fishers get chances of doing illegal fishing?*
>
> ***Change Laboratory Workshop Discussion CLWD2:*** *I want to comment on some of the issues we usually face. As BVC members we take some of the set rules and regulations to fishers and most of the time they complain to us that the rules are not taking into consideration what they are experiencing. Most of the time we tell local fishers who fish using lights during the night that small fish like Chambo are not supposed to be caught at the same time we see commercial fishers like MALDECO catching it using their trawl nets. We get very confused because we do not follow regulations when dealing with commercial fishers. We therefore kindly ask our colleagues in Fisheries to see to it that we are all following the regulations. If we are not allowed to catch small fish or we are in closed season we should all be respecting the rules regardless of the kind of fishing we are doing. If you can check the size of the catch MALDECO catch there is always a mixture of undersized fish and big fish. Why should they be allowed to catch small fish when artisanal fishers are restricted? As a matter of fact MALDECO fisheries are of very large scale and need to be monitored. The same catch that small fishers catch per month MALDECO can catch within a day. Small scale fishers sometimes do not go fishing due to strong wind but commercial fishers like MALDECO go fishing every day of the month. So while we are given the powers to work with our fellow fishers, we should also make sure that the same treatment is applying to commercial fishers because without that consideration our jobs as BVC members will be difficult. We need to be treated equally.*

As discussed earlier (see Chapter 6) the lack of a closed season for commercial fishers in the co-management context resulted in a tertiary quaternary contradiction between the object in the central activity system (fishing community) and the object in the government extension and research activity system. It was evident from the discussion in the CLW (captured in the data above) that the in-depth deliberations among co-management stakeholders facilitated boundary crossing across the three activity systems in deepening understanding and debate about the contradiction. Engeström (2008) noted that the point of interventionist workshops is

to build agency of the research participants and this was evident in the deliberations as they were striving to analyse the lack of closed season for commercial fishers (see also Chapter 8 where this is discussed in more detail). Such learning allows stakeholders within a certain context to learn and reflect on their actions in ways that can surpass formal processes of learning. The main purpose of co-management was to promote the recovery of the fish stocks (see section 1.4.4) and the introduction of a closed season has the same objective of protecting the breeding of fish and also protecting the young ones. It was with this background that BVCs and other fishing communities representatives demanded a closed season for all fishers and that regulations on the prohibition of fishing during closed seasons should be reviewed to include commercial fishers. The solutions modeled for Contradiction #2 included:

- Review the fisheries regulations to include commercial fishers in the closed season;
- Implement the regulations and impose the closed season for commercial fishers;
- Expand continuous monitoring of the fishing practices and gear of commercial fishers; and
- Empower BVCs and local extension workers to monitor commercial fishers during the closed season.

The willingness of stakeholders to influence and change practices to achieve their objective of a sustainable fishery through the extension of the closed season to commercial fishers is a value based commitment to the crisis of declining fish catches. As can be seen from the deliberations and the solutions modeled, people strongly feel that big fishing companies and other commercial fishers should also be observing the closed season so that the objective of co-management is met. As shown by this complex debate and solution modeling process, building trust among co-management stakeholders, especially the fishing communities, requires an approach in which views of all the stakeholders are respected and are included in the decision making process for improved management of the fisheries resources.

Table 7.7 Summary of discussion on Contradictions #2

Contradictions	Causes	Effects	Suggested solutions
Lack of closed season for commercial fishers	▪ Lack of commitment from government to monitor fishing practices of commercial fishers ▪ Lack of understanding by government on the objective of co-management ▪ Weak policy guidelines on sustainable fisheries and closed season	▪ Over-exploitation of immature and breeding fish stocks ▪ Depletion of the fish stocks resulting in their collapse ▪ Conflicts between artisanal and commercial fishers	▪ Review of the fisheries regulations to include commercial fishers in closed season ▪ Impose closed season for commercial fishers ▪ Continuous monitoring of the fishing practices and gear of commercial fishers ▪ Empower BVCs and local extension workers to monitor commercial fishers during closed season

7.3.2.3 Contradiction #3 focusing on contradictory messages on fisheries co-management

This contradiction was described in more detail in Chapter 6 as a primary contradiction in all activity systems (see section 6.4.1.2) linked to secondary (see section 6.4.2.1), tertiary contradictions (see section 6.4.3.1) and quaternary contradictions (see section 6.4.4.3). As discussed earlier contradictory messages emerging as a primary contradiction within the elements of all of the activity systems then affected the other elements in the activity system and become quaternary contradictions when they crossed other activity systems, also influencing the tertiary contradictions. Data reported in Chapter 6 and further discussion in the CLW showed that lack of coordination and lack of frequent meetings among stakeholders, as well as lack of conceptual clarity and a lack of well-designed mediation tools for the subjects and the community in the activity system to use as they work on the shared object, result in contradictory messages among co-management stakeholders. As discussed in the Lake Malombe case (see section 7.2.3.6) contradictory messages appeared in all the activity systems in that context too, and were found in all the activity systems in the south-east arm of Lake Malawi case (fishing communities and government including Fisheries College).

In the CLW, participants expressed concern that they lacked skills and experiences in the management of the fisheries resources because they do not meet frequently as a community

of practice to discuss some of the important issues. Participants in the CLW further analysed why there are so many contradictory messages in all the activity systems when all are trying to work on the common object of sustainable fisheries through the co-management approach, as shown in the data extracts below:

> ***Change Laboratory Workshop Discussions CLWD2:*** *We have different messages because BVCs and Fisheries want to be doing things as individuals. When we started the programme we used to work together in meetings, workshops and our friends from fisheries used to come and discuss a number of things about co-management. Even in our rural areas BVCs and village heads were doing things together. If we don't come together as BVCs and Fisheries we cannot say the same thing. The problem is not only among BVCs and fishing communities. We from Fisheries hardly meet to discuss some of the important things that are happening in the fisheries sector. Sometimes this is due to lack of funds to allow us come together and work on some of the crucial things. We sometimes hold meetings but because of so many things to discuss in those meetings we do not discuss some of the things that come from BVCs.*
>
> ***Change Laboratory Workshop Discussion CLWD3:*** *Most of the messages we get and use come from Fisheries and sometimes BVCs get confused when different messages come from the same source of information. It is important to consult each other and agree on what to take to the BVCs because as BVCs we do not keep the messages we take them to fishers and other people and most of the time we are not able to answer questions from our colleagues when the messages are not clear.*

It is evident in the discussion that the main source of contradictory messages is the lack of coordination among co-management stakeholders. People emphasised the need for frequent meeting and interaction among fisheries co-management stakeholders so that the messages are well understood before they are taken to the rest of the fishing communities. Most of the issues raised in the south-east arm of Lake Malawi case on contradictory messages were similar to those raised in the Lake Malombe case (see section 7.3.2.6). Solutions were also modeled for this contradiction and included suggestions to:

- Resume frequent meetings to discuss issues and learn from each other;
- Engage in joint planning and development of messages;
- Clearly define who is to do what among stakeholders to avoid conflicts; and
- Close the link between research and extension.

Table 7.8 Summary of discussion on Contradiction #3

Contradictions	Causes	Effects	Suggested solutions
Contradictory messages among co-management stakeholders on fisheries co-management	▪ Lack of coordination among co-management stakeholders ▪ Stakeholders do not understand co-management in the same way ▪ BVCs and village heads all want to control fishing activities and get benefits	▪ Fishing communities get confused ▪ Fishers take advantage of the unclear messages to do what they want ▪ Implementation of co-management becomes a big challenge because no one knows what to do	▪ Resume frequent meetings to discuss issues and learn from each other ▪ Engage in joint planning and development of messages ▪ Clearly define who is to do what among stakeholders to avoid conflicts ▪ Close link between research and extension

7.3.2.4 Contradiction #4 focusing on power conflicts between BVCs and traditional leaders

This contradiction was described in more detail as a secondary contradiction in section 6.4.2.1. It occurs between the subjects and the division of labour in the fishing community activity system and leads to lack of commitment among BVCs and local leaders affecting the object of co-management. As explained in earlier chapters, the introduction of BVCs in the rural areas brought in a number of tensions among people because of existing traditional structures. As discussed earlier in the Lake Malombe case, BVCs found other traditional structures in place that were in control of the fishing activities and who had privileges related to the fishing resources (see section 7.2.3.5). When BVCs were instituted, most of the privileges were no longer there and the power of traditional leaders e.g. chiefs and village heads was reduced. The same was experienced in the other water bodies in the region that have implemented a similar approach to co-management (see section 1.4). Discussion in the CLW on this contradiction showed that due to misunderstandings between BVCs and village heads on who was to control activities in the BVCs, some BVCs started disliking the active participation of village heads in the BVCs, arguing that they were bringing corrupt practices into the BVCs. Responding to these comments in the workshop, a group village head agreed that there were some village heads who are corrupt but pointed out that not all are:

> *Change Laboratory Workshop Discussion CLWD3: We all know that people are not the same. There are some village heads who accept illegal fishers because they receive bribes and because they are given money or fish, and then cannot stop them from illegal fishing. But we should also accept that there are a lot of chiefs and village heads and I am one of them who are doing a lot in the management of the fisheries resources. The most important thing is to continue teaching them about the importance of taking care of the fisheries resources. I always tell people that if our forefathers were as destructive as we are now, we would not have seen the fish we*

have now and that most of the fish have disappeared in our hands. We used to have a lot of good fish species in the lake but all are gone because of over-fishing and corrupt practices.

In probing this contradiction further it was shown in the data that in some beaches fishers connive with village heads and do not to listen to the BVCs especially when the BVC is strict with regulations. In Lake Malombe, some village heads in a number of beaches had disbanded the officially formed BVCs and had replaced them with those who were loyal to the traditional leaders (see section 7.2.3.5). Participants expressed dissatisfaction with the reaction by some of the traditional leaders and encouraged them to bring together BVCs that were not conforming to the required BVC expectations to discuss the challenges.

Change Laboratory Workshop Discussion CLWD2: We know that there are some BVC members who underrate village heads and think they can now control fishing activities alone without the concern of the village heads. But this is wrong and this is where conflicts on who is responsible in the BVCs come to the fore. Those of us who were trained when the programme started were told that the running of the BVC and fishing activities in any particular beach is the responsibility of all the BVC members and the village head for the area because the BVC is in his or her area.

Participants therefore agreed that BVCs and village heads should work together to run BVC activities e.g. conducting meetings, awareness campaigns, monitoring of fishing activities and enforcement of the rules and regulations. They modeled the following solutions to this contradiction:

- Ensure that there is a proper division of labour between BVCs and village heads;
- Hold frequent meetings with BVCs, village heads and extension officers;
- Ensure that there are transparent and accountable BVC activities, e.g. meetings; and
- Government must provide support to BVC activities to help address some of the internal conflicts and misunderstandings.

Table 7.9 Summary of discussions on Contradiction #4

Contradictions	Causes	Effects	Suggested solutions
Power conflict between BVCs and local leaders	▪ Control over fisheries activities ▪ Introduction of BVCs did not consider other structures which were in the communities ▪ Lack of clear roles and responsibilities (division of labour) among the BVC members ▪ Existence of corrupt practices	▪ Increased illegal fishing ▪ Non-functional BVCs ▪ Replacement of BVCs by local leaders ▪ More corrupt cases by both BVCs and village heads ▪ Continued collapse of the fishery and increased poverty	▪ Ensure proper division of labour between BVCs and village heads ▪ Hold frequent meetings with BVCs, village heads and extension officers ▪ Ensure transparent and accountable BVC activities, e.g. meetings ▪ Government should provide support to BVC activities to help address some of the internal conflicts and misunderstandings

7.3.2.5 Contradiction #5 focusing on the Fisheries College curriculum which does not have enough coverage of co-management issues

This contradiction was described in Chapter 6 as a secondary contradiction between the subjects and mediating tools in the college activity system (see section 6.4.2.3), *which is also linked also to a primary contradiction in the mediating tools of the college activity system* (see section 6.4.3.1). It was also mentioned in a quaternary contradiction focusing on contradictions between the subjects and mediating tools in the fishing activity system and government activity system (the Fisheries College is also a government institution).

In the CLW, it was the college lecturers who were most interested in discussing this contradiction. Participants observed that the current emphasis in fisheries management was on co-management and that they had reviewed the college curriculum to include co-management as a full course. However it was evident from their discussions that there is need to mainstream co-management into the other courses and also to orient lecturers who do not have co-management knowledge. People cited courses like Fisheries Development and Environmental Education as some of the crucial areas where co-management concepts could be infused or integrated to allow students to have a better understanding and linkages with the broad concept of fisheries co-management. As discussed earlier (see Chapters 1 and 2) the Fisheries Department introduced a participatory fisheries management programme after observing that the government was unable to manage the fisheries resources through a centralised management system. Graduates from the college have over the years been seen as not being fully able to articulate issues of fisheries resources management (Kachilonda, 2005)

and this has been due mainly to a history of a technically oriented curriculum with few links to the issues on the ground.

In the CLW college lecturers expressed concern about the lack of knowledge on co-management amongst lecturers especially those who do not teach extension courses as reflected in this data from the CLW:

> ***Change Laboratory Workshop Discussion CLWD2:*** *College lecturers need to also have better understanding of co-management because that is what the department is advocating that the management of the fisheries resources need to be the responsibility of all the stakeholders. To be honest most of the people who have more knowledge on co-management are only those who are teaching the course on co-management. From what we are discussing here it is an area that is crucial in the management of the fish stocks, in all areas of fisheries management.*

> ***Change Laboratory Workshop Discussion CLWD3:*** *Co-management is central to fisheries management courses and as college lecturers we need to have a better understanding of the concept and how others are working with it. We hear people talking about co-management and it is important for us as people who are teaching here to know it and also be able to support the programme.*

Justifying the importance of full coverage of co-management in the college curriculum it was noted in the CLW that better training of students at the college level would benefit the implementation of the programme because students work with BVCs and fishing communities after graduation. The Fisheries and Aquaculture policy emphasises the importance of training as a method to develop and maintain skills in the public and private sector (GoM, 2001). The Fisheries College implements its programmes according to the Fisheries and Aquaculture Policy objectives and the policy stresses the importance of having a curriculum that reflects the interests of the people through their active participation. This relationship between curriculum, policy and policy implementation was also brought out in the CLW, as shown in this data:

> ***Change Laboratory Workshop Discussion CLWD2:*** *It is important to have graduates from the college who are conversant with co-management approaches because wherever they will be sent to do extension work will be using the concepts they will learn from here. Sometimes we experience problems with students after graduation because some of them come out from this place without full understanding of some of the most crucial things like co-management. When students are sent to the district offices we assume they have enough knowledge to be able to work with fishing communities with less supervision. I therefore want to agree with the first speaker that there should be enough coverage of co-management issues in the college curriculum to prepare the students well before they leave the college.*

In trying to find solutions to the contradiction, it was noted that apart from reviewing the curriculum to cover the aspects of co-management, it is also important to engage lecturers in various co-management activities so that they also have hands-on experience (see Chapter 8

for recommendations in this regard). Lecturers in the CLW agreed that engaging college lecturers in expansive social learning activities such as the process that they were part of has potential to not only broaden their understanding but also provide opportunities for them to learn about areas needing more emphasis in the college curriculum. It will also allow them to gain more skills knowledge and experiences in fisheries resources management. The solutions modeled for contradiction #5 included:

- Strengthen capacity building of college lecturers in co-management;
- Review the college curriculum to mainstream co-management concepts into a wider range of courses;
- Undertake joint refresher courses with extension officers to share skills in co-management; and
- Engage in research and expansive learning programmes with students and lecturers to understand co-management in the fisheries context.

Table 7.10 Summary of discussion on Contradiction #5

Contradictions	Causes	Effects	Suggested solutions
Lack of enough knowledge about co-management in the college curriculum	▪ Less coverage of co-management requirements in the curriculum ▪ Unclear co-management principles among college stakeholders ▪ Poor understanding of co-management by teaching staff and students	▪ Incompetent graduating students to work with fishers ▪ Continuous decline of fish stocks due to lack of proper guidance to fishers ▪ Contradictory messages from lecturers to students up to the fishing communities	▪ Strengthen capacity building of college lecturers in co-management ▪ Review of college curriculum to mainstream co-management concepts into more courses ▪ Engage in joint refresher courses with extension officers to share skills in co-management ▪ Participate in research and expansive learning programmes with students and lecturers to understand co-management in fisheries context

7.3.2.6 Contradiction #6 focusing on the emergence of new fishing gear used to catch immature fish

This contradiction was discussed in Chapter 6 as a quaternary contradiction (see section 6.4.4.2) between the subjects in the fisheries activity system and rules in the government activity system. It surfaced due to a lack of timeous review of fisheries regulations, which in turn was linked to the development and use of new fishing gear used to catch immature fish.

The issue of new and destructive fishing gear appears in both case studies. As reported in Lake Malombe, the collapse of the fishery forces fishers to find survival strategies to catch more fish so as to earn a living (see section 7.2.3.2), and as already reported across this thesis, the modification and designing of different fishing gear has negatively affected the management of fisheries resources. Discussing the introduction of new fishing gear in the CLW, participants noted and confirmed other data in the study that much of the fishing gears currently in use is under-meshed and illegal:

> ***Change Laboratory Workshop Discussions CLWD3:*** *Yes last of last year 2012, I called for a meeting of all fishers. When they came, what we were discussing was about legal fishing gears and the dangers of using small meshed nets like mosquito nets. I emphasised in that meeting that if you continue using illegal fishing nets enforcement officers can come and you will lose all your nets because they can burn all the nets. When we were discussing these things all my village heads were there and today discussing these things is not strange. I was furious one day when I saw very tiny fish that were caught by mosquito nets. I called for a meeting of all fishers and in that meeting I was asking them why they are catching very tiny fish. I asked them if they would be happy to see that someone coming to kill their pregnant wife and their young children. In the discussions, they were refusing to see it like this, and I told them that it is the same with what they were doing catching very tiny fish because it means they will in the long run wipe out all the fish and there will be no future generation of that fish. Fishing tiny fish means you are destroying fish that could be mature fish tomorrow and if you continue destroying the young ones your children will not see and know that fish. I always narrate this same story every time I call for a meeting and I want to do the same when I call for the next meeting. They will tell our technical assistant that yes our group village head (GVH) called for a meeting and was not happy with catching small fish.*
>
> ***Change Laboratory Workshop Discussion CLWD2:*** *And it said that there is witchcraft for fishers, the ones operating Kandwindwi. We declared this a problem and agreed that we do not need Denmark [indicating small mesh size], and said 'please put 1 inch'. They actually accepted this and some of them removed the*

undersized nets in our presence but once they go fishing Denmark is still there … [Laughter] … We are not to stop our advice and monitoring. If they can remove the under meshed net the type of fish they will catch will be the recommended one because even with the under meshed net sometimes they catch a mixture of recommended and undersized fish. We need to make sure that we are monitoring the way fishers are catching their fish and the type of fishing nets they are using. So I think the meetings help us a lot because it is where we discuss what is happening here in our area with all the BVCs and fishers. If someone has seen a strange fisher with a strange fishing net we call each other and ask our BVC members to go and check at the beach.

It is evident from the data in this study that the introduction of illegal gear can be reduced by introducing regulations that prohibit the use of such fishing gear, and this was repeatedly mentioned as a solution. This, however, requires more frequent review of rules and regulations which includes newly designed gear and empowers BVCs to enforce them. Participants also noted that some illegal gear has been operating unchecked for years and that it is now becoming difficult to control because people think there is nothing wrong with them. People commented on how much illegal fishing gear was in use and that much of it is now regarded as legal as people are so used to it. What was encouraging in the CLW was the fact that there was reflexivity on this issue, and discussions on the contradiction were oriented towards solutions and monitoring. However, it was noted that the decision to phase out the 'new' fishing gear requires efforts from all co-management stakeholders to work together, to meet more regularly and to, with the support of the Fisheries Department, work out strategies to prevent people using it. Specific solutions modeled to contradiction #6 include:

- More regular and timely reviews of fisheries rules and regulations;
- More effective enforcement of fisheries regulations; and
- Ensure community engagement in drafting of regulations and by-laws.

Table 7.11 Summary of discussion on Contradiction #6

Contradictions	Causes	Effects	Suggested solutions
Contradiction between subjects in the fisheries activity system and rules in the government activity leading to lack of timeous review of fisheries regulations	▪ Massive illegal fishing taking place ▪ Failure to implement co-management principles ▪ Lack of policy guidance on the management of fisheries rules and regulations to support the management of fisheries resources	▪ Non observance of fisheries regulations ▪ Unclear guidance among fishing community stakeholders ▪ Continuous decline of fish stocks and lack of government support	▪ Timely review of fisheries rules and regulations ▪ Enforcing fisheries regulations ▪ Community engagement in drafting of regulations and by-laws

7.4 Reflection on the expansive learning process

As can be seen from the narrative above, the expansive social learning process in the south-east arm of Lake Malawi was an interesting and important learning process for all the stakeholders involved in the change laboratory workshop. It was interesting to note too that the approach was a new experience for both government and fishing community stakeholders as acknowledged by the Group Village Headman (GVH) who was part of the workshop:

> *Group Village Headman: I have learnt from this workshop that for us to come up with fruitful and effective solutions we first need to disagree and negotiate our way through to justify the differences. This is one of the meetings I have attended where the BVC member challenged my views and ideas and I like it because we are building a good foundation for the future of our fisheries resources.*

As in the Lake Malombe case study, participants confirmed that the workshop had ended up with solutions developed by all stakeholders. People took time to understand the process but later were able to exercise their powers as BVC members; village heads, government officers regarding what they thought were the right decisions.

Participants confirmed that the deliberation throughout the workshop was rich, and that though there was confusion when two groups opposed each other on certain issues, this had ultimately led to agreements following long debates. This provided an opportunity for people to reflect on different aspects and the assumptions of co-management and how it was / was not being practiced in their context. As shown in the quotation from the Group Village Headman, people had an opportunity to explore and learn from others, not only by agreeing on an issue but by continuously questioning some of the ideas and practices in order to analyse the sources of contradictions. The learning process was an open process and showed

that through continuous dialogue people with a good understanding of the contradictions in a context, might start experiencing change.

I found that the CLW approach offered a shift from traditional participatory workshops where people are taken through a range of activities that focus on synergy, rather than on surfacing and interrogation of contradictions. The process of surfacing, prioritising, debating and seeking solutions to agreed upon contradictions (emerging from the mirror data), provided a valid process where in-depth analysis of the tensions and contradictions experienced by co-management stakeholders could be deliberated and where those solutions identified were acceptable to all across the different activity systems.

It was evident that the intense discussions had fully engaged participants who often continued to discuss issues even during break times. Stakeholders expressed satisfaction with the expansive social learning process and pointed out that this was an exciting new era for sustainable fisheries management where they could come together to resolve issues. As noted in the solutions modeled above, and also in the Lake Malombe case, solutions were often proposed that required more intensive social engagement between different stakeholders in the co-management system.

However, as shown in both case studies, the expansive learning process, while taking less time or using less frequent meetings than suggested by Virkkunen and Newnham (2013), was still able to reach the level or stage of solution modeling. This, as explained in Chapter 4, is not the full expansive learning cycle and there is need for implementation of suggested solutions and for monitoring and reflecting on the implementation of the modeled solutions. However, it was not possible to follow this full cycle of the expansive learning process within the time frame of this study, and recommendations are made to extend the expansive learning process from here in Chapter 8. However, I did want to, within the time and resource constraints of this study, consolidate the solution modelling phase of the expansive learning cycle, especially to strengthen agentive commitments to the modeled solutions. For this reason I organised a second workshop which involved stakeholders from both the Lake Malombe and south-east arm of Lake Malawi in the form of a follow-up change laboratory workshop.

7.5 Way forward joint Change Laboratory Workshop

A follow-up change laboratory workshop to discuss the way forward for the solutions developed during the mediated intervention workshops was held with participants from the two research sites in September 2013. Participants included BVC members, traditional leaders, commercial fishers, government extension officers and college lecturers. Other people who were present and who shared research experiences were two researchers from

Mozambique and Zimbabwe, and two research colleagues who were involved in similar expansive learning research in Mozambique and in Zimbabwe and South Africa, with their research supervisors. This provided a new experience for the members of the activity systems, as they learned of expansive learning projects in other countries with rural communities and natural resources management.

The focus of the workshop was how to implement the solutions developed by groups during the change laboratory workshop. Most of the people who were present in the way forward CLW were also present in the CLWs held in the two case study sites. The workshop started with mirroring data on the solutions modeled in the two case study sites, reminding the participants of the previous process, and also showing what was similar and different across the two case contexts, as captured in Table 7.11 that follows.

Table 7.12 Summary of contradictions and solutions modeled used as the foundation of the mirror data for the start of the joint CLW

LAKE MALOMBE CONTRADICTIONS AND SOLUTIONS MODELLED (see section 7.2)	SOUTH EAST ARM OF LAKE MALAWI CONTRADICTIONS AND SOLUTIONS MODELLED (see section 7.3)
MODEL SOLUTIONS TO CONTRADICTION #1 modification of fishing gear that threatens sustainability of the fish stocks • Coordinated efforts by all stakeholders to work together and to empower BVCs and traditional leaders to use by-laws to monitor new fishing gear • Fisheries Department to facilitate the review of the regulations, and especially to undertake more frequent reviews of legislation • Fisheries Department to lead and facilitate improved communications and relationships among stakeholders to improve co-management practices • All to work together to ensure that there were improved relationships between BVCs and village heads to address issues of corruption and distrust	**MODEL SOLUTIONS TO CONTRADICTION #1 lack of other income generating activities** • Department of Fisheries should further explore appropriate income generating activities for fishers • Extension workers should consult other institutions on appropriate income generating activities • Motivate fishers to embark on other fish related activities e.g. fish farming • Continuous training and awareness on possible and sustainable income generating activities should be offered
MODEL SOLUTIONS TO CONTRADICTION #2 dissatisfaction with the closed season for fishing • Fisheries research, extension and the communities should conduct joint research on the right breeding season for fish • All stakeholders should monitor the fishing gear used because some is under-meshed and catches immature fish • Department of Fisheries should support suggestions of BVCs and local leaders to increase closed season period • Co-management stakeholders should also be exposed to other CBNRM best practices like Mbenji Island to learn other management strategies	**MODEL SOLUTIONS TO CONTRADICTION #2 focusing on the lack of closed season for commercial fishers** • Review the fisheries regulations to include commercial fishers in the closed season • Implement the regulations and impose the closed season for commercial fishers • Expand continuous monitoring of the fishing practices and gear of commercial fishers • Empower BVCs and local extension workers to monitor commercial fishers during the closed season
	SOUTH EAST ARM OF LAKE MALAWI CONTRADICTIONS AND SOLUTIONS MODELLED (see section 7.3) **MODEL SOLUTIONS TO**

LAKE MALOMBE CONTRADICTIONS AND SOLUTIONS MODELLED (see section 7.2)

MODEL SOLUTIONS TO CONTRADICTION #3 power related conflicts between BVCs and traditional leaders

- Introduction of coordination meetings with the Fisheries Department to clarify the roles of BVCs and local leaders in co-management
- Regular joint planning to develop tools for the co-management programme
- Regular locally organised meetings between BVCs and village heads to review co-management practices in the areas
- Regular joint meetings with fishers, local leaders, BVCs and the local extensions workers to also get views from the fishing communities

MODEL SOLUTIONS TO CONTRADICTION #4 focusing on the problem of contradictory messages on fisheries conservation and co-management

- Stakeholders to work together to develop tools for the co-management programme
- Frequent meetings to deliberate fisheries management issues and wherever possible call for fishing community meetings to ensure that the same messages are shared
- Research and extension should work together and whenever appropriate work together with BVCs and village heads to ensure clearer communication of key messages relevant to the co-management objectives

CONTRADICTION #3 focusing on contradictory messages on fisheries co-management

- Resume frequent meetings to discuss issues and learn from each other
- Engage in joint planning and development of messages
- Clearly define who is to do what among stakeholders to avoid conflicts
- Close the link between research and extension

MODEL SOLUTIONS TO Contradiction #4 focusing on power conflicts between BVCs and traditional leaders

- Ensure that there is proper division of labour between BVCs and village heads
- Hold frequent meetings with BVCs, village heads and extension officers
- Ensure that there are transparent and accountable BVC activities, e.g. meetings
- Government must provide support to BVC activities to help address some of the internal conflicts and misunderstandings

MODEL SOLUTIONS TO CONTRADICTION #5 focusing on the Fisheries College curriculum which does not have enough coverage of co-management issues

- Strengthen capacity building of college lecturers in co-management
- Review the college curriculum to mainstream co-management concepts into a wider range of courses
- Undertake joint refresher courses with extension officers to share skills in co-management
- Engage in research and expansive learning programmes with students and lecturers to understand co-management in the fisheries context

SOUTH EAST ARM OF LAKE MALAWI CONTRADICTIONS AND SOLUTIONS MODELLED (see section 7.3)

MODEL SOLUTIONS TO

LAKE MALOMBE CONTRADICTIONS AND SOLUTIONS MODELLED (see section 7.2)	**CONTRADICTION #6 focusing on the emergence of new fishing gear used to catch immature fish**
MODEL SOLUTIONS TO CONTRADICTION #5 focusing on a lack of training for Beach Village Committees • Fisheries Department to source funding for the training to avoid continuous mismanagement of the fisheries resources • Fisheries Department to liaise with BVCs to plan for less costly BVC training • All stakeholders to explore other means of getting funding for the training in case the Fisheries Department fails to raise funds	• More regular and timely reviews of fisheries rules and regulations • More effective enforcement of fisheries regulations • Ensure community engagement in drafting of regulations and by-laws

As shown in Table 7.11 above and as reported above in sections 7.2 and 7.3, there were both similarities and differences related to the proposed solutions, but the joint CLW showed that in fact, there was much that was similar in the Lake Malombe case and the south-east arm of Lake Malawi case data and proposed solutions. This joint workshop therefore allowed participants to reflect on their own contexts, but also on the wider water body and fishing practices and co-management issues as experienced across the two sites.

Participants in this workshop agreed to focus on the following issues and processes in the joint way forward CLW:

- Share what the stakeholders had developed since the last workshop (i.e. reporting on any actions taken);
- Deliberation of some crucial areas which required attention of stakeholders from the two research sites (i.e. cross-site prioritisation of solutions that require attention);
- Consider how people from Lake Malombe and the south-east arm of Lake Malawi could cooperate to make sure that the solutions which were modelled during the first CLW workshops are put into practice (i.e. possible collective agency for solution implementation);

- Drawing up of timelines for the proposed solutions which were modelled in the first workshop in order to have specific groups of people responsible for various actions (i.e. agentive commitments).

Starting with the mirror data from the two previous CLWs in the two case sites, modeling the solutions, I reminded participants of the contradictions which were discussed and which solutions were drawn up as discussed in section 7.2 and 7.3 above. I used a table (Table 7.11 above) to synthesise the contradictions and solutions modeled to remind myself of what to mirror back to participants. The contradictions and associated suggested solutions that were of most interest to the group in the way forward CLW were:

- Different ideas and views on the current closed season for Lake Malombe;
- Change in fishing gear which has resulted in a considerable amount of newly designed illegal gear in both Lake Malombe and the south-east arm of Lake Malawi, leading to concerns for more regular revision of legislation and better enforcement of legislation;
- Different messages from researchers and extensionists confusing fishers in both areas;
- Teaching methods at the Fisheries College not capturing crucial areas of fisheries co-management which results in new graduates that are underprepared to work with fishing communities on co-management;
- Lack of adequate input and support from the Fisheries Department on issues of co-management in the two sites which has resulted in poor support to BVCs to run their activities, resulting in demoralised BVCs and conflicts between traditional leaders and BVCs who have to facilitate awareness and enforcement activities;
- Lack of alternative sources of generating income to offer alternatives to fishing;
- Lack of closed season for commercial fishers operating in the south-east arm of Lake Malawi, with traditional leaders and BVCs not having power to enforce this; and
- Training of BVC members for the implementation of co-management as most of the BVC members are untrained.

Participants were divided into groups (those from Lake Malombe in one group and those from Lake Malawi in another) to draw up action plans based on the solutions which were discussed in the previous workshops, which focused on the above areas of interest across both sites. Plenary presentations took place after the group discussions where further discussions took place. Section 7.5.1 to section 7.5.2.4 report on what was shared in the plenary. This is further analysed in Chapter 8 using the framework of transformative agency

expressions that is being developed in relation to expansive learning and the outcomes of expansive learning in CHAT (see section 8.6).

7.5.1 Lake Malombe stakeholders

There was general agreement that unless action is taken, the fishery in Lake Malombe will continue to collapse. Stakeholders were concerned that the current situation is exacerbating already existing poverty in the area, and that their future is not clear because they do not have any alternatives for their livelihood. Participants agreed that the solutions which were modelled in the first change laboratory workshop needed to be taken seriously as actions and that efforts needed ensure that the proposed solutions are put into practice by assigning the right people to take them up. Emphasising the importance of taking the modeled solutions to the next level of action taking, one of the participants said:

> ***Way Forward Discussion WFD1:*** *During the last workshop we came up with the solutions that we are discussing here today but until these things are given to people to make sure that they are put into practice we will come back here after some time to discuss the very same things. We have to make sure that we all get the responsibility to put all what we discussed into action.*

Some of the solutions which were deliberated further and with more specific plans for actions included the following:

7.5.1.1 Closed season for Lake Malombe

As already discussed, the current closed season was contested by participants, and it was again noted that fishers continue to catch juvenile fish even after the open season. This appears to be because the period for closing the lake is too short. They noted that closing the lake from October to December is no longer valid Changes in weather conditions might also be affecting the breeding pattern of different fish species in the lake. A consensus was reached that the current closed season should be changed to October to April to give enough juvenile fish the chance to grow and swim to the deeper waters.

It was also agreed that the cost of monitoring and enforcement activities could be reduced by requiring all fishing nets are kept in one place during the closed season so that people do not have access to fishing. BVCs, traditional leaders and the Fisheries Department should jointly come up with a strategy to have this plan implemented.

The fisheries officers both at district and at the local level were requested to take the actions to the higher authorities and give feedback to the BVCs and the chief of the area on the outcome of the decision.

7.5.1.2 Emergence of illegal fishing gear

Participants once again expressed concern with the increase in the number of illegal fishing gear currently in use in Lake Malombe and the problem that much of this gear is considered legal as it is not included in the fisheries regulations as illegal. They all agreed that there was need for collaboration between the BVCs, traditional leaders and the Fisheries Department to quickly revise the regulations and put the regulations into practice.

People also noted that most of the fish caught in the lake are under-sized because of the type of fishing gear used and that if not checked, the fish stocks will continue to be depleted. It was therefore also agreed that there should be co-operation between the BVCs, traditional leaders, extension workers and researchers to make sure that they are extending the same messages to the fishing communities.

The Fisheries Department was requested to work together with BVCs and traditional leaders and, whenever possible, organise joint meetings to target sites with illegal gear.

7.5.1.3 Collaboration between BVCs and traditional leaders

One of the concerns which was discussed again in the way forward CWL was the lack of co-operation between BVC members and traditional leaders in some areas; this situation has resulted in non-functional BVCs. It was agreed that more frequent contact between local communities and the extension agents was one of the solutions to address the problem.

People also noted that unclear roles and responsibilities among the co-management stakeholders, especially the BVCs and the traditional leaders, are the cause of lack of collaboration. It was therefore agreed that a planning meeting between the extension agent and the BVCs and also the traditional leaders be organised to clearly indicate who is to do what in the areas and wherever possible, there should be joint meetings.

It was also agreed that in order to avoid the dissemination of contradictory messages, fishers should be involved in research activities taking place in their areas so that they understand why things are happening the way they are.

7.5.2 Lake Malawi stakeholders

The group again expressed concern on the uncontrolled illegal fishing activities in the area which have over the years impacted negatively on the management of the fish stocks. People argued that the south-east arm of Lake Malawi has the highest number of, and also the most diverse, fishers in the lake. It was observed in the joint CLW that apart from focusing on the fishing activities, farming activities taking place upland having an impact on the fishery. Some of the examples given were use of fertilizer and pesticides on upland farms resulting in chemical run-off and eutrophication in lakes and rivers.

Going through the solutions that were proposed in the last intervention workshop, participants noted that for things to be taken seriously there was need to make people responsible for the various solutions and request them to come back to the rest of the group and give feedback. The following are some of the solutions that were discussed further with specific actions and responsibilities allocated to different people.

7.5.2.1 Closed season for commercial fishers

People again expressed concern with the unclear application of regulations for the closed season: commercial fishers are allowed to fish throughout the year while artisanal or small scale fishers must stop fishing during the fish breeding period. People noted that the solution proposed in the last workshop to ensure that commercial fishers also observe closed season was not adequate. They felt strongly that a team should be tasked to take the matter forward and to argue it further with the policy makers.

Participants said that the observation of closed season by commercial fishers needed to start with the review of fisheries regulations but they also noted that this takes a long time. Commenting on the delay of taking action on the issue one of the participants said:

> ***Way Forward Discussion WFD2:*** *The issue of imposing a closed season to commercial fishers has been discussed for many times and what I have observed is that after the meetings nothing changes, no one picks the matter up. What we should know is that while we delay in taking action our friends the commercial fishers are continuously catching fish during closed season.*

It was therefore agreed that a suggestion to review the fisheries regulations be put forward through the district fisheries office that are to take it through the district assembly to the Fisheries Department for action. People agreed that they needed support from government to speed up the process of reviewing different regulations so that they keep up with the changing environment.

Frequent meetings between the Fisheries Department and the fishing communities were seen as the most crucial means of having the solutions worked upon as people would be asking for feedback on their requests.

7.5.2.2 Creation of alternative income generation activities

People agreed that one of the problems that is influencing overfishing in the south-east arm of Lake Malawi was the over-dependency on fishing due to lack of other businesses or activities that provide alternative means of livelihoods. People expressed the need to orient fishers to businesses that are not fisheries related and requested the Fisheries Department to link them to these.

Participants also noted that some organisations that offer different business opportunities have local extension workers who work with rural communities and requested the local extension workers to link up with them so that fishers can also benefit from these services in their areas.

There was therefore an agreement that the extension agents in the south-east arm of Lake Malawi explore how the NGOs that are working with communities on different business are implementing their programmes and that a joint meeting with them would benefit other fishing communities in the area.

7.5.2.3 Fisheries College curriculum

The solution the college curriculum coverage of the co-management approaches was seen as important so that the college could prepare students to work effectively with the fishing communities after training. Participants once again noted that the current programme does not adequately prepare students well for the co-management context, and that a further review of the extension curriculum was both appropriate and necessary.

Students are required to have adequate knowledge on what is happening in the Malawi fisheries and they need better field experience through active engagement with the fishing communities to prepare them better for their role as extension agents. Workshop participants argued that students can only get adequate exposure to the fisheries activities through field attachments and that they should be prepared to learn from the fishers.

It was therefore agreed that the current curriculum be further oriented to include an in-depth understanding of participatory approaches in a co-management context that can prepare them to be part of processes of collaborative management of the fisheries resources. They suggested that wider consultation is required to get more views from stakeholders on the restructuring of the curriculum to ensure it includes all the relevant aspects of co-management.

7.5.2.4 Contradictory messages from fisheries research and extension

Exploring the way forward for dealing with the problem of contradictory messages, participants agreed that these stem from lack of coordination between the fishing communities and the fisheries officers, as reported across this thesis.

It was therefore agreed that all the stakeholders should do as much as they could to work together and that from time to time there should be consultations with the village heads and the fisheries personnel to share the kind of messages to take to the fishers. There should also be closer co-operation between the research and extension units in the Department of

Fisheries, and between the Fisheries College, the fishers and the research and extension units, as well as between the BVCs, traditional leaders and extension and research agents.

7.5.3 Reflection on the way forward joint change laboratory workshop

Participants in the joint change laboratory workshop expressed satisfaction with the deliberations. They were especially pleased with the process of taking further the solutions which were modelled during the intervention CLW and the focus on a more practical and action oriented process.

It was also evident in the workshop that the combination of stakeholders from the two water bodies provided more insight into how the solutions to the contradictions could be analysed and how actions could be assigned to various players. It was useful for the two community groups to get together and share knowledge as many of their issues and modeled solutions were similar, although certain differences require special attention.

The notion of expansive learning refers to the creation of new concepts and practices for emerging forms and patterns of activity (Daniels, 2009, p. 214). As can be seen from the above, new knowledge was created through the debates and critical discussions gave the participants an opportunity to more fully understand the sources of the contradictions and their effects before modelling solutions and suggesting actions.

The activity provided insight into how a whole system approach to co-management implementation involving all stakeholders and their relations, would benefit others who are experiencing similar challenges. As they interacted among themselves, they also showed evidence of boundary crossing and were able to navigate through different languages, registers and culture as well as local meanings (Kerosuo & Engeström, 2003).

The process challenged participants to question the status of the fishery in the two sites and the need to see the direction in which the fisheries sector is going. As can be seen from the deliberations, there was a high level of reflexivity evident in the kinds of solutions being suggested, which shows further promise for ongoing co-learning, transformative agency and change. In the next chapter I consider the issue of transformative agency in more detail in relation to recommendations being made from this study.

7.6 Conclusion

This chapter has discussed the change laboratory workshops and the process the expansive social learning that occurred within the change laboratory workshops. It also describes how the research participants and I, as a formative interventionist researcher, learnt together as we

went through the process of analysing contradictions and modelling of solutions. As reported above, the use of the change laboratory workshop method provided a new orientation and learning experiences among co-management stakeholders. It was evident from the discussions that the participants were excited when they realised that through the disagreements and debates, they could develop new understandings and new knowledge and that acceptable solutions were identified to issues which had been constraining co-management activities and sustainable fisheries management. Throughout the deliberation participants kept on reflecting on their fishing practices (past, present and the vision of the future), and on how these should be oriented as they move forward.

The chapter also discussed how social learning process can provide for productive possibilities for dialogue and solution modelling across activity systems and amongst subjects from diverse backgrounds. It also showed that through collective discussions and decision making processes, solutions to some outstanding contradictions could be identified, and that clear actions and responsibilities could be assigned. As noted above, I was not able to implement the full cycle of expansive learning as explained by Engeström and his colleagues within the period and resource limits of the study, but I was able to take the process as far as solution modeling and action commitments. In the next chapter I reflect on and make recommendations for furthering the expansive learning process in the two case contexts.

The next chapter summarises the study, outlines recommendations based on the findings and suggests a way forward which identifies some crucial areas to work on and possible continuation processes of expansive social learning by fisheries extension and training. It also considers the empirical examples of the two cases as developed in Chapters 5, 6 and 7 and draws on these to propose curriculum change recommendations for extension training so that it might be better aligned with co-management approaches and principles.

CHAPTER 8

SUMMARY OF THE STUDY, RECOMMENDATIONS AND CONCLUSIONS

8.1 Introduction

This chapter provides recommendations and concludes the study. These are based on the insights gained into social learning and extension in fisheries resources management in Malawi, as this pertains to co-management of the fishery. They are based on the findings of the study and they respond to some of the agreed upon crucial areas that were identified and deliberated by stakeholders during the expansive social learning processes reported on in Chapter 7 which in turn were based on analysis of the activity systems (Chapter 5) and contradictions influencing the shared object of co-management within and across activity systems (Chapter 6). They also build on the insights gained on how learning takes place in these activity systems and how it is shaped by historicity, culture, power relations and changes in practice over time, as well as the richly textured processes and possibilities for co-learning identified and explored in the study (Chapters 5, 6 and 7).

As indicated in Chapter 1 the study sought not only to explore such learning processes in the context of co-management via empirical case study research, but also to produce recommendations in the form of a model of process that can improve extension training in and for co-management approaches. A review of the extension literature showed that there is a need for such a contribution, as argued in Chapters 1 and 2. This chapter therefore synthesises what has been learned from the empirical case study work in the two case study sites, and makes recommendations on how this approach to social learning may inform extension training and ongoing social learning in the fisheries management context of Lake Malawi. It consolidates the contribution of the study to new knowledge, and concludes with some suggested ways forward.

8.2 Overview of the study

As indicated in Chapter 1 and in the preceding pages of this study, this research aimed to investigate and expand learning in the context of co-management of fisheries resources to inform extension and training in the fisheries sector. The study was located in the field of environmental education with a specific focus on community learning, agency and sustainability practices in co-management of fisheries resources. It was aimed at understanding learning as an emergent, agency centred process of change through social learning models that are said to have power to mobilise community agency for change.

The change in fisheries management policy that has taken place towards the co-management and/or adaptive co-management approach brought implications for extension service and programmes in the fisheries sector that are as yet not well defined. The study's literature review revealed that co-management approaches assume collaborative learning, or co-learning, also termed social learning, or approaches that promote the engagement of different actors who are working on shared practice (Chapter 2). They also assume new forms of agency amongst co-management stakeholders and extension workers but fail to provide insight into how such forms of agency are to be developed. This study sought to address this gap in knowledge.

While there is an emerging body of research into social learning in the environment and natural resources management sectors, and the field of socio-cultural psychology has provided good models for expanding learning and human activity in workplaces (as indicated in Chapters 1-4), these theoretical foundations for establishing co-learning or social learning approaches in support of co-management policies are not well established in the fisheries co-management sector. They have the potential to support co-learning and the emergence of transformative agency amongst the diverse stakeholders in the fisheries co-management context. While there have been studies on co-management in the fisheries sector on the African continent, most point to problems with power relations, and lack of adequate forums for ongoing social interaction, which in turn points to a lack of adequate forms for ongoing expansive social learning. This is the case in the Malawian context too, where this study was located (in Lake Malombe and the south-east arm of Lake Malawi).

In order to address the above knowledge gap, the study explored the use of expansive social learning processes and practices in extension and co-management of the fisheries sector to model a social learning process within a co-management policy framework. The study argues that such social learning platforms must be created for co-management policy to be effectively realised, for without social learning engagement and solution building to address contradictions, co-management practices cannot evolve, as per the policy intentions or interests. Such processes are especially important for sustainable fisheries management as these are inherently tension laden as economic, social and ecological goals are to be achieved at the same time. A key issue that was raised in the expansive social learning processes was the need for ongoing training to complement existent forms of co-learning. This has implications for extension services, not only in terms of providing training, but also in terms of *how* extension officers might engage with fishers and other stakeholders through on-site training interactions.

As already indicated (see Chapter 1), I conducted the study to achieve three main goals:

- To investigate how fisheries co-management communities of practice learn to respond to the risks of declining fish catches (see Chapter 5);
- To enhance understanding of the historical and social cultural constituted knowledge and practice differences that are coupled with tensions and contradictions and how these may influence co-management policy implementation with a view to inform extension and training (see Chapter 6); and
- To develop a model and tools to use for extension and training for extension offices and communities in co-management practices to expand learning for the sustainable utilisation of the fisheries resources (see Chapter 7 and this chapter).

As shown in Chapters 3 to 7, cultural historical activity theory (CHAT) after Vygotsky's, Leont'ev and Luria's earlier work and Engeström's more recent work (see Chapters 3 and 4) provided a theoretical, analytical and methodological framework for undertaking this research as its core focus is on the development of new human activity, that occurs across different activity systems, and in which the possibility to expand learning for further development of human activity exists via the expansive learning framework used in this research. The CHAT framework also provides for tools to analyse whether such learning can contribute to transformative agency (see section 8.6 below), and allows for an in-depth and careful engagement with contradictions as a potential source of new learning. Such an approach to learning was seen to be relevant to the core object of co-management, as it provides a framework in which learning is continuous. It also provides an opportunity to resolve contradictions and model and develop solutions in collaborative ways through expansive social learning processes. It was therefore consistent with the objectives of co-management, and helped to address some of the underlying assumptions or taken for granted aspects of co-management. In the Malawian context it was a particularly helpful theoretical and methodological framework as it took account of historicity and of issues such as culture in the learning process, and it did not reduce learning to training.

CHAT has, however, been critiqued for not taking adequate account of power relations and in this study these emerged as critical shaping factors in co-learning and in the expansive social learning process (see Chapters 5 to 7, and section 8.3 below). This study has shown that it is difficult to separate power relations from culture and historicity, and that it is necessary to foreground these aspects of CHAT when dealing with complex objects such as co-management. This is especially so when these approaches are introduced following problems that were introduced via colonial forms of governance and which have created disruptions to traditional ways of managing natural resources. Additionally, the context of contradiction is complex, and as reported in Chapter 6, all the contradictions identified are in some way also related to the more complex contradiction that exists between the short term and long term

goals of achieving human well-being and sustainability of natural resources for human well-being in a context of poverty where few alternatives exist but to use available natural resources for livelihoods and immediate well-being. This also affects power relations, and strategies used for survival, which are difficult to change, despite their being awareness of the need to do so, as was shown in this study. This study indicated that in such a context, there is need for ongoing co-learning and deliberation, a process that is reflexive and ongoing and which must involve stakeholders working closely together.

More specifically, using contextual, historical and critical literature reviewing as well as the CHAT theoretical framework and methodology, the study was focused on responding to four main research questions (see section 1.7.3).

1. What learning takes place among different stakeholder groups in the context of fisheries co-management that influence co-management practices? (addressed in Chapter 5)
2. What are the learning and co-management practices that can be expanded in and through learning? (addressed in Chapter 6)
3. How can such learning be expanded amongst key stakeholders? (addressed in Chapter 7)
4. What extension and training model can be used to extend the knowledge to improve extension and training? (Addressed in Chapter 2, 7 and this chapter).

8.3 Methodology and design of the study

As briefly discussed above, and as outlined in detail in Chapters 3 and 4, the methodology and design of the study were based on the principles and approaches of formative interventionist research using case study method. The choice of this approach was influenced by my research goals (see section 1.7.2), and the context of the study (see Chapters 1 and 2). As can be seen in Chapters 5, 6 and 7, CHAT provided useful analytical tools to firstly interpret learning that was occurring, possibilities for further expanding learning and for expanding and capturing learning and new model solutions that emerged from this process. Moreover, it provided a means of implementing co-learning and for describing this learning as an expansive social learning process, and provided a socio-cultural lens for furthering social learning discourse in natural resources management. As discussed earlier both social learning theorists and CHAT theorists see contradictions as fertile ground for learning (see Chapters 2, 3 and 4), which 'came together' in this study via the expansive learning process that focused on contradictions as identified in the context of co-management.

The case study design, according to Yin, (2003), deals with complexities that are often found in social and educational activities (see section 4.2). In this study, the object of co-

management was found to be a complex object with many facets and different socio-political, socio-cultural, socio-ecological and educational dimensions. The case study design helped me to reflect on this complexity, and also to develop a deeper understanding of the complexities that exist in the fisheries co-management context. I was, through this, also able to learn how new knowledge and new possibilities for transformative agency are created through stakeholder interactions in the expansive social learning process.

As explained in Chapter 4, the study was divided into two phases: an investigation and an expansion phase (see section 4.3). The investigation phase responded to the first two research questions outlined above, and I used document analysis, semi-structured interviews, focus group discussion and observations to generate data. The expansion phase responded to the third research question and I used change laboratory workshops with stakeholders to deliberate the tensions and contradictions identified in the investigation phase in which I collected data from their discussions via recording, worksheets and observations (see Chapter 4). To address the fourth research question I reviewed trends in extension and extension training, and sought also to provide some critical insights into existing extension training orientations and approaches. This is complemented by the empirical work undertaken to test out an expansive social learning approach to co-learning in a co-management context. These two processes have allowed me to provide a model for extension training curriculum development which I share below in section 8.7.

Significant to the ethos and intentions of co-management is the insight that the expansive social learning processes highlighted in chapter 7 provided a shift from technology transfer approaches to extension and social learning to an approach that engages community agency within an emergent developmental social learning trajectory. As explained above, this approach advocates the active engagement of stakeholders and identification of solutions to contradictions through intervention workshops. The expansive social learning process used in this study shows the possibilities that exist for engaging fisheries co-management stakeholders in gaining deeper understanding of the core tensions and contradictions that affect their activities (in this case the activity of co-management), and also for modelling solutions and moving towards implementation of the solutions. Understanding the social learning experiences in Malawi fisheries co-management context in this way can also potentially allow for mutual ownership of the learning processes, as well as for whatever practical steps are taken forward (Kachilonda, 2012).

This research therefore not only provided insight into learning processes, but also actively sought to provide a productive learning space for all the stakeholders involved in co-management of the fisheries resources in the two case study sites, directly contributing to change oriented learning on the ground (i.e. it had direct practical engagement value). It showed that the formative intervention researcher has a potentially valuable role to play in

enabling co-learning and change, but as explained below, this role needs to be reflexively understood and engaged (see section 8.6 below). The study has also shown that using this kind of a methodology and approach allows for the examining of views from different stakeholders involved in the management of the fishery, and this can potentially inform a richer contextual learning space in the management of the fisheries resources (see Chapters 5, 6, 7). This approach is not unlike action research approaches, but as can be seen from the research undertaken to inform Chapters 5 and 6, the emphasis on deep contextual and social-cultural and historical understanding via the activity system and contradictions analysis *prior to* the formative intervention (the CLWs), provides for a more strongly contextualised and situated form of action research / formative intervention research.

8.4 Key findings of the study

As discussed in Chapter 4, the two cases were identified because they were the first areas to implement fisheries co-management and the interest of the study was in how learning takes place in the two sites. I did not choose the sites to do a comparative study, rather to develop an in-depth understanding on how stakeholders in the two sites learn to respond to the crisis of declining fish catches. An in-depth understanding of how stakeholders learn from each other as they interact on different issues related to fisheries management started to open up some insights into the unclear questions on why even in the middle of a co-management programme, there are still declining fish catches.

8.4.1 Key findings in phase one of the study (investigation phase)

As discussed earlier, the investigation phase was responding to the first two research questions (see section 1.7.3) to find out how people learn from each other and some of the learning that can be expanded. Results from the study confirmed that fishing communities come together to discuss issues that constrain them and through the process they develop mechanisms to respond to the challenges. The analysis in Chapter 5 shows that there are richly textured existent forms of co-learning in the fishing communities and between fishing communities and other activity systems. The analysis showed that these are shaped by:

- Changes occurring in and between the activity systems over time (including the influence of policy, funding etc.);
- Partnership formation, roles and responsibilities (which can also change over time);
- Cultural influences and power relations (especially as these relate to traditional and more recently introduced state forms of power); and
- The status of the fishery (declining fish stocks).

The content of the co-learning that takes place also takes different forms and the study showed that in the fisheries co-management context, co-learning was focused on the learning of practices and how to deal with challenges, and on understanding the importance of regulations and shared knowledge for sustainability of the fish stocks. However, the co-learning processes also allowed for understanding of diverse roles in and between the activity systems, for feedback and reflexivity. There was also evidence of intergenerational learning and new knowledge acquisition, and engagement with contemporary issues. The analysis in Chapter 5 also showed that co-learning was structured by agreed upon priorities and by the mediating capacity of the extension services, as well as by mobility and interaction with other fishers including fishers outside of the immediate context. Co-learning is also structured by experience, the politics of the fishery and by regulations and by new knowledge that is introduced via research. This, as argued in Chapter 5, provided a strong foundation for the possibility to further expand learning.

While this rich context for co-learning exists, one of the issues pertinent to this study is the fact that such co-learning can run counter to the objectives of co-management of the fishery. It can also be counter to the longer term sustainability of the fishery and can therefore pose risks to sustainable livelihoods of the fishing communities. This is shown by one of the key findings of the study which raised the contradictions in the emergence of new fishing gear which fishers have efficiently designed to catch more fish even during a time when fish catches have declined. The co-learning process was experiential in that fishers noticed that using the old fishing gear could hardly catch fish but with the new fishing gear, they were able to catch fish, including immature fish. This new knowledge of destructive fishing gear was also obtained via social interaction, and was shared among fishers from Lake Malombe and those that came in from other areas. As a result there has been an increase in new fishing gear in Lake Malombe and the south-east arm of Lake Malawi. This shows that fishers work and learn together as they face the risks of declining fish catches. They seek to find alternative strategies to respond to the challenge, even though it may be destructive to the fishery in the long term. The study did, however, find some levels of reflexivity amongst the fishers, and a willingness to engage with the issue as they *did* realise that such practices were unsustainable and ultimately destructive overall.

Despite this richly textured context of existing co-learning, the study also found that co-management stakeholders have not been working together to monitor their fishing practices. They lack coordination and this has over the years resulted in an increase in contradictory messages about co-management and fisheries management. The drop in support from the Fisheries Department to the BVCs also contributed to failure in the monitoring of fisheries resources, hence an increase in the violation of fisheries rules and regulations (see Chapter 7). It was, however, also evident in the study that fishing communities in the two case studies are aware that the fishery has collapsed / is collapsing and that the current fishing practices are

unsustainable. In trying to understand why people still use illegal fishing practices while knowing that the practices are depleting the fish stocks, they pointed out that they are forced to go fishing because it is the only resource for income and livelihood.

In trying to analyse the fisheries management system, it was clear that the social complexity present in the fishing communities is highly connected to their economic system. Results from the study showed that people are aware of the status of the fishery and that most of the illegal practices are due to a lack of alternative sources of livelihoods pointing to the complexities and deep-seated contradictions that exist in contexts of poverty and natural resources management.

Failure to frequently review the fisheries regulations emerged as a key challenge in the management of the fisheries resources. With the increase in technology development among fishing communities, new techniques emerge all the time which need legal checks and guidance from the government. The study revealed that most of illegal fishing gear and practices currently in use are not included in the fisheries regulations. Fishers know that for any fishing gear and practice to be declared illegal, this has to be covered in the regulations. BVCs and other traditional leaders expressed concern that the current regulations have not been reviewed for a long time and that much of what is happening now is silent in the regulations which makes the monitoring and enforcement of the fisheries regulations difficult.

Fishing practices in the two sites have been changing over time depending on the status of the fishery. Learning from the history of the fishing practices in the two sites (Lake Malombe and the south-east arm of Lake Malawi) people used to fish with legal gear but as time went on, different fishing practices were introduced and these have been passed from one generation to the other. It was evident in the study that fishers get the skills of fishing from long periods of experience and these are passed on to the younger generation. Learning among fishing communities is inter-generational with the skills and knowledge being passed from one generation to the next through practice. As shown in this study, as the skills are passed from one generation to the other, they become more complicated, especially when faced with challenges of resources depletion.

8.4.2 Key findings in phase two of the study (expansion of learning)

The expansion phase of the study was responding to the third research question: *How can the learning and co-management practices be expanded among key stakeholders?* Findings from the second phase were based on the expansive social learning process undertaken through change laboratory workshops. As discussed earlier (see Chapter 7) two expansive learning workshops were conducted in the two research sites.

The composition of stakeholders from diverse fisheries backgrounds provided a well-grounded analysis of the contradictions and the solutions which were developed represented the multi-voiced nature of the activity systems, and represented a wide range of perspectives. It was observed during the workshops that there were tensions among participants when they started tracing and analysing the contradictions, but that the tensions were re-oriented to solution modelling, which helped to strengthen collaborative approaches to resolving co-management challenges and contradictions.

The differences in opinions during the discussion were due to unclear guidelines for co-management and participants were striving to understand co-management better by reflecting on what BVCs and traditional leaders were told to be doing when the programmes started. Solutions modelled in the expansive learning phase show that co-management stakeholders require frequent consultations and coordination to enable them to contribute to the co-management processes. The high level of debate and long deliberations in the interventionist research process created a learning space among all the stakeholders as reported in Chapter 7. The new knowledge created through the expansive social learning process also allowed for mutual commitment to the common object.

Most of the contradictions surfaced during the investigation phase and discussed in more detail and focus in the CL workshops emanated from primary contradictions, and when traced further became secondary contradictions. In some cases the same contradictions crossed the boundaries of the activity systems and become tertiary and quaternary contradictions as reported in Chapter 6. The study revealed that it was important to trace the relations between the contradictions, and examine the root causes of the contradiction. This information on the contradiction and its constitution influenced how it could be best addressed, and therefore also how the response would influence the interacting activity systems. It was observed that there is a need for in-depth and careful research prior to the CL workshop process in order to provide good quality mirror data for deliberation (for the double stimulation referred to by Vygotsky and Engeström, see Chapter 3), and that the CL workshop process itself requires careful planning and facilitation to allow participants to get to the root causes of the contradictions, and to collectively model solutions.

While this was the case, the study also showed that the social learning processes within and across the activity systems and the expansive social learning process through the interactions of the fisheries co-management systems in change laboratory workshops, was able to provide consensus responses to the many important and critical questions negatively impacting on sustainable fisheries management. The process allowed for in-depth socio-cultural and socio-historical understanding to complement the ecological data on the fisheries and their decline. This allowed for critical understanding as the process moved from one step to the next through the participatory learning process. The use of CHAT in this study has helped to

realise this recommendation of UNESCO in practice, and to explain how people learn to execute activities in activity systems and how their activities affect each other within and across activity systems. Most importantly, it has provided a means through which new human activities such as co-management can develop, also providing a clear insight into how learning can lead development of new human activity (Vygotsky, 1978).

8.5.3 A summative perspective on learning, as observed in this study

As indicated in the preceding chapters of this study, and in the summary above, a richly textured learning environment and process were found and further mobilised in the context of fisheries co-management in Malawi in the two case study sites. From this it is clear that learning is a key and important process in fisheries co-management, and needs to be given more attention. As shown in Chapter 7, training in the co-management context was being neglected and there was a demand for, and interest in knowledge exchange and learning. This study has uncovered many dynamics of the learning process which can be helpful to thinking about the place and role of learning in fisheries co-management. Here I summarise some of the dynamics of the learning processes as found in the two case study sites to make this more visible.

1. *Who is learning in fisheries co-management?* As seen from this study fisheries co-management activity systems are complex due to the diversity of stakeholders ranging from fishing communities, extension and research officers and also lecturers from the Fisheries College. As shown in this study all these stakeholders were engaged in various co-learning processes and were also prepared to learn from each other. However, as also argued by Wals, van der Hoeven and Blanken (2009), success in social learning depends a great deal on the collective goals and/or visions shared by those engaged in the process. The importance of being willing to share and be committed to a common object (in this case co-management) as also evidenced in this study is core to the possibility of learning amongst heterogeneous groups or different activity systems. In this study all stakeholders were willing to learn together, even though there were tensions and conflicts amongst them (as described in Chapters 5, 6 and 7) as they all seemed to understand that the protection of the fishery was of benefit to all concerned and they were therefore willing to make commitments to the shared object of co-management and more sustainable management of the fishery.

2. *What do stakeholders learn?* The diversity of stakeholders allows people with different expertise, experiences and skills to be brought together to learn from and with each other. This study has shown that in the fisheries co-management context in Malawi, there is learning taking place that includes the following:

- learning about and how to implement new practices (illegal and legal)
- learning about regulations and how to manage the fishery within legal boundaries
- learning about fish stocks and their breeding patterns and how to manage the fishery accordingly
- learning about co-management approaches and the roles and responsibilities of diverse partners and how to interact with them
- learning how to work together to resolve contradictions and difficulties experienced in the fishery
- learning about best practices in other contexts and how these can be transferred to own context
- learning about sustainability and longer term implications of current practices
- learning about roles, responsibilities and power relations and how to navigate these within a complex governance context
- learning about new approaches and issues introduced via research
- learning about change and changes in context and practice
- learning about collaboration and how best to work together on a shared object such as co-management

3. *Why do they learn?* The evidence in this study shows that stakeholders in the two case study sites were learning for the following reasons:

   - To improve their fish catches, which in turn was motivated either by an interest in providing for family livelihoods and/or profit making although amongst the fishing communities the former was the main motive, rather than the latter. Amongst commercial fishers, the latter was a stronger motive than the former.
   - To manage the fishery in a more sustainable manner so that fish stocks would not become more depleted than they already were; this was the motive of government and fishers alike.
   - To create livelihood benefits for the communities that were dependent on the fishery; this was the motive of the chiefs, the BVCs and the government.
   - To benefit personally from the fishery; this was the motive of those who were being swayed by corruption and those that failed to substantively engage with the co-management object.

   This shows that the purpose of learning is very closely linked to the common object of people's activity, albeit in diverse and sometimes contradictory ways.

4. *How do they learn?* As shown in Chapters 5 and 7, stakeholders concerned with co-management across the different activity systems learn through responding to changes and uncertainties taking place in the fisheries sector drawing on existing networks and community structures which exist and are passed on from generation to generation as people interact with each other. They also learn in response to complexity and as shown in Chapters 2, 5 and 6, complexity in the fisheries co-management activity increases due to the composition of the stakeholders, knowledge gaps, resource limitations, historicity, and the power relations that may exist among stakeholders in the activity systems. The data also shows that stakeholders in the different activity systems learn where relations are stronger and where they are weaker; learning is less likely to occur (as for example between BVCs and chiefs, or researchers and extension officers). Lave and Wenger (1998) argued that learning happens through the interactions and relationships people form over time, and in this regard, this study found that power relations also shaped how people were learning and what could be learned. For example, the conflicts in authority between the BVCs and traditional leadership shaped some learning on co-management as shown in Chapters 5 to 7.

   This study has shown too that learning is significantly shaped by the social, and the insights gained into the learning process in this study seem to confirm Vygotsky's point that learning first occurs on the interpsychological plane, and is then transferred to the intrapsychological plane. Vygotsky described learning as a socio-cultural and cultural historical process that involves a merging of the intellect with the affect (or motives) (Newman & Holzman, 1993), and as a process that is shaped by a Zone of Proximal Development (ibid.). In this study it was clear that motives, especially the motive to access and use the fishery resources, as well as manage them better in response to risk of the fishery collapse, were key influencing factors on the learning process. Significant to interpreting the learning processes in this study is the point made by Vygotsky that "higher mental functions are internalised social relationships" (Newman & Holzman, 1993, p. 79). With this Vygotsky suggests that the social in learning should not be reduced to the interpsychological or interactions between people, but should also focus on the intrapsychological or what is internalised by individuals and how. Newman and Holzman (1993) suggested that to focus on the relationship between the interpsychological or social aspects of learning and the intrapsychological aspects of learning, there is a need to understand the Zone of Proximal Development. In this study it was the policy of co-management, and the collapse of the fishery that provided a social-ecological Zone of Proximal Development for learning to occur and this allowed multiple stakeholders to define and work on a common object. Newman and Holzman (1993) argued that the Zone of Proximal development must be located in material reality, and in the social processes

that produce it; it is a *principle* for "explaining the interaction between individual and society" (p. 79). Mukute (2010) argued that sustainability issues and concepts such as those represented in sustainable agriculture provide fruitful zones of proximal development for new learning in society as we engage with the complexities of social-ecological change. Lindley (2014) in his study found that wetland management provided a similar zone of proximal development for a national forestry company's learning and development. This study has shown how, when people are self-consciously engaging with a complex object such as co-management, they are in fact collectively learning and developing through self-conscious utilisation of the ZPD, where ZPD is "understood to be the fundamental social historical characteristic" (Newman and Holzman, 1993, p. 80). Moll and Greenberg (1990) suggested that resources in families are controlled through social relations which also function to facilitate the exchange of 'funds of knowledge' amongst participants. This study shows that this is the case at a community level too, and like in the Moll and Greenberg (1990) research, I found that there are social systems of knowledge that operate as "extended zones of proximal development" (p. 32) that are "multi-stranded and flexible in that they involve many people and can be arranged or re-arranged depending on the specific needs of the participants" (p. 32), showing that social networks and activity system engagement are vital for learning and development. And here it is also important to reflect that in this study, it was clear that the learning could lead development of the co-management process, as also proposed by Vygotsky, that learning is not development, but that learning *leads* development. Engeström's methodology of expansive learning using developmental work research and change laboratory processes provided *the means for learning to lead development* in this study.

5. *What is coming out of their learning?* Changes in the fishing practices and uncertainties in terms of declining fish catches have been some of the driving forces for learning among fisheries co-management communities of practice. Wals and Heymann (2004) argued that often when people are faced with challenges, conflicts and uncertainties they tend to get together in an attempt to respond to and adapt to the circumstances as was the case in this study. Some of the outcomes of the learning process that were observed in this study include:

    - Improved social-ecological knowledge and understanding, especially related to the concept of co-management, and approaches to better co-manage the fishery in a context of declining fish stocks;
    - Improved knowledge and understanding of the role and impact of different kinds of fishing gear on the sustainability of the fishery;

- Improved competence for boundary crossing learning and development (across activity systems);
- Improved reflexivity and understanding of the role of culture, politics, history, research and training in defining current decisions, conflicts and their resolution; and
- Improved motive / commitment to the sustainability of the fishery for the benefit of all who are dependent on the fishery (both current and future generations)

Another key outcome of the learning is some of the expressions of transformative agency as defined by Engeström (2011), Haapasaari, Engeström and Kerosuo (2012) and Heikkilä and Seppänen (2014). This is discussed in more detail below in section 8.6 in a discussion which has helped to frame recommendations from the study.

6. *How can we use the learning to improve fisheries management?* As argued above, and by Vygotsky and his followers, *learning leads development.* This provides a strong argument for using expansive learning techniques as explored through this study in the form of change laboratory workshops and similar formative intervention research approaches that are *learning-centred.* As shown in this study, through such an approach, stakeholders are able to deliberate and discuss co-management issues and collectively model and find solutions to the existing contradictions that they are experiencing. As also shown in this study, this happens when stakeholders from different levels and backgrounds meet to discuss and debate on issues or an issue (Engeström, as cited in Yamazumi, 2009, p. 21). The possibilities for learning leading development in natural resources management contexts has been explored by other researchers (see Chapter 2), and in a southern African context it has been explicitly explored by environmental education researchers using CHAT (Mukute, 2010; Masara, 2011; Lindley, 2014). These studies all show that adopting a *learning-centred approach to research-and-development,* changes research from being an externally extractive activity to a *process of learning-and-development,* where the research is integral to the learning process as was modeled in this study (see also earlier work in this genre such as the work of Babikwa, 2000). The study has shown that emerging data from research, used as mirror data, can stimulate new possibilities for learning, and that the co-defined solution modelling that emerges from the learning can assist in providing the stakeholders with some solutions that can help to better manage the fisheries resources. In the context of this study, the expansive social learning process through the change laboratory workshops in the two research areas provides grounds for the development of solutions to the contradictions in a participatory process where

stakeholders are actively involved. Confirming the value of the expansive learning process, Warmington et al. (2005) claimed that expansive learning is concerned with knowledge creation and application in context, emphasising the applied research-and-learning process that allows for learning to lead development. As discussed above, this also involves understanding how learning can lead to transformative agency. I focus my recommendations from the two cases on further development of transformative agency, as mobilised via the expansive learning processes in the study to date.

8.5 Case-based recommendations for enhancing transformative agency through ongoing expansive learning

Heikkilä and Seppänen (2014) suggest that one of the key aims of formative intervention expansive learning research is to enhance the agency of participants (Engeström & Sannino, 2010), especially during complex change situations. As indicated in Chapter 2, Engeström and Virkkunen (2007) described transformative agency as participants' capacity to make 'purposeful changes' to their work activity, in this case it to fishing and co-management activities. As indicated in the previous two chapters, and in Chapter 4, in this study, I used the methods of double stimulation using mirror data in change laboratory workshops to mirror contradictions for further deliberation, learning and development. Heikkilä and Seppänen (2014) suggested that methods developed in the CHAT research community such as developmental work research that use double stimulation can help to facilitate the emergence of transformative agency, as was also reported in Mukute's (2010) study.

It is not always easy to identify such transformative agency, and here I have found the work of Heikkilä and Seppänen (2014) useful to reflect on the emergence of transformative agency via the expansive learning process reported on in this study. They described six types of **agency expressions** that have been developed by Sannino (2008), Engeström (2011) and Haapasaari (2012) and suggest that these can be helpful when interpreting the relationship between expansive social learning and transformative agency. I used the work of Heikkilä and Seppänen (2014) to reflect on and make recommendations on the expansive learning process in the two case study sites, as they suggested that "agency can be understood as active working through contradictions" (p. 7) and they go on to describe how six forms of agency expression might contribute to the emergence of agency in formative interventions. They stated:

> Based on Sannino's (2010) findings as well as those of other researchers, Engeström (2011, 623-624) defined five forms of participants' transformative agency emerging during a formative intervention: agency may express itself through "resisting interventionists or management, explicating new possibilities or potentials in the

activity, envisioning new patterns or models of the activity, committing to concrete actions aimed at changing the activity, and taking consequential actions to change the activity". Later Haapasaari et al. (2012) added criticizing as the sixth form of emerging agency, as it differs from resisting. These forms contribute to agency as "participants' capacity to take purposeful actions to change their work activity" (Engeström & Virkkunen, 2007) in different ways.

While it was not my intention to research transformative agency in depth in this study, I have found that the agency expressions outlined by Heikkilä and Seppänen (2014) and colleagues, a useful reflective vantage point on the expansive learning and its potential for further learning and development. Unlike other researchers who study the emergence of agency in micro-level detail (e.g. Heikkilä and Seppänen (2014), Haapasaari (2012)), I only summatively examine the evidence of transformative agency as catalysed in and through this research. I use the framework provided by Engeström (2011) and Haapasaari (2012, p. 11), outlined in Table 8.1 below from a broader, more summative vantage point.

Table 8.1: Types of transformative agency (Engeström, 2011; Haapasaari, 2012, p. 11, cited in and adapted from Heikkilä and Seppänen, 2014, pp. 13-14)

Type of Agency Expression based on Engeström (2011) and Haapasaari (2012) (direct citation from Haapasaari, 2012)
A: *Resisting* the change, new suggestions or initiatives. Directed at management, co-workers or the interventionist
B: *Criticizing* the current activity and organisation. Change oriented and aiming at identifying problems in current ways of working
C: *Explicating* new possibilities or potentials in the activity. Relating to past positive experiences or former well tried practices.
D: *Envisioning* new patterns or models in the activity. Future oriented suggestions or presentations of a new way of working.
E: *Committing to actions.* Committing to take concrete, new actions to change the activity. Commissive speech acts are tied to time and place.
F. *Taking actions.* Reporting having taken consequential actions to change the activity in between or after the change laboratory sessions.

Heikkilä and Seppänen (2014) also suggested that *reframing* is a type of agency expression where participants reflexively seek to change their own practices.

8.5.1 Recommendations in the Lake Malombe case study context

As the expressions of transformative agency are context specific and are related closely to the interaction and expansive social learning processes that occurred in the case study sites, the recommendations need to be context specific. I make recommendations in relation to the key contradictions that were engaged in each case study site as reported in Chapter 7.

8.5.1.1 Interaction of fishers influences the modification of fishing gear

The study showed that the interaction that occurs among fishers coupled with the declining fish catches has influenced the modification of fishing gear. This shows that fishers have been able to *envision new patterns or models of activity, commit to new actions, and take actions to modify their fishing gear.* However, as found in this study, this transformative action was contradictory to the goals of co-management and especially sustainable management of the fishery. The expansive learning cycle was therefore oriented towards *reframing* these forms of action towards more sustainable forms of action that address the problem of modified fishing gear that were under-meshed and that were meant to catch small fish in order to maximise their catches.

In responding to this contradiction (Contradiction #1, see section 7.2.3.2), the following expressions of agency were noticed amongst the fishers:

- *Resistance,* as not all fishers were willing to change their practice and it was said that there were no alternatives, and if they stopped the practice, others would not, and thus the solution to the problem was seen to be more effective regulation.

- *Criticising,* as it was confirmed in the study, the practice of modifying fishing gear is detrimental to sustainable fisheries management and a delay in the review of the fisheries regulations accelerates the depletion of fish stocks as more and more immature fish are caught using the under-meshed fishing gear.

- *Explicating and Envisioning,* as the expansive learning process led to reflections on regular monitoring and effective application of regulations, and also made clear recommendations for more frequent reviews of the fisheries regulations and improved collective monitoring of the fishing practices. As reported in Chapters 6 and 7 it was seen that this could address the threat of harvesting immature fish during the open fishing season. It was also evident in the study that adequate government support to the BVCs and traditional leaders would motivate them to put more effort in the monitoring of the fishing gear in their BVCS and the influence traditional leaders have in various local areas would discourage the use of the fishing gear.

- *Commissive,* as the intervention workshops motivated local stakeholders to mobilise fishing communities in Lake Malombe led by the traditional leader to institute a local committee to start close checks on the kind of messages that are taken to the fishing communities and making sure that people work together closely to make sure that people get the right messages.

- *Taking action*, as BVCs and local leaders left the workshop, especially those from Lake Malombe, they started mobilising other fishers to start monitoring the fish catches in some of the beaches around Chimwala area and report to the traditional chief any sign of immature fish especially soon after opening the closed season.

Recommendation: While there is evidence of expressions of agency that include commitment and action taking (for improved monitoring), stronger forms of commitment and action taking are needed, especially amongst the fishers to strengthen the emergence of transformative agency within a *reframed* context. This should be the focus of future expansive learning interventions in the site. As indicated across this thesis, fishing is a practice, and it is at the level of fishing practice that transformative agency for more sustainable fishing must become realised. Thus, the ultimate test of transformative agency as emerging from the expansive learning process, will be both: improved regulations and monitoring *and* changes in fishing practice that move away from use of under-meshed fishing gear. This shows that the expansive learning process, while productive at the initiation stage, requires ongoing collaborative engagement and reflexive engagement, more than was possible within the boundaries of this study.

8.5.1.2 Shared knowledge on the current closed season

Responding to contradiction #2 (see Section 6.3.3.4) the following expressions of agency were noted amongst fishing communities:

- *Criticising,* as was evident in the study continuous catching of immature fish due to poor timing of the closed season period was negatively affecting the sustainable management of the fisheries resources and the livelihood of the fishing communities. As was seen from this study, fishing communities were dissatisfied with the current closed season, and were pressurising the Department of Fisheries research unit to undertake further research together with fishers to work out possible changes to the current closed season because they observed juvenile fish soon after opening their closed season.

- *Explicating and envisioning,* took place through articulating possibilities for a new closed season that is in line with the breeding of fish in Lake. Articulation of improved government support to BVCs and local leaders on the future explication of

a more sustainable approach to the management of the closed season was also observed.

- *Commissive,* during the change laboratory workshop, the need for joint research on the right period for the closed season became a key focus of the modeled solutions. The suggestion was made to use an action research approach involving multiple stakeholders, including the BVCs, traditional leaders, and to share data generated via other scientific methods with the research and extension officers. As stakeholders were mapping the way forward (see Chapter 7), they agreed to initiate a process to change and proposed extending the current closed season from the current period of three months to six months to allow the juvenile fish that are caught soon after open season to grow. BVCs and traditional leaders urged the Fisheries Department to design and organise the proposed joint research between research officers and fishing communities. The Fisheries Department representatives agreed to take up the proposal within their institutions.

- *Taking action,* to actually change the closed season did not take place in the duration time of the study, as this is a more complex process requiring engagement with a much wider range of stakeholders and actual changes in legislation which could take some time.

Recommendation: Making a change to the closed season is obviously a complex process (but not impossible, as it has been done before) and is likely to require much more substantive research and longer term engagement with a number of stakeholders across a much wider range of BVC contexts and government officials than was possible to mobilise within the confines of this study and its processes. This is also likely to require engagement with neighbouring BVCs or even the lake-wide constituencies. The proposals made in the expansive learning process in the Lake Malombe context, however, provides a starting point that can be taken up through a more substantive and widely extended expansive learning process. Crucial to the success of longer term action taking here would be the joint research project as proposed via the other expressions of transformative agency.

8.5.1.3 Power relations and conflicts that exist between Beach Village Committees and local leaders

The study revealed that BVCs and traditional leaders struggle for power on the control of fisheries resources. Before BVCs were introduced in the rural areas there were other local structures like village heads and chiefs who were in control of the fisheries activities. The introduction of BVCs obstructed some of the privileges of traditional leaders and the control of fisheries activities was compromised. The state-linked power of BVCs tended to

foreground the power of the BVCs and government more than the traditional leaders who are traditionally owners of the land, but this was not easily accepted by the traditional leaders, who were often appointing their own family members into the BVC structure.

In responding to this contradiction (contradiction #3, see Section 7.2.3.5), the following expressions of agency were noted among BVCs and traditional leaders:

- *Resisting,* as the newly instituted BVCs started working on co-management new roles and responsibilities which included monitoring of illegal fishing in the areas, closed season and others, traditional leaders felt obstructed from their control of the management of fisheries resources. This resulted in resistance to changes and initiatives brought by BVC structures, expressed through forms of transformative agency that led to appointment of family members into the BVC structures to resist the power of government appointed BVC members.

- There was *critique (criticizing)* of the behaviour of the traditional leaders to appoint family members to the BVC structures, termed a form of corruption. Traditional leaders also critiqued the BVCs, and traditional leaders started criticising their activities and the legality of the BVCs to charge illegal fishers. BVCs in turn, *critiqued* the Department of Fisheries research and extension units for not providing proper information, causing confusion and mixed messages.

- In all cases there was need for *reframing* towards a shared object of a more sustainable co-managed fishery in which all power relations would need to be reconsidered and reframed.

- *Explicating and envisioning,* took place via suggestions for more frequent dialogue and interactions between the two actors to ensure greater clarity on roles and responsibilities for co-management. Here the support of the Department of Fisheries was also seen to be important. In the CLWs, traditional leaders urged government to resume BVC training where roles and responsibilities of BVCs and traditional leaders could be redefined so that division of labour in both fishing community and government activity systems could be more carefully and transparently constituted.

Recommendation: There were *no substantive commissive or action taking expressions of agency* visible within the expansive learning process associated with this contradiction. To take it further than explication and envisioning, and to address the complex reframing, clearly required the Department of Fisheries' intervention and more substantive engagement with the underlying structural, socio-cultural and historical concerns that were shaping this contradiction. As indicated in section 8.6.1.5 below, the power related issues in this context are complex, and may require deeper engagement and understanding for a real solution to

emerge; hence I have also made a recommendation for further research pertaining to this. In the Lake Malombe context, however, it is recommended that further expansive learning engagements are mediated between BVCs, government and the traditional leadership to clearly outline roles and responsibilities and associated procedures for operation.

8.5.1.4 Contradictory messages on fisheries co-management

It was evident from the study that stakeholders have different understandings about co-management and that they give contradictory messages which at times confuse them, thereby constraining co-management approaches to fisheries management. In response to contradiction #4 discussed in section 7.2.3.6 the Lake Malombe stakeholders showed the following expressions of agency:

- *Criticising,* as new messages on fisheries co-management were introduced, both those in the fishing community activity system and those from the government activity system had different understandings of what co-management meant. As this contradiction was discussed, stakeholders from different activity systems critiqued each other as shown in Chapter 7.

- *Explicating and envisioning* of this contradiction pointed to being clearer about roles and responsibilities, about sharing information with each other (e.g. research and extension officers in the government activity system), and overall solutions envisaged pointed to closer communication between researchers and the extension service in the government activity system and also BVCs and traditional leaders in the fishing community activity system.

- *Committing to actions,* as contradictory messages were seen as constraining co-management stakeholders in both fishing community and government activity systems agreed to introduce more frequent collaborative co-management meetings where BVCs, traditional leaders and government extension officers come together to share new messages and clarify on issues that are not well understood.

- *Taking actions,* in trying to address the problem of giving different messages regarding co-management, stakeholders empowered traditional leaders and BVCs to consult extension officers residing in the areas any time they see or observe unsustainable practices due to contradictory messages.

Recommendation: Findings from the study show that frequent interactions through coordination meetings between extension and research; extension and BVCs and also among all co-management stakeholders to critically engage themselves in ongoing expansive social learning processes, would provide more opportunity for turning the contradictory messages

into well-grounded information. It is recommended therefore that these processes continue as planned.

8.5.1.5 Lack of training for Beach Village Committees and traditional leaders

Responding to contradiction #5 (see Section 7.2.3.7) the following expressions of agency were noted amongst fishing communities:

- *Criticising,* took place via expressions of dissatisfaction for having inadequately trained BVCs amongst all stakeholders including BVCs themselves. Traditional leaders strongly advised the Department of Fisheries not to expect people who do not know what to do to perform the way they expect. Poor performance of BVCs is due to lack of training.

- *Explicating and envisioning* took place as co-management stakeholders in both fishing community and government activity systems discussed the importance of having well-trained BVCs and traditional leaders. BVCs emphasised that such training can be decentralised and that extension officers with support from the District Fisheries Office can organise such training to cut costs of travel and accommodation.

- *Committing to actions,* traditional leaders and BVCs in Lake Malombe expressed willingness to support the planning of BVC training and the identification of the right people for the training. Traditional leaders assured BVCs that training could be conducted in already existing premises e.g. schools, traditional courts where large numbers can be accommodated. Stakeholders from the government activity system assured stakeholders from the fishing community activity system that processes will be put in place to identify funds for BVC training and urged those that need to be trained to make use of such chances when called for training.

- *Taking actions* to actually develop and implement the new training were not visible in relation to this contradiction within the confines of the study time period.

Recommendation: It is recommended that further expansive learning be undertaken to ensure that the training is developed and run as proposed. The study has also modeled a new approach to training, and recommendations have been made to improve extension training approaches (see section 8.6.2.5 below). This could also be used to address this contradiction further.

8.5.2 Recommendations for the south-east arm of Lake Malawi

8.5.2.1 Learning about role of Income Generating Activities and fisheries management

The study showed that fishing communities in the south-east arm of Lake Malawi have a good understanding that the decline in the fish catches is due to over dependence on the fishery due to lack of other alternative means of generating income for their livelihoods. Responding to contradiction #1 (see section 7.3.2.1) from the south-east arm of Lake Malawi, the following expressions of agency were noted amongst fishing communities:

- *Resisting,* BVCs and traditional leaders complained that the absence of other income generating activities is forcing fishers to fish with illegal fishing gear. This provides a reason for what seems to be a resistance to implement co-management approaches. They complained that fishing is the only source of income to sustain their livelihoods.

- *Criticising,* as evident from the study, BVCs expressed concern that extension workers and others from government assume people are ignorant about the way fish catches are declining and noted that they are the ones involved in the fishing and that any difference in fish catches is well known to them. BVCs requested government to assist them with other sources of generating income as a way of decreasing pressure on the fishery. They also critiqued some of the previous attempts to implement income generating activities as they took too long to realise an income (e.g. the vegetable growing project).

- *Explicating and envisioning,* as a way of looking at other possibilities and new ways of working to address the over dependency on the fishery, stakeholders in the three activity systems (fishing community, extension and research and also Fisheries College) discussed possible ways to provide for alternative ways that will reduce the dependency on the fishery, and suggested a multi-sectoral approach involving more than the Fisheries Department, but suggested that the Fisheries Department should help and lead such a process (see section 7.3.2.1).

- *Committing to actions* was evident as stakeholders in the government activity system assured BVCs and traditional leaders that they are working with other institutions who can come and train fishers to run other businesses apart from fishing.

- *Taking actions,* as people continued discussing this contradiction after the way forward change laboratory workshop it became evident that BVC members and fishers have intensified their involvement in other business. Some of the BVCs expressed interest in aquaculture and some had already started participating in a cage culture programme that was initiated by the Department of Fisheries.

Recommendation: It is recommended that further expansive learning processes be initiated amongst multiple stakeholders that can help fishers to diversify income to secure their livelihoods.

8.5.2.2 Lack of closed season for commercial fishers

It was revealed in the study that the lack of a closed season for commercial fishers compromises co-management efforts because the purpose of having closed season is to conserve and protect the breeding fish stocks during the breeding season. Responding to contradiction #2 (see section 7.3.2.2), the following expressions of agency were noted amongst fishing communities:

- *Criticising,* was evident in the dissatisfaction voiced amongst the fishing community stakeholders about the lack of regulation for commercial fishers on closed seasons. Their observations were that fish catches from trawl nets were comprised of immature fish. BVC members argued that this means that mesh sizes are small and monitoring of such fishing nets is important.

- *Explicating and envisioning,* BVC members and local leaders argued that the regulation on the closed season needs to be for both artisanal and commercial fishers, noting that the amount of fish caught by commercial fishers is more than that of artisanal fishers. BVC members and traditional leaders felt government favours commercial fishers and urged government to review its regulations policies for the benefit of all. They reflected on the fishers' past experiences, and indicated that it was evident that the absence of trawl nets in most of the areas in the south-east arm of Lake Malawi and other parts of the lake had a positive impact on the fishery. Fishing community activity system members requested a review of the regulations so that commercial fishers observe the closed season.

- *Committing to actions,* responding to the contradiction raised by BVCs and traditional leaders, extension and research officers indicated that the issue of closed season for commercial fishers has been highlighted in a number of meetings and that government was already trying to find ways of resolving the issue.

- *Taking actions,* as the fisheries policy was being reviewed, stakeholders in the extension and research activity system and also those from the Fisheries College activity system assured BVCs and traditional leaders that the issue is dealt with through a review of the regulations and making sure that the regulation is followed through the empowerment of BVCs and traditional leaders (see section 7.3.2.2). However, this did not manifest in actual changes to the practice of the commercial fishers in the time period of this research.

Recommendation: Results from the study showed that a closed season for both artisanal and commercial fishers and close monitoring of the fishing practices could enhance sustainable fisheries management in the south-east arm of Lake Malawi, and it is recommended that this issue be considered further at the level of action taking in future expansive learning processes.

8.5.2.3 Contradictory messages on fisheries co-management

The study confirmed that fisheries officers and BVCs are sharing contradictory messages on co-management, which compromises co-management and sustainable fisheries management practices. It was observed in the study that the contradictory messages are due to lack of coordination among co-management stakeholders. Responding to contradiction #3 (see Section 7.3.2.3), the following expression of agency was expressed by co-management stakeholders in community, extension and research and also Fisheries College activity systems:

- *Criticising,* BVCs and traditional leaders expressed concern about a lack of coordination amongst all stakeholders and noted this as the main cause of contradictory messages. Stakeholders in the three activity systems had different understandings of co-management and these different understandings are then shared with the fishing communities who also further confuse fellow fishers.

- *Explicating and envisioning,* BVCs and traditional leaders requested a new approach to the development of information through the engagement of both extension and research officers so that the same information could be shared. They also suggested more regular meetings.

- *Committing to actions,* as a way of addressing the issue of contradictory messages amongst co-management stakeholders, government committed to introducing frequent meetings to review different messages.

- *Taking actions,* after the change laboratory workshop in the south-east arm of Lake Malawi, research extension meetings were discussed with the Assistant District Fisheries Officer and further inter-BVC meetings were also planned where messages will be harmonised.

Recommendation: It is recommended that the proposed actions be taken forward as indicated in the envisioning, committing to action and action taking phases of the expansive learning process associated with this contradiction in the south-east arm of Lake Malawi. As shown in section 8.6.1 above a similar issue was discussed in Lake Malombe so experience at the Fisheries Department level could cover both of these communities. It could also cover others

where this issue is also likely to be present given that part of the source of the problem lies at the level of communication between extension and research in the Department of Fisheries (which serves all the BVCs along the lake).

8.5.2.4 Power conflict between Beach Village Committees and traditional leaders

Results from the study revealed that like in Lake Malombe, in the south-east arm of Lake Malawi, the introduction of BVCs on different beaches had created tensions between them and the traditional leaders who for a long time had been benefiting from the fishing activities in the areas. The power conflict between BVCs and traditional leaders was also a source of contradictory messages because the two actors compete for recognition. As in the Lake Malombe context, there were also accusations of corruption that resulted from this situation. Expressions of agency related to this contradiction in the south-east arm of Lake Malawi were very similar to that of Lake Malombe. Responding to contradiction #4 (see section 7.3.2.4) the following expression of agency was noted:

- *Resisting,* was evidenced by traditional leaders' resistance to the instituting of BVCs to undertake parallel activities resulted which obstructed traditional leaders from controlling the management of fisheries resources. This resulted in resistance to changes and initiatives brought by BVC structures.

- *Criticising,* BVCs were criticised by traditional leaders as it was said that they had no legal mandate to carry out activities such as charging illegal fishers. Traditional leaders were criticised for some forms of corruption, and the Fisheries Department was criticised for not clarifying roles and responsibilities properly to avoid governance conflicts.

- *Explicating and envisioning,* involved suggestions to ensure that roles and responsibilities are properly clarified.

- *Committing to actions,* were evident when government extension officers planned to resume BVC training so that roles and responsibilities of BVCs and traditional leaders could be clearly defined.

- *Taking action,* BVC members and traditional leaders in the south-east arm of Lake Malawi agreed to organise a separate meeting to plan new ways of working together and of jointly developing a plan of action which would include issues of division of labour in the BVCs. They agreed to indicate when and how frequently they would meet and agreed to submit their plan to the Department of Fisheries.

Recommendations: It was evident from the study that frequent stakeholder meetings, clear roles and responsibilities (division of labour) would help to address the conflicts. The issue of power relations is, however, more complex than it seems at face value, and further recommendations on this are made below in section 8.8.

8.5.2.5 Fisheries College curriculum less responsive to co-management

The study revealed that the Fisheries College curriculum is inadequately prepared for teaching co-management (from content, lecturer training and learning resources perspective) and that this makes it difficult for the lecturers to teach. It was also noted that most of the college lecturers do not have a deeper understanding of co-management except for the few who are specialised in extension and those teaching the subject. Responding to contradiction #5 (see Section 7.3.2.5) the following expression of agency was noted among Fisheries College lecturers:

- *Resisting,* as not all lecturers were knowledgeable about co-management most of them expressed a lack of capacity to cover co-management principles in their different subjects and indicated that they needed to be trained better.

- *Criticising,* was also evident in the study as it was said that college lecturers were not adequately trained, that they lacked good content sources, and that the knowledge from the research and extension divisions in the Department of Fisheries was not being shared with them. The college was critiqued for producing graduates from the college who lacked co-management knowledge to impart to the fishing communities.

- *Explicating and envisioning,* took place when it was suggested that there was a need for mainstreaming of co-management into the curriculum of the college, and that lecturers should receive more training on the topic of co-management and should interact more with the Fisheries Department and with the fishing communities.

- *Committing to actions,* college lecturers expressed interest in mainstreaming co-management into the college curriculum and they expressed a willingness to undergo training, so that they could cover the topic of co-management well in various subjects.

- *Taking action,* after the change laboratory workshop a tentative programme to have the curriculum reviewed was made and lecturers agreed to use the previous research programme on Community Based Natural Resources (CBNRM) to see what was missing from the curriculum.

Recommendation: The landscape of fisheries resources management is changing all the time and a review of the curriculum to mainstream or infuse the emerging issues in co-

management was seen as an appropriate way forward. It is therefore recommended that this approach be taken forward as agreed upon in the expansive learning process. This will require more training and orientation for college lecturers on fisheries co-management. This could be done through training, workshops, study visits to centres of expertise in co-management as also suggested by the group. A participatory curriculum review process engaging lecturers and other stakeholders in a social learning consultation process could assist in creating a curriculum that is relevant, reflexive, and responsive to co-management, as was shown by the discussions in relation to this contradiction.

8.5.2.6 Fisher interactions facilitate the emergence of new fishing gear

Like in the Lake Malombe case, the study confirmed that the massive use of newly designed under-meshed fishing gears in the south-east arm of Lake Malawi are designed to respond to a continuous decline in fish stocks, and the need for livelihood income from fish catches. Responses to this contradiction were very similar to the case of Lake Malombe, see section 8.6.1.1 above. In responding to this contradiction (Contradiction #6, see Section 7.2.3.6), the following expressions of agency were noticed amongst the fishers:

- *Resistance,* being an open access type of fishery not all fishers was prepared to change their unsustainable practices noting many people in the area were using illegal gear and that even if individuals were to stop, others would not.

- *Criticising,* was evident as fishers themselves admitted that there were numerous illegal fishing gears and methods in use by other fishers which are detrimental to sustainable fisheries management. They critiqued the Department of Fisheries for delaying the review of the fisheries regulations. All stakeholders critiqued the fishers for the use of the illegal gear.

- *Explicating and envisioning,* was evident in discussions related to reflections on proper monitoring and effective use of regulations through timely reviews of the fisheries regulations, and also through the discussion on providing alternative livelihood options for fishers. It was also clear that to address the issue BVCs and traditional leaders needed adequate government support and that that BVCs and traditional leaders needed to work together with government extension and research officers to discourage the use of the under-sized fishing gear.

- *Committing to action,* BVCs and traditional leaders made a commitment to intensify monitoring of illegal gear and to hold more awareness meetings in all the areas. BVCs confirmed that they would play a leading role in these meetings, and would help to control the emergence of illegal fishing gear in the area.

- *Taking action,* local leaders and BVC members agreed to start the process of using by-laws in the area so that all under-meshed and illegal fishing gear would be prohibited in the area. Soon after the change laboratory workshop, traditional leaders requested government to support them with fuel to help them monitor illegal fishing gear in the south-east arm of Lake Malawi. The level of action taking associated with this contradiction is, however, extensive, and real transformative agency change will occur once the actual fishing practices have changed, as was also noted in the case of Lake Malombe where this same contradiction was engaged with.

Recommendation: It is recommended that the start made towards transformative agency associated with this contradiction be supported, especially by government. But as outlined by the stakeholders, addressing this contradiction would require close co-operation over a longer period of time by all stakeholders in a collaborative effort. Thus, many further expansive learning sessions could be held to continue to address this contradiction, and I therefore recommend ongoing engagement with this contradiction in the context over time.

8.5.3 General reflections on the emergence of transformative agency via expansive learning

As outlined above, identifying the expressions of agency as they emerge via engagement with contradictions provides a helpful reflective lens on the expansive learning process. From the above it is clear that there was not much resistance to the principles and intentions of co-management, and most stakeholders were prepared to seek out solutions and find ways of addressing the contradictions in productive ways, most often calling for greater collaboration, better information and training, and viable alternatives. As indicated above, fishers do have capacity for exercising agency, but in the case of declining fish stocks, their agency needs to be reframed, as does some of the agentive actions of traditional leaders, extension agents and BVCs. As also indicated above, the expansive learning process can continue for a long time as the contradictions require considerable collaborative engagement to realise strong action taking that will bring about real changes at the level of fishing practices. However, all envisioned action, and the commitments to action and some of the actual actions taken during this limited period of expansive learning appear to be necessary and important for effective co-management of the fishery. In concluding this section, therefore, I recommend further expansive learning interactions that will be designed to follow through the commitments to agency that have been made in almost all of the contradictions that were discussed in the process that I supported.

I make further recommendations related to further research associated with the unfolding of transformative agency and expansive learning as I move towards concluding the chapter in section 8.8 below.

I now make recommendations for improvement of the curriculum framework for extension training, as this would provide one of the longer term mechanisms for facilitating such expansive learning (i.e. if all extension agents were trained to facilitate ongoing expansive learning).

8.6 Model curriculum framework for extension training

Responding to the last goal of the study, I now provide suggestions for a model curriculum framework for extension and training both at certificate and diploma level in fisheries management at the Malawi College of Fisheries. I focus on these two levels as this is where most extension officers are trained, and it is these extension officers that are to work as government representatives with the BVCs, the chiefs and the fishers in taking forward the co-management approach which is promoted by policy as described in Chapter 2. As reported in Chapters 5, 6 and 7, training and extension are seen by the fishing community activity system as being vitally important for the efficacy of co-management. Thus failure to address the extension curriculum from a co-management point of view would further exacerbate this problem. As indicated in the south-east arm of Lake Malawi case study, the Malawi College of Fisheries is the key national agent for training of extension officers who work with the fishers. And as indicated in Chapter 2, extension curricula may not always be well aligned to the policy framework of co-management. This section therefore addresses this issue.

8.6.1 Proposed model framework for extension training at certificate level in fisheries management

This qualification phase prepares students to implement fisheries policy at the lowest level of the sector and work with the fishing communities on the management of fisheries resources. After two years of training in fisheries management, students are deployed into various areas to interact with and support rural fishing communities. At that level they are required to have a good understanding of both fisheries management and also the socio-cultural and socio-economic status of rural communities. Drawing on insights from this study, I suggest some model courses for upgrading the certificate level training in fisheries management to respond to the current trends in co-management, and in associated forms of extension and training development. I do this by suggesting the inclusion of a number of methods as it is through these methods that the extension officers are to engage in co-learning approaches with fishers as would seem to be required for co-management (see Chapters 5, 6 and 7).

8.6.1.1 Method one: Contextual profiling and community knowledge

As shown in this study, understanding of the context and community knowledge are important dynamics for understanding the learning that is taking place, and how learning can be facilitated in the context (see Chapter 5). Supporting students to understand what is happening among the fishing communities where they expect to work after graduating from the college may provide good learning experience that can facilitate understanding of the situations they will be engaged with. It is possible to, in the certificate course programme, create activities that will allow students to engage with the fishing communities through contextual profiling as this will create opportunities for the students to understand and appreciate the existing fishing practices and the interactions amongst fishing communities. Students' engagement with the fishing communities may also facilitate new relationships between the new extension agents and the fishing communities and enhance the building of trust and openness in the way fishing practices are done and what could be done in future to improve their management practices. As shown in this study via the contextual profiling research that I did, contextual profiling involves a process of dialogue which is a method for local knowledge sharing and understanding for use in the management of the fisheries resources.

Thus, for this curriculum level I would recommend the following kind of curriculum activity with the students:

Involving students in a participatory deliberation process / set of exercises with all the stakeholders concerned to understand the following:

- Current views on the status of the fishery (i.e. is it being over-fished or not, are the practices legal or not, are fish that are being caught under-sized or not etc.).
- Current fisheries policy of co-management and how it is being used by stakeholders (i.e. do stakeholders know about the policy and who is responsible for its implementation)
- How different stakeholders are viewing the co-management situation (i.e. are there conflicts, is there agreement that this is a good way forward for managing the fishery etc.)
- Identification of gaps in the implementation of co-management practices and how such gaps can be filled
- Outline of the existing issues, tensions and contradictions that exist in the fishery.

8.6.1.2 Method two: Review paradigms of extension services

As shown in this study (see Chapter 2), understanding the trends in extension service are crucial for better understanding of the current approaches and why the shifts have taken place over the years. Apart from teaching about the extension methods and approaches, it would be important to take the learners back and let them map out and think through the history of extension services as this will allow them to more critically challenge and understand why things are happening the way they are. Reviewing the typology of extension services (as shown in Section 2.5) and linking it with the current collaborative management and adaptive co-management principles (outlined in section 2.4), and understanding how this aligns with social learning principles (discussed in section 8.7), may allow students to understand the implications of social learning in fisheries resources management.

In the current pre-service curriculum (see section 2.5.3) students are taken through the concept of participatory management principles, but this is not linked to a contextual, historical understanding of why these principles are important, or how they are part of wider social learning processes. As shown in this study, participatory approaches would make sense if they are situated within wider theories of co-management, and adaptive co-management and within an understanding that co-management also requires co-learning. There is therefore need to take the current curriculum approach of presenting participatory methods to students and to assist students to locate these participatory methods and approaches within the latest concepts of adaptive co-management. Important would be for the students to understand the role of participatory methods in an adaptive co-management process.

As discussed in Chapters 2 and 3, collaborative management or collaborative natural resources management involves the participation of key players in natural resources management i.e. the fishing communities and the government or other stakeholders who may be outside the locality. Allowing the students to engage with key aspects of collaborative natural resources management would help them to understand the role of participatory methods within a wider process of social learning. This would potentially allow the students to answer the crucial questions that the collaborative natural resources management approach asks like: Who learns? How do they learn? What do they or can they learn from each other?

As explained in Chapter 2, collaborative management is a rights based approach which aims at empowering communities through joint decision making. As indicated in Chapter 2, however, co-management should not be seen in isolation from adaptive management, as adaptive management provides an approach that seeks to address existing complexities associated with ecosystem management when faced with social-ecological challenges such as those that were found in the cases in the two research sites of this study (see Chapter 2). The study showed the importance of the adaptive co-management approach as a framework for

learning about participation, as it focuses on building knowledge among stakeholders through social learning processes, creating networks between multiple actors and through the continuous interactions and participation of diverse stakeholders who seek to, together, and in dialogue with each other, strengthen co-management institutions.

Thus, for the curriculum at this level I would recommend:

* Revision of the way in which participatory methods are taught, so that these are not taught as isolated methods or techniques for engaging with stakeholders, but rather that these are taught within the framework of an historical understanding of trends in extension services and natural resources management, foregrounding the emergence of adaptive co-management approaches, and locating participatory methods within an understanding of wider social learning processes.

8.6.1.3 Method three: Practical analysis

As shown across this study, fishing is a practice, and much of the co-learning occurs around the practices be they unsustainable practices damaging the fisheries ecosystem, or more sustainable practices that are oriented towards more sustainable co-management of the fisheries. Thus, practical analysis would also seem to be an important method to be critically explored because the graduates of the certificate course are expected to work with fishing communities who are practically knowledgeable and who are advancing in their fishing technologies as they confront challenges.

One possible approach to developing practical analysis capacity is by intensifying the students' attachment programmes through formulating a clear goal for the attachment, and by giving students practical tools for observing and analysing practices, allowing them to observe and analyse fishers' practices *in situ*. Taking part in the fishing practices and asking questions on why certain things are done the way they are done, would allow the students to become familiar with what is happening and this can be reflected using their theoretical knowledge about fishing practices. Creating space for dialogue and interaction with the fishers would provide learning space between the fishers and the attached student. The social learning experience gained would be taken through after their graduation and the fishers would equally benefit from the interactions.

As shown in this research, there is often a mismatch of information between the fishers and the extension agents because of a lack of interaction between the two actors. An example is that the use of indigenous fishing practice systems could potentially inform understanding of a wider range of management options but this would require critical analysis and understanding by the extension agents and practical analysis of the current situation.

Thus, for the curriculum at this level, I would recommend:

* Intensification of the current attachment programmes and qualitative improvements to the tasks given to the students for the attachment programme. The tasks should include tools for, and guidelines on how to participate in, and analyse fishing practices.

8.6.1.4 Summary

Orienting certificate level students to the above three methods of contextual profiling and local knowledge, reviewing of paradigms and trends in extension service to understand and locate participatory methods, and practical analysis in the fisheries sector would allow the extension agent to go out more prepared to contribute to the adaptive co-management of fisheries resources. A better understanding of the context in which the students are working can potentially also provide more opportunity for engaging in social learning processes where complex issues can be addressed through collaborative interactions and learning from each other. These are important elements to be highlighted in the certificate curriculum and can possibly also be explored further in relation to the Malawi fisheries extension and training policy implementation plan.

8.6.2 Diploma level in fisheries management

This is a mid-level manager's qualification where officers who have served for more than four years as fisheries assistants and who have O level certificates with credits in two science subjects come for an upgrading programme. Graduating students are deployed in different districts and sub-districts as supervisors or mid-level managers to the extension agents. As such these professionals are required to have capacity for a high level of analysis of issues and are also expected to understand the current trends in fisheries management. Having worked in the field with fishing communities for more than four years or so, the assumption is that they understand the current practices on the ground and that their experiences would help to generate further knowledge and skills in extension education and training.

As explained in section 2.5.3, this qualification currently requires a more reflexive, collaborative and open curriculum that focuses on sustainability and context. This would be responding to the current social-ecological, socio-cultural and socio-economic issues in extension and training and would potentially add value to extension and training of extension officer. In order to extend and improve the curriculum framework at diploma level for improved alignment with the co-management policy and learning processes as outlined in this study, I recommend a number of methods to be constituted at a higher order of learning to build critical thinking and higher analytical skills. I now provide a brief outline of the suggested methods which encompass the principles and *interlinked reflexive processes* of expansive co-learning as modeled and explored in this study in the two case study contexts (see Chapters 5, 6 and 7).

8.6.2.1 Method four: Expansive social learning processes

1. Activity systems

As shown in this study (see Chapters 5, 6 and 7) learning is central to natural resources management and such learning occurs in horizontal and vertical forms amongst different actors who are involved in the management of fisheries resources. As such, it is important for graduating students at diploma level to understand that the level of success of an intervention depends on the collective decision-making process which is achieved through the active engagement and interaction of stakeholders who operate in activity systems via a process of social learning where the actors learn from and with each other.

At this level students should be able to identify the different activity systems in a specific area and be able to identify who the subjects are, what the subjects are working on (their object), what mediating tools they are working with (physical and conceptual), the rules they are using, who the other communities are in the activity system and how they share their roles (division of labour). Taking students through the process would potentially provide a deeper understanding on how people in a given context work and learn from each other and what they learn as they are engaged in different activities. Understanding activity systems would also build a sense of learning from others and that the engagement with contradictions in the activity systems can potentially facilitate more learning and creation of new knowledge and understandings and new activity or practices.

2. Boundary crossing

It is important for the students at diploma level to understand that the success of any activity system or any group of people depends on the learning that takes place across the diverse activity systems, thus they need to understand the concept of boundary crossing and contradictions that emerge within and between activity systems. Apart from the learning that takes place at the level of the activity system, also more importantly is the learning that occurs across activity systems because it involves more critical thinking, debating and some in-depth discussions and combined decision making processes. Students should be aware that learning that happens across the boundaries of different activity systems or different groups of people is likely to be more critical and diverse as shown in this study. As shown in this study, boundary crossing triggers certain forms of dialogical engagement and if mediated well, the process can invite other perspectives which provide further possibilities for learning and change. As also shown in this study, through boundary crossing people can enter into renegotiation of relationships, reframe their thinking and practice, and co-create new perspectives. As shown in this study, this could be an important aspect to emphasise in the context of fisheries management where

previous approaches to fisheries management resulted in a loss of trust among co-management stakeholders.

3. Contradictions

To fully understand and engage with boundary crossing, it is also important for students to understand that activity systems are complex systems and the concept of boundary crossing brings with it different knowledge that contradictions with communities and other knowledge systems, rules, objects, subjects, mediating tools and/or division of labour. As shown in this study, the context of fisheries management in Malawi is already characterised by contradictory information messages that exist among different stakeholders. Their interactions within and across different activity systems brings forth a range of different types of contradictions, most of which are related to the central contradiction between attaining livelihood security and natural resources sustainability in a context of poverty where few alternatives exist. It is therefore important at this level for the curriculum to clarify that contradictions are not problems but are fertile ground for learning to take place and that agents involved in the activity systems can participate in processes that lead to transformative agency and changes in practice. As shown in this study, as stakeholders within and across different activity systems debate and challenge each other, they create room for more explanation, for modeling of solutions, and through this they can creating new knowledge and better understanding of the contested issues, which also allows them to act in new ways, and through this change their activity systems and the manner in which different activity systems interact on a shared object such as co-management for sustainable livelihoods and a sustainable fishery.

8.6.2.2 Method five: Expanding learning; mediation and intervention workshops

This is a very crucial part with regard to social learning where both the extension workers and the fishing communities learn from and with each other through an expansive social learning process. It will be important for the students to have skills and knowledge on how to expand the learning that occurs through mediation and intervention workshops. This is the stage where stakeholders will be engaged in the deliberation of the contradictions identified within and across the activity systems and will be aiming at finding solutions to the contradictions identified in the activity systems and through boundary crossing. As extension workers the extension agents should have the necessary skills to mediate the intervention workshops to make sure that there is engagement of stakeholders and that there is systematic process of deliberation which may result into knowledge creation as different activity systems develop agreed new objects. It is important to note that mediation and intervention workshops are fertile grounds for knowledge creation through in-depth analysis of the contradictions by all those involved in different activity systems. In a complex system like the fisheries sector,

expanding learning through mediation and intervention workshops provides opportunities for fishing communities, Beach village Committees, traditional leader, fish traders and processers, people running other business, extension and research officers and all those involved in the management of the fisheries resources to come together and deliberate tensions and contradictions which constrain fisheries resources management.

For the students at mid-level manager positions who are expected to develop skills to be able to analyse issues pertaining to extension and education with extension agents and the fishing communities, this method allows them to engage with a diverse group of co-management stakeholders without succumbing to the negativity of conflicts. As shown in this study, this also requires an understanding of power relations in the social context. This study has also shown that expanding learning through mediation and intervention workshops can allow for comprehensive deliberation and collaborative articulation of potential solutions to the contradictions from different activity systems through boundary crossing processes.

8.6.2.3 Method six: Modeling solutions and monitoring

As explored in this study, at this level solutions to different contradictions are discussed by all the stakeholders. Model solutions that respond to the contradictions are developed and can be voiced by any members of the activity systems. This is the level where new objects and new knowledge is created through the engagement of all the stakeholders involved. It is also the stage where action plans are discussed to allow for the proper monitoring and accountability of the activities agreed in the process. A curriculum that can allow for a complete expansive social learning process would build capacity amongst the students to deal with complex issues that did not have solutions. This would allow them to see that through the social learning process, solutions can be identified and developed by all the stakeholders.

8.6.2.4 Method seven: More expansive learning

The whole expansive social learning process up to method 6 would potentially build capacity in the extension student to be able to continuously engage with different stakeholders and together conduct more expansive learning workshops on different issues within and across the activity systems. As shown in the analysis above on transformative agency, there is a need to extend the expansive learning process beyond only a few workshops. Longer periods of engagement for expansive learning are also recommended by Engeström and Virkunnen. Mukute (2010) and Masara (2011) also recommended that further expansive learning workshops may be needed to continue the process of activity development over time, and Lindley's (2014) study showed that even if five or more expansive learning experiences took place, more time was needed to resolve the more complex institutional issues that are found in social-ecological sustainability activity systems. It is for this reason that I am

recommending this process for extension training, as extension agents are present in a particular context over longer periods of time, and as discussed before (see Chapter 2), an extension agent is expected to motivate and mediate learning among communities. Engaging in a carefully constituted, ongoing expansive social learning process with stakeholders is one of the ways to engage people in creating knowledge and developing their activity over time through collaborative and transformative forms of agency.

8.6.2.5 Summary of recommendations for the diploma level

As indicated above, I am recommending that diploma level students be exposed to the entire expansive learning process, and that they develop capacity to mediate and facilitate expansive learning workshops and processes. This study has shown that it has a high level of synergy with the assumptions and principles of adaptive co-management, and is therefore consistent with both the fisheries management policy of Malawi, and the assumptions of co-management. It would therefore seem to be important to ensure that extension training is also aligned to this policy and practice paradigm for fisheries management. Working through an expansive social learning process as discussed in this section can potentially provide a praxis-oriented approach to developing the capacity of students to engage with the fishing communities and together find solutions to the contradictions which exist in co-management. This would, in turn, require the Fisheries College lecturers to have the necessary capacity to work through such a process with students, and also to share the theoretical understandings of the approach with the students. This requires a meta-level understanding of the alignment of this approach to extension training, with co-management policy and principles.

The potential exists that conducting the expansive social learning process as a practical activity with the students and fishing communities as a social research activity to start with, would not only allow the two to engage in mediation and learning through the workshop process but also build confidence amongst the students to run the intervention workshops with the fishing communities after graduating from the college. In this regard I therefore also recommend lecturer training to engage with expansive social learning. This should be practical and ideally should involve the lecturers in working through the processes of expansive social learning with a group of students and stakeholders from the different fisheries activity systems. This will potentially also strengthen the relationship between theory and practice for fisheries co-management and extension. The case studies produced for this thesis could be used for such training, and could potentially also give rise to the development of further similar cases of expansive learning involving multiple stakeholders and their activity systems. It would also be important to ensure that the *whole process* is worked through carefully at a meta-theoretical level as well as a practical level, and care should be taken not to fragment the process into discrete methods. Thus, while I propose

recommendations according to the methods above, it would be important to maintain the *process integrity* between the methods.

As can be seen from the above, there is also *progression* between the curriculum recommendations for the certificate and diploma qualifications. This integrity should be retained as the recommendations become transferred to practical curriculum activities and schedules.

8.7 Recommendations for further research

8.7.1 Recommendations for further research on the college curriculum

As indicated above, I have made recommendations for developing the college extension training curriculum at two levels. These are based on the process that I worked through in this study. They will, however, need to be further researched as *curriculum processes* in a Fisheries College context at the two levels as recommended above. I would therefore recommend that further research be done to establish how the expansive learning process can be translated into a college curriculum learning process.

There are possibilities to consider how this can be done, not only as extension curriculum development, but also within the context of mainstreaming of the co-management concept, as this was recommended as an approach or strategy by stakeholders in the expansive learning process as outlined above.

8.7.2 Recommendations for further research relating to transformative agency development and expansive learning

The use of expansive social learning processes in the identification, analysis and the development of solutions to contradictions with stakeholders in the two fisheries case studies helped participants to have a deeper understanding of the sources of contradiction, and their socio-cultural context and possible ways of addressing them. Daniels and Walker (1996) noted that social learning is a process of framing issues, analysing alternatives and debating choices which enables constituencies to reflect on their own and others' values, orientations and priorities in the context of inclusive deliberation. Analysis of the interactions that take place in fisheries co-management (fishing communities, government officers) showed that there are boundaries amongst stakeholders. Some of the noted boundaries were: boundary of knowledge within the fishing community activity system (different fishing communities have different knowledge about the fishery); boundary of knowledge within the government activity system (extension officers, researchers and the college lecturers have different knowledge about the fishery); boundary of socio-cultural knowledge about the fishery amongst co-management stakeholders (fishers, extension officers and researchers and

lecturers) and boundary of power amongst co-management stakeholders (fishers, extension officers and researchers and lecturers) on who is to control what in the agreement. The study confirmed that the expansive social learning process provides an approach that allowed the different stakeholders to start engaging collectively amongst themselves and through the engagement, develop their agency to work together to find solutions to the contractions that had been constraining different aspects of the co-management programme.

The change laboratory workshops in particular, were significant formative interventions for the emergence of transformative agency expressions (as outlined in Chapter 7 and reflected upon in section 8.6). They brought in people who did not otherwise have an opportunity to come together. They were able to engage with each other and through the deliberations, their relationships were strengthened and collective and transformative agency expressions were identified that showed further possibility for transformative agency development. Their debates, agreements and joint decision making on the contradictions facilitated joint learning in the context of fisheries co-management.

The results of the study echo Beck (1992)'s proposal for reflexive learning in a risk society. He suggested that modernity needs to be reflexive in response to uncertainties that surround ongoing environmental degradation and risks produced by modern science, technology and industrial development. In the context of Lake Malawi, it was not so much modern science and technology that was producing the risk directly (as in the case of industrial effluent, for example), but rather the 'side effects' of the longstanding political economic processes surrounding modernity that have exacerbated and led to continuities in high levels of poverty in many African countries, revealing complex risks associated with natural resource use, poverty, livelihoods and sustainability. Mukute (2010) in his study argued that such reflexivity also involves cognitive justice and the development of criticality and sustained forms of agency and emergence.

As shown in this study, learning among fishing communities was for the most part contradictory to fisheries co-management and required in-depth deliberations and *reframing processes* involving all the stakeholders to develop solutions to address the contradictions through social learning process as provided for in CHAT and Development Work Research methodology. These methodologies enable a formative intervention research led approach to expanding learning with different stakeholders. However, CHAT does not fully explain 'transformative' besides an explanation that it involves transformation of human activity or the shared object. Introducing sustainability and risk into this process seems to re-orient transformation in a particular direction, and therefore requires a stronger focus on *reframing,* as is also proposed by Wals (2007) in his work on reflexive social learning for sustainability.

As was shown in this study, the technology development among fishing communities e.g. the modern design of fishing gear and use of modern fishing techniques if unchecked would continue to negatively impact on the fisheries resources (see Chapters 6 and 7), which in turn would place communities at risk from exacerbated food insecurity. The study shows that reflexive learning oriented solutions proposed in the study were put forward such as improved communications and interactions amongst different groups. Reflexive policy is monitoring and governance solutions were also put forward involving revision and regular monitoring and use of regulations.

The study also showed (see section 8.6 above) that in order to increase transformative agency among fisheries co-management stakeholders they may need to be reflexive and open to learning and new knowledge creation. This requires processes of reframing, resisting, criticising, explicating, envisioning, committing to actions, and taking various actions. However, this study also showed that it also involves *confronting, navigating and understanding complex power and governance relations,* and one may add that agentive expression can also be exemplified by *confronting and navigating power relations* (see sections 6.3.1, 6.3.1.1, 6.3.1.2 and 6.3.1.3, where this process issue was discussed in more detail). I draw on some of the data here to show that the recognition and 'voicing' of these power relations is also a process of *transformative agentive expression*, but that this form of transformative agentive expression is also highly complex and may not always be what it seems at face value as indicated by the few citations below.

> ***Focus group data (FGM2)****: ... we need fisheries to give us powers and we are ready as BVC members to work with our fellow fishers ... we are not supported by fisheries ... sometimes fishers challenge us and we have no power* [the BVCs ironically are community-based representatives of government - or local agents (not employees) of the Department of Fisheries]
>
> ***Interview with Chief (IIM2):*** *... as a chief in the areas I make sure that I support government rules and regulations because when we go to the district assembly, people ask so many questions* [yet there are allegations that chiefs are not supporting the BVCs as recommended by the state, but are appointing their own family members as BVCs]
>
> ***Focus group data (LM2):*** *There are some conflicts between local chiefs and the government because the BVCs respect the chiefs more than the local extension officer based in the area ...* [this shows how authority is attributed, and how this influences agency]
>
> ***Focus group data (LM1):*** *Our frequent meetings as BVCs have helped to reduce the numbers of illegal fishers unlike the old days when our chiefs were working alone in the management of the fisheries resources ...* [this shows a change in authority attribution, to a collective management situation where power is held that changes traditional systems of authority; note that this is in the same context as the citation above, showing complex forms of agency associated with power relations]

In the post-colonial, post-independence context of Malawi where relations of trust and social cohesion have been disrupted by long periods of colonial intrusion, post-independent government structuring and re-structuring (linked also to neo-colonial forces of structural adjustment – see Chapter 1) and ongoing structural poverty, it is important to consider the processes of navigating and confronting power relations as part of the process of transformative agentive expression and agency development. This study has shown that the governance systems and power relations surrounding fisheries resources management and co-management are complex and have long and deeply embedded historical and socio-cultural roots, and shape and influence the object of fisheries co-management substantively. As discussed in the study, and as also described by research respondents, as different people come together to discuss possible ways of managing the fisheries resources, there have been instances of violence between extension officers and fishing communities especially linked to non-observance of fisheries regulations (Njaya, 2007). The complex dynamics of the deep-seated contradictions that arise between sustainable fishing and over-exploitation of the fisheries resources for livelihoods in a context of persistent poverty, no doubt requires further understanding and possible intervention in a coordinated manner through a social learning process. This process needs to be complemented by other interventions (e.g. viable economic opportunity development) that could allow people to share workable solutions to the challenges experienced and that can explore the processes of transformative agency formation within this complex structurally emergent context that gives rise to the power relations observed in the study and their impact on co-management policies and intentions. Undertaking this in-depth analysis was not possible within this study, but it is clearly an interesting and important area for further research. Engeström (2001) commented on the above at a broader level by saying that the contradictions within an activity system can become a guiding principle for empirical research and a starting point for new change oriented learning (see Chapter 3).

Recommendation for further research: From this study I would therefore recommend further research into the *those transformative agentive expressions associated with confronting and navigating power relations in and between activity systems* involved with the complex object of co-management for sustainability and livelihood well-being in rural African natural resources management contexts where traditional leadership and power structures are operating side-by-side with modern state systems of governance. Here issues of complexity related to sustainability objects also need to be taken into account, as recommended by Mukute (2010). As natural resources come under further pressure from expanding populations, exacerbating poverty, and climate change, this is likely to become a very important area for social learning and co-management research, especially to explore the potential of expansive social learning for engaging these power relations in productive ways

that respond to risk and that further collective well-being of people and social-ecological systems resources.

8.7.3 My role as an interventionist researcher and recommendations for interventionist researchers

As explained and shown across this thesis, I worked as a formative interventionist researcher throughout the research process. As discussed earlier (see section 4.1), an interventionist researcher helps practitioners to take epistemic actions. As pointed out (see section 4.3) the study had investigation and expansion phases. In both phases I played different roles. In the first phase I worked as a motivator during interviews and focus group discussions to facilitate reflection in order to get in-depth information and understanding. I guided and clarified issues during interviews and focus group discussions. Cohen et al. (2007) noted that data collection from focus group discussions is characterised by the researcher's provision of a topic of discussion and interaction within the group. I started with the identification of the research sites through a process of contextual profiling. From this I was able to identify suitable BVCs to work with and through interaction with them and other stakeholders; I was then able to identify the interacting activity systems based on the findings from my contextual profile and these discussions. This shows that the interventionist researcher needs to develop a close relationship with the context in which he/she undertakes research, and this often also requires historical understanding and some familiarity with the research context.

As shown in my study, I had deep knowledge and experience of engaging with the fishing communities and associated activity systems through my prior experience and work in the context of the Lake Malawi fishery, Fisheries Department, extension services, research services, and the Fisheries College (see section 1.3). I was also aware of the historical trends in extension services, of the new emphasis on co-management, and also of where new co-management approaches had been tried out. Nevertheless I needed to undertake very careful historical documentation reviews, and field-based interviews and focus group discussions and observations to deepen my insights into this context. An interventionist researcher should therefore not assume that if he / she has existing experience in a context, this equates to deep understanding of the activity and activity systems at work in that context.

Through the rigorous document analyses, observations, and discussions during the interviews and focus group discussions, I was able to successfully deepen my understanding of co-management as a shared object that was characterised by many socio-culturally and historically shaped contradictions, many of which I had not noticed before. This process of rigorous analysis of the contradictions arising from the data helped me to mediate relevant discussions among stakeholders and clarified ongoing possibilities for expanding learning, none of which were particularly clear to me at the start of the research. Even though I was

familiar with some of the issues in the context (e.g. the mixed messages, parallel governance systems etc.), I had not previously interpreted them as contradictions that provided opportunities for expansive learning and the expansion of human activity. Findings from the investigation phase therefore helped me to decide on how to mobilise and engage the relevant stakeholders in the Change Laboratory workshops. Thus, my experience is that investment in rigorous analysis of the contradictions is a critical step in the process to facilitating expansive learning. Most important, however, is the presentation of this as 'mirror data', rather than one's own opinion of what is happening in the fishery.

In the expansion phase my role was therefore to consolidate mirror data from the investigation phase, put the data in an understandable format that would be accessible to the research participants who were from diverse backgrounds (some were not used to reading complex texts as they were mostly engaged in fishing practices) (see Chapter 5). Important too, was presenting the mirror data in such a way that the co-management stakeholders could agree on priorities to focus on in further analysis and deliberation, as reported in Chapter 7. I also found that it was necessary to emphasise to co-management stakeholders that they live in a highly connected interactive and evolving social-ecological system. The expansion phase and mirror data was not intended for blaming one another, but the intention was rather to seek solutions together. The process was intended to allow them to improve different activity systems and create new knowledge. *I therefore found* ***the shift made between criticising and envisioning*** *in the transformative agency expressions to be crucially important in the expansive learning process, even though I did not see it explicitly as such at the time – it was only afterwards when I used the transformative agency expressions analysis that I could see this*. As shown in my research, I actively needed to guide the stakeholders away from criticising each other, which they found easy to do at the start, towards envisioning collective responses to shared concerns.

As explained in Chapter 7, I mediated deliberations during the Change Laboratory workshops, facilitated the analysis of contradictions and the process of knowledge creation with the full engagement of stakeholders. I stimulated stakeholders to actively contribute to the discussions and the process enabled me to understand how knowledge gained among stakeholders could be expanded to improve fisheries resources management. As a formative interventionist researcher I sought to actively challenge the research participants with problem solving questions to help them to reflect on the current practices and why things are happening the way they are. This provided space for more discussions and dialogue (Dick & Williams, 2004) among the fisheries co-management stakeholders as reported in Chapter 7.

The process of engaging stakeholders to deliberate tensions and contradiction in fisheries co-management also helped to create agency among the stakeholders which was only semi-evident to me in the Change Laboratory process and in the way forward workshop, where

expressions of agency were consolidated. However, later, in writing up the reflections and recommendations on the recommendations for change made by the stakeholders in the change laboratory workshops, I was able to identify the key features of the transformative agency expressions that emerged from the expansive learning process (which I have shared in section 8.6 above). In doing this, I was able to reflect on the expansive learning process itself, and to see the achievements of this process from a transformative agency perspective. I could also identify the limitations of the process that I followed, and where the expansive learning process could / should be strengthened in future interactions with the fishing communities. I came to realise that expansive learning must be an ongoing process over time, as the contradictions are complex, and the time available for this research only really led to reframing, envisioning, some commitments to action and some early indications of action taking for some of the less complex contradictions. The actual and more substantive changes in practice were yet to come into being, and this would require time, and dealing with the deep-seated more complex contradictions would take many more years than were allocated to this study.

The temporality and regular interaction demands of ongoing expansive learning processes thus puts the interventionist researcher in a difficult position, as it is not always possible to maintain ongoing contact with the stakeholder groups concerned, and ideally the role of the intervention researcher should be taken up by some or more of the regular stakeholder groups. My analysis of the situation is that this should ideally be the extension agents, especially the more senior extension agents who have a responsibility to implement co-management and to work with fisheries stakeholders regularly over time to ensure that the co-management policies and practices are understood and implemented. Hence I made recommendations for improving the Fisheries College curriculum, which as discussed in Chapter 7, was not well aligned with co-management approaches, assumptions and principles (see section 8.7 above). I am, however, grateful that my current position will also allow me to continue with the expansive learning processes that were started within the research framework and limitations of this thesis. In post-doctoral field-based work I also hope to have the opportunity to take up some role in training of college lecturers to understand the power and potential of expansive learning as an extension approach for fisheries co-management, as modeled in this study.

Another key lesson that I learned about being a formative interventionist researcher is that one needs to be reflexive and responsive, and open to new dimensions and dynamics in the research process. Due to the diversity of stakeholders, there were some unclear areas that required more input along the way, and re-explanation and revision. As an interventionist researcher, I tried to be reflexive and responsive, and give explanations and examples with reference to the insights that I had gained about the different activity systems. From the beginning of the Change Laboratory workshops I made sure that the boundaries that were

present within and between the different activity systems were reflexively engaged to allow for more contributions mainly from the BVCs and traditional leaders, who in most cases are unheard, and where a key contradiction of power relations surfaced. This led me to realise that it was important to also focus on power relations in the expansive learning process. As explained above, the context of power relations in the fisheries co-management context in post-colonial, post-independent rural African contexts such as Lake Malawi has its own complexities that need to be understood by researchers, and by the participants in the research process. I also came to understand that these were important dynamics associated with the expression of transformative agency that requires more reflexivity and interpretation over time; hence I have made a recommendation for further research related to this dynamic of the emergence of transformative agency for co-management through expansive learning.

I also realised that the contradictions as surfaced in this study were related to each other, but that all were related to a deep-seated contradiction that exists between livelihood security and the sustainable use and management of resources which provide these livelihoods within a short-term, long-term continuum in contexts of poverty. Engaging with this deep-seated contradiction will also require ongoing reflexivity, responsiveness and ongoing deliberation of solutions as there is no single simple solution to this contradiction.

8.7.4 Contribution to new knowledge

The study's contribution to the fisheries management sector in Malawi is to provide examples of model expansive social learning processes from which extension training curricula can be derived that are more congruent with co-management principles and assumptions. The study's broader contribution to new knowledge is to deepen understanding of the praxis and potential of expansive social learning in co-management policy environments, especially shedding light on how social learning processes can help to mediate a rising tensions and contradictions of the intended paradigm shift in fisheries resources management. Overall, and on a more practical level, the study contributes to the realisation of the intended paradigm shift in the fisheries resources management where social learning (as modelled through the study) is identified as a necessary process for the actualisation of adaptive co-management in achieving more sustainable fisheries management. A further contribution of the study is to illuminate the importance of reframing and engaging reflexively with power relations in the process of supporting transformative agency through expansive learning, especially in contexts where the power relations have historically complex socio-cultural and structurally shaped dynamics, and where they surface in the context of complex social-ecological objects oriented towards sustainability.

This research project developed mediation tools for use by those working on co-management and through the recommendations for changes in extension training and curriculum

development, the study hopes to facilitate the capacity and active engagement of extension and training officers through approaches that allow them to also engage with the expansion of learning, knowledge, agency and change of practice towards a more sustainable fishery. Through application of CHAT and social learning literature, in the historically emerging context of fisheries management and extension training and practice, the study has also provided a way of understanding historically specific practices, their objects, and mediating artefacts as these relate to co-management. It shows too that fishing communities and social organisations that support them, are continuously developing their human activities, influencing change in current fishing practices. More importantly the study has shown that the active engagement amongst stakeholders in the fisheries co-management process through expansive learning allowed them to bring diverse knowledge to fisheries resources management and showed that through this process, *fishing communities and subjects in their supporting activity systems have agency for change, and that this agency for change can be further mobilised through reflexive and expansive social learning interactions.* A most crucial stage in this process, as shown in this study, is the analysis of such knowledge to understand how it relates to a more sustainable fishery that can benefit all, now and in future.

8.7.5 Limitations of the study

The research was conducted in two sites (Lake Malombe and the south-east arm of Lake Malawi) where the fisheries co-management programme stated as explained in section 1.2.1). As explained, I sampled four BVCs in Lake Malombe and five in the south-east arm of Lake Malawi and these were involved in the first and second phases of the study, leading to productive engagements and some forms of transformative agency as explained above. However the messages that were given to the BVCs were not clear on the composition of the BVCs and village heads and chiefs as ex-officials in the BVC were not given special invitations to come to various meetings. The lack of more effective communication resulted in a lower level of representation of village heads and chiefs in both research sites, and with expanded representation the process could have been richer, and could have offered more insights and other solutions, especially given their significant role as outlined in the study. The lack of wider representation of traditional leaders was expressed as a limitation by participants during the Change Laboratory workshops. They indicated that other important stakeholders in fisheries co-management were missing because traditional leaders own the land where the programme is being implemented. Thus, the research could have been strengthened by stronger representation of these stakeholders. As explained above, this complex relation that exists in this context needs to be more deeply understood, and it would probably have been advantageous if I had been able to do more in-depth analysis of the power relations at the start of the research during contextual profiling and activity system analysis, as this would have strengthened the subsequent phases of the research.

As shown in the reflections on transformative agency expressions, it is also clear that the expansive learning process could also have been of a longer duration, perhaps over a few years with many more interactions. However, this was not possible given the practical limitations surrounding the conduct of the study. I do, however, have the opportunity to take this work further in post-doctoral work and study contexts, and to this end, the study has provided a new and interesting means of expanding my own engagement with fisheries management in the Lake Malawi context, a process which I have been involved in and committed to for many years already.

8.8 Conclusion

In conclusion, this chapter has discussed the summary of the key research findings, their implications in co-management of fisheries resources, and has made a range of different types of recommendations which are inclusive of recommendations for each of the case sites, the theoretical, interpretive and formative interventionist processes associated with the expansive learning process, and the context in which the expansive learning was conducted. The process modelled in this study, and the associated recommendations provided in this study may assist the implementation of co-management and further inform extension and training in the fisheries sector in Malawi.

And finally, at the end of this study, I can say that I now consider myself to be a more experienced and confident formative interventionist researcher. It is in this spirit that I conclude this chapter and the thesis in the hope that the expansive social learning process as used and discussed in this study may facilitate new orientations and approaches to the implementation of expansive social learning processes and practices in extension and co-management for the sustainable management of fisheries resources. I feel that I can also more confidently now suggest that the paradigm shift in co-management of fisheries resources can significantly be enhanced by a stronger commitment to collaborative learning. As mentioned at the start of this study, there is / was little guidance provided as to how such collaborative learning is to be conceptualised and/or expanded, a gap which I hope this study has filled (at least in part). Ultimately, the study seeks to promote ongoing reflexive learning and active engagement of fisheries stakeholders with the aim of sustaining the fishery which in turn can contribute to sustaining people's income and food security situation, improve their livelihoods and help to alleviate poverty among rural people who depend on the fisheries resources. In doing this, the study sought to explore and provide new insights into the important role of learning in the ongoing development of human activity in the Lake Malawi fisheries context, which can hopefully also provide inspiration to other fishing communities in Africa who are also seeking to implement co-management approaches.

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