Management of small-scale fisheries in developing countries : The case of Elephant Marsh in Malawi

Kosamu, I.B.M.

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Management of Small-Scale Fisheries in Developing Countries: The case of Elephant Marsh in Malawi

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ISHMAEL BOBBY MPHANGWE KOSAMU

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Promotores:	Prof. dr. W. T. de Groot (Radboud Univ. Nijmegen / Universiteit Leiden)
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To my late grandfathers:

Ishmael Mphangwe Snr. and **White Chilumpha**

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General Introduction

Women are involved in fish trade at Chisamba Fishing Village of the Elephant Marsh Wetland

1.1. Introduction

Despite the provision of many ecosystem goods and services such as fisheries, agriculture, (eco) tourism, water supply, transport, carbon sequestration, biodiversity as well as water purification, the management of wetlands across the globe continues to face many challenges. The competing and sometimes conflicting interests of various stakeholders often result in management paradigms that only focus on the few ecosystem goods and services for which direct local interest is high such as cash crop production (McCartney & Houghton–Carr, 2009). The result is often unsustainable resource exploitation which is costly to both humans and nature and the ecological systems which support them.

The lack of certainty on sustainable wetland management frameworks is particularly common in most developing countries; more so in sub-Saharan Africa. These are also the very geographical locations where socio-economic indicators of human development are

poor (United Nations Development Programme, 2014; Neumayer, 2001; Bowen & Riley, 2003; Gutiérrez et al., 2011). The ever-increasing exploitation pressures mainly emanating from socio-economic drivers such as high population growth, market growth, rural poverty and unstable political systems continue to challenge natural resource managers with problems that require urgent but adaptive solutions.

In the 1970s, deficiencies in the management of natural resources were attributed to lack of stewardship among resource users; a situation that led to either the transfer of property rights to 'state command and control' or privatization (Kellert et al., 2000; Hardin, 1968). In Africa, the evolution of natural resources management systems can be related to three identifiable sets of theories namely: the classical (state control) approach (Biot et al., 1995; Grimble & Chan, 1995; Blaikie, 1996), neo-liberal (deregulation) approach (Blaikie et al., 1997; Adger et al., 2001; Béné & Neiland, 2006; Lockwood & Davidson, 2010), and populist approach (Ostrom, 1990; Olsson et al., 2004). The state-based classical approach was supported by most early scholars (Cheung, 1970; Johnson, 1972; Campbell, 1981; Smith, 1981) who based their school of thought on the "Tragedy of Commons" (Hardin, 1968). However, in later years (2000s) a review of state-centric systems of natural resources management revealed that the approach has become less popular because, among many other reasons, it leads to loss of property rights for the local people and incites abuse, non-compliance and competition (Persoon & van Est, 2003; Berkes et al., 2003; Ribot et al., 2006; Seixas & Davy, 2008). These contestations on the effectiveness of state control over natural resources laid a foundation for populist typologies of natural resources management which have come with different labels such as community based natural resources management (CBNRM); integrated conservation and development projects (ICDPs); joint management (Berkes et al., 2008; Flaherty et al., 1999, Cheong, 2004); and co-management (Ostrom, 1990; Berkes, 2010; Pomeroy, 2003; Agrawal, 2001; Ostrom, 2005). Out of these management styles, the most commonly used approach has been 'co-management' (Pomeroy, 2016; Cundill & Fabricius, 2010). Despite its non-universality, the co-management model has generally been accepted as an inclusionary power-sharing strategy between the state and resource users whose basis is a consensus of all the actors involved (Berkes, 2010; Ostrom, 2005; Gutiérrez, et al., 2011). Nevertheless, recent studies have argued that the success of any system for managing natural resources depends on a clear understanding of the social networks of the actors involved and the institutions within which they operate (Pahl-Wostl & Hare, 2004; Bodin et al., 2006; Ostrom, 2009). Since the dynamics that underlie social and ecological systems are known to be very complex (Evans et al., 2011; Mahonge, 2010), it is critical to give careful thought when downscaling globally popular natural resources management frameworks such as co-management (Ostrom,

1990; Cox et al., 2010). In many cases, a tentative, flexible and learning-based approach grounded in local potentials may work out better than theory-based designs. In fact, Kolding and van Zwieten (2006) note that the theoretical and hypothetical relationships from which most universal models for institutional design are developed usually use very limited empirical evidence. Along the learning-based pathway, new or less known but adaptive institutions may be built that protect long-term sustainability of natural resources.

One of the widely studied wetland services whose management has stimulated a lot of institutional science debate (Kolding & van Zwieten, 2014) and which forms the basis for this PhD thesis is small-scale fisheries (SSF). According to Carvalho et al. (2011) defining scale in fisheries has been difficult among scholars. The substitutability of SSF associated terms such as “artisanal”, “local”, “traditional”, “small”, “subsistence”, “non-industrial”, “low-tech”, “poor” etc., is symptomatic of the complexity of the characteristics that underpin their definition (Natale et al., 2015). In this PhD thesis, SSF is defined purely on the spatial distribution of the fishing unit (small scale) and refers to traditional fisheries involving fishing households (as opposed to commercial companies), using a relatively small amount of capital and energy, making short fishing trips close to the shore, and mainly for local consumption (either subsistence or market -oriented). In philosophical terms, the main advantage of studying artisanal, small-scale fisheries is that if it is accompanied by adequate institutions, SSF expresses the idea ecosystem-based management (De Groot and van den Born, 2003) very well. Additionally, if compared to such ecosystem good and services as tourism, fisheries can be studied at the level of a wetland in its actuality. The management of SSF is also particularly perceived as important because 15% of the world population depends on fish as the main source of animal protein (Béné et al., 2015). Although most developed countries have been successful in designing sustainable management systems at the SSF scale (Isaacs, 2012), developing countries such as Malawi where this study was conducted are still struggling. The widely adopted mode of management is where governments are in regulatory position (Ward & Weeks, 1994; Carswell, 2003) but many SSFs are gradually moving towards imposed co-management arrangements (Hara & Nielsen, 2003; Nunan et al., 2015). For instance, having studied a decreasing trend in fish catches at the 4 metre-deep Lake Malombe in Malawi (Van den Bossche and Bernascek, 1990), Jul-Larsen et al. (2003) recommended putting in place co-management arrangements.

The focus of this PhD thesis is the fishery at Elephant Marsh wetland in Southern Malawi (figure 1.1) which supports the livelihoods of about 1500 households. In 1897, the wetland was mandated as one of the first two protected game reserves in Malawi. The aim was to

protect large game animals, including elephants, which are reported to have been common in the area (Hughes & Hughes, 1992). Field work observations revealed that there is no recent data. Moreover, the enforcement of wetland management regulations at the Elephant Marsh has never been very effective (Turpie et al., 1999) and was largely interrupted by the two world wars (Inter-agency Working Group on Protected Areas, 1997). The final loss of statutory protection of the Elephant Marsh seems to have occurred during the transition from colonial rule to the then newly independent government (Mvula & Haller, 2009) that lacked a well-coordinated legal and institutional setup. Since then the Elephant Marsh Fishery relies on local management arrangements which stem from a blend of customary law and some elements of state regulation. The emphasis of these arrangements is on input controls (gear restriction, closed fishing season etc.), and not output controls (e.g. catch limits) (Njaya et al., 2012; Soliman, 2014).

The question of whether individual fishermen will really comply to the regulatory controls has always been difficult (Sutien et al., 1990; Young, 2013) due to intricate social links that usually exist in small-scale fishing communities (Beuving, 2013) but as Jentoft (1989) observes, when fishermen are persuaded to advance local collective interests (e.g. at the fishing community level) at the expense of personal interests, it becomes easier to achieve success in fisheries management. Based on this complexity of motivation to fisheries management success, the issue that motivates this PhD thesis is whether the current management arrangements may be adequate to sustain the fishery at the Elephant Marsh in the longer run and to explore options of management strengthening if needed.

In fisheries science, the traditional way of determining sustainable exploitation of fish stocks is by the use of maximum sustainable yield (MSY) which is related to fishing effort (Bousquet et al., 2008; Froese and Proelß, 2010). MSY sees sustainability purely through the maintenance of a fish stock population and excludes the effects of competition, symbiotic or commensal relationships with other species, trophic relationships or changings in carrying capacity due to other human influences such as pollution (Bell and Morse, 2008; Legović, et al., 2010; Larkin, 1977; Garcia et al., 2012). The limited ability of MSY to guide the environmental and social dimensions of fisheries management and its limited application in multi-gear and multi-species fisheries (Kolding and van Zwieten, 2006) has led to the birth of ecosystem-based approaches which seek to alleviate the classical extremes of MSY (Pikitch, et al., 2004; Zhou, et al., 2010; Berghöfer, et al., 2008; Berkes and Folke, 1998). For the Elephant Marsh Fishery, the MSY is not yet definitive. Instead, sustainability attributes in this PhD thesis are based four indicators (*i*) stability of catch (abundance overfishing); (*ii*) quality of catch (non-juveniles for the late maturing *Oreochromis* and *Tilapia*

species); (*iii*) trends in the catch per unit effort (CPUE); and (*iv*) the ability to keep non-community members (immigrants) out of the resource.

The key actors in the Malawian fisheries sectors are the government officers, fishers, leaders of fishing community user groups (known as Beach Village Committees) and traditional chiefs. Several authors (Donda, 2001; Hara et al.,2014; Hara, 2001;2002; Njaya et al., 2012; Ganter et al., 2001) have highlighted some of the challenges in the interactions among these key players. It is therefore important that before devising any governance options for sustenance of the Elephant Marsh Fishery, a proper understanding has to be achieved about the various roles of each of the key players and the relationships amongst them at the local level.

1.2. Objective

Against this background, the major drive behind this dissertation has been to design more empirically grounded institutions for the management of small-scale inland fisheries in developing countries. This drive can be found back in research questions *iii* (empirical basis) and *iv* (designs). But before arriving there on a proper quality level, it was logical to first get to know the region (research question *i*) and to study how comparable fisheries are managed (research question *ii*).

Thus, the main objective of this study is to determine sustainable institutional arrangements for themanagement of small-scale fisheries resources in developing countires; and how they relate to local needs as well as national and international interests in the conservation of these resources. The research questions were as follows:

i. What are the socio-ecological and land use setting and potentials of the Elephant Marsh wetland in Malawi?
ii. What are the key actors and institutions in the management of small-scale inland fisheries in developing countries compared to situation at Elephant Marsh fishery?
iii. What are the key socio-causal dynamics of the management system at the Elephant Marsh Fishery?
iv. How can these socio-causal dynamics at the Elephant Marsh Fishery, if and insofar needed in the near future, be translated into strengthened institutions for sustainability of small-scale inland fisheries in developing countries?

1.3. Study Area

Location and ecology

The Elephant Marsh is located on the East African Rift Valley floor in the southern part of Malawi (14°25′–17°50′S and 35°15′–35°15′E), see Figure 1.1. It covers an average area of about 600 km^2, although actual size varies from about 2700 km^2 in the wet season to 500 km^2 in the dry season. The variation creates seasonal pressure on the ecosystem goods and services that communities can draw from the wetland. The Elephant Marsh straddles the administrative districts of Chikhwawa and Nsanje, which fortunately follow similar institutional arrangements so that for this study, no major trans-district complications arose. The region has an average altitude of 500 m above sea level and an annual precipitation range of 560 to 960 mm. Four hydro-climatic seasons are identified, comprising (1) hot, dry weather with low river levels from July to September, (2) hot, windy, wet weather from October to December, (3) hot, humid, wet weather from January to March, and (4) humid, cool weather from April to June. The marsh is fed by the Shire River, the only outlet of Lake Malawi, which flows through it in a southerly direction before joining the Zambezi River in Mozambique. It extends from the south eastern part of Illovo sugar estate to just above the confluence of Shire River and Ruo River at Chiromo. Since the Ruo River has a less buffered flow regime than the Shire, its peak flow levels can rise above those of the Shire's, causing backflow into the marsh, sometimes (1950, 1991, 2001, 2011, 2012 and 2015) with substantial flood damage.

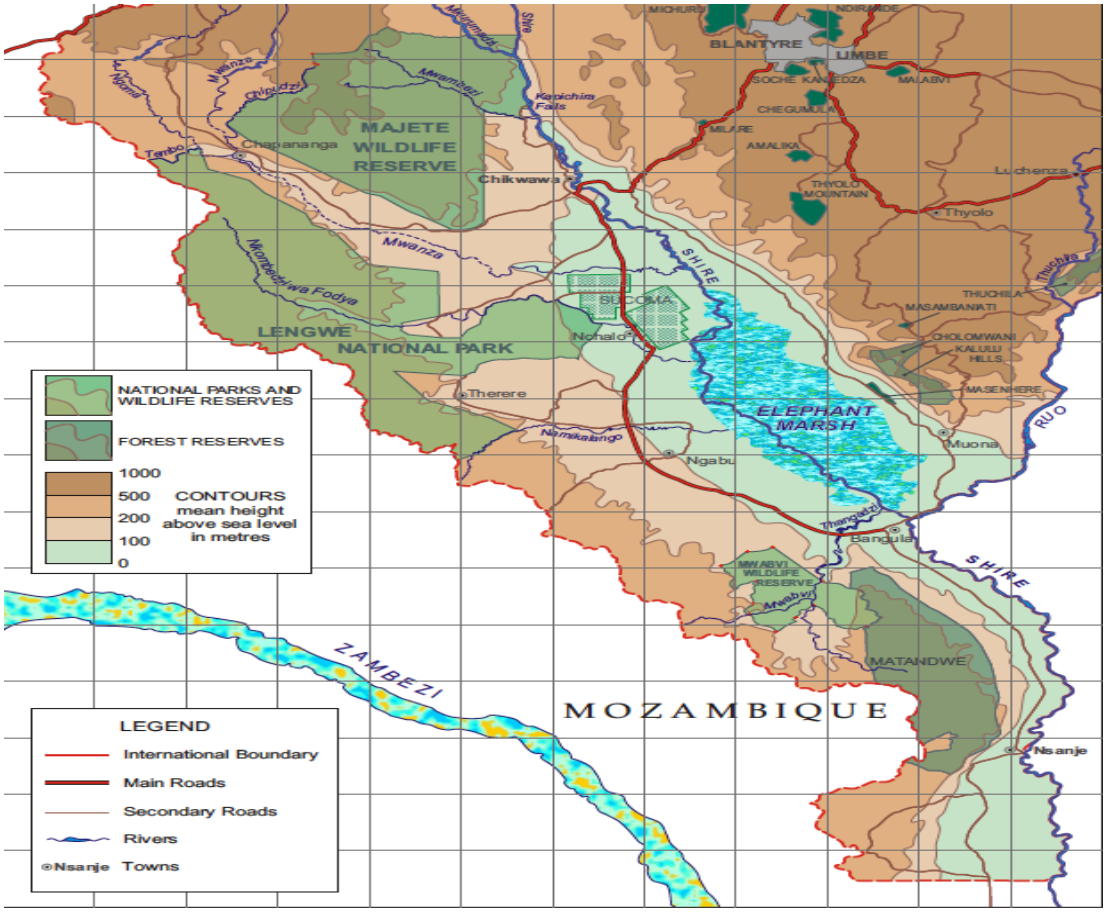

Figure 1.1 Map of southern Malawi showing the position of Elephant Marsh

The marsh has relatively grassy margins but the bulk of its surface is formed by a mosaic of rooted swamp vegetation (sudd) floating vegetation and open water. In the southern part, this pattern is interspersed with islands with saline soils and palm trees (Hughes & Hughes, 1992). The floating vegetation includes *Nymphaea odorata* (water lily), *Eichhornia crassipes* (water hyacinth), *Pistia stratiotes* (water lettuce), and *Azolla nilotica* and *Salvinia molesta* (floating ferns). Other common flora in the wetland include *Phragmites australis* (common reed), *Vossia cuspidata* (hippo grass), *Typha domingensis* (cattail), *Cyperus papyrus* (papyrus), *Cyperus procerus* (sedge), *Lonchocarpus capassa* (apple-leaf),*Utricularia inflexa* (bladderwort), and *Hyphaene benguellensis (vegetable-ivory palm),* from which palm wine (locally known as *uchema*) is produced.

The Elephant Marsh supports a diverse population of birds with more than 60 species. These include *Ardea purpurea* (purple heron), *Butorides striata* (green-backed heron), *Nettapus auritus* (African pygmy goose), *Ardea goliath* (goliath heron), *Anas undulate (yellow-billed duck), Erythrocercus livingstonei* (Livingstone's flycatcher), *Scotopelia peli* (Pel's fishing-owl), *Telecanthura ussheri* (mottled spinetail), *Phalacrocorax lucidus* (white-

breasted cormorant), *Haliaeetus vocifer* (African fish eagle), *Alcedo atthis* (common kingfisher), *Alcedo cristata* (malachite kingfisher), *Anaplectes rubriceps* (red-headed weaver), *Ploceus cucullatus* (village weaver), *Tringa totanus* (common redshank),*Tringa nebularia* (common greenshank), *Bubulcus ibis* (cattle egret), *Merops boehmi* (Boehm's bee-eater) *Tchagra minuta* (marsh Tchagra)*, Estrilda astrild* (common waxbill), *Actophilornis africanus* (African lily-trotter), *Actitis hypoleucos* (common sandpiper), Tringa stagnatilis (marsh sandpiper)*, Rostratula benghalensis* (greater painted snipe), *Philomachus pugnax* (ruff), *Macronyx croceus* (yellow-throated longclaw)*, Glareola pratincola* (collared pratincole)*, Acrocephalus palustris* (marsh warbler), *Mycteria ibis* (yellow-billed stork), *Ardeola ralloides* (squacco heron), *Asio capensis* (marsh owl) and *Rynchops flavirostris* (African skimmer) (Dowsett-Lemaire & Dowsett, 2006).

The Elephant Marsh is also home to many fish species mainly comprising cyprinids (*Hydrocynus vittatus, Lebo altivelis, Barbus species, Lebeo mesopsand Labeo Congoro*), Cichlids (*Oreochromis mossambicus, Oreochromis placidus, Eutropius sepressirotris* and *Tilapia rendaii*) and Clarids (*Clarius geriepinus, Clarius ngnamensis and Protopteus annectus*). Out of these fish species *Clarias gariepinus* (locally known as mlamba), *Oreochromis mossambicus, Oreochromis placidus* (makumba) *Sarotherodon mossambicus* (chambo) and *Barbus ssp*. (matemba) comprise over 90 percent of the commercial catch (Government of Malawi, 2010). The wetland also acts as an ecological barrier between *Barbus johnstonii* (Cyprinidae family) of Lake Malawi and Upper Shire, and *Barbus marequensis* of the Lower Shire and Zambezi.

The Elephant Marsh is also a very important habitat for *Crocodylus niloticus* (Nile crocodile) and *Hippopotamus amphibius* (hippopotamus). The 2015 International Union for Conservation of Nature (IUCN) red list identifies *Rynchops flavirostris* (African skimmer) and *Oreochromis mossambicus* (chambo) in its natural range as species which are ‘Near Threatened’ while Appendix 1 of the Convention on International Trade in Endangered Species (CITES) list includes *Crocodylus niloticus* (Nile crocodile) and *Hippopotamus amphibius* (hippopotamus).

Human Environment

There are about 24 fishing villages at the Elephant Marsh namely: Chambalo, Ntchenyela, Chisamba, Bulawayo, Pindani, Alumenda, Mchesi, Nyaulombo, Nyalugwe, Thedzi, Mitawi, Nthenda, Nyangu, Nsambokulira, Chuluchamkango, Bwemba, Mchachajemusi, Twaya, Mpandeni, Namathongo, Njale, Chigwamafumu, Mwala, and Nkolimbo. These villages are

located on two distinctive geographical sections of the wetland which are locally referred to as the ‘East Bank’ and the ‘West Bank’. Most of the fishing villages (~70%) are situated on the East Bank while the remaining 30% are situated on the West Bank. A map (figure 4.1) showing the spatial distribution of the fishing villages at the Elephant Marsh is presented in Chapter 4 of this thesis.

The indigenous people at the Elephant Marsh are the Mang‘anja but many other ethnic groups have migrated to the area, most notably the Sena (Schoffeleers 1968). Other ethnic groups in the area include: Lomwe, Yao, Chewa, Ngoni, Tonga and Tumbuka. The Man’ganja are usually specialized farmers (wetland cultivation of maize, rice , sorghum, millet, beans, cassava and sweet potatoes) while the Sena tend to engage more in livestock keeping (goats, cattle, sheep and poultry) and small-scale fishing with a relatively business-oriented outlook. Fishing involves the use a variety of gear that include gill nets, fish traps, hooks, cast nets, scoop nets, seine nets and fish spears. Fish spears are usually used in the wet season when fish are all over in the flood plains.

Access to the Elephant Marsh is very good as there is a good network of peripheral roads and a railway line to Malawi’s commercial city of Blantyre. With a natural population growth of 2.8% and an influx of people from upland and other districts such as Blantyre, Thyolo and Mulanje (NSO, 2008) coupled with rising poverty in Malawi, where 51 per cent of the population is living below the income poverty line of US$1.9 a day (NSO, 2012a), pressure to convert the wetland to agricultural land is likely to increase. The 2008 Population and Housing Census report for Malawi indicates that about 100,000 people had immigrated to Chikhwawa and Nsanje districts between 1998 and 2008 (NSO, 2008).This represents about 14% of the original population thereby creating more pressure on the ecosystem goods and services of the Elephant Marsh. The human population is rapidly increasing and there is an accompanying resource utilization which has resulted in degradation of the wetland ecosystems. Apart from population growth at the local wetland ecosystem, influxes of people from uplands and other districts have exerted exploitation pressure on the Elephant Marsh. Many farmers, as a result, occupy and cultivate fragile marginal lands such as swamps and riverbanks. Lower water levels due to drought and river flow regulations by a barrage and dams have facilitated the settlement and utilization of marshes creating further stress on wetland ecosystems. Many farmers are killed or injured by crocodiles as they cultivate near the riverbanks, draw water to irrigate their crops or when crossing the river to gardens on the other side of the river.

There are five main traditional areas (commonly known as Traditional Authorities) around the Elephant Marsh, namely: Makhuwira, Mlolo, Lundu, N'gabu and Mbenje (NSO, 2008). Ownership of land at the Elephant Marsh is based on customary tenure and access to land is through kinship or marriage, depending on ethnic cultures and traditions (Schoffeleers, 2008). For example, the Man'ganja system of succession and inheritance is matrilineal while the Sena system is patrilineal whereby inheritance follows the male line and the wife moves to her husband's village for settlement. Many original traditions and norms have now been eroded by intermarriage, modernization and intermingling between the different tribes (Mandala, 1990). However, it remains in accordance with Malawi's National Land Policy of 2004 that land (including wetland) under customary tenure is communal and cannot be sold outside the community.

Management arrangements at Elephant Marsh are therefore guided by customary law. At village level and under guidance of a traditional chief, each development sector (education, health, natural resources management etc.) is represented in the form of a village-level executive committee that is responsible for coordination of specific activities. In the fisheries sector, the village level committee is called the Beach Village Committee (BVC), which also controls access to the Elephant Marsh through BVC leaders known as Beach Chairs. The social organisation (social capital) of the local community is therefore an important attribute for successful management of resources at Elephant Mrsch. In this thesis, social capital refers to the social networks and norms (behaviours) which individuals or groups of individuals can use to facilitate coordination and cooperation for their own or mutually beneficial collective outcomes (Gutie´rrez et al., 2011; Sekhar, 2007; Grafton, 2005).

1.4. Fieldwork Methodology

This study mostly relied on the primary information due to the scarcity of secondary data. Data collection was done using a mix of qualitative and quantitative techniques from multiple sources to improve the validity and reliability of the data (Yin, 1994). These included structured interviews with key informants, participatory observations, Geographic Information Systems (GIS), Focus Group Discussions, and informal talks with individuals. These various techniques targeted relevant actors in small-scale fisheries at the Elephant Marsh in Malawi. In addition, secondary data were collected from documents at relevant offices and through internet search. The study followed strict ethical guidelines and considerations as required by Leiden University. In that respect, participation in the study was based on voluntary consent of the participating parties. Data collection was done during three periods: May to December 2011, April to September 2012, and January to June, 2013.

Pilot (Reconnaissance) Survey

The fishing villages at the Elephant Marsh were initially surveyed prior to the actual data collection to enable the researcher to familiarize himself with the local conditions of the study site and therefore to establish the feasibility details of the study. This was an imperative step for making decisions on the approach for data collection. The pre-assessment provided a general overview which was important for identification of data sources and modifying the data collection tools to reflect the reality on the ground.

Primary data collection

For primary data collection, it was necessary at each stage to critically look at the best method to use in collecting factual information on fisheries management at the Elephant Marsh.

Key Informant Interviews (KII)

Key informant interviews included such personnel as local leaders, fishers, fish traders, fisheries extension workers, government officials, and chairpersons of village fisheries committees. Due to reminiscence problems among the elderly, it was necessary to cross-check some information by asking several people the same questions and also asking the younger generations.

Focus Group Discussions

This method was used to collect information from local leaders (village chiefs), fishers, fisheries committee, and community members of fishing village. Whyte (1977) classified it as “public hearing”. These focus group discussions provided information about fisheries management at the Elephant Marsh. This information complemented and clarified some of the data collected through Key informant interviews. Focus group discussions were generally open but checklists were used to guide discussions. In some cases, the discussions were followed by more probing questions on specific issues of interest in order to get more detailed information.

Informal Discussions

Informal but articulated discussions were used to confirm and complement information collected using other methods. Sometimes, when people are formally questioned, they tend to give answers which sieve information they think may lead them to risk in one way or

another. During data collection, informal talks were useful in generating more information which may not have been obtained during formal discussions.

Geographic Information Systems (GIS) and Participatory Observations

Landsat Thematic Mapper (TM) images obtained from Malawi's Department of Land Conservation in the Ministry of Agriculture and Water Development were used to produce maps of the study area. The classes of interest were cultivated land, grazed land, built-up land, freshwater, grassland, marshes and forest land. Classification employing the Gaussian Maximum Likelihood Classifier algorithm was used to create land use maps from the satellite imagery. This was done using ArcGIS 9 software. The green (0.52-0.60µm), red (0.63-0.69µm), near-infrared (0.76-0.90µm) and two mid-infrared (0.76-0.90µm and 2.08-2.35µm) bands were used in the classification. A range of wavebands was selected to improve the delineation accuracy of land use. A handheld global positioning System (GPS) was used to identify the physical location of the fishing villages which helped in generating the land use map of the area. Participatory observations were also used to supplement and/or confirm the data collected using other approaches.

Review of Secondary Data

Existing secondary data were extracted from relevant documents such as, policies and laws, books, reports, publications, journals and internet articles. The relevant documents were accessed, perused and the relevant information/text sorted and photocopied for further analysis. In some cases, there was either no electricity or photocopying services. In such cases, a digital camera was used to capture relevant documents which were later downloaded to a computer, printed out, and sorted, and analyzed based on the objectives of the study. In addition, a literature study of the existing research reports and some official statistics was done.

Limitations of the study

This PhD study achieved its intended goals despite some limitations which future research in small-scale fisheries management at the Elephant Marsh in Malawi may improve on. One clear shortfall was the scarcity of data on fish stock assessments which, without necessarily affecting the results of the study, limited the width and depth of the institutional design recommendations that have been proposed in this thesis. The scarcity of secondary data (some very old) also resulted in the researcher spending a lot of time to generate primary data to inform the study. Although there is no reason to believe that the fisher-informants should somehow be systematically biased, but still, the fish catch data has not been counted

systematically. Another thing to note is that being a case study, the scaling up of the findings from the Elephant Marsh Fishery to similar small-scale fisheries in other parts of Malawi or elsewhere should be done with caution. The reason for this is that socio-causal dynamics at the Elephant Marsh might be locally unique. The diversity and complexity of socio-ecological systems for small-scale fisheries across the globe therefore requires that wholesome generalities for sustainable small-scale fisheries management options should be subjected to further research.

1.5. Thesis Outline

The thesis comprises six chapters. The present chapter gives a general overview of the topic of study and presents the research questions. Chapter 2 presents the management arrangements as well as the ecosystem-based development potentials that exist at the Elephant Marsh in Malawi. Chapter 3 unveils the conditions that are necessary for small scale fisheries in developing countries. Based on lessons from the preceding chapters, Chapter 4 uses empirical data from the Elephant Marsh Fishery to establish conditions that are necessary for its sustainability. Chapter 5 analyses the socio-causal linkages among various key actors in order to devise a sustainable management plan that can achieve long-term sustainability of the Elephant Marsh Fishery. Finally in Chapter 6, the thesis presents the major conclusions and an outlook to further institutional development.

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Institutions and Ecosystem-Based Development Potentials of the Elephant Marsh, Malawi

Ishmael B. M. Kosamu [1,2,*], Wouter T. de Groot [2,3], Patrick S. Kambewa [4] and Geert R. de Snoo [2]

[1] The Polytechnic, Department of Physics and Biochemical Sciences, University of Malawi, Private Bag 303, Blantyre 3, Malawi.

[2] Institute of Environmental Sciences (CML), Leiden University, P.O. Box 9518, 2300 RA, Leiden, The Netherlands.

[3] Institute for Science and Innovation Studies, Faculty of Science, Radboud University, P.O. Box 9010, 6500 GL, Nijmegen, The Netherlands.

[4] Department of Economics, Chancellor College, University of Malawi, P.O. Box 280, Zomba, Malawi.

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A fisherman taking home his day's catch at Chigwamafumu Fishing Village

Abstract

The Elephant Marsh, a wetland in Southern Malawi, is important for fishing, agriculture, hunting and the collection of natural resources for the livelihoods of local communities. However, there has been increasing pressure driven by a changing climate, population growth, rural poverty and agricultural conversion, all of which threaten the future of the wetland. Currently, Malawi does not have either a national wetland policy or a climate change policy and wetland issues are only marginally present in the National Parks and Wildlife Policy of 2000 and National Fisheries and Aquaculture Policy of 2001. As a result, the country lacks a framework that could be strong enough to achieve balanced and sustainable wetland management for multiple resource users. The objective of this study was to establish the development potentials of Elephant Marsh from an ecosystem-based ('working-with-nature') perspective. It was revealed that there are development potentials in fisheries, recession agriculture, biomass for energy, conservation and tourism. This paper emphasizes that as these opportunities are developed, there will be need to strengthen management institutions at local and national levels, and the coordination between the two.

Keywords: Elephant Marsh; wetland; Malawi; local institutions; ecosystem-based management; livelihoods; co-management

2.1. Introduction

Wetlands and other aquatic ecosystems cover about 20% of Malawi's surface area. The 1971 Ramsar Convention, of which Malawi is a party, defines a wetland as any area of marsh, fern, peat, land or water, whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brackish or salty, including areas of marine waters, the depth of which does not exceed six meters at low tide. As Turner et al. (2000) observed, wetlands are the only single group of ecosystems that have their own global framework for conservation and wise use (maintenance of the ecological character). For a wetland to qualify as a designated Ramsar site, it has to exhibit unique ecological, botanical, zoological, limnological or hydrological importance. In Malawi, only Lake Chilwa (224,800 hectares) has been designated as a Ramsar site.

Despite its long history and importance, the Elephant Marsh in southern Malawi (see Chapter 1) is one of the least studied wetlands in Malawi. The publications that do exist (Ngoma, 2010; Chimatiro, 2004; Njaya, 2005) focus almost entirely on fisheries management. In 2004, an inventory was made of potential strategies for the management of crocodiles and hippopotamus in the Lower Shire region of Malawi that included the Elephant Marsh (USAID, 2000). This inventory however lacks attention on the integration of conservation with local livelihoods, as is the case in ecosystem-based management.

Ecosystem-based management is commonly defined as an integrated, science-based approach to the management of natural resources that aims to sustain the health, resilience and diversity of ecosystems while allowing for sustainable use by humans of the goods and services they provide (Garcia et al., 2003).This definition imparts a holistic vision of ecosystem management by including humans as the users of goods and services. The introduction of humans into the approach necessitates the need to include human values such as equity, socio-economic and cultural values as well as the harmony of their interrelationships. This perspective also implies the principle of integrated river basin management that involves a comprehensive inclusion of all land and water services (such as transport and fisheries), planning and regulation of human activities towards a complex set of interacting objectives to ensure long-term sustainability (Garcia et al., 2003). It simultaneously looks at all economic water-related sectors such as fisheries, water supply, agriculture and tourism, and recognizes the implications that originate from multiple functions of a resource. Thus, ecosystem-based management moves away from looking at human needs first (e.g. food and revenues) and then incorporating nature into these needs. Rather, it first takes stock of both the human and ecosystem needs and potentials and then tries to

strike a sustainable balance of utilization. In philosophical terms, ecosystem-based management expresses a vision of 'partnership with nature' rather than the traditional attitude of 'mastery over nature' (De Groot et al., 2011) and its success relies on a well-coordinated policy framework.

Malawi does not have a national wetland policy and issues of wetlands (and floodplains) are only marginally present in the National Parks and Wildlife Policy (Government of Malawi, 2000), and in the National Fisheries and Aquaculture Policy (Government of Malawi, 2001). As a result, the country lacks a management framework strong enough to enforce a balanced and sustainable wetland development under rising pressures such as overexploitation and agricultural conversion which are mainly driven by population growth, rural poverty, climate change and market growth. In the Elephant Marsh, additional drivers include fluctuation in water levels caused mainly by hydroelectric power generation at Kapichira Dam and the abstraction of water for irrigation by Illovo sugar estate; both located upstream. Moreover, the coordination of the roles of the various stakeholders in wetland management at Elephant Marsh is not very clear or stable.

One specific purpose of this chapter is to bring into perspective a clear understanding of the socio-ecological and land use setting of the Elephant Marsh as well as the ecosystem-based development potentials that exist at the wetland. The second specific purpose of the chapter is to highlight existing actors and local institutions pertaining to the management of the marsh. In order to avoid overexploitation, future development options will have to be efficient and effective. There is a need to build on local institutions; for example, as partners in co-management arrangements. Data presented in this chapter are based on field visits which were done from May to December 2011 using key informant interviews, a structured questionnaire, participatory observations, review of secondary data and focus group discussions.

2.2. Ecosystem Services

Wetlands are important for many ecosystem services, such as fisheries, agriculture, livestock grazing, (eco)tourism, water supply, water purification, carbon sequestration, wildlife goods, biodiversity, and transport. Quite often however, wetlands are subjected to a development paradigm that maximizes the one or two ecosystem services for which markets are readily available such as cash crop production (McCartney & Houghton–Carr, 2009).

The Elephant Marsh wetland is one of the most productive ecosystems in Malawi, contributing to the livelihoods of thousands of households in Chikhwawa and Nsanje districts (Timberlake, 1997). Agricultural production in and around the wetland relies on the wetland's year-round moisture and the fertile alluvial soils. Rainfall is usually erratic and rain-fed agriculture is becoming less reliable. The high productivity of the soils has been one of the major attractive factors for human settlement around the wetland since as early as the 3rd century AD (Robinson, 1973). With a natural population growth of 2.8% and an influx of people from upland and other districts such as Blantyre, Thyolo and Mulanje (NSO, 2008) coupled with rising poverty in Malawi, where 51 per cent of the population is living below the income poverty line of US$1.25 a day (NSO, 2012a), pressure to convert the wetland to agricultural land is likely to increase. The 2008 Population and Housing Census report for Malawi indicates that about 100,000 people had immigrated to Chikhwawa and Nsanje districts between 1998 and 2008 (NSO, 2008). This represents about 14% of the original population thereby creating more pressure on the ecosystem goods and services of the Elephant Marsh.

Fisheries are an important sector of the Elephant Marsh. For Malawi as a whole, fish contribute 60 percent of the animal protein intake (Ngoma, 2010). The fisheries industry directly employs over 60,000 people and indirectly engages 500,000 beneficiaries through fish processing, transportation, marketing, as well as boat building and repairs (Government of Malawi, 2011; Yaron et al., 2011). Fishing mostly occurs between April and July when flood waters are receding and the fish becomes easier to catch. The annual fish production from around the Elephant Marsh has been estimated at an average of 8500 tonnes (World Bank, 2010). This figure possibly includes the lower sections of the Shire River downstream from Elephant Marsh but generally indicates an annual production of 141.7 kg/ha. There are no recent data on the economic value of fisheries exploitation at the Elephant Marsh partly due to lack national interest in carrying out research on common pool resources such as the Elephant Marsh. Unfortunately, such data is very important for future impact assessment studies. Based on 1990 data on production and market prices, the economic value of Elephant Marsh fisheries was estimated at US$ 1.1 million per year (Seyam et al., 2001) Fish prices change quite rapidly in Malawi. For instance, the average fish price at rural markets in Malawi rose from MK 88.05 (US$ 0.53)/kg in 1999 (Brummett, 2000) to MK 210.19 (US$ 1.29)/kg in 2001 (Matiya et al., 2003) representing a 47% increase over a three year period. This implies that fisheries value at the Elephant Marsh is certainly higher at present than it was in 1990 in real terms.

Fishing is complemented by recession agriculture in terms of both household labor and income (Ngoma, 2010). The major crops grown in and around Elephant Marsh include rice, maize, sorghum, millet, beans, cassava and sweet potatoes. The cash crops are mostly sold at the local markets and then transported by traders to bigger towns and cities (Turpie et al., 1999). The economic value of Elephant Marsh's recession agriculture was estimated at US$ 0.7 million per year in 1990 (Seyam et al., 2001).

Elephant Marsh is used for livestock grazing which include an estimated 104,450 cattle (World Bank, 2010).The estimated economic value of Elephant Marsh for grazing was at US$1 million per year in 1990 (Seyam et al., 2001). The wetlands are a source of good, year-round fodder (mainly sedge and young reed) and watering points for the animals. The best grazing period in the wetlands however is during the dry season. Unfortunately, this coincides with the breeding season for crocodiles posing a danger to livestock and herders. Based on focus group discussions, it was discovered that crocodiles are generally looked upon as enemies by the local people because of attacks and competition for fish. They have also been seriously hunted for their eggs, meat and skin. In 1997, for example, over US$ 23,000 was generated from the sale of 200 skins, which were exported to fashion houses in countries like France (USAID, 2000). The poaching has led to reduction in crocodile populations. Field visits in 2011 showed that hippos too are hunted, with meat sold locally. Numbers and values are as yet unknown.

The estimated total economic value of Elephant Marsh in 1990 of US$ 2.8 million per year (Seyam et al., 2001), besides being outdated to some extent, notably excludes other important ecosystem services such as water supply, water purification, transport, natural products and biodiversity.

2.3. The People and Their Traditions

The indigenous people at the Elephant Marsh are the Mang'anja but many other ethnic groups have migrated to the area, most notably the Sena (Schoffeleers, 1968). Other ethnic groups in the area include: Lomwe, Yao, Chewa, Ngoni, Tonga and Tumbuka. The Man'ganja are usually specialized farmers while the Sena tend to engage more in fishing and livestock keeping, with a relatively business-oriented outlook.

There are five main traditional areas (commonly known as Traditional Authorities) around the Elephant Marsh, namely: Makhuwira, Mlolo, Lundu, N'gabu and Mbenje (NSO, 2008). Apart from their communal power, traditional authorities also act as the intermediaries between

spirit worshiping communities and their gods. A rain cult among the Mang'anja worships Mbona whose head is believed to have been cut off hundreds of years ago leading to an outflow of a river of blood. Mbona is said to annually return to the home of his wife (Salima) in the form of a snake that foretells what will happen in the coming year (Schoffeleers, 2008; Mandala, 1990). The Mbona cult has been linked to population movements, settlement patterns, acceptance or non-acceptance of immigrants. In the 1930s, Mbona, through Traditional Authorities, directed the population to emigrate and relieve pressure on the marshes of the Lower Shire as a reaction to perennial flooding of the marshlands (Schoffeleers, 1979).

There are four categories of land tenure in Malawi namely; customary land, public land, leasehold and freehold. Ownership of land at the Elephant Marsh is based on customary tenure and access to land is through kinship or marriage, depending on ethnic cultures and traditions. For example, the Man'ganja system of succession and inheritance is matrilineal while the Sena system is patrilineal whereby inheritance follows the male line and the wife moves to her husband's village. These original traditions and norms have now been eroded by intermarriage, modernization and intermingling between the different tribes (Schoffeleers, 2008; Mandala, 1990; Schoffeleers, 1979). However, in accordance with the National Land Policy of 2004, land under customary tenure is communal and cannot be sold outside the community. Communal land is governed by customary law, in which the traditional leaders are the custodians of the land (Takane, 2007; Chirwa, 2008; Matchaya, 2009). Such traditional systems which are backed by customary law have been found critical in governing small-scale fisheries in such countries as India and Ghana (Jentoft et al., 2011).

2.4. Management Arrangements

The Elephant Marsh and Lake Chilwa were mandated as the first two protected game reserves in Malawi in 1897. The aim was to protect the large game animals, including elephants, which were common in the area. It is reported that one of the early missionary explorers to Malawi, David Livingstone, met a huge herd of around 800 elephants in the wetland hence the name Elephant Marsh (Hughes & Hughes, 1992). The customary management institutions that prevailed in the unprotected areas (common pool resources) all over the country were mainly influenced by secular and religious powers of traditional chiefs. For example, there were ritual prohibitions of hunting in forests associated with shrines such as the Mbona among the Mang'anja (Inter-Agency Group on Protected Areas, 1997) The enforcement of natural resource management regulations at the Elephant Marsh has, however, never been very effective (Turpie et al., 1999) and was largely interrupted in

1911 when it became clear that the area would be required for settlement (Inter-Agency Group on Protected Areas, 1997). The final loss of statutory protection of the Elephant Marsh and Lake Chilwa seems to have occurred during the transition from colonial rule to the then newly independent government in 1964 (Mvula & Haller, 2009) that lacked a well-coordinated legal and institutional setup.

Due to its customary tenure status, the Elephant Marsh is managed by local institutions with little input from the central government. In Malawi, the hierarchy of power has been devolved from central government to give authority to District Assemblies (DAs) to make local decisions that may favor development (Njaya et al., 2012). For example, the formation and implementation of by-laws to support fisheries management in a particular area is done by DAs. The DAs (made up of elected politicians and councilors; inherited traditional authorities; and appointed, influential members of society such as religious leaders and officials from non-governmental organizations) get advice and guidance from District Executive Committees (DECs), which are formed by government employees from different departments in the district. Decision making at this level is based on consensus between DAs and DECs (Njaya et al., 2012). The next lower level is headed by the Traditional Authorities (TAs) and comprises Group Village Chiefs who make Area Development Committees (ADCs). Authority at this level comes from DAs but support and technical advice is given by Area Executive Committees (AECs), which are made up of extension workers from government and representatives from non-governmental organizations. Decisions made by ADCs are passed on to Group Village Development Committees (headed by Group Village Chief and comprised of traditional village chiefs) for implementation at the community level through Village Development Committees. Decisions made at all these levels are generally accepted by the people because of involvement of chiefs who traditionally, have a lot of authority.

At the village level and under guidance of the village chief, each development sector is represented in the form of an executive committee that is responsible for coordination of specific activities (Njaya et al., 2012). Figures 2.1 and 2.2 capture the local relations that exist in managing the fisheries sector at Elephant Marsh. The fishery is mainly guided by customary law through village chiefs who receive their mandate through inheritance, and managed by user groups called “Beach Village Committees” (BVCs) which is headed by a chairperson (BVC Chairs). Village chiefs are given ex officio (non-voting) roles as patrons of the BVCs (Russell & Dobson, 2011). The term “beach” stands for a fish landing site; sandy or swampy (as at the Elephant Marsh). They are connected to one fishing village each. The BVC Chair and the other members of the BVC (usually composed of ten office bearers) are

elected directly into their positions through local democracy at a village meeting for a two-year renewable term. Villagers eligible to vote are mainly those who are involved in fishing activities such as fishers and fish traders. Access to the Elephant Marsh is controlled through customary law by the BVC Chairs. Spatially, BVC chairs are strategically positioned at entry canals that lead into the wetland. Figure 2.3 shows one of the entry points. The house on the left is where the BVC Chairs sits to run the fishing affairs of his area of jurisdiction. Some twentyfour BVC Chairs are found around Elephant Marsh. Community members can get access rights into the Elephant Marsh by paying an annual fishing license fee of MK 360 (US$ 0.5) to the governmental Department of Fisheries. This fee is quite low compared to the value of fish and can be afforded by most members of the community.

Based on participatory observations and focus group discussions during the field visits in 2011, the arrangement appears to be working smoothly; one strength being that it assures community membership of the wetland users. Fish traders are also locally known as '*angoni*' broadly meaning foreigner (immigrant) and, specifically for this fishery, someone from outside the circle of the fishing villages at the Elephant Marsh (although *Angoni* also refers to an ethnic group in Malawi), and are not allowed to fish.

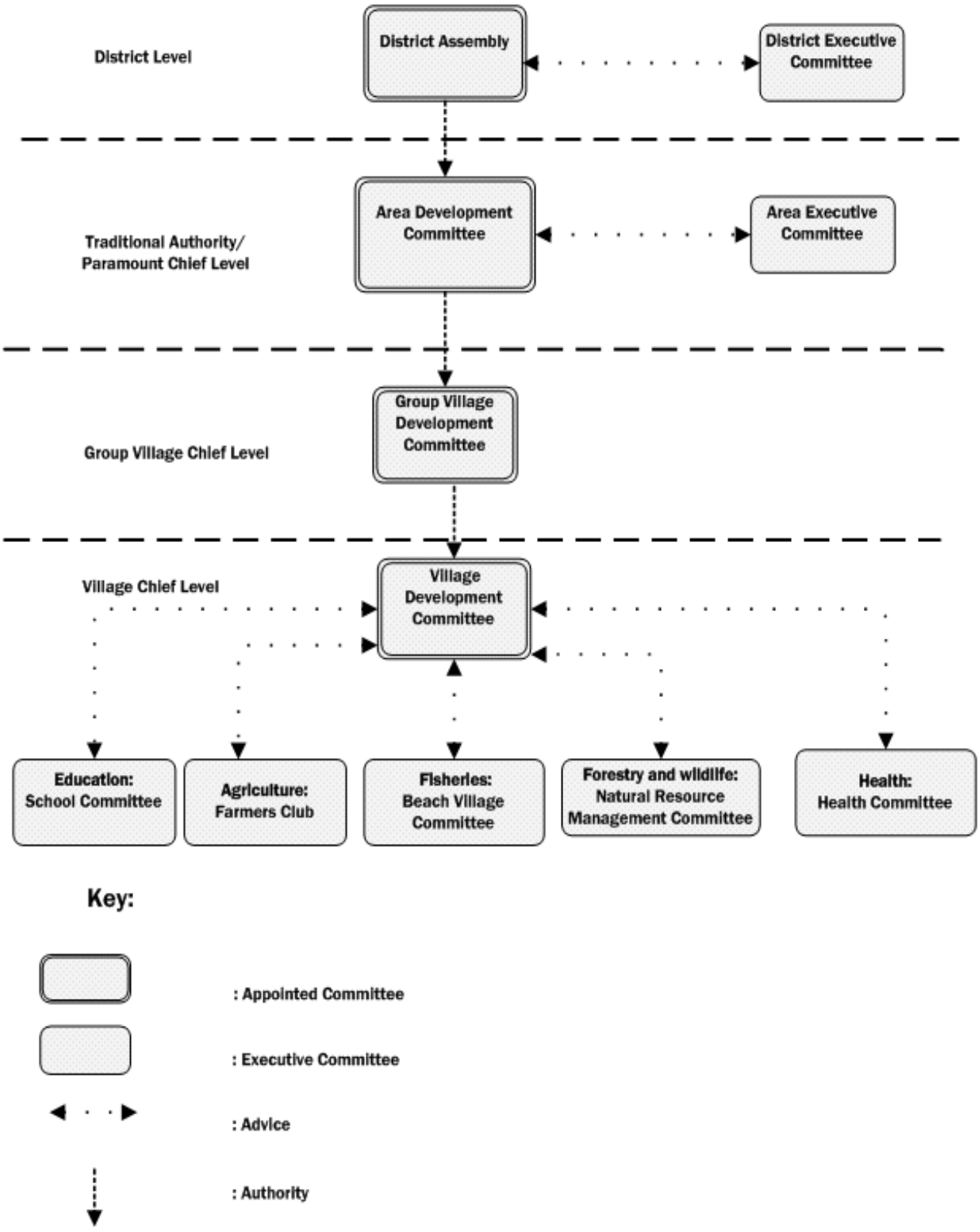

Figure 2.1 The power hierarchy at district level in relation to local communities. Adapted from Njaya et al. (2012).

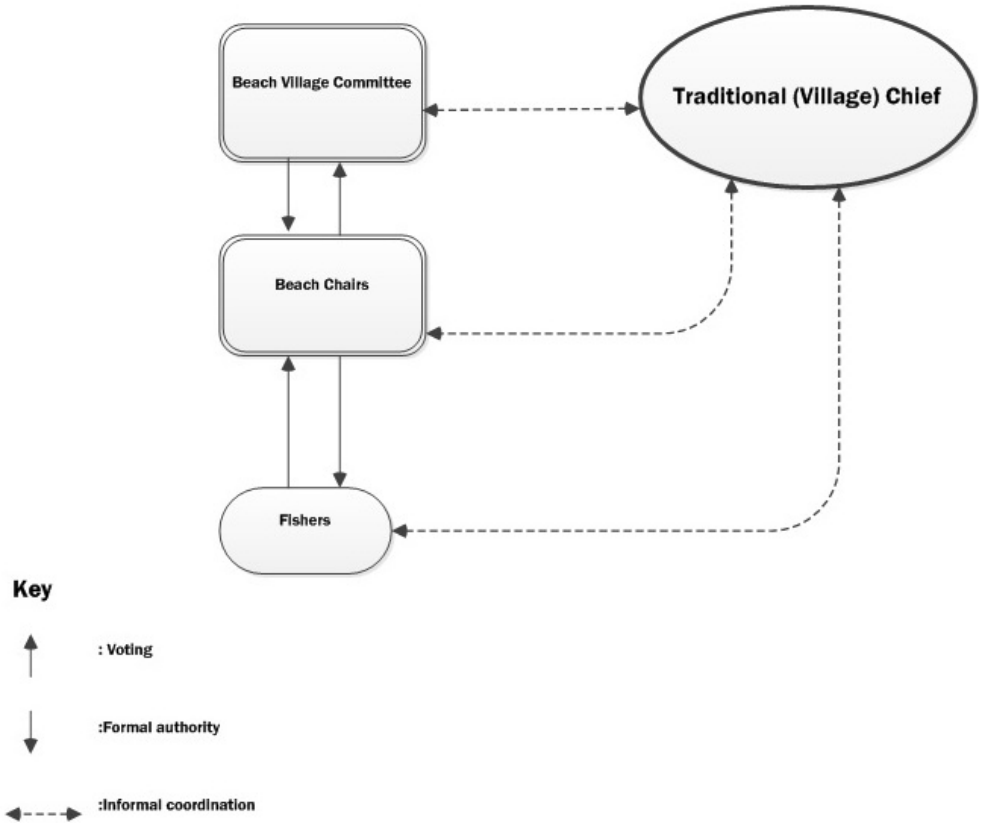

Figure 2.2 Organization of local fisheries management at the Elephant Marsh.

Figure 2.3 One of the entry points into the Elephant Marsh. In the background, fishermen prepare to go out. The poles are used to push the boats and measure water depth.

2.5. Ecosystem-Based Potentials of the Elephant Marsh

The Elephant Marsh has rich alluvial soils that favor most crops including rice and maize. The current agricultural activities around and inside the Elephant Marsh are mostly for household food and not large scale commercial purposes. Prospects for undertaking large scale commercial agriculture (rice and maize production) are strong however, given the currently low opportunity cost of labor and the proximity of urban markets. This would increase employment opportunities as well as the average income levels of the local people. At the same time, these very prospects might lead to big-time investment to drain and convert the wetland into a large-scale irrigation scheme. Although a detailed discussion of such irrigation schemes lies outside the scope of this paper, any cost-benefit analysis should be concerned with the possible negative effects of such schemes such as loss of ecosystem goods and services. The communities are currently organizing themselves in small-scale commercial farming groups and obtaining loans from money lending institutions (such as Malawi Union of Savings and Credit Cooperatives (MUSCCO)) to support initiatives that reduce wetland degradation and promote conservation agriculture.

Increased fish production in the Elephant Marsh appears to be an opportunity. The wetland is a good breeding ground for many species of fish and the good road network to Malawi's commercial capital of Blantyre (at about 120 km) and other densely populated districts puts the Marsh in a good economic position. If proper ecosystem management approaches are adopted, the fish catch can increase. For example, Denny et al. (2006) have proposed integration of smallholder wetland aquaculture into farming activities at Yala Swamps in Kenya, a wetland similar to Elephant Marsh; in a system they termed 'fingerponds'. In this approach, small ponds are dug into the wetland and used for fish production while the excavated soil is used to create raised bed gardens for vegetable production.

The hippopotamus that are found in the wetland are known to maintain the channels that enable fishing and probably also enhance fish productivity by creating more landscape diversity. During structured interviews with fishermen in 2011, they complained that the channels are becoming too narrow due to declining numbers of hippopotamus. Harvesting reeds and floating vegetation for energy (see below), done in such a pattern that there is a balance with natural primary production in the swamp may also create more open water and enhance fish production.

Papyrus and reeds grow thickly in the Elephant Marsh and are used locally to make mats, hats, chairs, thatch, granaries, baskets and fishing gear. Papyrus is also used as a lining for

coffins. Lily bulbs (locally known as *nyika*) are sometimes eaten for carbohydrates especially in years of poor crop harvest (World Bank, 2010). Value addition, crafts development plus urban and tourist marketing of these products may promote the livelihood of the locals and enhance their motivation to protect the ecosystem.

Malawi is a country faced with acute energy shortages. Only 8 percent of the population has access to electricity (Tenthani et al., 2011). The papyrus and reeds may therefore relieve the energy demand by acting as a source of bio-energy. A similarly high bio-energy resource potential from reed harvesting in Poland has been uncovered (Biemans et al., 2008). Reed (*Phragmites australis)* is a herbaceous lignocellulolic crop with a net calorific value of 4944.4 kWh/ton (De Wit, 2011) and an annual above-ground production of 20 tonnes per hectare (Murray-Hudson & Mmopelwa, 2011). If based on the land use map of the Elephant Marsh (see figure 4.1) we assume that 60 percent of the wetland has *Phragmites australis* growth, 480,000 tons could be annually produced using biogasification (decomposing the vegetation into methane, using anaerobic bacteria), having a calorific value of 2.37×10^9 kWh. Theoretically, this could be converted into a steady 10 to 20,000 kW (De Wit, 2011; Gravalos et al., 2010;Kryževičienė et al., 2008; Rajvansi, 1986; Nilsson et al., 2006), which is about 3 percent of Malawi's total installed electricity capacity of 302 MW (Tenthani et al., 2011).

How this energy potential might be utilized requires more research. It might well be, for instance, that solar panels, combined with a small battery and LED lamps, would be the superior solution for household-level lighting needs. The biomass energy from the marsh could then be used for heavier electricity demands (communal video centers, maize mills, *etc.*), especially in villages that lie close to the marsh's entry points where the biomass can easily be transported by boat. Another energy option to be explored is to focus on heat rather than electricity production, e.g. making briquettes as an alternative for firewood (Faxälv & Nyström, 2006).

The landscape and fauna at the Elephant Marsh and the rich cultural and historical heritage of the people around it (Schoffeleers, 1974; Olsthoorn, 2011) make it a potential destination for social and ecotourism. A joint effort of the Mlambe Foundation of the Netherlands, the Museums of Malawi and the Department of Antiquities has created a heritage center called *Tisunge* (which means 'Let us keep') at the entrance gate of nearby Lengwe National Park to preserve Lower Shire's historical and cultural heritage. Archeologists and oral traditions have revealed small stone and iron tools from short-statured foragers of the 3rd century AD, referred to as *Batwa* (Welling, 2000). The center has a library, a small museum and a children's club.

Tourism in Malawi is estimated to contribute about US$ 159 million per year and employs about 7.6 percent of the population (Government of Malawi, 2015). In 2014, tourism contributed to 8 percent of the country's GDP. Ecotourism may not only support conservation efforts but also boost the economic activities of the local people in the area. There are already two well-known protected areas in the proximity of the Elephant Marsh (Majete Game Reserve and Lengwe National Park). While there are no data on the ecosystem dynamics in the wetland at the time of Livingstone's journeys to the area, it would be interesting to connect the management plan with those of the protected areas both biologically and in terms of tourist packages. The Elephant Marsh could specialize in bird watching. This could then be combined with 'social tourism' for travelers who want to stay with a local family, learn their culture, join fishing and village life, and follow the footsteps of Livingstone. Social and ecotourism can create new livelihoods and act as an incentive for conservation and other sustainable livelihood activities such as beekeeping. The initial stages require collaboration with the protected areas and investment in at least one fast and trustworthy tourist boat. A good example of successful wetland ecotourism in sub-Saharan Africa is the Okavango Delta in Botswana. On the downside of this potential, it is worth remembering that wetlands can be a breeding ground for such diseases as malaria and bilharzia (schistosomiasis) (Verhoeven et al., 2006). A health risk assessment needs to be done before social and ecotourism is to be stimulated.

2.6. Towards Co-Management of the Elephant Marsh?

The exploitation pressure on the Elephant Marsh will certainly rise due to background developments such as population growth, market forces, rural poverty and climate change. During 2011, the consumer price index for various rural commodities in Malawi rose by about 5% (NSO, 2012b). If the food prices (including fish) and energy shortages will continue to increase, there is likelihood that powerful outsiders such as business oriented citizens from other parts of Malawi and abroad would buy or force their way in (usually through village headmen), move away the natives to resettle elsewhere and exploit the Elephant Marsh, for example, for large scale commercial agriculture. Such cases have happened at Likangala Irrigation Scheme in Malawi (Mulwafu & Nkhoma, 2002) and Gambella rice paddies in Ethiopia (Bossio et al., 2012).

On top of that, any realization of the development potentials discussed above will make the wetland more attractive for use by both locals and outsiders. In Section 2.5, we have seen that the current local management arrangements appear to be working well but also that they are quite informal and not protected by strong central institutions or state involvement.

The question therefore arises to what extent and in which way institutions need to be strengthened in order to prevent them to succumb under the rising tide of interested exploiters. Will management institutions remain strong enough if purely locally based? Can local institutions be entrusted to also safeguard the supra-local ecosystem services performed by the Marsh? These questions indicate that institutional analysis is warranted, especially with a view to explore the option to engage government in the guidance and protection of the local arrangements and organizations.

The question of how to manage common pool resources (CPR)—of which the Elephant Marsh in an example—was raised in the late 1970s by the U.S. treaty tribes in the western part of Washington State to describe the relationship they aspired to have with state managers over fisheries management (Ostrom, 2005). This happened a few years after Garrett Hardin had published his seminal article on “The Tragedy of the Commons” (Hardin, 1968) which, based on a rational choice logic, proclaimed that any common pool recourse will ultimately be overexploited to the ruin of all. Even though empirical social scientists have demonstrated convincingly that this idea is often contradicted by real-world facts, it remains true that common property regimes can function sustainably only under certain conditions (Ostrom, 1990) and can fail under increasing outside pressure (Ostrom, 1990). “The Tragedy of Common Access” therefore arises from lack of support and strong recognition by central states of the locally developed institutions, which usually are better placed to manage common pool resources (Woodhouse et al., 2000; Haller, 2010). Ostrom (1990) highlighted the need to nest smaller common property systems such as the Elephant Marsh in bigger enterprises, for example, wetland management frameworks at national level so that issues of cross-scale cooperation can best be addressed. Currently, the central state in Malawi does not fully recognize the right of local resource users at the Elephant Marsh to create their own management institutions. This situation jeopardizes the sustainability of the local wetland management institutions at Elephant Marsh.

Central states can have many roles in common property management (De Groot et al., 2011). Some are negative, e.g. usurping or undermining local institutions. Others are positive, such as actively protecting common land against intrusion by outsiders. Local institutions therefore evolve and reposition themselves around internal and external factors that best represent the legitimacy, ideologies and economic interest of more powerful actors (Haller & Merten, 2008; Chabwera & Haller, 2010). This unfortunately encourages open access constellations where external actors tend to benefit more (Haller & Merten, 2008) because central states fail to enforce formal rules to control the activities of intruders. This “New Institutional Approach” (Haller & Merten, 2008; Ensminger, 1998) usually leads to a

shift towards leasehold land tenure systems, which disadvantages the locals and a subsequent erosion of local institutions (Chabwera & Haller, 2010). ‘Co-management’ is the term coined for arrangements in which government and communities or user groups share responsibilities over a resource. Co-management has been engineered early in fisheries practice (Ostrom, 1990; Olson, 1965) but presently gains a widening application like in forest management (Kayembe, 2008). Experience from elsewhere (such as Kafue Flats Floodplain Wetland in Zambia) has however shown that although co-management arrangements promise many theoretical benefits, there is usually limited involvement and an unbalanced cost-benefit distribution between supra-local and local group interests (Heller & Merten, 2008; Ensminger, 1998).

Africa offers a fertile ground for co-management, because community-based management of common pool resources was historically built on the heritage of communalism (Borrini-Feyerabend et al., 2000) that utilized complementary and mutually beneficial traditional systems (Songorwa, 1999; Leaky & Morell, 2001). The local level systems were based on locally specific knowledge of resource dynamics and resource users (Pomeroy, 2003) and therefore tended to vary much between locations. For the same reason, present-day institutional scientists emphasize that co-management arrangements need to be locally crafted; there is no “one size fits all” model (Berkes, 2010). In Africa, recent examples of co-management approaches include the Community Wildlife Service (CWS) in Kenya; Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe; Administrative Management Design for Game Management Areas (ADMADE) in Zambia; and Community Partnerships for Sustainable Resources Management (COMPASS) in Malawi. In all these arrangements, there is a defined system boundary around a natural resource and set rules that regulate entitlement of ownership and use. Co-management in all these cases depends on a good integration of local regimes into national systems. When a natural resource is not protected by the state, for instance, the dynamics of the right to own, the right to use, and the conflicts of user rights and obligations become central. The COMPASS project, which was concluded in 2009, aimed at enhancing the capacity of rural communities to sustainably manage natural resources and improve household income from sales of natural resource-based products. The project was a success because it worked extensively with community based organizations and communities saw immediate benefits through diversified livelihood sources, food availability and activities that promoted natural resources management. Due to the substantial community involvement in both the COMPASS project and the current management arrangements at Elephant Marsh and the similarity of intended outcomes, there are many lessons that may be replicated.

Institutional theories can of course be used in the design of co-management arrangements. Examples are the populist approach (Ostrom, 1990; Olsson et al., 2004) the neo-liberal approach (Blaikie et al., 1997; Adger et al., 2001; Bene & Neiland, 2006) and the classical approach (Blaikie, 1997; Biot et al., 1995). But as said, the art of designing successful governance system relies on locally crafted institutional '*bricolage* ' (Russel & Dobson, 2011; Lankhorst & De Groot, 2012) in which empirical data are built into the existing local traditions and institutions as discussed previously in this chapter.

2.7. Concluding Remarks

For Elephant Marsh and many other similar wetlands, the first action is to explore the need of institutional strengthening *vis-à-vis* the rising pressures of the business-as-usual scenario and a scenario of possibly successful realization of ecosystem-based development potentials. This can take the form of a negotiated consensus between an outsider assessment and the community's own assessment of institutional strengths and weaknesses. This then would be a basis for an open-ended process of participatory institutional *bricolage* that focuses on the points where engagement of the state is most needed. One outcome could be that the state would confine itself to regulation of access by outsiders and safeguarding of a number of supra-local values such as sustainability, biodiversity and external ecosystem services, and leaves all else to the communities to manage.

The latest Malawi State of Environment and Outlook report (Government of Malawi, 2010) highlights that many wetlands in Malawi (including Elephant Marsh, Ndindi Marsh, Marshes of Chitipa, Lake Chilwa, Rungwenya) are under major threat due to anthropogenic activities, mainly agricultural conversion. Malawi needs to develop a wetland policy that will help promoting a balanced and sustainable wetland management for multiple resource users under increasing pressure from population growth, poverty, overexploitation, a changing climate and agricultural conversion. The policy would therefore be of particular essence in protecting the many Malawian wetlands that are under similar circumstances as the Elephant Marsh. Realizing the importance of the Elephant Marsh, it would be paramount to designate it as a Ramsar site with the aim of enhancing the opportunities highlighted earlier in this paper and to arouse interest in scientific studies, local community awareness and involvement as well as funding opportunities for the protection of the wetland. Although designation of a wetland as a Ramsar site may lead to wise use and protection, it should be noted that there is need for strong national and international programmes that promote community awareness and involvement in managing wetland ecosystems. For example,

although Lake Chilwa is a Ramsar site, it still faces challenges such as inadequate national and international support for implementation of the management plan that was developed in 2001 with funds from the Danish International Development Agency (DANIDA). This includes the allocation of water, ecosystem degradation resulting from poor agricultural practices and the overexploitation of natural resources (mainly bird hunting for food) by local communities. The Ramsar status of any wetland alone is not enough as a management option unless it is coupled with other initiatives that promote sustainable livelihoods of local communities. It is also important to improve data collection schemes at the Elephant Marsh so that decision making by local and national institutions as well as policy formulation and implementation are based on real-time information.

This study has revealed that if the available opportunities are to be efficiently and effectively exploited at the Elephant Marsh, there is need to rise above the institutional design principles of Ostrom (1990) which are based on nested enterprises and move towards real participatory approaches such as constitutionality (local people's sense of ownership in bottom-up institution building). There is a need to strike a balance between the local wetland management system, where pressure on the Elephant Marsh emanates mainly from poverty, and the national and international interests of biodiversity conservation as advocated by the Ramsar convention. Although enhanced production and maximum benefits from ecosystem good and services are central to any management system of the Elephant Marsh, it is important to realize that there are always limits to growth. Any management programme for the Elephant Marsh should therefore strive towards sustainable exploitation of the opportunities that lie in the wetland's goods and services.

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3

Conditions for sustainability of small-scale fisheries in developing countries

Ishmael B. M. Kosamu [1,2]

[1] The Polytechnic, Department of Physics and Biochemical Sciences, University of Malawi, Private Bag 303, Blantyre 3, Malawi.

[2] Institute of Environmental Sciences (CML), Leiden University, P.O. Box 9518, 2300 RA, Leiden, The Netherlands.

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Proud fishermen at Njale Fishing Village

Abstract

Institutions that manage small-scale fisheries across the globe can be locally based, state controlled or of a mixed, cross-scale nature. The latter arrangement, widely known as co-management, is generally believed to be the preferred approach for sustainability. This paper employs a crisp-set qualitative comparative analysis (csQCA) to examine 17 cases of small-scale fisheries in developing countries, in order to assess the degree of state involvement which may be most effective in realizing sustainable small-scale fisheries. These degrees vary between: (a) strong top-down regulation irrespective of fishing community wishes, (b) a co-management mode of negotiation with fishing communities, (c) a merely supportive role of the state, or absence from the fishing scene. It was revealed that contrary to expectations, the sustainability of small-scale fisheries depended solely on the strength of collective social capital of the local communities at the resource scale. With weak local social capital, degrees of government involvement did not make any difference; the fisheries were unsustainable in all cases. The prime role for governments in small-scale fisheries in developing countries therefore seems to be as intelligently absent as possible, by way of respecting, protecting, and supporting local institutions.

Keywords: small-scale fisheries, developing countries, sustainability, co-management, community-based management, governance, success and failure factors

3.1. Introduction

The management of small-scale fisheries (SSF) has received considerable attention in recent years (Evans & Andrew, 2011; Hauzer et al., 2013), despite the assertion of Isaacs (2013) and Alfaro-Shigueto et al. (2010) that the management of SSF has generally been overlooked. Out of this rich literature, the present paper uses case studies from developing countries notably Chile, Comoros, Ivory Coast, Malawi, India, Laos, Mexico, South Africa, Zambia, Zimbabwe, Senegal, and Nigeria to investigate which degree of state involvement may be most effective in realizing sustainable SSF. While some of the cases studies examined are success stories, others are not.

The key factors that lead to either success or failure of these fisheries may be unique to a particular system and therefore not necessarily applicable elsewhere (World Bank, 2004). However, recent experiences and scholarship reveal some of the major conditions that are crucial in making SSF sustainable. Evans & Andrew (2011), for example, highlight that development of social networks that empower local resource users and foster resilience is crucial for the sustainability of SSF in developing countries. The effectiveness of such management responses can only succeed if there are modifications in power relations between the state and the local institutions (Berkes & Seixas, 2005). In their general assessment of global fisheries management (with no particular focus on SSF), Gutiérrez et al. (2011) identified strong community leadership and a robust collective social capital as the most important attributes for success. Collective social capital is defined in this regard as the social capacity of groups, in terms of trust and institutions, to take collective action (Lankhorst & De Groot, 2012). Nevertheless, co-management still remains the main adage in SSF management, implying that in addition to community strength there is a need to have strong governments to safeguard the sustainability of fisheries. Through a detailed review of literature and an analysis of 17 cases studies from twelve developing countries the present chapter aims to determine the key actors and the level of institutions (local, state controlled or mixed) which is most decisive in the sustainability of most SSF in developing countries. This analysis is crucial for comparing the key actors and institutions in the management of the Elephant Marsh fishery with situations in other developing countries. Mention has to be made here that the cases are examined as they are reported in literature and therefore some deviation from the latest developments regarding a particular fishery may be expected.

The next section reviews literature on SSF management in developing countries, thus providing the basis for the variables used in the analysis. The third section provides the methods used, an overview of the cases and how the scores for each variable were

generated. The fourth section gives results and discussion. The paper ends with some implications for future policy direction and fisheries management practice in developing countries.

Being a form of resource extraction, capture fisheries usually do not continuously require high inputs after making the initial investment in the acquisition of the extraction equipment. Thus, the benefits of high-level extraction may easily outweigh the operational cost and lead to over-exploitation of the resource. Moreover, capture fisheries usually start out as an open access situation and even if access is later closed to a restricted group, full privatization is usually impossible and the fisheries remain a common pool resource, hence subject to the risk of Hardin's (1968) 'tragedy of the commons' that leads to resource exhaustion. Hardin (1968) concluded that communal natural resources can only be sustained if a coercive central authority oversees the exploitation or if the resource is fully privatized (e.g. by enclosing private farm land and restricting fishing areas). In the same vein, Béné et al. (2010) stated that "over-exploitation of a resource which is owned by many and not effectively managed by anyone, leads to reduction in catch and eventual poverty of users and others who would otherwise benefit from the harvests".

Capture fisheries are sometimes protected against over-exploitation by natural circumstances such as sheer size, inaccessibility or cold, as shown for instance in Brox (1990) and Planque et al. (2010). In most cases however, small-scale capture fisheries, consisting for instance of inland water or tropical seas are seldom protected by such circumstances, thereby requiring strong institutions that can regulate extraction by humans and achieve sustainability of the resource. Such regulatory institutions can be locally based, state controlled or a crossbreed of the two in what is widely known as co-management.

The concept of 'tragedy of the commons' has become deeply entrenched in fisheries management, as shown for instance by Ward and Weeks (1994) who found that in spite of all evidence to the contrary, U.S. government officials hung on to the idea that fishing communities without government control can only deplete the resource. As discussed by Carswell (2003), governments often need such narratives to justify their regulatory existence. Ostrom (1990) was the first to dispute this management paradigm, not by denying the logic itself as faulty or untrue, but by studying how communities can counteract the 'tragedy' mechanism in crafting successful institutions. She postulated eight conditions for the success of managing common pool resources which have been included in the present study as highlighted in Table 3.1.

Table 3.1 Choice of conditions of interest for SSF in developing countries

Ostrom's condition/attribute	**Ostroms' definition of the condition/attribute**	**The community variable under which Ostrom's condition/attribute was captured in the study**
Clearly defined boundaries	Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.	This condition was met for each fishery (case) as a precondition for inclusion in the study.
Congruence between appropriation and provision rules and local conditions	Appropriation rules restricting time, place, technology, and/or quantity of resource units (in this case fish) are related to local conditions and to provision rules requiring labour, material, and/or money.	This condition is part of collective social capital; presence of locally crafted fishing rules.
Collective choice arrangements	Most individuals affected by the operational rules can participate in modifying the operational rules	This condition is part of collective social capital; fishermen involvement in making rules.
Monitoring	Monitors who actively audit CPR conditions and appropriator behaviour are accountable to the appropriators or are the appropriators.	This condition is part of collective social capital; fisheries committees at each fishery are responsible for monitoring the resource.
Graduated sanctions	Appropriators who violate operational rules are likely to be assessed using graduated sanctions (depending on seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators or by both.	Part of collective social capital: the application of sanctions within the fishing community.
Conflict resolution mechanism	Appropriators and their officials have rapid low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.	Part of collective social capital: the availability of locally accepted adjudication.

Minimal recognition of rights to organize	The rights of the appropriators to devise their own institutions are not challenged by external government authorities.	This condition is part of the variable on the role of the state.
Nested enterprises	Appropriation, provision, monitoring, enforcement, conflict resolution and governance activities are organized in multiple layers of nested enterprises.	This condition is part of collective social capital at the level of the resource.

These conditions were emphasized by Cox et al. (2010) using both empirical and abstract cases, and are a good basis for designing management systems for SSF. For example, “minimal recognition of rights to organize” necessitates legitimacy and non-interference by central states of the locally constructed institutions, while “nested enterprises” underscores the need to nest the local rules into rules that exist at a larger scale. The nesting is important for support (e.g. information sharing) as well as completeness and endurance of a system so that issues of cross-scale cooperation and resource users at a larger scale can best be addressed.

Wilson et al. (2006) state that local SSF management cannot be effective if it is not considered legitimate by local resource users especially when central states are too weak to enforce formal rules as is often the case in developing countries. When central states are weak, the activities of intruders are not controlled and compliance becomes a voluntary action (Sowman et al., 2013; Chabwela & Haller, 2010). When central states fail to devolve power to local communities in co-management or community-respecting arrangements and consistently take a position of commanding, imposing and enforcing alien rules and regulations, the negotiated fulcrum is lost, illegal activities may emerge and the management system is likely to fail (Béné et al., 2009; Isaacs, 2012).From a broader view of Ostrom’s (1990) theory as highlighted in Table 1, it can be deduced that central states and resource users are the two crucial parties in making the eight conditions of SSF management to either work well or not. The presence of a central state in SSF management might be supportive (recognizing, helping, educating, informing), seeking a co-management arrangement (power and responsibility sharing), or conflictive (imposing external regulations). Despite most efforts in SSF management in developing countries have put considerable emphasis on setting up co-management arrangements. The approach in Africa, however, has generally been devolution of some aspects of management from central states to local communities resulting in an imbalance of power and interests. Co-management’s failure to clearly define and allocate power relationships as well as operational responsibilities to resource users has also been reported by Ruddle and Davis (2012).

From the critical perspective of Ward & Weeks (1994) and Carswell (2003), it may be noted that the co-management discourse still justifies the *‘raison d’être’* (reason for existence) of state regulators. Thus, a proper theoretical perspective leads to a research platform that can reveal instances where purely community-based fisheries management can be conceptualized along with the other management types. Hints that such research might be fertile are given for instance by Hara & Nielsen (2003) who point out that co-management in Africa appears to be more of an illusion than an empowerment of local fishing communities

and there is need to find some bold answers to its ability in achieving the objectives of all players. Even years after Ostrom' (1990) work, Jentoft et al. (2003) also found it difficult to conceptualize the necessity of the state in the management of fisheries. They mention that "an alternative agent like the state is not always needed and community level institutions play a greater role in fisheries management if they are allowed and equipped to do so". In some cases, however, informal institutional building can get support from centralized formal law like in the V-notch lobster programme as reported by Acheson (1989) as well as Acheson & Gardner (2011).

In her book "Understanding Institutional Diversity", Ostrom (2005) defines institutions as rules, norms and shared strategies that mediate human behavior. From this perspective, it is clear that the sustainability of SSF depends on a continuum of attributes that positively shape human actions towards a negotiated consensus on powers and responsibilities in relation to the fisheries resource at either the supra-local level (e.g. existence of guiding legislation and policies from central government) or the local level (e.g. leadership, power relations, benefit sharing). Several scholars (Sowman et al., 2013; Béné et al., 2009; Wilson et al., 2006; Castello et al., 2011; Pomeroy, 1991) have decried the lack of recognition and involvement of small-scale local fishers in fisheries management, especially in developing countries. To achieve a balanced representation in decision making, there needs to be a stronger shift to arrangements in which local communities and governments share responsibilities over a resource. Although the basic idea of such arrangements is to achieve equal power sharing (strong government interacting with strong communities), the application of the notion has varied widely especially in SSF management where the socio-ecological context is quite complex and diverse (Allison & Ellis, 2001; Evans et al., 2011). Whatever the case, these partnerships require high levels of compliance from local communities and significant support, information sharing, consultation, advice and cooperation from government (Sen & Nielsen, 1996) in order to sustainably manage common pool resources.

From the literature reviewed this study analyses 17 SSFs in developing countries which were chosen on the basis of availability, sufficiency and clarity of data on fish catch trends, the role of the state and the ability of a fishery to fulfill at least the first condition on Ostrom's list (clear boundaries).The chapter seeks to determine the key actors and the level of institutions (local, state controlled or mixed) which is most decisive in the sustainability of most SSF in developing countries. The analysis uses four factors namely: collective social capital (CSC), supportive central states (SUP), co-management (CO-M) and imposing

central states (IMP) on the sustainability (SUS) of small-scale fisheries in developing countries.

3.2. Methodology

3.2.1 Research variables

The present study has used crisp set qualitative comparative analysis (csQCA) to analyze success and failure factors for sustainable SSF in developing countries. The first step was to define community and government-action variables whose influence would be tested on the sustainability of SSF. Obviously, the work of Ostrom (1990) and Cox et al. (2010) offer a good basis for assessing community capacity (collective social capital) and as Latour (2005) puts it, the social connections that an actor has with different networks determine what the actor is, wants and can do. The social networks have actually been found to influence actors' behaviour in natural resources management (Bodin & Crona, 2009).Table 3.1 gives Ostrom's eight attributes and the way these variables were included in the present study. Out of the eight variables, two are fixed in the methodology of this paper. The first is "clearly defined boundaries" which was used to select case studies where no confusion existed over the physical and social (insiders/outsiders) boundaries. The second fixed variable is Ostrom's attribute number 8 of "nested enterprises" which has been incorporated in the definition of social capital that primarily looks at the scale level of the whole fishery (e.g. whole lake). The remaining six attributes were collapsed into one and defined as community strength or capacity variables which are formally called collective social capital (CSC). Reasons for this collapse were, first, that the interest of the paper is more in the roles of the state, and second, that most of the case study data did not simply allow assessment of all separate attributes (e.g. conflict resolution mechanisms or graduated sanctions). So typically, if a case study tells a story of successful, self-organizing communities, CSC is taken as high and when authors indicate "weak social cohesion" and such-like phenomena, that is translated as low CSC, with Ostrom's more detailed variables as a background check of the decision.

The variables on the role of the state have been inspired by a non-fishery case study analysis by De Groot et al. (1995) who classified the supportive or destructive roles of the state in efforts by local communities to manage natural resources. The classification of the state roles is done using a simple seven-rung ladder based on direct, indirect or passive influence. The case study analysis by De Groot et al. (1995) explains the interplay of factors influencing the defence of common pool resources by local communities in various parts of the world. The analysis is presented in simple but quantified terms (e.g. 'time to get to the

resource', or 'labour productivity of the foregone activity'), added to which are the respective dimensions (e.g. 'hours' and '$/day'). The assumption is that initially the local community decides on how to spot ‘intruders’ to the resource and make the first coercive contact; this establishes the 'Cost of Contact' (CC). This CC then becomes a component of the total 'Cost of Defence' (CD), which is weighted against its total benefit. The model is applied to examples of local resource defence: rangelands in southern Sudan; management of trees and pasture in southern Somalia; management of beaver stocks by the Cree in Quebec; and resource use rights in the Logone Basin of Cameroon and Chad. Table 3.2 specifies the three basic state roles derived from that ladder and the formal definition of each of the variables.

Table 3.2 Research variables. Adapted from De Groot et al. (1995).

Variable	Abbreviation	Definition	Score
Collective social capital	CSC	Strong locally crafted institutions	0 or 1
Supportive state	SUP	State recognizes and supports local institutions	0 or 1
Co-management	CO-M	State is involved in co-management arrangements with the community	0 or 1
Imposing state	IMP	State is imposing issues on the community	0 or 1
Sustainability outcome	SUS	Fishery is sustainable	0 or 1

The preceding literature review has indicated that success and failure factors for sustainable SSF in developing countries should at minimum include:

1. The strength/weakness of the fishing community (CSC). This variable is scale-dependent in the sense that the local institutions should be present at resource scale. For instance, if a fishery has a biological scale of one big lake, coordination should be present at the level of the lake, and not only at the level of separate user groups or village communities.
2. The degree of support given to the local institutions by the central state (SUP). Such support could be the protection of the resource against outsiders, or fish stock monitoring.

3. Willingness of the state to enter into open negotiation with user groups (CO-M). In other words this variable represents willingness of a state to enter into co-management arrangements with a community. Note that in this variable, it makes no difference if a fisheries policy formulated by the state is formally devolved, decentralized or de-concentrated (Lewins et al., 2014). What really matters in the actual interaction at the state-community interface.
4. The degree of central state regulation set irrespective of community desires (IMP). In practice, this is a scenario where the state is involved but imposing its own regulations on the community.
5. The last variable represents the overall status of the fishery (outcome) in terms of its sustainability during the case study period (SUS). Sustainability in this respect is looked at with the assumption that it is not attributable to variations related to climate, river discharge, pollution or decline from original to sustainable yield levels. In this particular case, the indicator for sustainability was based on trends in fish catch data (including species composition and the size of the classes in the catches) as reported by the authors in literature. Persistent decline of fish catches indicated that the fishery was unsustainable.

The advantage of having three variables on the role of the state (variables 2, 3 and 4) is that they can vary independently from each other enabling the comprehension of mixed situations. A central state may, for instance, protect the resource from outsiders through patrols (variable 2) but at the same time impose state-based regulations on the same local communities whose interests it wants to safeguard (variable 4).

3.2.2 Qualitative Comparative Analysis and the sample of the cases

Qualitative Comparative Analysis (QCA) focuses on linking an outcome to causal configurations, which are considered as explanatory conditions. There are three QCA techniques (all based on set theory and Boolean algebra) namely: multivariate QCA, crisp set QCA, and fuzzy set QCA. This paper uses crisp set QCA because of its ability to portray multiple causal combinations including minority effects which enabled the data from the case studies to be assessed. A crisp set is a condition in which a case may be interpreted based only on two possible outcomes (0 or 1) expressed as either in or out; true or false; yes or no. For example, a specific fishery might be successful (1) or not (0) if there is a rule-imposing state. The major limitation with csQCA is that the method does not allow for intermediate scenarios because it is case-based and therefore reproducibility of results can sometimes be difficult.

Crisp set QCA is done in six steps (Rihoux & DeMeur, 2009; Marx, 2010; Rihoux, 2013) using TOSMANA (*Tool for Small-N Analysis*) version 1.3.2.0 (Cronquist, 2007). It allows a direct conversion of hypotheses into variables (Table 3.1) which are relevant for all the cases, followed by building of a raw dataset for the cases (Table 3.3) and construction of a truth table. The third step involves resolving contradictory configurations (outcomes that lead to 0 for some observed cases and 1 for other cases). Contradictory configurations were solved by re-examining the way in which the various conditions were operationalized. For instance, if the threshold of dichotomization for a given condition was the source of the contradiction between cases, the threshold was adjusted to resolve the contradiction (Rihoux, 2013). The next step was to perform Boolean minimization (step 4), which helps to clarify and simplify complex expressions of causal configurations. Step 5 identifies the logical remainders (combinations that are possible but have not been observed among the cases). The truth table and overall result of the analysis (Box 3.1) are automatically generated by TOSMANA (step 6).

3.2.3 The case studies and the dataset

The following is a summary of the 17 cases indicating how the scores for each variable were generated. The overview is given in Table 3.3.

I. Lake Mweru-Luapula Fishery in Zambia (Aarnik, 1999)

The management of Mweru-Luapula Fishery is officially under the jurisdiction of the state. This happened as a result of a move to change colonial rules which were perceived to favour the “whites”. The government of Zambia, through the Department of Fisheries, imposed a management structure which allowed for open access to the resource for all Zambians under the national motto of “One Zambia, One Nation” (SUP = 0, IMP = 1, CO-M = 0).The imposition of the new management structure faced a lot of resistance from the local communities (mainly the Lunda, Shila and Bwile ethnic groups), led by their traditional chiefs. The ethnic groups however, remained highly divided at the resource scale (CSC = 0). There was observed change in the catches which decreased from 12kg per 100metres of net in 1955 to 3kg per 100 metres of net in 1992 (SUS = 0).

II. Lake Kariba Fishery in Zimbabwe (Jackson et al., 1998; Musando, 1996)

The first settlers of the area belong to the Tonga ethnic group and they had managed the fisheries resource based on chieftaincy. Other ethnic groups such as the Gova and Korekore later settled in the area and they adopted the management style sanctioned by the Tonga

(CSC = 1). However, between 1974 and 1980, the management system was disrupted by guerrilla war to liberate Zimbabwe to independence. Post-independence policies resulted in the formation of Lake Kariba Fisheries Research Institute (LKFRI) which promoted the formation of cooperatives with fisher communities under state control and imposed rules and regulations over the resource (SUP = 0, IMP = 1, CO-M = 0). The local communities resisted. In order to diffuse the growing tension, Lake Kariba Fisheries Research Institute facilitated the creation of a fishers association but this was viewed with suspicion by fishers the local communities were not willing to enforce the imposed regulations. It is evident from the literature that despite the diversity in group composition (three ethnic groups) the fishers relate well with each other, especially against outsiders like government agents who are seen as enforcers of alien law. Fish catches declined from over 3000 tonnes per year in 1987 to about 1500 tonnes per year in 1997 (SUS= 0).

III. Lake Chilika Fishery in India (Sekhar, 2007; Pattanaik, 2007; Nayak and Berkes, 2010)

Lake Chilika Fishery had about 150 fishing villages in 2009, with about 30% of the village population involved in fishing. The local communities had very good social networks which were strong enough to implement a system that gave fishing rights only to locals and not outsiders, even when the latter belonged to the elite. The fishing communities had also organized themselves so well that they have clear boundaries and societal allocations of the types of fish species to be captured by particular groups (CSC = 1). This arrangement required leaders with good reputation to enforce the rules they set thereby ensuring sustainable utilization of the resource. Government interventions were seen to erode cooperation and trust between the different fishing groups but also allowed outsiders to gain easy access to the resource. Although the state had recognized and allowed the presence of the local institutions (SUP = 1), it continued to lease out parts of the lake to outsiders (with mechanized boats and gear) in addition to imposing restrictions on the use of traditional nets (IMP = 1). There was no cooperation arrangement between the government and the local fishing groups (CO-M = 0). Fish catches remained stable at about 7000 tonnes per year between 1985 and 2004 (SUS = 1).

IV. Aby Lagoon Fishery in Ivory Coast – Period 1 (Kponhassia & Konan, 1998)

The fishery had well-established-community-based management arrangements (CSC = 1) until 1980 when the state decided to control access by introducing professional identity cards for fishers (IMP = 1). The exercise of distributing identity cards however, included outsiders (SUP = 0).The local fishers then reduced their trust in government-led initiatives (CO-M = 0)

and fish production dropped from about 6000 tonnes in 1980 to 3600 tonnes in 1981 and even 2100 tonnes in 1982 and continued to drop in the early 1990s (SUS = 0).

V. Aby Lagoon Fishery in Ivory Coast – Period 2 (Khan et al., 2004; Njifonjou et al., 2006)

Due to the continued drop in fish catches and conflicts which arose between local fishermen and outsiders at Aby Lagoon, the government of Ivory Coast re-instituted local fisheries administration in 1994 under the Integrated Development of Artisanal Fisheries (IDAF) programme (IMP = 0). The programme allowed the local communities to form their own fisheries associations to work with government agents and the roles of various actors were also agreed upon (SUP = 1, CO-M = 1). This arrangement led to renewed community confidence and trust as well as re-organization of the fishery. There now was active involvement of the communities. The fishery had about 3000 fishers in mainly from Aboures and Mossi ethnic groups. There is local democracy in choosing leadership and the good social cohesion (CSC = 1) has also helped to improve participation towards management of the common pool resource. Fish catches are reported to have improved since 1997 to an average annual production of about 10 000 tons in 2006 from the reported 2100 tonnes of 1982 (SUS = 1).

VI. Ngazidja Coastal Fishery in Comoros (Hauzer et al., 2013)

The fishery has 44 fishing villages and the existing arrangements are mainly community based and informal. Each fishing village has established a fishing association based on local democracy and leadership attributes. The number of resource users per village is small with some villages having only 10 fishers, but what is clear is that there is strong social cohesion (CSC = 1). Fisheries governance at Ngazidja is shared between government through the fisheries department and village fishing associations (CO-M = 1). The state maintains no formal regulations on fishing (IMP = 0) but is involved in overarching logistical and administrative support such as external funding for projects and guidance on new management tools (SUP = 1). Most fishers at Ngazidja use extremely simple gears, yet catch figures remain considerably high (e.g., they average at 22 kg/day per traditional canoe with one fisher on-board and 110 kg/day per powerboat with two fishers on-board) over a 20 year period (1989-2009). (SUS = 1).

VII. *Caleta El Quisco* Inshore Fishery in Chile (Castilla & Fernandez, 1998)

The *Caleta El Quisco* Fishery had about 139 fishers (with 42 officially registered divers). The fishers had a committee called ‘*Caleta*’ whose leadership was democratically elected and the

aim was to regulate the fishery and keep outsiders out in order to sustainably manage the fisheries resource. The system worked well based on solidarity (social cohesion), strong commitment from the fishers and trust in the leadership (CSC = 1). The government had a supportive role through the establishment of “Management and Exploration Areas” in a co-management agreement (SUP = 1, CO-M = 1, CON = 0). Fish catches were sustainable with an average of about1000 metric tonnes for a 6 year (1989-1995) period (SUS = 1).

VIII. *Sero Callos de Hacha* Coastal Fishery in Mexico (Basurto, 2005)

The main ethnic group at the *Sero Callos de Hacha* Fishery is the Seri and initially there was no regulation by the federal government. However, pressure from outsiders (non-Seri communities) to have access rights to fish in the Seri waters increased and the government started to issue fishing licenses at a fee including outsiders (SUP = 0, IMP = 1). The government agents kept all the financial benefits to themselves (CON = 1), a scenario that did not go well with the Seri people who successfully created parallel entry mechanisms for outsiders to divert the benefits to themselves (CSC = 1). The parallel entry system was possible because the government had no presence or authority inside the Seri waters (CO-M = 0). SSF catch data have not been systematically collected at *Sero Callos de Hacha* Fishery but historical counts indicate that a fish buyer in 1978 used to receive about 400 kg daily from about 20-25 fishers and in 2001 a buyer was receiving about 100 kg catch from a similar number of fishermen, indicating that the catches tended to be unsustainable (SUS = 0).

IX. Lake Chiuta Fishery in Malawi (Donda, 1998; Njaya et al., 2012)

The motivation to create a management arrangement for Lake Chiuta fisheries originated from the local communities as a result of harmful effects of the use of *Nkacha nets* (having very small mesh size) by some fishers. The rules were based on popular consensus (CSC = 1) and to some extent spirit worship. The lake has three islands and fishing close to any of the islands is perceived as a provocation of the spirits who would kill the fisher. Fishers have 9 fisheries committees. These committees report to Lake Chiuta Fisheries Association which is an umbrella body of all the committees and works hand-in-hand with government agents (SUP = 1). For instance, local fishers and their committees made a decision to ban the use of *Nkacha* seines because it was perceived that the gear destructive to the fishery. According to Njaya et al. (2012) the committees “instructed the Department of Fisheries to legally endorse the decision, which is still in force today” (CO-M = 1). Trust in the leadership and a strong social cohesion are the main pillars of the community-based management

arrangement at Lake Chiuta Fishery. Annual fish catches increased from 1600 tonnes in the late 1980s to over 4000 tonnes in 1996 and appear to be sustainable (SUS = 1).

X. Lake Kariba in Zambia (Hachongela et al., 1998)

The fishery has four ethnic groups (Valley Tonga, Bemba, Lozi and Plateau Tonga). In the 1980s, the Valley Tonga were the dominant first settlers and did not want the other groups to fish in the area but were not powerful enough to drive them out and that resulted in very weak social cohesion at the resource level (CSC = 0). To bring equity in access rights, in 1993 the government of Zambia revised the management arrangement of the fishery by placing the state in pivotal decision making position (IMP = 1). Community participation was low (CO-M = 0), conflicts became rampant, the government did not help out in any local problem (SUP = 0) and all elements of trust, equity and efficiency were lost. Fish catches decreased further from 2, 237tonnes in 1990 to 1,355tonnes in 1995 (SUS = 0).

XI. Lake Chilwa Fishery in Malawi (Njaya, 2009; Evans & Andrew, 2011)

Lake Chilwa Fishery has 43 legitimate fishing committees and access is controlled through issuing of licenses from the Department of Fisheries to local fishers and the enforcement of local rules is done by the committees in a co-management agreement. The government supports the local committees materially (gear) and financially (CO-M = 1, SUP = 1, IMP = 0). Because fishing at the lake is mostly seasonal (the lake recedes in the dry season months of August to November), fishers usually migrate to and from the lake. This migration makes it difficult to have stable local committee leadership that can really oversee the utilization of the resource. There are also reported power struggles between the local chiefs and the committee leadership resulting in weak social relations (CSC = 0). Fish catches have generally been decreasing from about 15,000tonnes in 1990 (van Zwieten et al., 2003; Allison et al., 2002) to about 12,000 tonnes in 1999 (Nyasulu et al., 2001) and only about 5000 tonnes in 2008 (Chiwaula et al., 2012) (SUS = 0).

XII. Khong District Inshore Fishery in Laos (Baird & Flaherty, 2005)

Khong fishery has 63 fishing villages and is supported by two non-governmental organizations (Lao Community Fishers and Dolphin Protection Project) which were implemented between 1993 and 1997 respectively. Locals initiated the community-based management and the government gives them support without interference with the running of the fishery (SUP = 1, CO-M = 0). The success levels for the different villages are varied but overall, the system is robust and most fishers have reported an increase in fish catches.

According to Baird and Flaherty (2005) the social homogeneity in the Khong contributes to the success of the community based fisheries management arrangement (CSC = 1). In 1997, it was estimated that 4,000 tonnes of fish were caught in Khong District which was reportedly higher than in 1993 (SUS= 1).

XIII. Nguru-Gashua Wetland Fishery in North East Nigeria (Neiland et al., 2005)

The Nguru-Gashua Wetland Fishery is managed by a local committee headed by a chief fisherman who is referred to as 'Sarkin Ruwa'. The chief fisherman is responsible for controlling access to the resource and ensuring adherence to the local regulations. The fishing grounds where access is restricted are well organized based on community membership especially to the Bulama and Jarma ethnic groups (CSC = 1). The government has introduced a licensing scheme but the system has failed to gain acceptance from locals (SUP = 0, CO-M = 0, IMP = 1). In 1997, the total catch was about 18,000 tonnes (Neiland et al., 2000) but by 2008, the fishery had declined to an annual catch of about 16,000 tonnes and it was anticipated that the fishery would become overexploited (biologically and economically) in the near future (Neiland & Béné, 2008)(SUS = 0).

XIV. Olifants River Coastal Fishery in South Africa (Hauck & Sowman, 2001; Sowman, 2003)

The fishery is dominated by two Afrikaans speaking rural coloured communities of Ebenaeser and Papendorp. During the 45 years of apartheid in South Africa (1948 - 1994), natural resources management was based on state command and control. Soon after the post-apartheid government came into office, a local committee was put in place to oversee the fishery. Although the committee was elected in 1994 at a public hearing, there was weak social cohesion between the two groups (CSC = 0) and there was no trust in the local leadership as well as the government officials. The committee ended up having no legitimacy in the community resulting in confusion and unwillingness of the resource users to take up responsibilities. The mistrust stemmed mainly from the apartheid rule where such local committees were used as spy agents. By 1999, all efforts to formulate co-management arrangements had collapsed (CO-M = 0, SUP = 1) mainly due to lack of interest and support from government officials to give up some powers (IMP = 1) to the local community (Sowman, 2003). There are no figures on catch statistics but fishers are reportedly indicating declining catches (SUS = 0).

XV. Lake Malombe Fishery in Malawi (Njaya, 2007)

In this fishery, there is a fisheries committee which is headed by a chairperson. Members of the committee comprise 30 percent of fishers. Most of the fishers feel their concerns are not well represented by the committee. There is a lot of power struggle between the committee leadership and the traditional chiefs underlining poor social cohesion and lack of trust in the leadership (CSC = 0). There is no local democracy as the traditional chiefs prefer to appoint their own people into leadership positions. Therefore there are no reliable community based fisheries management structures at Lake Malombe. Consequently the government has set the existing fisheries rules and is currently supporting the people in implementing them through the Department of Fisheries (SUP = 1). Although the government initiated the formation of co-management arrangements, there is no concrete agreement yet (CO-M = 0, IMP = 0). Lake Malombe had annual catches of about 7500 tonnes in the 1980s but only about 750 tonnes in the 1990s. For example for *Oreochromis* species, there was a drop from 25kg per 100m net in 1984 to 1kg per 100m net in 1995 (van Zwieten et al., 2003) (SUS= 0). Of course, the decline in catch per 100m could also be attributable to other factors such as an increase in the population of fishers.

XVI. Kafue Flats Floodplain Wetland Fishery in Zambia (Haller & Merten, 2008)

The Batwa, Balundwe and Ila ethnic groups were the first to settle in the floodplain and had a well-coordinated social structure with local rules on management of the fishery. As time passed by, however, Lozi and Bemba immigrants created pressure on the fisheries resource and conflicts arose. The central government created by-laws that legitimized access to everyone as long as they were Zambians and had identification to that effect (IMP = 1). This declaration broke the original social structures at the level of the resource (CSC = 0). Citizenship and not communal locality took over the control of the fishing arrangements thereby creating an open access situation with no government support (SUP = 0, CO-M = 0).According to official national data on the Kafue Flats Fisheries the annual catches had reduced from 6 metric tonnes in 1990s to only 2 metric tonnes in 2004 (SUS = 0).

XVII. Kayar and St. Louis Coastal Fishery in Senegal (Gaspart et al., 2007)

Two groups (belonging to the Wolof ethnic group) operate at this fishery; the native Kayar and the migrating St. Louis fishers. The Kayar are in favor of controlled access while the fishers from St. Louis are in favor of open access, at least for them. In 1994 both groups reached a consensus of establishing a fisheries committee (*comité des peches*) and a Kayar/St Louis Solidarity Committee (CSKSL), to help in the declining fisheries. They

effectively agreed upon ways of restricting outsiders' access to the resource (CSC = 1). The government officially recognizes the presence of CSKSL and gives it the necessary support but there is no official co-management agreement (SUP = 1, IMP = 0, CO-M = 0). The system works well and the fish catches increased (Morand & Breuil, 2005) from 4500 tonnes in 1948 to 40,000 tonnes in 1999 (SUS= 1)

Table 3.3 The dataset built on the 17 cases

Case ID	Name of case	Location	CSC	SUP	CO-M	IMP	SUS
I	Mwelu - Luapala	Zambia	0	0	0	1	0
II	Lake Kariba	Zimbabwe	1	0	0	1	0
III	Lake Chilika	India	1	1	0	1	1
IV	Aby Lagoon – case 1	Côte d'Ivoire	1	0	0	1	0
V	Aby Lagoon – case 2	Côte d'Ivoire	1	1	1	0	1
VI	Ngazidja	Comoros	1	1	1	0	1
VII	Caleta El Quisco	Chile	1	1	1	0	1
VIII	Sero Callos de Hacha	Mexico	1	0	0	1	0
IX	Lake Chiuta	Malawi	1	1	1	0	1
X	Lake Kariba	Zambia	0	0	0	1	0
XI	Lake Chilwa	Malawi	0	1	1	0	0
XII	Khong District	Laos	1	1	0	0	1
XIII	Nguru-Gashua	Nigeria	1	0	0	1	0
XIV	Olifants	South Africa	0	1	0	1	0
XV	Lake Malombe	Malawi	0	1	0	0	0
XVI	Kafue Flats Case	Zambia	0	0	0	1	0
XVII	Kayar & St. Louis	Senegal	1	1	0	0	1

3.3. Results and Discussion

Table 3 shows that the dataset is simple enough to basically analyze the trends without the use of csQCA. For example, in all cases where CSC = 0, there is no sustainability (SUS = 0) irrespective of any score for a supportive government, co-management or a conflictive state, but when CSC= 1, there is always sustainability except in cases where the government imposes its own rules (IMP = 1). The csQCA is still used however to have more formal certainty.

Using csQCA, the truth table of the 17 cases generated in the TOSMANA Analytical Report (Box 3.1) shows that different configurations (sustainability and non-sustainability) could be found among the empirical cases.

Box 3.1 The Truth Table and TOSMANA Analytical Report

Algorithm: Graph-based Agent

Truth Table:

v1: Collective Social Capital v2: Supportive Government

v3: Co-management v4: Conflictive Government

O: Outcome id: Case Study

v1	v2	v3	v4	O	id
0	0	0	1	0	I, X, XVI
1	0	0	1	0	II, IV, VIII, XIII
1	1	0	1	1	III
1	1	1	0	1	V, VII, IX
1	1	0	0	1	VI, XII, XVII
0	1	1	0	0	XI
0	1	0	1	0	XIV
0	1	0	0	0	XV

Result (all): Collective Social Capital {1} * Supportive Government {1}

(III, V, VI, VII, IX, XII, XVII)

The output is read as: successful SSF management is observed in conditions (III, V, VI, VII, IX, XII, and XVII) that combine strong collective social capital [Collective Social Capital {1}] and a supportive government [Supportive Government {1}].

It is clear from the overall result of the 17 cases examined that good collective social capital and a supportive government are the key factors in achieving sustainability of fisheries management in developing countries. Although recent scholarship has emphasized the need to promote co-management arrangements in common pool resources, it only sounds logical (and within definition boundaries) to suggest that there can never be co-management if the state authority does not recognize community organization and interests. Imposition of interventions by the state often breaks the existing collective social capital and the consequences can be even be worse if there no pre-existence of collective social capital. Experiences from Kafue Flats Floodplain Fishery in Zambia has also revealed that although central states promise many theoretical benefits when imposing management arrangements, there is usually limited involvement of local group interests resulting in social resentment and consequent counter-productivity (Haller & Merten, 2008; Chabwela & Haller, 2010). However, it is interesting to note that in Malawi, for example, the formation of functional local institutions which get support from the central state usually starts out from strong collective social capital at local level. Otherwise, if government support is given to communities in which the collective social capital is weak, there is no effect from the support which basically lands in a vacuum. Although the central state took a non-conflictive position at lakes Chiuta, Malombe and Chilwa, the fishery at Lake Chiuta is the only one which is thriving, due to the good social structures at local scale. This is consistent with findings by Gutiérrez et al. (2011) where fisheries management was not successful in communities with low social capital even when there was continued government effort. It is therefore imperative that future interventions in fisheries management policy and practice should strive to first build enough social capital (as evidenced, for example, by communities maintaining school blocks together, planting trees in a village plot, fixing dysfunctional bridges, resolving internal conflicts or anything in that line) and support the local institutions. In this line, fisheries managers may also need to properly define what constitutes social capital in particular communities because variations in this constitution have previously been observed (De Groot & Tadepally, 2008).

Cases which have co-management arrangements are only five in the dataset for this study and only appear to work when collective social capital is already strong. In other words, co-management does not appear to make any difference. Some cases such as Lake Chilika in India reveal an interesting scenario. While the state is conflictive and there are no co-

management arrangements, the fishery is still a success because the collective social capital is strong enough to persist under government pressure. This reflects that the formula for success hides in the local people who if properly involved can be used to craft successful SSF management systems which would divert away from popular theory-based designs. In such circumstances, it is always good practice for policy makers and fisheries practitioners to undertake a deeper analysis of the communities in question before conceptualizing and implementing strategies that would yield intended outcomes (Walters & Vayda, 2009; Castillo et al., 2005; Vayda &Walters, 1999).

In most developing countries, an understanding of the factors of success in SSF is still at infancy stage. Most of the reported success stories come from developed countries where SSF are not very prominent (Ratner et al., 2012; Isaacs, 2013). One thing though which is clear from this study is that where state agencies are weak (as is the case in most developing countries), strong local institutions appear to be '*conditio sine qua non*' (an indispensible condition) for resource sustainability. When the collective social capital is low, government support does not result in sustainability. However, when collective social capital is high, it can sometimes even survive an imposed state intervention although quite often, conflict with the state only results in the breakdown of local organization and the fishery becomes a failure. It is therefore important that when central states notice dwindling fisheries due to poor collective social capital they should bring in interventions that are not aimed at "ruling" the fishery but rather at (re)building the local community cohesion. The devised strategies need to be continuously improved to suit the complexity and dynamism of socio-ecological systems such as small scale fisheries. One analytical option for such interventions is the "Action in Context" (AiC) framework as devised by de Groot (1992) which essentially recognizes that social actors respond to definite underlying motivations in collective community action.

3.4. Implications for future policy direction and fisheries management practice

This study has emphasized that the sustainability of SSF management in developing countries relies heavily on a strong collective social capital and a supportive government. Future practice and policy directions on fisheries management should understand the relevance of concrete community trust, networks, norms plus values and strive to streamline them in decision making and policy formulation. Governments, especially in developing countries, and their agents should realize the need to rise above the theoretical principles of "impose and control" and begin to take a more passive, non-conflictive position in designing

working solutions for the sustainability of common pool resources such as small scale fisheries. In cases where fisheries fail due to weak local institutions, the imposition of fishing rules or the establishment of co-management arrangements is futile. The only feasible government reaction seems to lie in helping to (re)build collective social capital and then protect the institutional result. This can be done for example by encouraging civil engagement in transformative learning to reduce disadvantageous power differentials that exist in many fishing communities in developing countries.

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Conditions for Sustainability of the Elephant Marsh Fishery in Malawi

Ishmael B. M. Kosamu [1,2]

[1] The Polytechnic, Department of Physics and Biochemical Sciences, University of Malawi, Private Bag 303, Blantyre 3, Malawi.

[2] Institute of Environmental Sciences (CML), Leiden University, P.O. Box 9518, 2300 RA, Leiden, The Netherlands.

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Women processing fish at Nkolimbo Fishing Village

Abstract

The Elephant Marsh, a wetland in Southern Malawi, is important for small-scale fisheries. It is managed by local institutions, which are not formally linked to any state institutions. This paper uses qualitative comparative analysis (QCA) to examine factors for sustainability at 24 fishing villages around the wetland using a hypothesis that “If strong local institutions (with or without government support) exist in an environment where resource users take collective action, and there is no or minimal conflictive interference, small-scale fisheries become sustainable”. It was revealed that the sustainability of small-scale fisheries management at Elephant Marsh relies heavily on the strength of local fisheries’ committees. Future interventions on fisheries management at the resource should, therefore, pay particular attention to protecting and (re)building collective social capital, especially in the leadership of fisheries committees.

Keywords: small-scale fisheries; wetland; sustainability; local institutions; Elephant Marsh; conditions; governance; Malawi

4.1. Introduction

Small-scale fisheries (SSF) support the livelihood of over 180 million people in developing countries (Evans & Andrew, 2011). Despite their relative importance, studies on the management of SSF in developing countries are limited. Most of the well-known studies have been done in developed countries where SSF are scarce (Ratner et al., 2012; Blaikie, 2006). The deficiency in down-scaled studies has led most decision makers in developing countries to manage SSF using generalized blueprint panaceas generated in developed countries.

Due to background developments such as population growth, rural poverty, climate change, and market forces, the exploitation pressure on SSF is likely to increase. In such scenarios, Hardin (1968) would propose that some regulatory authority (likely a central government agency) should come in to regulate the resource before the commons are overexploited. Indeed, in the early 1990s central states had put themselves at the center of managing common pool resources (CPR) (Pomeroy & Vaswanathan, 2003), however resulting in conflicts rather than sustainability (Chabwera & Haller, 2010). One reason for the failure has been that centralized bureaucracies are often unable to respond to rapid social-ecological change (Folke et al., 2005). As a result of the general failure of central governments to manage common pool resources, there has been a shift towards more participatory, joint management arrangements (Napier et al., 2005; Pomeroy et al., 2001).

Joint management arrangements were engineered quite early in SSF (Ostrom, 1990) but have gained wide application in forest management (Zulu, 2012). The design of successful management arrangements in SSF is not simple and depends on the locally-based institutional "*bricolage*" that focuses on the necessary points of engagement between resource users and regulatory authorities, such as the central states (Russell et al., 2008; Lanhorst & De Groot, 2012).

For developing countries, the institutional design dilemma is compounded by the stratification of the social, economic, political and biodiversity landscapes. Several scholars (Hara & Nielsen, 2003; Ribot et al., 2008; Jentoft et al., 2003; Béné et al., 2009) have questioned the rationale behind the adoption and implementation of "imported" institutions in systems that have been poorly understood. Nevertheless, most efforts in small-scale fisheries management in developing countries have put a lot of emphasis on setting up co-management arrangements. The approach in Africa, however, has generally been

devolution of some aspects of management from central states to local communities resulting in an imbalance of power and interests.

From the critical perspective of Ward & Weeks (1994) and Carswell (2003), it may be noted that the co-management discourse still justifies "*raison d'être*" (reason for existence) of state regulators. Thus, the critical perspective leads to a research platform that can reveal instances where purely community-based fisheries management can be conceptualized along with the other management types. Hints that such research might be fertile are given, for instance, by Hara & Nielsen (2003), who point out that co-management in Africa appears to be more of an illusion than an empowerment of local fishing communities and there is need to find some bold answers to its ability in achieving the objectives of all players. Even years after Ostrom's work (1990), Jentoft et al. (2003) also found it difficult to conceptualize the necessity of the state in the management of fisheries by mentioning that "an alternative agent like the state is not always needed and community level civil institutions play a greater role in fisheries management if they are allowed and equipped to do so". In some cases, however, informal institutional building can get support from centralized formal law like in the V-notch lobster programme as reported by Acheson (1989). The good news though is that small-scale systems such as SSF are easier to drive to success than large-scale entities because of the reduced number of competing interests and minimal layers of organization (Armitage et al., 2009).

The Elephant Marsh, a wetland in southern Malawi (see Chapter 1), is important for SSF and the management arrangements are quite informal. The wetland is managed by local institutions, which are not formally linked to any strong state institutions. Malawi also lacks a management framework strong enough to enforce a balanced and sustainable wetland development under rising pressures, such as overexploitation and agricultural conversion, which are mainly driven by population growth, rural poverty, climate change and market growth. In the Elephant Marsh, additional drivers include fluctuation in water levels caused mainly by hydroelectric power generation at Kapichira Dam and the abstraction of water for irrigation by Illovo sugar estate; both located upstream (Turpie et al., 1999). Moreover, the coordination of the roles of the various stakeholders in wetland management at Elephant Marsh is not very clear or stable (Kosamu et al., 2012). It is therefore important to determine factors of success for these locally-based management arrangements in order to achieve long-term sustainability of the fishery at Elephant Marsh and reflect upon optimal roles of the state.

Case studies from which lessons on SSF in developing countries can be drawn and applied to the Elephant Marsh Fishery are found, for example, in Chile, Comoros, Côte d'Ivoire, Malawi, India, Laos, Mexico, South Africa, Zambia, Zimbabwe, Senegal, and Nigeria (Castilla &Fernández, 1998; Hauzer et al., 2013; Njifonjou et al., 2006; Njaya, 2009; Sekhar, 2007; Baird & Flaherty, 2005; Basurto, 2005; Hauck & Sowman, 2001; Haller & Merten, 2008; Jackson et al., 1998; Gaspart et al., 2007; Neiland et al., 2005). While some are success stories, others are not. Experiences from Kafue Flats Floodplain Fishery in Zambia for instance, reveal that although central states promise many theoretical benefits when devising management arrangements, there is usually limited involvement and inadequate cost-benefit analysis of local group interests resulting in social resentment and consequent counter productivity (Chabwera & Haller, 2010;Haller & Merten, 2008) . However, it is interesting to note that in Malawi, for example, the formation of functional local institutions, which get support from the central state usually starts with a strong collective social capital (Njaya, 2009). Although the Malawi government has taken a supportive role at lakes Chiuta, Malombe, and Chilwa, the fishery at Lake Chiuta is the only one that is striving due to the good social structures at local scale. This is consistent with findings by Gutiérrez et al.(2011) where fisheries management was not successful in communities with low social capital (probably due to internal stratification and hierarchies), even when there was continued government effort. Some cases, such as Lake Chilika in India (Sekhar, 2007), reveal an interesting scenario. While the state is not supportive and there are no co-management arrangements, the fishery is still a success because of a strong collective social capital. It is therefore logical to suggest that conditions of success for each fishery are unique and can only be established if the system in question has been thoroughly studied. This paper uses qualitative comparative analysis (QCA) to examine factors of success that are crucial for the key actors and institutions at 24 fishing villages around the Elephant Marsh wetland using a hypothesis that "If strong local institutions (with or without government support) exist in an environment where resource users take collective action, and there is no or minimal conflictive interference, small-scale fisheries become sustainable".

The next section reviews literature on small-scale fisheries management in developing countries and provides a basis for the variables used in the analysis. The third section provides the methods used and how the scores for each variable were generated. The fourth section gives results and discussion. The paper ends with some implications for future policy direction and small-scale fisheries management practice in developing countries.

4.2. Small-Scale Fisheries Management in Developing Countries

Being a form of resource extraction, capture fisheries usually do not continuously require high inputs after making the initial investment in the acquisition of the extraction equipment. Informally put, once you have the boat and fishing gear, you tend to go on fishing. Thus, the economics of extraction easily lead to over-exploitation of the resource. Moreover, capture fisheries usually start out as an open access situation and even if access is closed to only a restricted group, full privatization is usually impossible and the fisheries remain a common pool resource, hence, subject to the risk of Hardin's (1968) "tragedy of the commons" that leads to resource exhaustion. Hardin (1968) concluded that communal natural resources can only be sustained if a coercive central authority organizes the exploitation. Béné et al. (2010) observed that "over-exploitation of a resource which is owned by many and not effectively managed by anyone, leads to reduction in catch and eventual poverty of users and others who would otherwise benefit from the harvests".
Capture fisheries are sometimes protected against over-exploitation by natural circumstances such as sheer size, inaccessibility or cold, as shown for instance in Brox (1990) and Planque et al. (2010). In most cases however, small-scale capture fisheries, consisting for instance of inland water or tropical seas are seldom protected by natural means, thereby requiring strong institutions that can regulate extraction by humans and achieve sustainability of the resource. Such regulatory institutions can be locally based, state controlled or a crossbreed of the two in what is widely known as co-management.

As already mentioned in chapter 3, Ostrom (2005) defines institutions as rules, norms and shared strategies that mediate human behavior. From this perspective, it clear that the sustainability of SSF depends on a continuum of attributes that positively shape human actions towards a negotiated consensus on powers and responsibilities in relation to the fisheries resource at either supra-local level (e.g., existence of guiding legislation and policies from central government) or local level (e.g., leadership, power relations, benefit sharing). Several scholars (Béné et al., 2009; Sowman et al., 2013; Wilson et al., 2006; Castello et al., 2011) have decried the lack of recognition and involvement of small-scale local fishers in fisheries management, especially in developing countries.

To achieve a balanced representation in decision-making, there is a shift to arrangements in which local communities and governments share responsibilities over a resource. Although the basic idea of such arrangements is to achieve equal power sharing (strong government *versus* strong communities), the application of the notion has varied widely especially in small-scale fisheries management where the socio-ecological contexts are quite complex

and diverse (Wilson et al., 2006; Castello et al., 2011). Whatever the case, these partnerships require high levels of compliance from local communities and significant support, information sharing, consultation, advice and cooperation from government (Pomeroy, 1991) in order to sustainably manage common pool resources. Ostrom (1990) identified eight conditions for the success of managing common pool resources. The conditions are: (i) clearly defined boundaries around the resource; (ii) congruence between appropriation and provision rules and local conditions; (iii) collective-choice arrangements; (iv) monitoring; (v) graduated sanctions; (vi) conflict resolution mechanisms; (vii) minimal recognition of rights to organize; and (viii) nested enterprises. Based on earlier studies (Kosamu et al., 2012), the fishery at Elephant Marsh in Malawi can achieve the first two principles mainly due to a good collective social capital at resource level. Collective social capital, in this respect, is defined as the social capacity of groups, in terms of trust and institutions, to take collective action (Lankhorst & De Groot, 2012).

Table 4.1 Choice of the conditions of interest at the Elephant Marsh Fishery

Ostrom's (1990) Condition/Attribute	Definition of the Condition/Attribute	Variables that Define the Attribute/Condition at the Elephant Marsh Fishery (based on own participatory observations, focus group discussions and structured interviews)	Current Status of the Condition/Attribute at Elephant Marsh/Justification for Inclusion in the Study
Clearly defined boundaries at the resource	Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself	Each fishing village has a defined boundary agreed upon by fishers and their leadership, legitimate users (non-outsiders) are known, and the external boundaries of the wetland are clear.	Condition met (Kosamu et al., 2012).
Congruence between appropriation and provision rules and local conditions	Appropriation rules restricting time, place, technology, and/or quantity of resource units (in this case fish) are related to local conditions and to provision rules requiring labor, material, and/or money	Fishers pay small amounts of money to obtain a fishing license, get labor, purchase acceptable fishing gear, have restricted periods of entry into the resource.	Condition met (Kosamu et al., 2012).
Collective choice arrangements	Most individuals affected by the operational rules can participate in modifying the operational rules	Existence of local democracy, ability to influence or change operational rules, Influence of the chief on choice of fisheries committee leadership? Are women included in the fisheries committee leadership? Boat theft or absence of theft? Do community members trust each other? Are fishers migrating to other fishing villages? For the local situation at the Elephant Marsh, this is attainable if collective social capital at village level is good.	Not clear before this study.

Monitoring	Monitors who actively audit CPR conditions and appropriator behavior are accountable to the appropriators or are the appropriators	Are the fisheries assistants from government/government officers present? What is the impact of the presence of the government officers? Does their presence have any impact on the communities that use the CPR? Do the officers just come to “police” or they inform and teach fishers other things on fisheries management?	Not clear before this study.
Graduated sanctions	Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators or by both	What the status of the local leadership in form of fisheries committee chairman? Actual implementation of the rules by the committee chair? Reputation of the committee chair (Knowledge and ability to act), Presence of own office space for the committee, are by-laws there for implementation, Does the implementation depend on extent/level of offence? Is this really done/ are the by-laws really implemented?	Not clear before this study.
Conflict resolution mechanism	Appropriators and their officials have rapid low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.	Chiefs, fisheries committee leadership, government officials? The hierarchy of conflict resolution (Chiefs, fisheries committee leadership, government officials). Does the chief uphold the roles of the fisheries committee in conflict resolution?	Not clear before this study.
Minimal recognition of rights to organize	The rights of the appropriators to devise their own institutions are not challenged by external government authorities	Interference from state? Does the state challenge the right of users to create their own local institution? What roles do the government officers have? What is the optimal role of the state/government agents?	Not clear before this study.
Nested enterprises	Appropriation, provision, monitoring, enforcement, conflict resolution and governance activities are organized in multiple layers of nested enterprises	National guiding principles/ government officials? What is their level of support in policy direction and information sharing? Is the fishery operating according to national guidelines? Is there cross-scale cooperation?	Not clear before this study.

Using evidence from several authors (Allison & Ellis, 2001; Evans et al., 2011; Sen & Nielsen, 1996) and as highlighted by Ostrom's (1990) list in Table 4.1, the sustainability of SSF at Elephant Marsh may also depend on several other factors in addition to a good collective social capital at resource level. For example the presence (or absence) of government officers and the leadership of local chiefs in conflict resolution mechanisms can either be positive if they uphold the roles of local fisheries management committees or negative if they calculatedly take a more "power defending" position (conflictive interference) (Gutiérrez et al., 2011; Hviding & Baines, 1994). Conflictive interference may consequently bring administrative difficulties and social divisions at resource level (Chabwera & Haller, 2010; Béné et al., 2009; Sen & Nielsen, 1996).
It is therefore not surprising that most of the conditions on Ostrom's (1990) list, especially the last six, are seldom attained in developing countries like Malawi. For instance, "Minimal recognition of rights to organize" necessitates legitimacy and strong recognition by central states of the locally constructed institutions while "nested enterprises'' underscores the fact that central states (governments) are important for support (policy direction, information sharing) so that issues of cross scale cooperation can best be addressed. Wilson et al. (2006) observe that local SSF management cannot be effective if it is not considered legitimate by stakeholders especially when central states are too weak to enforce formal rules for controlling activities of intruders and safeguarding supra-local values such as biodiversity and external ecosystem services. The overall result is usually voluntary compliance, which eventually disadvantages locals and erodes local institutions (Chabwera & Haller, 2010; Sowman et al., 2013). On the other hand, if central states fail to devolve power to local communities in joint management arrangements and consistently take a position of commanding, imposing and enforcing alien rules and regulations, the negotiated fulcrum is lost, sporadic illegal activities may emerge and the management system is likely to fail (Béné et al., 2009; Béné, 2003; Njaya et al., 2012; Eggen, 2011; Pomeroy & Berkes, 1997; Isaacs, 2012).

From the literature reviewed, it seems the management constituency of the Elephant Marsh fishery is built around collective social capital (which may depend on the leadership of the local fisheries committee or village chief), and the presence of a central state, which might be supportive (recognizing, helping, educating, informing, power sharing) or conflictive (imposing alien regulations). This chapter seeks to determine factors that influence the roles of the key actors and institutions in the management of the Elephant Marsh Fishery. Based on earlier findings in chapter 2 and participatory observations, the four factors that were focused on are: collective social capital at village level (CSC_V), collective social capital at local fisheries committee level (CSC_C), presence and influence of government agents

(GOV), and the role of chiefs (CHF) in the success of local SSF management at Elephant Marsh in Malawi.

4.3. Study Area

Elephant Marsh is located on the East African Rift Valley floor in the southern part of Malawi (14°25′–17°50′S and 35°15′–35°15′E), see Figure 4.1. It covers an average area of about 600 km^2, although actual size varies from about 2700 km^2 in the wet season to 500 km^2 in the dry season. The variation creates season-oriented pressure on the ecosystem goods and services that communities can draw from the wetland. The Elephant Marsh straddles the administrative districts of Chikhwawa and Nsanje, which fortunately follow similar institutional arrangements and therefore no major trans-district problems arise. The region has an average altitude of 500 m above sea level (asl) and an annual precipitation range of 560 to 960 mm. The mean annual precipitation in Malawi is 1180 mm and the altitude ranges from 50 to 3000 m asl. The marsh is fed by the Shire River, the only outlet of Lake Malawi, which flows through it in a southerly direction before joining the Zambezi River in Mozambique.

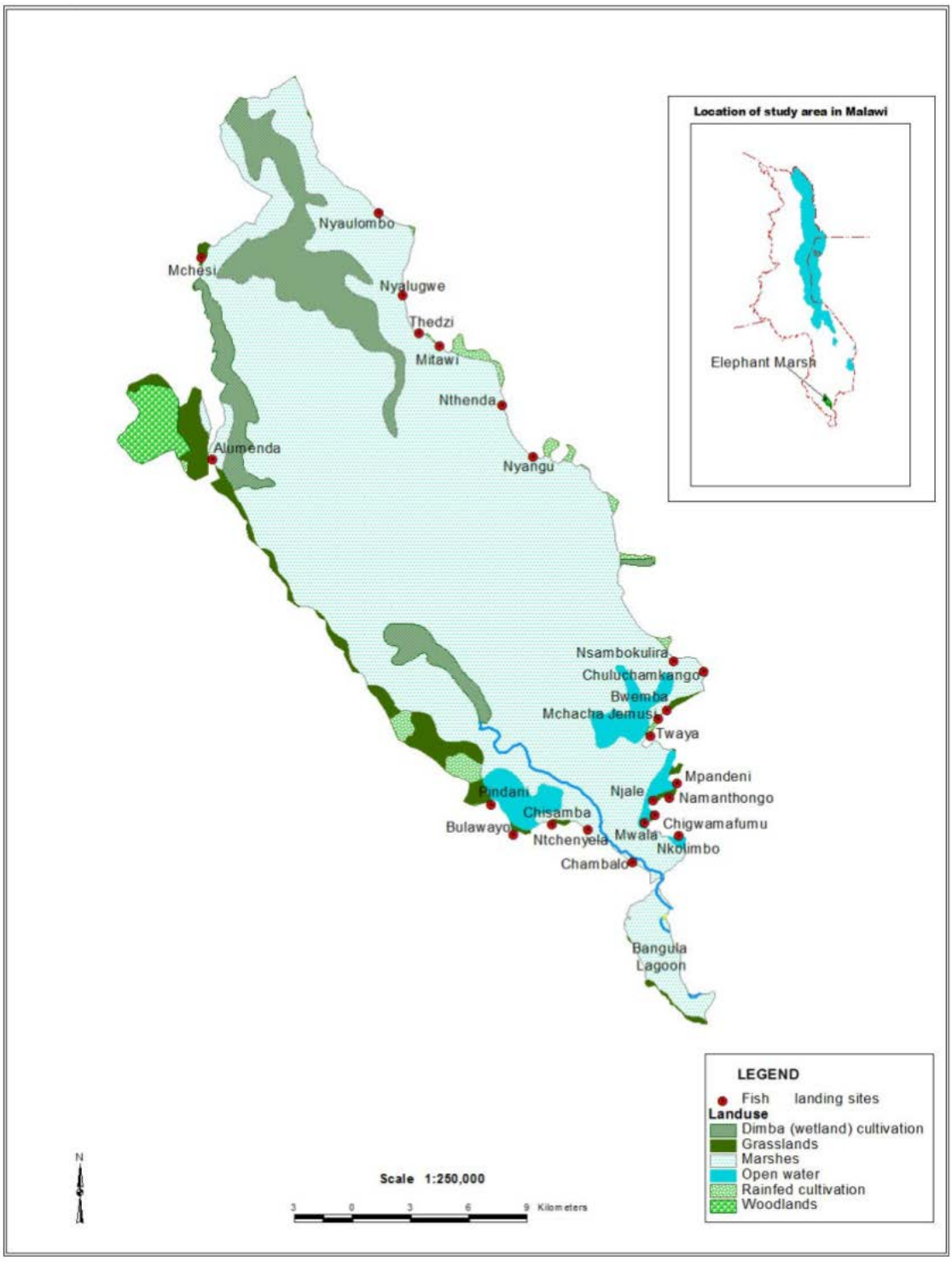

Figure 4.1 Map of the Elephant Marsh showing the location of the fishing villages

The marsh has relatively grassy margins but the bulk of its surface is formed by a mosaic of rooted swamp vegetation (sudd), floating vegetation and open water. In the southern part, this pattern is interspersed with islands with saline soils and palm trees. The Elephant Marsh is also home to several species of fish, out of which *Clarias gariepinus* (locally known as

mlamba), *Oreochromis mossambicus (chambo)*, *Oreochromis placidus(makumba)*, and *Barbus ssp. (matemba)* comprise over 90% of the commercial catch (Kosamu et al., 2012).

The International Union for Conservation of Nature (IUCN) red list identifies *Rynchops flavirostris* (African skimmer) and *Oreochromis mossambicus (chambo)* as species under threat in its natural range while the Convention on International Trade in Endangered Species (CITES) list includes *Crocodylus niloticus* (Nile crocodile)and *Hippopotamus amphibius* (hippopotamus). The Elephant Marsh is therefore a very important habitat for these species.

The annual fish production from around the Elephant Marsh has been estimated at an average of 8500 tons (Kosamu et al., 2012).This figure possibly includes the lower sections of the Shire River downstream from Elephant Marsh. There are no recent data on the trends of fisheries exploitation at the Elephant Marsh partly due to lack national interest in carrying out research on common pool resources such as the Elephant Marsh. Unfortunately, such data is very important for future impact assessment studies.

Management arrangements at Elephant Marsh are guided by customary law. At village level and under guidance of a traditional chief, each development sector is represented in the form of an executive committee that is responsible for coordination of specific activities. In the fisheries sector, the village level committee is called a Beach Village Committee (BVC), which also controls access to the Elephant Marsh through Beach Chairs. Some twenty-four fisheries committees are found around Elephant Marsh. Based on our field visits in 2013, the arrangement appears to be working well based on community membership of the wetland users. Immigrants are restricted from access to the wetland but are allowed, for example, as fish traders and processors. In most cases, they are easily identified and referred to as "*Angoni*" meaning "outsider" (although *Angoni* is a name of an ethnic group).

4.4. Methodology

4.4.1. Research Variables

The present study focuses on analysis of success and failure factors for sustainable SSF in the Elephant Marsh Fishery using crisp set qualitative comparative analysis (csQCA). Data on all research variables were collected between April and November, 2013 using focus group discussions, participatory observations, and key informant interviews. The preceding literature review (Section 4.2) has indicated that these success and failure factors should at minimum include: (i) the collective social capital of the fisheries committee; (ii) the collective

social capital of the fishing village; (iii) the presence of government agents and their influence; (iv) how the chief of the village is involved in fisheries management (conflictive or supportive role); and (v) the overall status of the fishery (outcome) in terms of sustainability. Sustainability in this respect is looked at with the assumption that it is not attributable to variations which are related to such factors as climate or river discharge. Data for all the five variables were collected through focus group discussions, interviews, and observations. Triangulation was attained by using emic (insiders' view) and etic (researchers' impression) approaches. The following is a summary of the main attributes that were looked at to come up with a score of either (0) for failure or (1) for success. The general guideline was to have a strict cut-off between 0 and 1.

i. Collective social capital at the fisheries committee level: The actions of the fisheries committee are motivated by several factors including reputation of the leader and communal value attached to fish. This variable was quantified using five attributes: (i) the etic (researchers') impression of the quality of the fisheries committee chairperson (knowledge and ability to act); (ii) presence of an own fund at the fisheries committee level; (iii) availability of a committee-owned structure (building for meetings/office); (iv) presence of written by-laws; and (v) the actual implementation of graduated sanctions to offenders by fisheries committee. Each attribute had a score of 1 resulting in an overall additive maximum of 5 points. As an input variable for data analysis the 5 points were assessed as a score of (1) while anything lower was assessed as (0).

ii. Collective social capital at the village level: When community cohesion is strong, achievement of a common purpose is easier than in an environment of conflict. The score for this attribute was based on (i) collective community effort to keep the sanitary conditions of the beach clean and the existence of local democracy; (ii) boat safety/absence of theft; (iii) inclusiveness of females at the beach (e.g., as fish processors and traders); (iv) willingness to explore trust-based investment (e.g., fishers to give their catch of the day to a trader for sale at a market and only get proceeds after the trader has sold the fish); and (v) migration of fishers to other villages for fishing reasons, (indicator of a "bad beach"). Each attribute had a score of 1 resulting in an overall additive maximum of 5 points. As an input variable for data analysis the 5 points were assessed as a score of (1) while anything lower was assessed as (0).

iii. Government visits and impact: The score for this attribute was based on the frequency of official visits by government agents and the impact of what they do during the visits. According to Malawi's Department of Fisheries, government agents are supposed to visit a beach at least twice a month for extension activities. This essentially translates to a minimum of 24 possible visits in a year. The impact of the visits was measured at three levels: (i) "come and look" gave an impact factor of 1; (ii) "come, look and police" gave an impact factor of 2; while (iii) "come, look, teach/inform and police" gave an impact factor of 3. A final score was generated by multiplying the number of visits in a year by the impact factor to give a minimum positive impact score of 72 points (*i.e.* 24 × 3). As an input variable for data analysis 72 points or more (if there was a higher frequency of visits) were assessed as a score of (1) while anything lower was assessed as (0).

iv. Chief's support: Due to the customary arrangement, the chief is important in upholding the roles of the fisheries committee. The score for this attribute was based on whether the chief is supportive or in conflict with the affairs of the fishing site, especially the fisheries committee using three indicators (i) etic (researcher's) impression (e.g., from stories of conflict or other negative allusions); (ii) opinion of fishers, traders and fish processors and (iii) opinion of government officials. Each indicator had a score of 1 resulting in an overall additive maximum of 3 points. As an input variable for data analysis the 3 points were assessed as a score of (1) while anything lower was assessed as (0).

v. Sustainability: The score for this attributes is based on the researchers' objective assessment (Reichertz, 2004) and insiders' view (emic) of four indicators (i) stability of catch (abundance overfishing); (ii) quality of catch (non-juveniles for the late maturing *Oreochromis* and *Tilapia* species); (iii) trends in the catch per unit effort (CPUE); and (iv) the ability to keep non-community members (immigrants) out of the resource. Each attribute had a score of 1 resulting in an overall additive maximum of 4 points. As an input variable for data analysis the 4 points were assessed as a score of (1) while anything lower was assessed as (0).

4.4.2 Qualitative Comparative Analysis and the Defining Variables

Qualitative Comparative Analysis (QCA) focuses on linking an outcome to causal configurations, which are considered as explanatory conditions. There are three QCA techniques (based on set theory and Boolean algebra) namely: Multivariate QCA, crisp set

QCA, and fuzzy set QCA. As indicated earlier, this study uses crisp set QCA because of its ability to portray multiple causal combinations including minority effects. A crisp set is a condition in which a case may be interpreted, based only on two possible outcomes (0 or 1) expressed as either in or out; true or false; yes or no. For example, a specific fishery might be successful (1) or not (0) if there is a conflictive village chief. The limitation with csQCA is that the method does not allow for intermediate scenarios because it is case-based. Table 4.1 specifies the definition of each of the variables in formal terms.

4.4.3 Crisp Set QCA and an Overview of the Case Studies

Crisp set QCA is done in six steps (Rihoux &De Muer, 2009; Rihoux, 2013; Marx, 2010) using TOSMANA (Tool for Small-N Analysis) version 1.3.2.0 (Cronqvist, 2005). It allows a direct conversion of hypotheses into variables (Table 4.2), which are relevant for all the cases, followed by building of a raw dataset for the cases (Table 4.3) and construction of a truth table. The third step involves resolving contradictory configurations (outcomes that lead to 0 for some observed cases and 1 for other cases) before performing Boolean minimization (Step 4), which helps to clarify and simplify complex expressions of causal configurations. Step 5 identifies the logical remainders (combinations that are possible but have not been observed among the cases). The truth table and overall result of the analysis (Box 4.1) are automatically generated by TOSMANA (Step 6). The fishing villages are presented based on their location (East or West) on the banks of the marsh.

Table 4.2 The variables.

Variable	Abbreviation	Definition	Score
Collective social capital_ committee	CSC_C	Strong collective social capital at local fisheries committee level	0 or 1
Collective social capital_ village	CSC_V	strong collective social capital at village level	0 or 1
Government Agents	GOV	Presence and influence of government agents	0 or 1
Village chief	CHF	Chief is in conflict the community	0 or 1
Outcome	OTM	Fishery is sustainable	0 or 1

Table 4.3 The dataset for the 24 fishing villages.

Case ID	Name of Beach	Location	CSC_C	CSC_V	GOV	CHF	OTM
I	Nkolimbo	East Bank	0	0	1	0	0
II	Mwala	East Bank	1	0	0	1	1
III	Chigwamafumu	East Bank	1	1	0	1	1
IV	Njale	East Bank	1	1	1	1	1
V	Namanthongo	East Bank	0	1	0	1	0
VI	Mpandeni	East Bank	0	0	1	0	0
VII	Twaya	East Bank	0	1	0	1	0
VIII	Mchachajemusi	East Bank	1	1	1	1	1
IX	Bwemba	East Bank	0	0	1	0	0
X	Chuluchamkango	East Bank	1	0	1	0	1
XI	Nsambokulira	East Bank	1	1	0	1	1
XII	Nyangu	East Bank	0	1	1	0	0
XIII	Nthenda	East Bank	0	0	1	0	0
XIV	Mitawi	East Bank	1	0	1	1	1
XV	Thedzi	East Bank	1	1	1	1	1
XVI	Nyalugwe	East Bank	0	0	0	1	0
XVII	Nyaulombo	East Bank	1	1	1	1	1
XVIII	Mchesi	West Bank	0	0	0	1	0
XIX	Alumenda	West Bank	1	1	0	1	1
XX	Pindani	West Bank	1	1	1	0	1
XXI	Bulawayo	West Bank	0	0	1	0	0
XXII	Chisamba	West Bank	1	1	1	1	1
XXIII	Ntchenyela	West Bank	0	0	1	1	0
XXIV	Chambalo	West Bank	0	1	1	1	0

There are more fishing villages on the East Bank of the Elephant Marsh in comparison to the West Bank because Illovo sugar estate has occupied most of the land on the western side of the wetland.

4.5. Results and Discussion

From Table 4.3, one can easily deduce that that the dataset is simple enough to manually analyze the trends even without the use of csQCA. For example, in all cases where CSC_C = 0, there is no sustainability irrespective of a positive score for a good collective social capital of the village, presence and influence of government agents or a conflictive chief but when CSC_C = 1, there is always sustainability. The csQCA is still used however to have more formal certainties.

Using csQCA, the truth table of the 24 cases generated in the TOSMANA Analytical Report (Box 4.1) shows that different configurations (sustainability and non-sustainability) could be found among the empirical cases. The output is read as: sustainable small-scale fisheries management at Elephant Marsh is observed in fishing villages (II, III, XI, XIX, IV, VIII, XV, XVII, XXII, X, XIV, XX) that have a strong collective social capital at fisheries committee level (COLLECTIVE SOCIALCAPITAL_COMMITTEE {1}).

Box 4.1 The overall output of the analytical process.

Algorithm: Graph-based Agent
Settings:
Minimizing Value 0 1 C including R

Truth Table:

v1: Collective Social Capital_ Committee
v2: Collective Social Capital _Village
v3: Government Agents
v4: Village Chief
O: Outcome
id: Beach

v1	v2	v3	v4	O	id
0	0	1	0	0	I, VI, IX, XIII, XXI
1	0	0	1	1	II
1	1	0	1	1	III, XI, XIX
1	1	1	1	1	IV, VIII, XV, XVII, XXII
0	1	0	1	0	V, VII
1	0	1	0	1	X
0	1	1	0	0	XII
1	0	1	1	1	XIV
0	0	0	1	0	XVI, XVIII
1	1	1	0	1	XX
0	0	1	1	0	XXIII
0	1	1	1	0	XXIV

Result: (all)
COLLECTIVE SOCIAL CAPITAL_COMMITTEE {1}
(II, III, XI, XIX, IV, VIII, XV, XVII, XXII, X, XIV, XX)

The overall result from this study has revealed that a good collective social capital at the fisheries committee level is the key factor in determining sustainability of locally-based wetland fisheries management at the Elephant Marsh. In most cases, weak economies like Malawi have very low financial capacity to support fisheries management activities at community level. The lack of material and financial resources forces the agents to be simultaneously present and absent (Chabwera & Haller, 2010), thereby creating shortfalls in the effectiveness of management programmes. This study has underscored that the presence of government agents in itself does not contribute much to fisheries sustainability. Policy makers should therefore shift their effort towards establishment and strengthening of capable local leadership, which can spearhead community interests and ensure the sustainability of a resource. As most scholars (Zulu, 2012; Béné et al., 2009; Sen & Nielsen, 1996) have observed, one of the major challenges in establishing efficient local management structures in Malawi is the question of power sharing between village heads and fisheries committee leadership. At Lake Chilwa Fishery in Malawi, for example, there are 43 fishing committees and access is controlled through issuing of licenses from the Department of Fisheries (DoF) and the enforcement of local rules is done by the committees. However, there are reported power struggles between the local chiefs and the fisheries committee leadership resulting in weak social relations that jeopardize the sustainability of the fishery (Njaya, 2009). Nielsen et al. (2004) also pointed out that the involvement of chiefs in SSF can be a delicate matter because local chiefs do not always operate in ways that fit well with transparency and participatory decision-making arrangements. In all but two (Chuluchamkango and Pindani) fishing villages at Elephant Marsh, the inability of the village chiefs to devolve some of their power to local fisheries committee leadership resulted in failure of a fishery. It is not surprising therefore to note that collective social capital at village level was disintegrated at almost all sites where the chief was conflictive. Similar observations have been made at Kafue Flats Fishery in Zambia (Haller & Merten, 2008).

At the same time it is interesting to note that good collective social capital at village level did not automatically translate into good leadership at the fisheries committee level. Many scholars have warned against the tendency of assuming group homogeneity in community structures that exhibit good collective social capital (Wilson et al., 2006; Castello et al., 2011; Allison & Ellis, 2001). While it is difficult at this moment to rule out the influence of government agents in the management of SSF at Elephant Marsh, it is clear that future efforts in making the Elephant Marsh fishery a success seem to dwell more on identifying good local leaders, grooming them to build or strengthen the existing collective social capital, and encouraging cross-scale interactions amongst all fishing villages around the wetland so that sustainability of the common resource can safeguarded.

It should also be realized that building such well-organized social systems for SSF management takes time (Armitage et al., 2009). There is, therefore, need to develop novel approaches, which can accommodate popular communal transformation of resource users under the guidance of a motivated and trusted local leader. Culturally, Malawians are reluctant to individually challenge decisions made through community consensus (Evans & Andrew, 2011) and that makes it easier for a group to “silently” stand against unpopular, unilateral decisions, which a village chief can make (Njaya, 2009; Pomeroy & Berkes, 1997). It is therefore not strange that in some cases successful local committees were found in villages where the chiefs are conflictive. These findings reinforce the notion by Basurto (2005) that when there is good local leadership at resource scale, local communities are able to organize themselves and develop efficient local management systems that can avoid the overexploitation of SSF even when support from central states is limited. One point to consider though is that in most parts of the world, even in countries with the highest literacy levels, fishers tend to attain lower levels of education (Njaya, 2009), hence, most central states are reluctant to give them power and accept that they have the ability to organize themselves and sustainably manage a resource.

4.6. Conclusions

The sustainability of small-scale fisheries management at Elephant Marsh in Malawi depends on building strong local institutions with motivated leadership that can safeguard the interests of resource users. Future practice and policy directions on fisheries management at Elephant Marsh should understand the relevance of concrete local community trust, networks, norms plus values and strive to streamline them in decision making and policy formulation. The government of Malawi should begin to take a more participatory position in designing locally crafted working institutions for the sustainability of common pool resources, such as small-scale fisheries at Elephant Marsh. In villages where fisheries fail due to weak local institutions or conflictive chiefs, the imposition of fishing rules is futile. Feasible government reaction seems to lie in (re)building collective social capital, especially the leadership of a fisheries committees and formally linking the established local institutions to the central government structure.

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5

Actor-based design of a management system for the Elephant Marsh Fishery in Malawi

Ishmael B. M. Kosamu [1,2,*], Wouter T. de Groot [2,3] and Patrick S. Kambewa [4]

[1] The Polytechnic, Department of Physics and Biochemical Sciences, University of Malawi, Private Bag 303, Blantyre 3, Malawi.

[2] Institute of Environmental Sciences (CML), Leiden University, P.O. Box 9518, 2300 RA, Leiden, The Netherlands.

[3] Institute for Science and Innovation Studies, Faculty of Science, Radboud University, P.O. Box 9010, 6500 GL, Nijmegen, The Netherlands.

[4] Department of Economics, Chancellor College, University of Malawi, P.O. Box 280, Zomba, Malawi.

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Local fishing knowledge is transferred to the youth at Chisamba Fishing Village

Abstract

In Malawi, fishing community user groups (known as beach village committees), traditional chiefs, government officers and fishers are the key players in fisheries management. Based on interviews and participant observation, this paper uses an actor-based framework (known as Action-in-Context) to unveil the issues that are crucial in devising a sustainable governance system for the Elephant Marsh Fishery in Southern Malawi. We establish and propose that the key social variables for the design of a three-pillared (locally based, weak and amorphous) resilient institution for sustainability of the Elephant Marsh Fishery are (i) the social reputation of the leaders of local fishery institutions (beach village committee leaders), and (ii) the power dynamics between traditional chiefs and these local fishery leaders. We end the paper by exploring the implications of the findings on the sustainability of the fishery under rising resource pressure.

Keywords: small-scale fisheries, governance, Malawi, local institutions, actor-based analysis, Action-in-Context, leadership, power, Elephant Marsh, sustainability.

5.1. Introduction

The Elephant Marsh, a wetland in the southern part of Malawi, is important for small-scale fisheries (SSF). The wetland is located on the East African Rift Valley floor and covers an average area of about 600 km^2, varying between 2700 km^2 in the wet season and 500 km^2 in the dry season. The marsh is fed by the Shire River, the only outlet of Lake Malawi, which flows through it in a southerly direction before joining the Zambezi River in Mozambique. The marsh has relatively grassy margins but the bulk of its surface is formed by a mosaic of rooted swamp vegetation (sudd), floating vegetation and open water. In the southern part, this pattern is interspersed with islands with saline soils and palm trees. The Elephant Marsh is home to several species of fish, out of which *Clarias gariepinus* (locally known as *mlamba*), *Oreochromis mossambicus* (*chambo or mphende*), *Oreochromis placidus* (*makumba*), and *Barbus ssp.* (*matemba*) comprise over ninety percent of the commercial catch (World Bank, 2010). The annual fish production from around the Elephant Marsh has been estimated at about 8500 tonnes. There are no recent scientific data on the trends of fisheries exploitation at the Elephant Marsh but fishers generally feel the catch per unit effort is slowly decreasing (see Chapter 4). Based on a 2014 survey by Malawi's Department of Fisheries (DoF) there are about 1500 fishers at the Elephant Marsh (DoF, 2014).

As highlighted in chapter 2 of this thesis, the Elephant Marsh Fishery is mainly guided by customary law through village chiefs who receive their mandate through inheritance, and managed by user groups called "Beach Village Committees" (BVCs) which is headed by a chairperson (BVC Chairs). The concept of BVCs was introduced in Malawi in 1991 as a government initiative under the Participatory Fisheries Management Programme (PFMP) with support from the British Overseas Development Administration (ODA), in response to declining fish catches at Lake Malombe and the Upper Shire River (Lewins et al., 2014). Since then BVCs have been adopted at the national level and supported by the National Fisheries and Aquaculture Policy (NFAP) (Government of Malawi, 2001) as an institutional interface between the Department of Fisheries (DoF) and the fishing communities.

Although the Elephant Marsh can be characterized as a single ecosystem, the mosaic landscape has led to fragmentation of the open water into several smaller "lakes" which are managed independently at the fishing village (beach) level. Currently there is no overall fisheries management association to coordinate the operations of the BVCs (Kosamu, 2014). Bavinck (2005) reported that the interactions of fishers in such small-scale fisheries undivided resource systems may "snowball into nothing less than a tragedy of the commons"; as the actions of fishers in one part of the water body can, on aggregate, affect

the performance of others in a different location of the same system. Indeed, migration is a common feature among fishers at the Elephant Marsh. Fishers periodically migrate to beaches where the catch is better than their home village, often for short stays with no intentions of permanent shift. The phenomenon has also been observed in many parts of Africa and South-East Asia (Nunan, 2010; Randal, 2005).

Studies on the Elephant Marsh fishery are limited. Evidence from a recent study (Kosamu et al., 2012) shows that the locally-based management system at Elephant Marsh is working well. These findings are consistent with Bavinck's (1996) assertion that local decision-making structures in fishing communities are capable of implementing regulatory actions towards what is perceived as a common good. However, due to background developments such as population growth, rural poverty, climate change and market forces, the exploitation pressure on the SSF is likely to increase and achieving sustainability in the near future may require stronger institutions than those that are now at work. The present study aims at unveiling a short-term management design for the Elephant Marsh Fishery specifically but also a type of thinking that maybe fruitful to institutional science in general.

Another study by Kosamu (2014) has shown that the quality of leadership of the local fisheries committee (BVC Chairs) seems to be a prime factor (key actor) for a well-managed fishery at the Elephant Marsh. A full account of Kosamu's (2014) assertions is presented in chapter 4 of this thesis. The questions this chapter addresses are: What are the key socio-causal dynamics of the management system at the Elephant Marsh Fishery? How can these socio-causal dynamics, if and insofar needed, be translated into strengthened institutions for sustainability of the Elephant Marsh Fishery in the near future? On the basis of Kosamu's (2014) assertions, our analysis in this chapter first addresses issues that relate to BVC Chairs at the Elephant Marsh Fishery and then moves on to the other key actors such as fishers, village leaders and government fisheries officers.

5.2. Methodology

5.2.1 Methodological framework

In this chapter we follow an actor-based approach (as opposed to a more systems-oriented approach) which identifies the roles of all actors connected to the fishery (e.g. fishers or government officers) and the institutions that underlie the action of the actors. This is consonant with our desire to trace the key socio-causal dynamics because actors, not systems, are the social entities that can act and thereby effect change. The approach does not deny the influence of social networks on actors' behaviour in natural resources

management (Bodin & Crona, 2009); obviously actors respond to and influence the social system characteristics in which they operate. We use the "Action-in-Context" framework (AiC) as devised by De Groot (1992) to identify all the major actors, their potential to act (comprising their active capacity and motivation to act), and their actions' causal linkages before identifying the overall patterns of social causation that emerge in the management of Elephant Marsh Fishery. Action-in-Context (AiC) is an actor-based framework inspired by such authors as Vayda (1983), Vayda &Walters (1999) and Elster (1989) designed to facilitate the tracing of multi-actor and multi-level social causation.

AiC enables the transformation of qualitative descriptions into empirical data and interpretations. As highlighted by Overmars et al. (2007) some of the key advantages of AiC over more inductive approaches such as econometrics lie in its ability to allow explicit description of parameters and relationships among variables and the possibility to include variables which are constant throughout a study, e.g. if labour costs are constant they cannot be included in regression analysis.

The domain of AiC can be defined as "sufficiently deliberative action". This then excludes habitual or purely emotional or physical behaviours, as well as people's relatively deep 'life choices' or commitments. Thus our assumption in this study is that small-scale fisheries management is sufficiently deliberative to allow for valid description in a broad and culturally sensitive rational choice approach. This is analogous to, for instance, Ostrom's (1990) application of broad rational choice to resource management in general.

The core element of AiC is a triangular causal structure which expresses that in order to act, the actor needs both the option ('opportunity', 'autonomy', 'power' etc.) and the motivation ('desire', 'will' etc.) to do so. In Figure 5.1 the triangular causal structure of the actor, action, implementable options and motivations is illustrated with terms added from our fisheries case at the Elephant Marsh. Typically for AiC, implementable options and motivations are depicted as separate from each other despite the fact that on a deeper level, they are interdependent. For instance, people do not usually continue to have desires for what they know they can never get (options), while on the other hand persistent desires can build capacity on a longer run. Thus, AiC enables clear and comprehensive causal mapping of on-going interactions, without denying that more interpretative methods might be needed to understand longer-term change.

From the causal triangle onwards, AiC proceeds in two analytical directions. The first is depicted in Figure 5.1, and called 'deeper analysis', connecting as it does the actor's

implementable options and motivations to their underlying social phenomena. In Figure 5.1 for instance, the BVC Chair's motivation to maintain his social reputation embeds his actions in the BVC ('microstructure'). The 'implementable options' of the actor are built from 'autonomy' or 'capacity' composed of institutions, rules and financial or private social capital, and 'potential options'. The difference between 'potential options' and 'implementable options' lies in what the actor can really do in the active world as opposed to what the actor could do if presented with greater capacities. 'Motivations' are all aspects of the options under normative consideration by the actors in their choice of action. They can be separated analytically as 'objectified motivations' and 'interpretations'. 'Objectified motivations' are the quantifiable demerits of the action, e.g. in terms of money, or calories. Actions of decision makers in fisheries management are often influenced by such quantitative motivations but on the other hand, more culturally-embedded qualifications of costs and benefits can be important too; these are called 'interpretations' in AiC. 'Interpretations' relate to Simon et al.'s (1958) overview of human motivations which are: material inducements (money or goods); opportunities for distinction, prestige and personal power; desirable conditions of work e.g. cleanliness; pride in workmanship; service for family or others; patriotism or religious feeling; personal comfort and satisfaction in social relationships; conformity to habitual practices and attitudes; and a feeling of participation in important events. These basic individual motivations and values have also been reported by Schwartz et al. (2012) in a more detailed assessment.

The second analytical direction for tracing of causal linkages in AiC connects the action-to-be explained to actions of other actors, specifying the 'actors field' that link the actor (e.g. BVC chair) to secondary actors such as the village chief, fishers and government officers (Figure 5.2), through intermediary actions. The BVC Chair's actions are influenced by other actors that act upon the motivations or options for a particular action. When identified, these 'actors of influence' such as the village chief or government are referred to as secondary actors. (Note that what is called primary, secondary etc. here is only a matter of counting, not denoting empirical or normative importance.) From there on, it is easy to identify causal linkages with the next, tertiary layer of 'actors of influence'.

Thus, we see that the actors' field concept deeply differs from social networks that appear to be the only inter-actors concept guiding the social sciences. Broadly put, social networks are structures related to how actors shape institutions (collective action), while actors fields describe how institutions shape the actions of the actors (Hobbes et al., 2007).

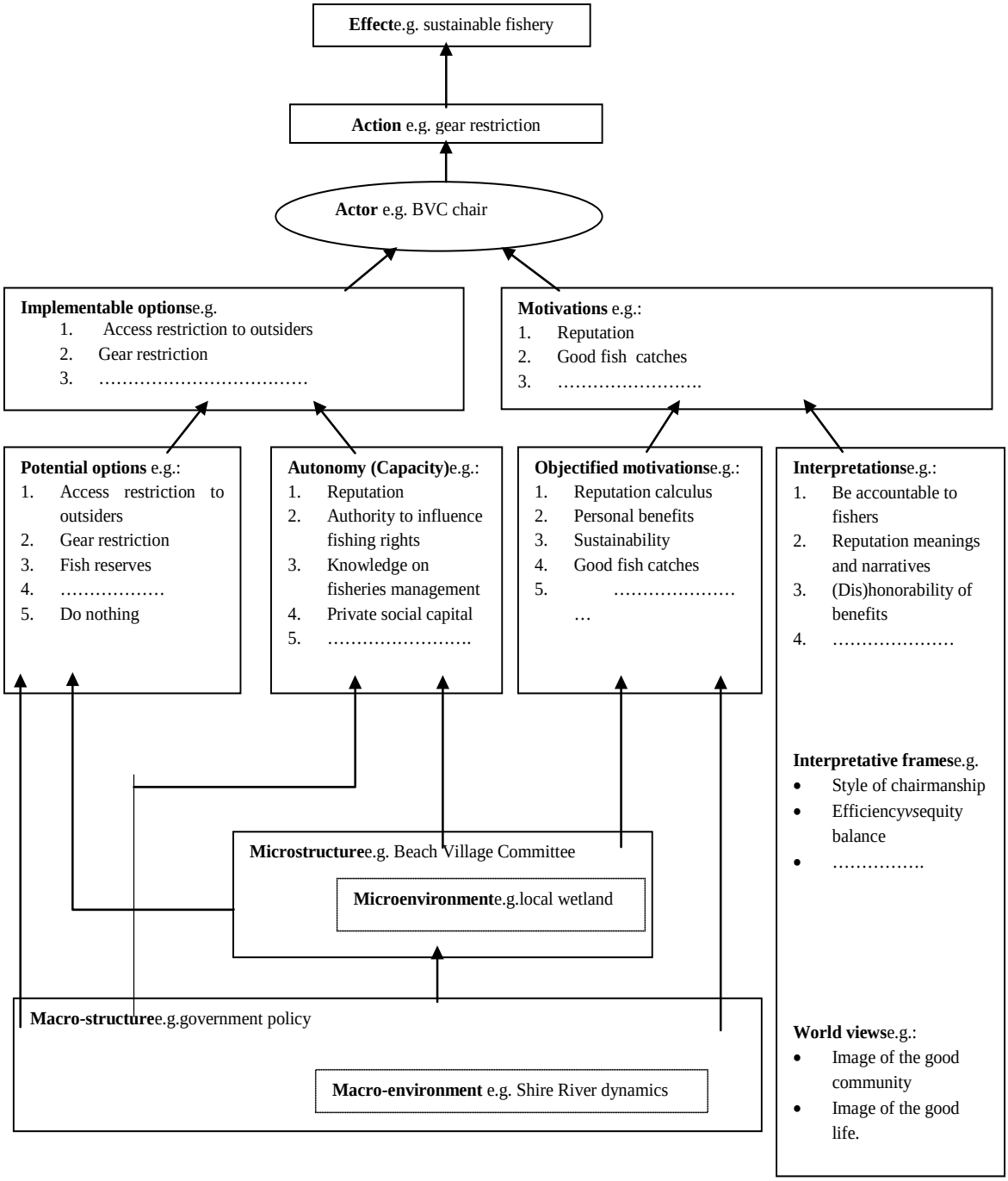

Figure 5.1 The structure of AiC 'deeper analysis' with a few items from the study area filled in. The BVC Chair's action of gear restriction is the explanandum from which the analysis works its way downward. Arrows indicate the causal direction.

5.2.2 Data collection and analysis

Data collection was undertaken between March and June 2014. Interviews, focus group discussions and observations were done at twentyfour fishing villages at the Elephant Marsh with fishers (*n* = 240), BVC Chairs (*n* = 24), village leaders (*n* =24), fisheries officers (*n* = 6) and district as well as national fisheries officials (*n* = 10). Secondary data were obtained from such sources as government databases, reports, journals and internet articles.

Some of the questions for each of the four key actors at the Elephant Marsh Fishery included: What are the actions of the key actor? What capacities and motivations (costs and benefits/incentives) explain these actions? Which institutions or structures underlie the key actor's motivations and capacities? How are the actions of the key actor influenced by the other key actors? What are the capacities and motivations of these other key actors who have an influence on the actions of the key actor in question? What are the main social causalities, dynamics and mechanisms among these key actors? A social causation map (Glaser, 2006; Gray et al., 2012; Hall et al., 1994) emerging from answers to these questions helped in tracing the key factors and actors that are essential in crafting institutions that could be central in achieving sustainability of the Elephant Marsh Fishery under increasing pressure but also help institutional designers in small-scale fisheries. This is particularly important because, as Ostrom (1992) highlights, an institution is "the set of rules-in-use by a set of individuals to self-organize repetitive activities that produce outcomes affecting those individuals and potentially affecting others".

As the answers to these questions were sought, it was also important to bear in mind that some of the pressures that exist at the Elephant Marsh may require some ecological thinking too. Our focus on socio-causal linkages had a reason; any solution (whether ecologically or socially based) requires social embedding to work at all.

The interviews were guided by AiC schemas and the concept of "sustainability", which was discussed in terms of: (i) stability of catch (abundance overfishing); (ii) quality of catch (non-juveniles for the late maturing *Oreochromis* and *Tilapia* species); (iii) trends in the catch per unit effort (CPUE); and (iv) the ability to keep non-community members (immigrants) out of the resource. Interview responses were progressively synthesised into AiC schema during field data collection. Participant observation helped verify interactions between actors, the market prices, size of catches, main fish species, and the legality of the fishing gear used, among other attributes. The resulting AiC schemas were then progressively interpreted and synthesized into a number of narratives that focused on key themes. For an example of a

characteristic AiC schema result, see Figure 5.2 that takes a BVC chair as a primary actor and shows how the motivations and options of other key actors influence the BVC Chair's actions in the management of the Elephant Marsh Fishery.

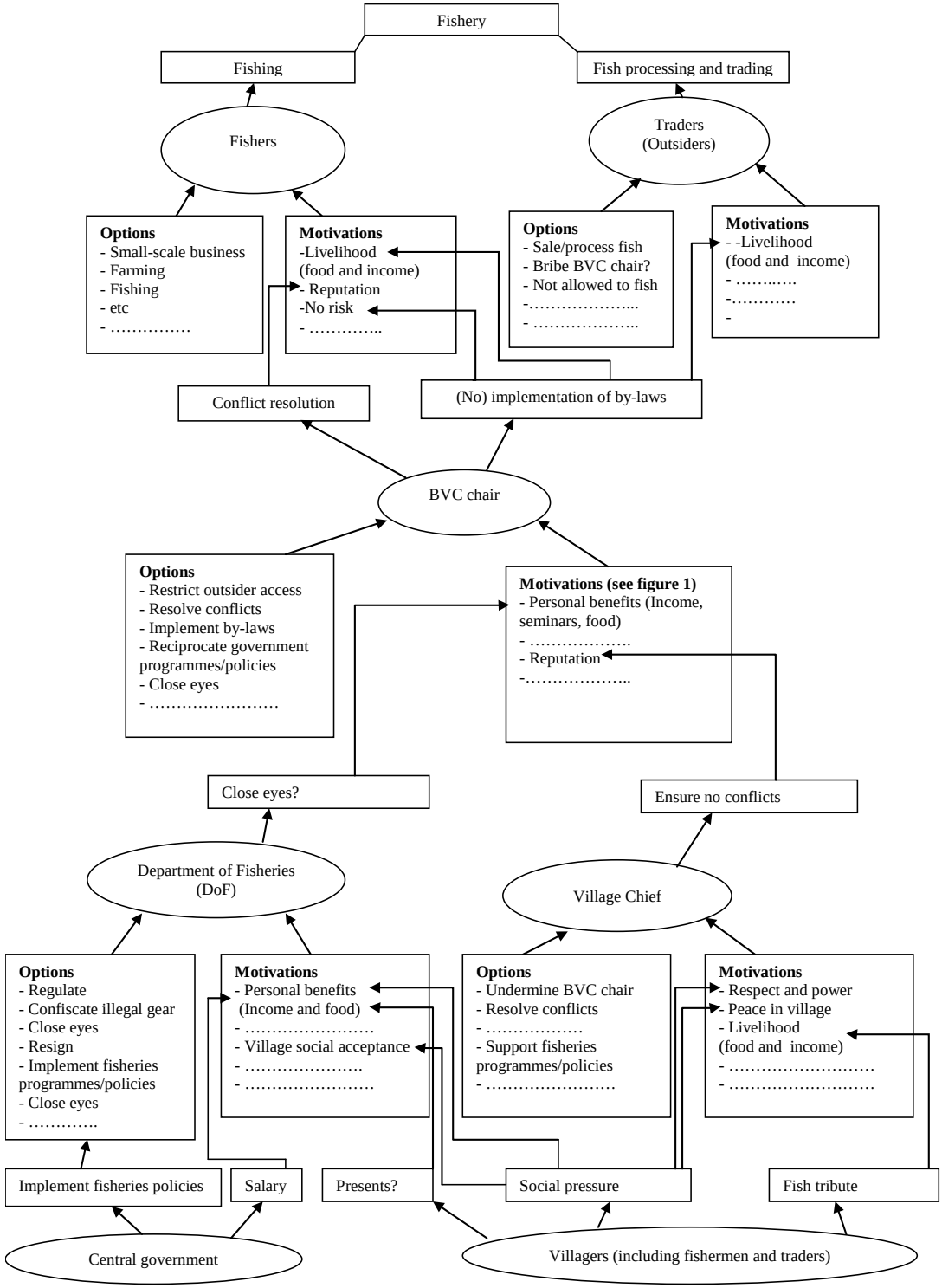

Figure 5.2 Summary of an actors' field for the Elephant Marsh Fishery. Below each actor category, the boxes indicate the options and motivations leading to the actor's actual action. Actors are linked through actions that influence options and/or motivations of other actors.

In the presentation of the study findings in the following sections, we focus on the resultant narrative themes.

5.3. Results

This section reports on the causal narratives (themes) of the key socio-causal dynamics in the management of the Elephant Marsh Fishery that emerged from the AiC analysis and starts off with the fishers.

5.3.1 Livelihood support and reputation motivate the fisher

Most of the families (>70%) at the Elephant Marsh are poor and depend on fish and subsistence wetland agriculture for their livelihood. Table 1 summarizes the basic cost and benefits at the Elephant Marsh. It is evident from the table that the returns to labour of specialized fishing are much higher (three to four times) than of specialized wetland rice farming. Moreover, rice farming is feasible only in one season. This is an important background for interpretation of our fisheries data. People do not have access to remunerative options besides fisheries, for instance, and reputation in fishing activities corresponds to a large extent to reputation at the village level. It is also interesting to note that an annual net income of roughly 3000 US$ (Table 5.1) for an average fishing household of 5 persons (NSO, 2008), translates to 1.6 US$ per day which is just above both the global poverty line of 1 US$ (World Bank, 1990) and the revisited proposition of 1.25 US$ (Ravallion et al., 2009) but slightly lower than the new recommendation of 1.9 US$ (World Bank, 2015).

Table 5.1 Return to labour (US$ per working day) for the two main livelihood activities at the Elephant Marsh, using estimates of the most commonly occurring cost and benefit figures. The estimates are based on assumption of eight working hours per day, 300 working days per year (i.e. no sickness or other major problems), and that there no other economic activities for the rest of the year.

Item	Wetland Rice farming	Fishing
Labour investment	70 days/ha/yr	300 days/yr.
Inputs	Rice seeds: 40kg/ha * 0.7US$/kg = 28US$ Fertilizer (Urea): 50kg/ha*0.8US$/kg = 40US$	Cost of a dugout canoe = 177 US$ every 7 years = 25 US$/yr. Fishing licence fee = 0.9 US$/yr. Gill net (100metres) = 0.4US$ *100 = 40US$/yr.

	Total inputs = 68 US$/yr.	Total inputs = 66 US$/yr.
Annual Harvest/catch	1000 kg/ha/yr.	10 kg per day (11 kg is usually caught and about 1 kg is given to village chief as tribute)*300 days/yr. = 3000 kg/yr
Market price	0.3 US$/kg	1.12 US$/kg
Gross income	1000*0.3 US$ = 300 US$/yr.	3000*1.12 US$ = 3360 US$/yr.
Net income	238 US$/yr.	3294 U$/yr
Return to labour	3 US$/working day	11 US$/working day

Fishers indicated that being able to support a family with food and basic income brings pride and social acceptance in the village. Social reputation is also enhanced by good citizenship as displayed for instance by reciprocating trust, participating in communal work, funerals and other activities, and refraining from illegal actions such as breaking fisheries by-laws.

5.3.2 Reputation is the key for the BVC Chair

The capacity and motivation of BVC chairs to implement the local fisheries rules written in the by-laws are pivotal for the fishery at the Elephant Marsh to work. In this section, we first discuss the rules, the BVC Chair's motivations and finally their implementation capacity. According to Ostrom (1992) rules work well when "every participant knows the rules, knows that others know the rules, and knows that others also know that the participant knows the rules". The rules-in-use by the actors are therefore not always the written by-laws or indeed the legislative provisions or court regulations (Ostrom, 1992) but self-modified versions of the written rules. In the same vein some respondents lamented that social complexities at village level can make it difficult to impose sanctions against offending fishers as narrated by one BVC Chair: "*We wish we could confiscate gear but looking at our local situation [poverty in the village], we feel sorry and just forgive each other"*. In some cases implementation of the rules was lacking because of fear for cultural beliefs (witchcraft) as revealed from the following response: *"This village is not united; if you offend someone [confiscate their fishing gear] they can create crocodiles which can kill you when you go fishing".*

When asked if BVC Chairs had the capacity to restrict the number of new (non-*angoni*) fishers coming to a beach, most respondents thought it is impossible to implement that provision. The BVC Chair at Mchachajemusi said *"It is possible to regulate fishing gear, regulate timing and to deny access to* angoni, *but new fishers from local villages are always welcome because in our culture it is a taboo to exclude own people. There is no way to keep*

these new fishers away. …..Not even the chief, the government, or the president can do that". The BVC chair at Chisamba which is one of the successful beaches (see section 4.4 of chapter 4 of this thesis for a detailed explanation of the meaning of success in this context) indicated the beach had many fishers and new ones kept coming; the BVC counteracts this immigration pressure by implementing an annual semi-closed season between 1 January and 31 March during which it strictly does not allow certain gear such as seine nets. The BVC Chair further suggested that in future they may have to control how much each fisher catches, so that everyone has equal access.

Besides managing their own beaches, BVC Chairs also display a degree of inter-beach coordination. With a focus on maintaining social order, BVC Chairs write transfer letters for outgoing fishers and demand the same from fishers coming to their beach. They also make phone calls to inform one another about troublesome fishers such as boat thieves. An example of sustainability-oriented coordination is that the beaches of Nsambokulira, Twaya, Bwemba, Chuluchamkango and Mchachajemusi jointly maintain a ban on *kumba* nets (under-meshed fishing nets originating from Mozambique). Indicative of the as yet relatively weak power of such agreements is that some beaches that are party to the agreement (like Bwemba and Twaya) are currently not implementing the ban.

From our analysis, at almost all successful beaches, the implementation of by-laws by the BVC Chair was adhered to. In the interviews, BVC Chairs attributed their capacity to manage beaches well mainly to personal reputation: *"When the affairs at the beach are being managed well, people give me a lot of respect*". The fungibility of this capital was noted, for example, in that any failure of a BVC Chair to resolve conflicts or keep outsiders out, or if fishers move away from the beach due to low catches, the other villagers may consider that as a weakness and the BVC Chair may become a subject of village gossip leading to overall loss of reputation. Thus, failure to implement by-laws invokes the breakdown of reputation, which then further reduces the BVC Chair's capacity to act.

When asked about how they resolve conflicts, all respondents (BVC Chairs, village chiefs and fishers) said conflict resolution starts from the BVC Chair who may refer more serious offences to the village chief, police, or courts (in that order) depending on the gravity of an issue at hand. None of the respondents mentioned the Department of Fisheries (DoF) as a player in conflict resolution. Our analysis of conflict resolution revealed that while the BVC Chairs and village chiefs tend to be motivated to resolve the conflicts because they want to protect their reputation and possibly get some other benefits (e.g. fines), the motivation of

the police and courts is very weak because there is no direct incentive for them from the fishery.

All BVC Chairs in our sample acknowledged that the village chief is an important source of BVC Chair's power and legitimacy without whose support things fall apart. For example, we identified a case at one beach in which the chief did not want to support the BVC Chair and the tension resulted in a physical fight, finally adjudicated by court. The BVC Chair of the concerned beach had this to say: *"Some chiefs are just difficult for no reason. Our chief here was threatening me that I had no power to tell the fishers what they should be doing. He even threatened the officer from the DoF that he would ban the officer from coming to this village. I was not happy and we fought. The case was referred to police and the court. I won the case and now he [the chief] is a bit quiet….. But still I feel that if we are to implement new strategies at this beach, like the coordination with other beaches, then the chief has a bigger say. In the end, I can only implement what the chief has approved. He owns the beach; I only oversee the fisheries but this village has other issues too not just fish, so in that respect I have lesser power than him. Otherwise it may lead to a situation where the chief will say that I 'have stepped on his head'. Actually, I am sure that the situation is similar in other beaches."*

What then would the BVC Chair's motivation be to maintain these rules? This question is pertinent because the BVC chairmanship is not remunerated by salary or a regular local contribution. Consequently, he has to go fishing just like the other fishers, in addition to doing the work connected to the chairmanship. Our analysis showed that the BVC Chairs sometimes get small hand-outs or presents, and are occasionally invited for seminars by the DoF. Social reputation is the major motivation for the BVC Chair, however, as often repeated in the interviews. Capacity to do the job of the BVC Chair effectively creates reputation which in the background is backed by formal law through the FMCA. We see this backing mostly at work in conflict resolution and gear restriction.

5.3.3 Power relations between the village chief and BVC Chair are the key dynamic

The previous section has already made it clear that besides the BVC Chair, village chiefs are holding a powerful position in the Elephant Marsh Fishery; see also Lewins et al. (2014), Njaya et al. (2012), Eggen (2011), and Russell & Dobson (2011).

Our interviews with fishers, village chiefs and BVC Chairs at the Elephant Marsh revealed four roles of chiefs in the small-scale fishery namely: (*i*) A BVC chair cannot accept a new

fisher without first asking for consent from the village chief; (*ii*) The BVC chair cannot call for a meeting for fishers and other stakeholders such as fish traders without seeking approval from the village chief; (*iii*) The village chief has power to evict or fine (under customary law) a community member who is not abiding by village norms that there is always tranquility and peace in the village; and (*iv*) The chief supports the BVC for example by safeguarding confiscated gear as one chief put it: *"When BVC chairs confiscate illegal fishing gear, they pass it on to me for safe-keeping until the government officers come for handover. We work together well"*. It is therefore evident that the village chief helps to keep the membership of a fishing community in check so that fishers are easily distinguished from outsiders. We established that the main motivation for the village chief is a weekly fish tribute which he receives from fishers (channeled through the BVC Chair) as part of their catch. Usually this amounts to some 5 kg of fish per beach per week with a monetary value of about 6 US$/week. Obviously, the tribute would decrease in value if a village chief would allow too many fishers at the beach which would, in essence, lead to localized overfishing.

Our analysis has also shown that if the village chief receives his weekly fish tribute as scheduled, he almost always supported the BVC leadership and there are usually no power struggles or conflicts with other stakeholders. In principle, this can only happen if the fish catches are good, which is probably a reason why the village chief was almost always supportive of the BVC Chair in villages that had good fish catches.

5.3.4 The Department of Fisheries (DoF) and state-based sustainability rules

A frequently voiced point by respondents was that the DoF plays a role in influencing community attitudes and behaviour towards fisheries management through information sharing on good fishing practices. It is well known in Malawi that the government officers who are entrusted with the implementation of the state's fisheries management programmes have low salaries in addition to numerous other challenges they face in getting the resources they need for their job. Our analysis therefore found it unreasonable to expect the government officers to sanction offenders of fisheries regulations or not be tempted to accept petty handouts in form of fish or money. It was not surprising consequently to observe that those government officers often take no action against fishers that are using illegal gear such as mosquito nets. For example in one case a fisheries assistant exhibited deliberate 'closure of his eyes' and had this to say during a walk around a beach: "*Yes indeed, we can see lots of juveniles in the catch here and on the fish drying racks, but that is OK because today is not my official visiting day for this beach".*

Apart from the low salaries, it was also established that the extra challenges faced by DoF officers include the poor status of the roads leading to the beaches, lack of trust between governments officers and village chiefs, high rates of illiteracy among fishers making it difficult to share information, inadequate resources for operations including lack of transport, and the differences in by-laws between BVCs making it difficult to regulate because fishers move to beaches that have weaker rules which often results in localized overfishing.

5.3.5 The central government and policies for conflict resolution

The AiC analysis established no causal relationship between the central government and what actually happens in the Elephant Marsh fishery at present. We however pay some attention to the central government here however because it is responsible for formulating policies that are deemed necessary for sustainable management of fisheries resources in Malawi.

The law governing fishing matters is contained in the Fisheries Conservation and Management Act (FMCA) (Government of Malawi, 1997), the Fisheries Conservation and Management Regulations (Government of Malawi, 2000a) and the Fisheries Conservation and Management Rules (Government of Malawi 2000b). Under the FMCA, a BVC does not have power to suspend or cancel a fishing license granted by the DoF but may merely make a recommendation to the DoF to that effect. This provision reduces the *de jure* ability of the BVC chair to effectively manage fishers who are capable of paying the license fee to the DoF but fail to follow the by-laws at a fishing village. The *status quo* at the Elephant Marsh in which respected BVC chairs do have the *de facto* capacity to implement the by-laws is another proof of the disjoint between policy and localized reality.

Under section 8 of the FMCA, the DoF is given power to enter into a fisheries management agreement with an existing fisheries management authority. A fisheries management authority is defined under section 2 of the FMCA as *"any local community organization established for the purpose of promoting local participation in the conservation and management of fisheries in Malawi".* Connected to this interesting option, the FCMA stipulates that for a fisheries association to be able to legally act, it should have legal personality. This necessitates registration under the Trustees Incorporation Act (Government of Malawi, 1968) or other law that can confer legal personality. Registration as an association provides a legal mechanism through which villagers may collectively hold legal title on the fishery, a thing that is not available in the current setup at Elephant Marsh Fishery.

5.4. Towards an empirically based management institution: weak, local and amorphous

The purpose of this section is to explore how the socio-causal dynamics which have been identified, if and insofar needed, can be translated into a strengthened institution that could help safeguard the sustainability of the Elephant Marsh Fishery. The empirical findings presented here are well-suited for the institutional design goal, since the AiC framework has a causal orientation which is paramount to the design of an effective solution.

Many institutional design theories and frameworks are available in the context of fisheries management. One is the set of based institutional design rules of Ostrom (1990) and Cox et al. (2010). Another, more normative basis is the Institutional Analysis and Development (IAD) framework (Imperial & Yandle, 2005) which has been a reference point for later propositions such as Rijke et al. (2012) who propose a 'fit-for-purpose' governance framework, Cinner et al. (2012) who propose incentives for ecosystem stewardship and Pahl-Wostl (2007) who proposes social learning for adaptive management. Our institutional design here is data-based but pays close reference to the principles of Ostrom (1990) which were reviewed by Cox et al. (2010) and, much akin to the "grounded theory" of Glaser & Strauss (2009). The grounded theory approach recognizes the need to use the data gathered in making any theoretical propositions or when linking existing (grounded) theory to new findings. Thus the grounded theory uses existing theories or allow for the generation of new ones based on the data gathered (empirical evidence). We initially put the general institutional theory and design frameworks between the brackets and let the data speak for themselves , without letting this voice be 'colonized' (Cheney & Weston, 1999) by the conceptual classifications and normative criteria of the theories and frameworks. Thereafter we relate our data-based propositions with design rules of Ostrom (1990) and Cox et al. (2010) such as 'nested enterprises' (rules at each of the fishing villages at the Elephant Marsh should be nested within the rules at the scale of the whole fishery), 'collective choice arrangements' (the majority of actors at the Elephant Marsh Fishery should have the autonomy to formulate rules), 'congruence with local conditions' (locally crafted fishing rules should be present), 'monitoring' (BVCs with support from other actors should have the responsibility to monitor the resource), 'graduated sanctions' (there should be application of varied sanctions to offenders depending on severity and frequency of violation) and 'conflict resolution mechanism' (locally acceptable adjudication should be available within the fishing community at Elephant Marsh). These attributes form the basis of the three-pillar design which I propose in the proceeding section of this thesis. By nature, theories and frameworks easily resonate with the vision of good institutions in that both aim to be coherent, strong, logical and generic. Thus, not only the state itself but also institutional frameworks tend to be

"seeing like a state", as Scott (1998) has described eloquently. Blending the "grounded theory" way with the design principles of design rules of Ostrom (1990) and Cox et al. (2010) may not only be appropriate for the Elephant Marsh Fishery but also an experiment of more general value for institutional science; it invites us out of the box, discovering that pillars for a good institutions may sometimes also, in a way and to some extent be weak, purely locally crafted, and amorphous.

Pillar 1: A low-cost, weak institution, built for growth and adaptation

Fish catch data at the Elephant Marsh Fishery are scarce but signs are that real overfishing does take place locally in the marsh's mosaic, as indicated by the temporary migration of fishers to beaches where they get higher catches and these beaches' BVC Chairs taking action by crafting local fishing rules of closed seasons and regulated gear. The 'graduated sanctions' contained in the operational rules are now seen to slowly grow 'upward' as 'collective choice arrangements' in two senses: spatially from a local to a supra-local level through inter-beach coordination, and institutionally from informal personal rule to formal rule of (local) law. In congruence with the local conditions, virtually all of our respondents agreed that some sort of really supra-local institution, on the clearly defined boundaries of the Elephant Marsh, could be helpful. The question then becomes: helpful to do what? What should be the mandate and 'action arena' of such an institution that could link up with currently felt needs? From our data, four functions come to mind: (i) strengthening of the on-going process of inter-BVC coordination, (ii) implementation of a simple, people-based marsh-wide monitoring system, integrating the locally available informal data on catches and CPUE, (iii) discussing a self-organized but yet more cost-effective relationship with the government (Ostrom's (1990) minimum recognition of rights to organize), which could for instance motivate fisheries officers to 'open their eyes', and (iv) informally exploring long-term management strategies using hypothetical scenarios, e.g. rising population and climate change. These four tasks would create an adaptive learning institution preparing itself for growth and action if needed, without requiring costly administrative overload. Basically, the current village-level institutions are good enough to only require a yearly marsh-wide coordination meeting of, say, two days. The necessity of such a low-cost institution does not require justification at the local level and could be locally funded. Expressing its modest mandate, it could for instance be called the Annual Elephant Marsh Fisheries Meeting – not 'Board' or 'Authority' or anything of that weight yet.

Pillar 2: A purely locally based 'nested enterprise'

As we have seen, rules that work at the Elephant Marsh fishery are both locally crafted and enforced. Consequently, the very weak presence of the state and national fisheries policies in the Elephant Marsh may be seen as a benign rather than a problematic circumstance. Indeed, the semi-quantitative analyses of Kosamu (2014; 2015) have shown that on both the level of the Elephant Marsh and of 17 other cases in developing countries, strong local institutions enhance sustainability while any state interference, whether imposing rules in state-based management or negotiating rules in co-management, result in a breakdown of sustainability-enhancing rules. The analysis of the present chapter has shown why this may be so. Reputation is both the key motivation and the key capacity (power) of the BVC Chairs and the village chiefs. Why would they continue to be motivated if they cannot be their 'own man' anymore, being degraded to an implementer of exotic conflict resolution mechanisms or policeman of external rules? Why would fishers listen to such people, given that real state power (courts, fines) is in fact far away? This approach can help in understanding how a weak supra-local institution, leaving local motivations and power intact, may create better outcomes than a strong one (even more so if state-based). This leads to a point where we can visualize a marsh-wide institution as a purely locally based 'nested enterprise' sensu Ostrom (1990), crafted and governed by the local committees. According to Kolding et al. (2014), when such self-governing systems are established, they enjoy greater local legitimacy particularly in weak political systems (as is the case in Malawi and most developing countries) and therefore stand a better chance of success.

Pillar 3: An internally amorphous institution

As discussed, the power interaction between the BVC Chairs and their village chiefs is the key dynamic determining the fate of the fishery at the local level. If they support each other's reputation, the beach will be well-managed. Reputation being a volatile capital however is vulnerable to any emergent conflicts which can easily result in breakdown of rules and subsequent overfishing. It may be noted that at the village level, the relationship between a BVC Chair and a village chief, though framed in general cultural traditions and metaphors, is primarily personal and not captured in the legal framework or administrative logic. It would appear wise to maintain this principle at the supra-local level of the marsh-wide institution. Any logical task division between the two groups (e.g. as decision-makers versus advisors, decision-makers versus implementers, politics versus administration) would frame the two roles as opposed and/or subordinate to each other, and subsequently bring disunity and tensions down to the local level. Therefore, counter-intuitive as it may seem, the marsh-wide institution should be left internally unstructured, with village chiefs and BVC Chairs included

without formal specification of their roles. This proposition counters the suggestion by Hara et al., (2015) of some independence of the BVCs from the authority of the local leaders, without, infringing on their traditional powers and privileges. In so doing, the resultant institution does not force western formats of democracy on the local system that can continue with its own style [possibly more generally African style, see Nkhata et al. (2009)] of mixing mandates (hereditary, elected and legal) with the power mechanisms of reputation. This leaves room, for instance, for lessons to be interpreted and transmitted from chiefs who successfully manage the power differential with their BVCs and therewith create well-managed beaches. In the case of the Elephant Marsh, where all of the four types of power relations distinguished by Agrawal & Ribot (1999) are centralized with the chiefs, an internally amorphous institution which reproduces the local power set-up will ensure that the chiefs' opinions will tend to prevail in the end, but not without due deliberation. This does not differ much from the principle of the final 'primacy of politics' in the western *trias politica* (Kickert, 2001).

5.5. Conclusion

As we have seen, an actor-based multi-level analysis of rules and other mechanisms prevailing in a fishery can help much in designing a cost-effective institution for the near future. For the design of longer-term institutional options, our assumptions underlying the actors-based method (Action-in-Context in our case) which presume that small-scale fisheries management is sufficiently deliberative to allow for valid description in a broad and culturally sensitive rational choice approach become weaker. This is because new types of actors may move in making the BVCs dysfunctional or because actor capacities and motivations become more intertwined. This then necessitates a stronger blend and reliance on both theoretically driven institutional frameworks and a flexible process of institutional development guided by an adaptive, learning organisation. It is our conviction that a sustainable management system for Elephant Marsh Fishery relies on three pillars namely: a low-cost, weak institution built for growth and adaptation; a purely locally based' nested enterprise'; and an internally amorphous institution. In so doing, we hope to have unveiled a management design for the Elephant Marsh fishery specifically but also a style of thinking that may be fruitful for institutional science in general.

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6

Synthesis and Outlook

6.1. Synthesis of the preceding Chapters

The present dissertation has started out with the following research questions:

i. What are the socio-ecological and land use setting and potentials of the Elephant Marsh wetland in Malawi?
ii. What are the key actors and institutions in the management of small-scale inland fisheries in developing countries compared to situation at Elephant Marsh fishery?
iii. What are the key socio-causal dynamics of the management system at the Elephant Marsh Fishery?
iv. How can these socio-causal dynamics at the Elephant Marsh Fishery, if and insofar needed in the near future, be translated into strengthened institutions for sustainability of small-scale inland fisheries in developing countries?

These questions have been the starting points of the preceding chapters 2 to 5, respectively, and the explicit answers are found there. The present chapter gives a more synthetic and narrative overview of the findings.

The Elephant Marsh, a large riverine wetland in the southern part of Malawi, is facing many pressures driven by a changing climate, population growth, rural poverty, market forces, and agricultural conversion, all of which threaten the future of the wetland. The wetland has relatively grassy margins; a mosaic of rooted swamp vegetation (sudd), floating vegetation, and open water. The southern part of the wetland is interspersed with islands having saline soils and palm trees. The wetland is an important habitat for several species of fish and birds, Nile crocodile, and hippopotamus. The indigenous people at the Elephant Marsh are the Mang'anja but other ethnic groups, mainly the Sena, have also migrated to the area. The Sena tend to engage more in fishing and livestock keeping while the Man'ganja are usually specialised farmers. Landownership at the Elephant Marsh is based on customary tenure; a situation that has led the management of the wetland to rely on a blend of customary law and some elements of state regulation. At the same time, the Marsh holds a lot of potentials for sustainable development. Broadly put, these options can be grouped in two families of ecosystem development paradigms.

One can be called ‘conversion’. The conversion idea builds on natural circumstances but only in the most basic sense; it uses the available water inputs, soils and solar inputs to construct a totally new ecosystem, usually one of intensive production (e.g. agriculture, aquaculture, and forestry). Biodiversity does not have noteworthy survival opportunities in such landscapes except possibly if nature reserves are set aside, but the system can be sustainable if properly designed and implemented. Sustainability is not deeply engrained in the style of thinking of this ecosystem development paradigm, however, tending to be seen as a costly add-on to the intensive technologies that needs to be pushed by strong government regulations.

The other family of development options can be called ‘ecosystem-based’ or ‘working-with-nature’ development. As shown in Chapter 2 of this thesis, the Elephant Marsh wetland has several ecosystem-based development potentials which mainly lie in prospects of swamp rice production, artisanal fish production using both capture or pond technologies (Denny et al., 2006), energy production from papyrus and reeds and tourism based on a rich natural and cultural heritage of the area. Because ecosystem-based options build on existing ecosystems, biodiversity and sustainability will tend to be more automatically engrained in this paradigm although of course, their actual realization will continue to need attention and be supported by adequate technologies, organizations and regulations (institutions).

Ecosystem-based and conversion options may often be combined to some extent. This thesis has an emphasis on the ecosystem-based perspective however, and focuses especially on the institutions that can support their sustainability under rising resource pressure, e.g. due to population growth. Doing so, the questions one would want to ask are: What are the existing management structures, and how do they work? Do these existing management structures need strengthening? What would be the role of the government is such an effort? Would it be important, for instance, to strengthen the role of the state somewhere along the line of resource pressure increase? What, in short, would be adequate management institutions for the Elephant Marsh?

In addressing these questions, the PhD study was cognizant of the fact that ecosystem-based management includes human values such as efficiency, equity and cultural values as well the harmony and stability of their interrelationships so that sustainable utilization of ecosystem goods and services can be achieved. In philosophical terms, ecosystem-based management expresses a vision of partnership with nature rather than the traditional attitude of mastery over nature (De Groot & van den Born, 2003). Artisanal, small-scale fisheries express this idea very well (if, again, accompanied by adequate institutions). This is one of

the reasons why this thesis has a prime focus on the Marsh fishery. One other reason is that contrary to tourism, for instance, fisheries can be studied at the Marsh in its actuality. Finally, fisheries are the major livelihood component of the people living around the Marsh; this suggests that institutions that may be discovered and discussed with respect to fisheries may be expandable over the other sectors, too. This theme will be picked up in the second, 'outlook' part of the present chapter.

There are many paradigms in the management of small-scale fisheries (SSF) globally but one of the most common approaches is co-management. In this approach, the state is seen as the natural guardian of large-scale and long-term interests (sustainability), and involved in a (transparent) process of negotiations with the local communities or user groups that bring in their own values and knowledge. The crafting of such co-management arrangements can follow institutional theories such as the populist approach (Ostrom, 1990; Olsson, 2004) the neo-liberal approach (Blaikie et al., 1997; Adger et al., 2001; Béné & Neiland, 2006) and the classical approach (Blaikie et al., 1997; Biot et al., 1995). The present thesis has departed from the co-management idea but also by a methodological intuition that not these frameworks but a more open and empirical approach should be in prime position. This has enabled the researcher to discover that the co-management idea itself needs to be questioned, as we will see. The art of designing successful governance system relies on locally crafted institutional '*bricolage*' (Russel & Dobson, 2011; Lankhorst & De Groot, 2012) in which empirical data are built into the existing local traditions and institutions. This PhD study has established that the key actors at the Elephant Marsh Fishery are fishers, village chiefs, leaders of fishing community user groups (known as Beach Village Committees), and government officers. For Elephant Marsh the findings of this study have established that the first action is to explore the need of institutional strengthening *vis-à-vis* the rising pressures of the business-as-usual scenario and a scenario of possibly successful realization of ecosystem-based development potentials. This would then form the basis for a more open-ended process of participatory institutional construction work that focuses on the points that reveal if the state should be involved and to what extent, if at all.

One of the key questions of this PhD study was: are the key actors and institutions in the management of small-scale inland fisheries in developing countries compared to situation at Elephant Marsh fishery? In order to examine the relevance and level of state presence in the management of SSF and compare with the situation at the Elephant Marsh, my research examined 17 cases of SSF in developing countries to determine which mode of institutional setup (locally controlled, state controlled or mixed in co-management) is most decisive in the sustainability of SSF. Mention has to be made that the cases were only examined as they

are reported in literature and therefore some deviation from latest developments regarding a particular fishery are to be expected.

After an extensive literature review, the most relevant factors in the success of managing SSF in developing countries such as Malawi were identified as follows: local collective social capital (CSC), supportive central states (SUP), co-management (CO-M) and imposing central states (IMP). The dependent variable represented the overall status of the fishery in terms of sustainability during the case study period (SUS). The indicators of this variable were based on (i) stability of catch (abundance overfishing); (ii) quality of catch (non-juveniles for the late maturing *Oreochromis* and *Tilapia* species); (iii) trends in the catch per unit effort (CPUE); and (iv) the ability to keep non-community members (immigrants) out of the resource. Crisp-set qualitative comparative analysis (csQCA) of the variables for the 17 cases studies revealed that good collective social capital and supportive governments are the two key factors in achieving sustainability of SSF in developing countries. More self-assertive roles of the state (co-management and imposition) were associated with unsustainability or even causing it.

Having identified local collective social capital and a supportive government as crucial ingredients in the sustainability of SSF in developing countries, the next step in this PhD study was to apply the findings to the Elephant Marsh, with stronger differentiation of what this local 'collective social capital' might be composed of. At the Elephant Marsh and using the same csQCA technique, four factors pertaining to collective social capital as well as the role of the state were identified and tested for their effect on the success of fisheries management at the 24 fish landing sites ('beaches') .The four factors were: collective social capital at the village level (CSC-V), collective social capital at the local fisheries committee level (CSC-C), the role of village chiefs (CHF), and the presence and influence of government agents (GOVT).The analysis revealed that a good collective social capital at fisheries committee level (CSC-C) is the key factor of success in the management of SSF at the wetland. The presence of government agents was not found to be the key factor of success in the management of the fishery. It must be borne in mind here that at the macro level, i.e. not measured in this analysis, Malawi has a fisheries law that in broad terms supports the local fisheries committees (a 'SUP' in terms of the preceding analysis), as will be discussed later.

Similar to what several scholars have observed in many parts of Africa, the field work for this study also established that there are sometimes intensive power struggles between village chiefs and the fisheries committee leadership ('Beach Village Committee chairs'). This gave

rise to the question of whether the local fisheries committee (CSC-C) is the only major factor in SSF management at Elephant Marsh: what lies behind this undifferentiated CSC-C factor? What makes success or failure of the fisheries committees? Raising the interest in this question is also that the design of any institutional change for robust sustainable management of SSF at the Elephant Marsh requires more than just satisfaction with the CSC-C factor but rather an evolutionary understanding of who are the key actors, what are their capacities and motivations for change and what are the interactions that determine the success or failure of the Beach Village Committees. This required a more causally oriented, hence more qualitative multi-actor study. One optional basis for this analysis is the "Action-in-Context" (AiC) framework as devised by de Groot (1992) which essentially recognizes that social actors respond to underlying options and motivations in collective community actions. A detailed AiC analysis was therefore done to (i) determine the key socio-causal dynamics of the management system at the Elephant Marsh Fishery and, (ii) explore how these socio-causal dynamics, if and insofar needed, be translated into strengthened institutions for sustainability of the Elephant Marsh Fishery in the near future. The analysis identified the causal linkages of the actors before identifying the overall patterns of social causation that emerge in the management of Elephant Marsh Fishery.

Based on the earlier findings, the AiC analysis started out with questions that directly related to beach village committee chairmen (BVC chairs) before moving on to the other actors. The questions asked were: What are the actions of the BVC Chair? What capacities and motivations explain these actions? Which institutions or structures underlie the BVC chair's motivations and capacities? How are the actions of the BVC chair influenced by other key players such as government officers, village chiefs and fishermen? What are the capacities and motivations of these other actors who have an influence on the actions of the BVC Chair? What are the main social causalities, dynamics and mechanisms among these key players? The findings of the AiC analysis identified several causal narratives (themes) based on the key actors namely: (*i*) Livelihood support and reputation motivate the fishermen; (*ii*) Reputation is the key factor for the BVC Chair; (*iii*) Power relations between the village chief and BVC Chair are the key dynamic; (*iv*) The Department of Fisheries (DoF) advocates for state-based sustainability rules; and (*v*) The central government promotes policies for conflict resolution.

These themes were seen to auger well with the institutional design goal because the AiC framework has a causal orientation which is paramount to problem solving. After critical analysis of the available theories and frameworks in SSF management, it was decided that for this PhD study a more relevant institutional design for the Elephant Marsh Fishery should

be socio-scientifically empirically based on the socio-causal dynamics that have been identified. The data-based approach was done with much akin to the “grounded theory” thinking in the social sciences which invited this PhD research out of the institutional science box to discover that adequate institutions may sometimes also, in a way and to some extent, be weak, purely locally crafted and amorphous. On this basis, this PhD study proposes that a resilient management institution for the Elephant Marsh Fishery should have three ‘pillar characteristics’. It should be: (*i*) a low-cost weak institution built for growth and adaptation; (*ii*) a purely locally based ‘nested enterprise’ and, (*iii*) an internally amorphous institution. It is thought that based on these three pillars, an institution can be locally crafted that will be effective to keep the Marsh fishery sustainable in the years to come.

6.2. Outlook: Towards a marsh-wide fisheries ‘Authority’?

In this section, I will bring in some theory-based reflections on how the ‘three-pillared’ design relates to some wider examples, and how the proposed weak institution might grow, if need be in the longer future, into a stronger one.

Even though the minimum threshold of fish depletion (sufficient scarcity) that will trigger the fishing communities to invest heavily in the institutional future at the Elephant Marsh Fishery has not yet been reached (Ostrom, 2009), a future with rising pressures on the resource is not hypothetical, considering Malawi’s national population growth at a rate of 2.8 per cent (NSO, 2008). Boyd & Slaymaker (2000) discussed an interesting angle on the relationship between human population growth and management of natural resources. They used six case studies from Africa to show that although human population growth is always blamed for deterioration of natural resources, over a period of time, it can actually lead to improvement rather than deterioration of natural resources, especially due to locally based institutional development. The authors stressed though that for such a local response to be rapid enough, the new resource management institutions should provide tangible direct benefits to the local community with emphasis on securing food and income rather than controlling exploitation *per se*. On the other hand, increased pressure on fish resources may also lead to complication in its management arrangements (Njiru et al., 2014). Thus for instance if we consider the establishment of a longer closed fishing season at the Elephant Marsh and bearing in mind the recent debate surrounding the effectiveness of limiting open access as a means of managing small-scale fisheries (Kolding & Van Zwieten, 2011; Garcia et al., 2012), it follows that some guarantee for the “security of institutional investment” will be needed; fishermen will expect to actually see increased catches and fairly benefit from the same later.

Therefore, much will depend on the effectiveness of institutional development process during the period between the crossing of Ostrom's (2009) scarcity threshold and the possible collapse of the management system. In the context of the present study, this amounts to the question of whether the three-pillared local institution will be able to develop rapidly enough into a fully-fledged, marsh-wide fisheries "Authority". In view of the preceding discussion on the role of the state, I envision this Authority to hold more regulatory power than the three-pillared institution but still be fully locally based, as a 'nested enterprise' *sensu* Ostrom (1990). I will say a few words about the institutional development process first and then continue with the institutional content, focusing on the legal and financial issues separately.

6.2.1 The institutional development process

First of all, any process of further institutional strengthening of the Elephant Marsh fishery should have a robust community basis while also being mindful of the evolving nature of relations between various actors and the ever-shifting motivations behind their actions. Sufficient flexibility must be retained in the design process to allow for the organic *bricolage* of the community-based institution and not force it to adopt prescribed rules and structures. Two examples that could be inspirational in that regard may be found at Lake Chilwa (Njaya, 2009) where fishing communities established a fisheries association to oversee the operations of all BVCs, and at East African lakes such as Victoria (Medard, 2002; Heck et al., 2004) where Beach Management Units (BMUs) self-organized to work together.

Hand in hand with the discussion of the possible structures, mechanisms and mandates of the to-be-formed 'Authority', capacity building should prepare envisaged key actors for their future roles. Training may focus, for instance, on fish stock assessment, administration, fish management ecology, conflict resolution and leadership. External organizations such as DoF, NGOs and religious groups may be invited in the process in order to enrich arguments and broaden the local base.

6.2.2 Legal aspects

As presented in chapter 5 of this thesis, Malawi has a number of national-level regulations that pertain to the fishery at the Elephant Marsh. The legal and policy instruments are contained in the Fisheries Conservation and Management Act (FMCA) (Government of Malawi, 1997), the Fisheries Conservation and Management Regulations (Government of Malawi, 2000a), the Fisheries Conservation and Management Rules (Government of Malawi, 2000b), and the National Fisheries and Aquaculture Policy) (Government of Malawi, 2001).

The regulations are mainly aimed at gear limitations, closed seasons, closed areas and mesh size restrictions. The FMCA recognizes the formation of local institutions such as BVCs and gives them the legal mandate to formulate and enforce by-laws, regulate access as well as mobilize own financial resources, e.g. through fines paid for infraction of the by-laws.

This PhD study has shown that this legal framework *de jure* governing fisheries management in Malawi, despite its overall character of respecting local institutions, contains several weak spots which are likely to start hindering the effectiveness of the Elephant Marsh Fishery once the 'Authority' would become more formalized. Some of these weaknesses include (*i*) The local BVCs are made responsible to organise the fishery, but the ultimate sanction of withdrawal of a fishing licence and adjudication of local conflicts is reserved by the state through the Department of Fisheries and state courts, respectively; (*ii*) There is disparity between the inflexible national legal and policy provisions (especially the FCMA) and the by-laws or customary rules at the fishing villages, making it virtually impossible for DoF officers to let their actions evolve *in situ;* (*iii*)The DoF with support from the chiefs has the right to seize illegal gear under sections 30 and 32 of the FCMA but the mandate to destroy seized items is vested in the criminal law courts and therefore very difficult. Seizure without destruction will continue to give room for corruption as discussed earlier under the roles of the village chief.

Obviously, a first step to be made is to better align the national and local provisions. This requires a careful examination and (re)combination of the *de jure* and *de facto* rules, involving all stakeholders. The outcome will make the economic and political cost of friction between the communities, Authority and state as small as possible. This resonates well with the observation by Jentoft and Chuenpagdee (2015) that there is a growing appreciation in recent years of the need to re-embed the responsibility of fisheries governance to local institutions.

No matter how successful the alignment process will be, there will always be discrepancies between state law and local law. This does not necessarily spell disaster. After all, the currently large discrepancies do not seem to stand in the way of successful local fisheries management. Rather, they appear as incoherencies between customary and state law that local people have learned to live with, as is common in many parts of Africa. Thus, the two options with respect to the discrepancies appear to be either to leave them and hope for the best, or work towards an increased state recognition of local law. In the area of conflict resolution, for instance, the state could recognize a local fisheries conflict adjudication

institution, analogous to the fully community-based *'Tribunal de los Aguas'* (Water Tribunal) described by Ostrom (1990) in the case of irrigation systems in Spain. For the future of the Elephant Marsh fisheries, it seems wise to open up a process of clarification with respect to the domains of customary and state laws, negotiating for a good space for customary conflict adjudication along the way.

6.2.3 Financial aspects and options for multi-sectorial locally-based institutional development

Financial rules may play a pivotal role in establishing balanced relations not only locally, but also between the possible Fisheries Authority and the state. Local sentiments may for instance question any taxation of the fishery by the state, especially if all management is locally provided for. This in turn may severely damage the goodwill of the government, even to the point that the state refuses to go along with any local proposals, as has for instance been reported in Uganda where the central government blocked locally crafted wetland management plans that did not provide for money transfers beyond the local government units (Andeweg, 2006). Against that background, the current license fee to the Department of Fisheries is an institution that should be embraced rather than undermined, since it enables a peaceful relationship with the central state authorities. Its current level of about 1 US$/year is in fact very modest compared to a fisherman's net earnings of around 10 US$/day. Safeguarding this same relationship and its independence, the fishing 'Authority' will have to do all it can to be self-supporting and avoid financing requests to the government. The outlook in this respect is positive; many local BVCs already have well-working financial institutions at their level (managed from fines and small contributions of fishermen as BVC-membership fees), and a higher-level fishing Authority, if designed cost-consciously, does not need a degree of staffing that cannot be supported by the 1500 fishermen (DoF, 2014) of the Marsh.There even appears to be room for other financial involvements of the Authority, such as establishing a revolving fund to help fishermen and traders with micro-credits e.g. for fish processing.

On the other hand, when one realizes that apart from good fish catches, the people at the Elephant Marsh also have other needs (values, goals etc. such as good schools, good health facilities, enough food) the idea of establishing an institution to cater for *all* the development potentials which have been identified at the Elephant Marsh (fisheries, agriculture, livestock grazing, energy, and tourism) becomes exciting. The important question then would be whether a multi-sector, marsh-wide 'Multi-Sector Authority' for the Elephant Marsh would be successful. Of course, one pre-requisite for such an establishment would be to learn from the marsh-wide Fishery Authority if it would prove to be a success.

The progression from the fisheries-only 'Authority' to the multi-sectoral 'Authority' would however be difficult as it would entail formation of almost a 'new local government' comprising several state departments and other stakeholders thereby stirring decision-making competition. The other obstacles would be that there is no basis in the national legal and policy provisions for such an institution and it would require much more state involvement than with fisheries only 'Authority', thereby breaking the power of the purely locally based 'nested enterprise'. So, in a nutshell, the idea of establishing a multi-sector, marsh-wide 'Authority' for the Elephant Marsh requires a new and deeper understanding of the emergent socio-causal linkages and invites us to more research.

6.3. Lessons for small-scale fisheries management in developing countries

The findings in this thesis have several critical implications for small-scale fisheries management in developing countries. Firstly, it has been shown that before any small-scale fisheries governance system for a particular fishery is designed and operationalized, there is need to define and understand the interests and roles of each actor including the social networks that exist among them. Secondly, for common pool resources such as wetland SSF whose boundaries are well defined, it seems prudent to entrust the governance systems with the local users. The role of the state should then be to uphold the interests of the local resource users through the provision of information on fish stock assessments, legitimization of the local institutions, and protection of the resource boundaries from external intrusion. State defense of the resource boundaries might be particularly crucial when the local resource users exhibit lack of coercive power to defend the resource from external users. The state should, therefore, not allow or support outside actors from coming in and usurping the local system. In this regard, this thesis is in agreement with the framework devised by Ostrom (2009) which suggests that long-term resource sustainability is difficult to achieve when local institutions are overruled and suppressed by larger scale, state-based governance systems. Thirdly, this thesis has shown that sustainable management options for common pool wetland resources do not always require costly governance systems. Locally crafted styles of management can offer lower costs of monitoring, enforcement and defense of the resource from external intrusion. In addition, this thesis did a coarse filter examination of the various governance systems in SSF around the world and established a sustainability convergence around trust, reputation and respect of the leadership of local institutions. Lastly, institutional scientists should open up and shift their range of what may be classified as characteristics of good institutions for common pool wetland resources such as SSF. By focusing less on formal (Western-style) requirements of

institutional design, and reflecting more on what really works, institutional thinking should accept that good institutions might also be amorphous, low-cost and purely locally-based.

6.4 Conclusions

The following conclusions can be drawn from this study:

1. The socio-ecological and land use setting of the Elephant Marsh offers many ecosystem-based development potentials which include prospects of intensified small-scale rice farming, increased small-scale fish production, energy production and ecotourism.
2. The Elephant Marsh Fishery is managed by community user groups (known as beach village committees) which are supported by three other key players namely: village chiefs, fisheries officers and fishers. Based on a comparative analysis of the Elephant Marsh Fishery and 17 cases of small-scale fisheries in other developing countries, the optimal role of the government of Malawi in the management of the Elephant Marsh Fishery seems to be as intelligently absent as possible by way of (re)building, respecting, protecting and supporting local institutions, if necessary up to the full-Marsh level. In other words, co-management is not the key perspective for the Elephant Marsh Fishery.
3. The key socio-causal attributes for sustainability of the Elephant Marsh Fishery lie in the social reputation of the BVC Chair and the power dynamics between traditional chiefs and the local fishery leaders.
4. Safeguarding the sustainability of the Elephant Marsh fishery in the near future lies in the establishment of a weak, purely locally based and internally amorphous fisheries management institution, as a ‘nested enterprise’ on the whole-Marsh level, based on the existing local fisheries committees. Further growth of this institution into a full-fledged locally based fisheries ‘Authority’ is possible when the need arises, especially if Malawi’s fisheries regulations would be adapted such that inconsistencies with the full acknowledgement of such an institution were removed. Such an adaptation would not be fundamental because the law already recognizes local ‘Authority’ in fisheries management. Expansion of a fisheries ‘Authority’ into a multi-sectorial authority that regulates all of the Marsh’s ecosystem based potentials is theoretically attractive but may be practically undesirable, requiring more research and fundamental governance discussions.

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Summary

Management of Small-Scale Fisheries in Developing Countries: The case of Elephant Marsh in Malawi

Keywords: sustainability, institutions, small-scale fisheries, Malawi, wetlands, Elephant Marsh governance.

Wetlands provide many ecosystem goods and services which include fish production. The sustainability of small-scale fisheries (SSF) has received considerable attention in recent years because fish is one of the major sources of animal protein to a considerable fraction of the global population which is estimated to increase to about 9.5 billion by 2050. Most of this attention has evolved around the pressures to which SSF are increasingly subjected, emanating particularly from population growth, rural poverty, weak institutional mechanisms, market forces, climate change among others.

This thesis focuses on designing a sustainable management institution for the Elephant Marsh Fishery in Southern Malawi. With fieldwork which started in May 2011 to June 2013, this PhD study uses empirical data to understand the socio-ecological system of the Elephant Marsh Fishery and propose an actor-based institutional design which would achieve long-term sustainability of the fishery.

After the introductory chapter 1, the second part of this thesis (Chapter 2) brings into perspective a clear understanding of the socio-ecological and land use setting of the Elephant Marsh as well as the ecosystem-based development potentials that exist at the wetland. The second chapter also highlights the actors and local institutions pertaining to the management of the wetland.

Just like many similar ecosystems across the globe, the Elephant Marsh has come under increasing pressure in recent years which threatens the future of the wetland. Currently, Malawi does not have either a national wetland policy or a climate change policy and wetland issues are only marginally present in the National Parks and Wildlife Policy of 2000 and National Fisheries and Aquaculture Policy of 2001. As a result, the country lacks a framework that could be strong enough to achieve balanced and sustainable wetland management for multiple resource users. Chapter 2 of this study reveals that there are

significant ecosystem-based development potentials at Elephant Marsh mainly in fisheries, recession agriculture, conservation, tourism and biomass for energy. Chapter 2 further shows that if these ecosystem-based development potentials are to be efficiently and effectively exploited at the Elephant Marsh, there is a need to rise above the institutional design principles of Ostrom which are based on nested enterprises and move towards real participatory approaches such as constitutionality (local people's sense of ownership in bottom-up institution building). Certainly, as the present thesis suggests, there will be need to strike a balance between the local wetland management system, where pressure on the Elephant Marsh emanates mainly from poverty, and the national and international interests of biodiversity conservation as advocated by the Ramsar convention. Although enhanced production and maximum benefits from ecosystem good and services are central to any management system of the Elephant Marsh, it is important to realize that there are always limits to growth. Any management program for the Elephant Marsh should therefore strive towards sustainable exploitation of the opportunities that lie in the wetland's goods and services.

Globally, institutions that manage small-scale fisheries can be locally based, state controlled or of a mixed, cross-scale nature. The latter arrangement, widely known as co-management, is generally believed to be the preferred approach for fishery sustainability.

In Africa, fisheries management faces many challenges due to unstable governance systems (weak states) whose role has evolved tremendously over the last century. The changes in the role of the state have mainly surfaced from a cautious realization that social actors (humans) respond to underlying incentives and are therefore central for any management system to work at all. With close reference to rich literature from across the globe, Chapter 3 of this thesis employs a crisp-set qualitative comparative analysis (csQCA) to examine cases of small-scale fisheries in several developing countries, in order to assess the degree of state involvement would be most relevant for designing a sustainable management for the Elephant Marsh Fishery. These degrees vary between: (a) strong top-down regulation irrespective of fishing community wishes, (b) a co-management mode of negotiation with fishing communities, (c) a merely supportive role of the state, or absence from the fishing scene. It was revealed that contrary to expectations, the sustainability of small-scale fisheries depended solely on the strength of collective social capital of the local communities at the resource scale. With weak local social capital, degrees of government involvement did not make any difference; the fisheries were unsustainable in all cases. The findings from this study have accentuated that the sustainability of SSF management in developing countries relies heavily on a strong collective social capital and a supportive

government. Future practice and policy directions on fisheries management should understand the relevance of concrete community trust, networks, norms and values and strive to incorporate these in decision making and policy formulation. Governments, especially in developing countries, and their agents should realize the need to rise above the theoretical principles of “impose and control” and begin to take a more passive, non-conflictive position in designing working solutions for the sustainability of common pool resources such as small-scale fisheries. This can be done for example by encouraging civil engagement in transformative learning to reduce disadvantageous power differentials that exist in many fishing communities in developing countries.

Chapter 4 uses the success and failure factors for SSF in developing countries which were identified in Chapter 3 to ascertain relevant factors for the sustainability of the Elephant Marsh Fishery. It is revealed that the Elephant Marsh Fishery sustainability depends on building strong local institutions with motivated leadership that can safeguard the interests of resource users. The present thesis therefore recommends that the government of Malawi should begin to take a more participatory position in designing locally crafted working institutions for the sustainability of common pool resources, such as small-scale fisheries at Elephant Marsh. In villages where fisheries fail due to weak local institutions or conflictive chiefs, the imposition of fishing rules is futile. The feasible government reaction then lies in (re)building collective social capital, especially the leadership of fisheries committees, and formally linking the established local institutions to the central government structure. In doing so an important inclusion would be the contextualization of key socio-causal dynamics of the management system at the Elephant Marsh.

Cognizant of the importance of the socio-causal dynamics, Chapter 5 of this study used an actor-based framework (known as Action-in-Context) to unveil the issues that are crucial in devising a sustainable governance system for the Elephant Marsh Fishery. It was established that the key social variables for the designing a proposed three-pillared (locally based, weak and amorphous) resilient institution for sustainability of the Elephant Marsh Fishery are (*i*) the social reputation of the leaders of local fishery institutions and (*ii*) the power dynamics between traditional chiefs and these local fishery leaders. It is clearly evident from the present study that an actor-based multi-level analysis of rules and other mechanisms prevailing in a fishery can be instrumental in designing a cost-effective institution for the near future. For the design of longer-term institutional options, the assumptions underlying the actors-based method (Action-in-Context in our case) become weaker, e.g. because new types of actors may move in or because actor capacities and motivations may change or become more intertwined. This then necessitates a stronger

reliance on both institutional theory and frameworks or (as has been my choice) the design of a flexible process of institutional development guided by an adaptive, learning organization.

The last section of thesis (Chapter 6) synthesizes the main findings and proposes what needs to be done in designing a resilient management system for the Elephant Marsh Fishery. This PhD thesis ends by stimulating a style of thinking that may be fruitful for institutional science in general.

Samenvatting

Duurzaam beheer van kleinschalige visserij in ontwikkelingslanden: de Elephant Marsh in Malawi

Trefwoorden: duurzaamheid, instituties, kleinschalige visserij, wetlands, Malawi, Elephant Marsh, sociaal kapitaal, overheid, bestuur.

Wetlands leveren veel natuurlijke goederen en diensten waaronder de productie van vis. De afgelopen jaren heeft de duurzaamheid van kleinschalige visvangst veel aandacht gekregen. Vis is namelijk voor een aanzienlijk deel van de wereldbevolking één van de voornaamste bronnen voor dierlijke eiwitten, een wereldbevolking die tegen het jaar 2050 geschat wordt 9,5 miljard mensen te omvatten. Die aandacht richt zich steeds meer op de tegendruk die kleinschalige visserij ondervindt, in het bijzonder en in toenemende mate van maatschappelijke factoren als bevolkingstoename, armoede op het platteland, zwakke institutionele mechanismen, marktwerking en klimaatverandering.

Het onderhavige onderzoek richtte zich op het ontwerpen van een duurzame beheersstructuur voor de aanpak voor de visserij in de Elephant Marsh gelegen in het zuiden van Malawi. Empirische data, verzameld tijdens veldonderzoek in de periode mei 2011- juni 2013, worden in het onderhavige onderzoek gebruikt om de socio-ecologische situatie van de lokale visserij in de Elephant Marsh te doorgronden. Vervolgens wordt een op de actoren gebaseerde beheersstructuur voorgesteld op basis waarvan een duurzame visserij voor langere termijn zou kunnen worden bereikt.

Na een inleidend hoofdstuk (Hoofdstuk 1) wordt voor een juist begrip van achtergrond en aanleiding van dit onderzoek in Hoofdstuk 2 een beeld geschetst van de socio-ecologische situatie en het landgebruik van de Elephant Marsh. Ook de mogelijkheden van het gebied voor een op natuurlijke processen gebaseerde verdere ontwikkeling worden aangegeven. In Hoofdstuk 2 worden tevens de lokale actoren en instituties beschreven die betrokken zijn bij het beheer van het wetland.

Zoals bij veel vergelijkbare en over de hele wereld verspreide ecosystemen is de Elephant Marsh de laatste jaren onder toenemende druk komen te staan. Deze druk bedreigt de toekomst van dit wetland. Op dit moment heeft Malawi geen nationaal beleid voor wetlands.

Ook bestaat er geen gericht beleid voor het tegengaan van de gevolgen van klimaatverandering. Wetlands komen alleen marginaal aan de orde in het ‘National Parks and Wildlife Policy’-document uit 2000 en in het ‘National Fisheries and Aquaculture Policy’-document uit 2001. Hierdoor beschikt Malawi niet over een , wettelijke basis die voldoende stevig is om een evenwichtig en duurzaam wetlandbeheer voor de bewoners en gebruikers die zo’n gebied op verschillende wijze gebruiken, te realiseren. Uit Hoofdstuk 2 komt naar voren dat er aanzienlijke ontwikkelingsmogelijkheden binnen het Elephant Marsh bestaan, met name voor de visserij, de landbouw van overstromingsgebieden, de opwekking van bio-energie, het natuurbehoud en het toerisme.

In Hoofdstuk 2 wordt ook aangetoond dat, als men die op de aanwezige natuur gebaseerde ontwikkelingsmogelijkheden van de Elephant Marsh efficiënt en effectief zou willen benutten, er meer nodig is dan de door Ostrom opgesomde uitgangspunten voor het ontwerpen van instellingen. Deze uitgangspunten zijn gebaseerd op met elkaar verbonden instellingen en gericht op de bevordering van een meer participatieve benadering zoals via grondwettelijke borging (de lokale bevolking voelt zich en is zelfstandig bij de ontwikkeling van een passende organisatievorm). Uit dit onderzoek komt naar voren dat er behoefte bestaat aan het vinden van een juiste balans tussen enerzijds het lokale wetland management systeem, dat de armoede van de Elephant Marsh als uitgangspunt heeft, en anderzijds de nationale en internationale belangen inzake het behoud en beheer van biodiversiteit zoals die door de Conventie van Ramsar worden bepleit. En, hoewel productiestijging en maximaal voordeel halen uit de natuurlijke goederen en diensten de uitgangspunten zijn voor een managementsysteem voor de Elephant Marsh, moet steeds in de gaten worden gehouden dat er grenzen aan de groei zijn. Elk managementsysteem dient daarbij gericht te zijn op duurzame exploitatie van de ontwikkelingsmogelijkheden die het gebruik van goederen en diensten van dit wetlandgebied biedt. Wereldwijd kunnen instellingen die zich bezig houden met kleinschalige visserij wat hun organisatievorm betreft a) plaatselijk georganiseerd zijn, b) door de overheid gecontroleerd worden of c) uit een mengvorm van a) en b) bestaan. Over het algemeen wordt aangenomen dat de laatstgenoemde managementvorm, alom bekend als co-management, de beste resultaten oplevert bij de verduurzaming van de visserij.

In Afrika ziet de visserij en het visserijbeleid zich alom gesteld voor grote uitdagingen. De oorzaak hiervan is gelegen in weinig stabiele overheden (zwakke staten), overheden waarvan de rol en taken gedurende de afgelopen eeuw aan grote veranderingen onderhevig zijn geweest. Deze veranderingen werden vooral duidelijk toen de betreffende overheden zich realiseerden dat sociale actoren (mensen) handelen op basis van onderliggende doelen en dat deze actoren cruciaal zijn bij het hoe dan ook functioneren van elk

managementsysteem. Onder gebruikmaking van de omvangrijke literatuur die over dit onderwerp beschikbaar is, wordt in Hoofdstuk 3 een ‘crisp-set Qualitative Comparative Analysis’ (csQCA) uitgevoerd om kleinschalige visserijprojecten in verschillende ontwikkelingslanden te onderzoeken. [csQCA is een bepaalde variant van een geavanceerde rekenkundige techniek die wordt gebruikt voor de analyse van complexe gegevensbestanden – vert.] Deze analyse is gericht op het achterhalen van de mate waarin de betrokkenheid van de overheid van belang is bij het ontwerpen van een duurzaam beheersmodel voor de visserijsector in de Elephant Marsh. De mate van betrokkenheid blijkt te variëren van een sterke ‘top-down’-benadering waarbij geen rekening te wordt gehouden met de wensen van de lokale visserijsector, via een co-management overlegstructuur met de visserijsector, tot een louter ondersteunende rol van de overheid voor de visserij of met soms zelfs in het geheel geen betrokkenheid van de overheid.

Uit dit onderzoek kwam naar voren dat, in tegenstelling tot de verwachtingen, de duurzaamheid van kleinschalige visserij geheel afhangt van van de grootte en de kracht van het gemeenschappelijk sociaal kapitaal van de lokale gemeenschappen die ter plaatse de natuurlijke bronnen exploiteren. Wanneer dit lokale, sociale kapitaal slechts in beperkte mate beschikbaar is maakt het niet uit of en in hoeverre er sprake is van overheidsbemoeienis; steeds bleek de visserijsector dan niet duurzaam te zijn. De uitkomsten verkregen uit het onderhavige onderzoek laten verder zien dat de duurzaamheid van kleinschalige visserij management in ontwikkelingslanden vooral afhankelijk is van een sterk gezamenlijk sociaal kapitaal en een ondersteunende rol van de overheid. Bij de ontwikkeling van een duurzaam visserijbeleid en het implementeren van dat beleid dient rekening te worden gehouden met het grote belang van vertrouwen hebben in de betrokken gemeenschap, in hun netwerken en in hun normen en waarden. Nationale overheden, in het bijzonder die in ontwikkelingslanden, en hun vertegenwoordigers dienen zich te realiseren dat het noodzakelijk is om meer te deen dan het “opleggen en controleren”. Zij moeten zich meer afwachtend en minder conflictueus opstellen bij de ontwikkeling van werkbare oplossingen voor het duurzaam gebruik van gemeenschappelijke, natuurlijke bronnen, zoals bij kleinschalige visserij zou moeten gebeuren. Dit kan bij voorbeeld worden bereikt door bevordering van de betrokkenheid van burgers bij het leren om te gaan met veranderingen, dat wil zeggen, op zo’n wijze dat de machtsverschillen die er bestaan binnen veel vissersgemeenschappen in ontwikkelingslanden worden verkleind.

De in Hoofdstuk 3 getraceerde succes- en faalfactoren bij de kleinschalige visserij worden in Hoofdstuk 4 gebruikt om te achterhalen welke factoren van belang zijn voor de duurzaamheid van de visserij in de Elephant Marsh. Het blijkt dat hierbij een grote behoefte

is aan de ontwikkeling van sterke lokale instellingen onder gemotiveerd leiderschap, een leiderschap dat is gericht op de betrokken vissers ter plaatse. Het onderhavige onderzoek leidt dan ook tot de aanbeveling dat de Malawiaanse overheid meer moet participeren bij de ontwikkeling van plaatselijk gewortelde en goed functionerende instellingen voor het duurzaam gebruik van gemeenschappelijke natuurlijke bronnen, zoals door de kleinschalige visserij in de Elephant Marsh. Het heeft geen enkele zin om in dorpen, waar de visserij door zwakke lokale instellingen of door niet-meewerkende dorpshoofden niet goed loopt, aan de visserij regels op te leggen. Succesvol opereren van de overheid begint in zo'n geval met de opbouw of het herstel van het gemeenschappelijk sociaal kapitaal, vooral ook voor het leiderschap van de instellingen voor visserij. Daarbij moet ook de relatie tussen de bestaande lokale instellingen en de centrale overheidsstructuur worden geformaliseerd. De contextualisatie van de essentiële socio-causale dynamiek in de Elephant Marsh zal hiervan een belangrijk gevolg zijn.

Nadat op deze wijze het belang van de socio-causale dynamiek duidelijk is geworden, wordt in Hoofdstuk 5 getracht die elementen te achterhalen die essentieel zijn bij het ontwerpen van een bestuursstructuur voor duurzame visserij in de Elephant Marsh. Hiervoor wordt een onderzoeksinstrument gebruikt dat is gebaseerd op de rol van de verschillende betrokken actoren, de zogeheten 'Action-in-Context'-benadering. Het bleek dat de meest essentiële, sociale variabelen bij de ontwikkeling van het voorgestelde, op drie eigenschappen gebaseerde veerkrachtige instelling (te weten: plaatselijk geworteld, zwak en vormloos) voor een duurzame visserij in de Elephant Marsh zijn: i) het maatschappelijke aanzien van de leiders van de lokale visserijorganisaties en ii) de krachtsverhoudingen tussen de genoemde leiders en de leiders die van oudsher aanwezig zijn, dat wil zeggen, met meer algemene taken. Uit het onderhavige onderzoek komt duidelijk naar voren dat een op de actoren gerichte netwerkanalyse van regels en andere mechanismen die bepalend zijn voor de visserij voor de korte termijn kan worden gebruikt bij de ontwikkeling van een kostenefficiënte beheersinstelling. Voor de uitwerking van institutionele opties voor de lange termijn lijken de veronderstellingen die inherent zijn aan een 'Action-in-Context'-benadering echter minder goed bruikbaar, onder andere omdat er andere actoren kunnen opduiken of omdat de vaardigheden en motivaties van de actoren kunnen veranderen of vermengd kunnen raken. Dit maakt het noodzakelijk dat er een groter vertrouwen ontstaat in zowel de instellingen als de kaders óf – en dat is de keuze die in dit onderzoek wordt gemaakt – dat er een flexibel ontwerpproces voor de ontwikkeling van instellingen wordt gehanteerd, waarbij uitgegaan wordt van een adaptieve, lerende maatschappij.

Hoofdstuk 6, het laatste hoofdstuk, bevat de synthese van de belangrijkste uitkomsten en aanbevelingen van het onderzoek waarbij de aandacht zich richt op wat er nodig is om een veerkrachtig managementsysteem te ontwerpen voor duurzame visserij in de Elephant Marsh. Deze dissertatie wordt afgesloten met een pleidooi om een manier van denken te stimuleren die profijtelijk kan zijn voor de organisatie- en bestuurskunde in het algemeen.

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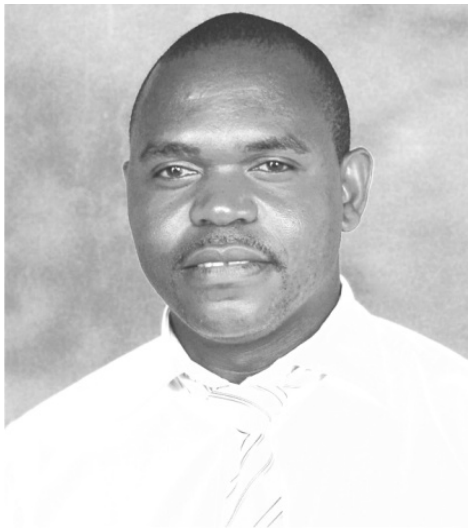
Curriculum Vitae



Ishmael Bobby Mphangwe Kosamu was born on 9th December, 1975 at Madisi Hospital in Dowa District, Malawi. He is the eldest son to Ted and Esitere Mphangwe. Ishmael's school days started at Manyani Full Primary School in Malawi's central district of Kasungu before he continued with his education at Dowa Secondary School. He then studied for his Bachelor's Degree in Environmental Science and Technology at University of Malawi. In 2002 he was admitted to study for a Masters Degree in Environmental Science and Technology at UNESCO-IHE Institute for Water Education at Delft in The Netherlands where he graduated in April 2004. Since then, Ishmael has been actively involved in teaching, research, outreach and consultancy at the University of Malawi where he is employed in the Faculty of Applied Sciences. Ishmael was awarded a scholarship by the Malawi Government through the University of Malawi Scholarship Programme to study for this PhD.

E-mail of the author: ikosamu@poly.ac.mw