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Review

Revisiting the 'three-pillared design' of a management system for the Elephant Marsh Wetland Fishery in Malawi

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This paper revisits and builds on the work of Ishmael Kosamu, Wouter de Groot and Patrick Kambewa who, in 2016, proposed a management system for the Elephant Marsh Wetland Fishery in Malawi, and identified key issues that would help the fishery to be sustainable in the short to medium term. They postulated that a sustainable three-pillared (locally based, weak, and amorphous) institution for the Elephant Marsh Wetland Fishery would rest on: (i) the social reputation of the leaders of local fishery institutions (beach village committee leaders), and (ii) the power dynamics between traditional chiefs and local fishery leaders. This paper suggests additional attributes and new insights which, if included in the design that Kosamu and his colleagues proposed, could make the institution more relevant in the long term. The suggested supplementary priorities embrace both financial and legal issues in the institutional development process.

Key words: Elephant Marsh, institutions, Malawi, small-scale fisheries, sustainability, wetlands.

INTRODUCTION

Despite the provision of many ecosystem goods and services, such as fisheries, agriculture, eco-tourism, water supply, transport, carbon sequestration, biodiversity and 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 and Houghton-Carr, 2009). The result is often unsustainable resource exploitation, which is costly to both humans and nature and the ecological systems that 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 and Riley, 2003; Gutiérrez et al.,

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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 (Hardin, 1968; Kellert et al., 2000). 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 and Chan, 1995; Blaikie, 1996), neo-liberal (deregulation) approach (Blaikie et al., 1997; Adger et al., 2001; Béné and Neiland, 2006; Lockwood and 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 and van Est, 2003; Berkes et al., 2008; Ribot et al., 2006; Seixas and Davy, 2008). These contestations on the effectiveness of state control over natural resources laid a foundation for populist typologies of natural resources management that have come with different labels such as community based natural resources management (CBNRM); integrated conservation and development projects (ICDPs); joint management (Flaherty et al., 1999; Cheong, 2004; Berkes et al., 2008); and co-management (Ostrom, 1990; Agrawal, 2001; Pomeroy, 2003; Ostrom, 2005; Berkes, 2010). Out of these management styles, the most commonly used approach has been 'co-management' (Cundill and Fabricius, 2010; Pomeroy, 2016). 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 (Ostrom, 2005; Berkes, 2010; Gutiérrez et al., 2011). Nevertheless, recent studies such as Pahl-Wostl and Hare (2004), Bodin et al. (2006) and Ostrom (2009) 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. Since the dynamics that underlie social and ecological systems are known to be very complex (Mahonge, 2010; Evans et al., 2011), 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) noted 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 and van Zwieten, 2014), and which forms the basis for this paper is small-scale fishery (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 paper, 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 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). The management of SSF is 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 are still struggling. The widely adopted mode of management is where governments are in regulatory position (Ward and Weeks, 1994; Carswell, 2003), but many SSFs are gradually moving towards imposed co-management arrangements (Hara and 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 paper is the fishery at Elephant Marsh Wetland in Southern Malawi, which supports the livelihoods of about 1500 households (DoF, 2014). 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 were reported to have been common in the area (Hughes and Hughes, 1992). Although field work observations revealed that there is no recent data, the enforcement of wetland management regulations at the Elephant Marsh has, however, 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 and Haller, 2009), which lacked a well-coordinated legal and institutional setup. Since then, the Elephant Marsh Fishery relies on local management arrangements that 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 fishermen will comply with 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). However, as Jentoft (1998) 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 paper is to critically consider how the short to medium term (<20 years) management arrangements proposed by Kosamu et al. (2016), could be modified to sustain the fishery at the Elephant Marsh wetland in the long run (> 20 years).

Based on interviews and participant observation, Kosamu et al. (2016), used an actor-based framework (known as Action-in-Context) to propose that within a short to medium term a resilient management institution for the Elephant Marsh Fishery should have three 'pillar characteristics', namely; (i) a low-cost weak institution built for growth and adaptation; (ii) a purely locally based 'nested enterprise' and, (iii) an internally amorphous institution. In the following section, this paper will bring in some theory-based reflections on how the 'three-pillared' design might grow, if need be in the longer future, into a stronger one.

TOWARDS A LONG-TERM MARSH-WIDE FISHERIES 'AUTHORITY'

Even though the minimum threshold (Ostrom, 2009) 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 (Kosamu et al., 2012), a future with rising pressures on the resource is not hypothetical, considering Malawi's national population growth at a rate of 2.8% (NSO, 2008). Boyd and 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 and 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.

It should therefore be mentioned that 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 paper, 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 role of the state, this paper envisions the 'Authority' to hold more regulatory power than the three-pillared institution, but still be fully locally-based, as a 'nested enterprise' *sensu* Ostrom (1990). The next section 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.

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 beach village committees (BVCs), and at some 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 (fishing community user groups known as BVCs, traditional chiefs, government officers and fishermen) 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 Department of Fisheries (DoF), NGOs and religious groups may be invited in the process in order to enrich arguments and broaden the local base.

Legal aspects

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). These 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 by-laws.

The legal framework governing fisheries management in Malawi, despite its overall character of respecting local institutions, contains several weak elements, which are likely to start hindering the effectiveness of the Elephant Marsh Wetland Fishery once the 'Authority' becomes 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 DoF 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. Seizure without destruction would give room for corruption as fishermen would want to bribe some corrupt chiefs to get their fishing gear back.

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, 'Fisheries Authority' and state as small as possible. This resonates well with the observation by Jentoft and Chuenpagdee (2015) that there is a growing appreciation among fisheries management experts 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 current 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 as is and hope for the best, or work towards 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), as described by Ostrom (1990) in the case of irrigation systems in Spain. For the future of the Elephant Marsh Wetland Fishery, 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.

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 (Andeweg, 2006) where the central government blocked locally crafted wetland management plans, which did not provide for money transfers beyond the local government units. Against that background, the current practice in Malawi where fishermen pay a license fee to the Department of Fisheries (Kosamu et al., 2012; Kosamu, 2015) 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. In 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 proves 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 more research.

CONCLUSION

Safeguarding the sustainability of the Elephant Marsh fishery lies in the establishment of a 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. However, 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 Elephant Marsh's ecosystem-based potentials is theoretically attractive, but may be practically undesirable, requiring more research and fundamental governance discussions.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

REFERENCES

Adger WN, Benjamisen T, Brown AK, Svarstad H (2001). Advancing Political Ecology of Community in Natural Resources Conservation. World Dev. 27:629-649.

Agrawal B (2001). Participatory exclusions, community forestry, and gender: an analysis for South Asia and a conceptual framework. World Dev. 29: 1623-1648.

Andeweg K (2006). Central issues in decentralized wetland management: A comparative case study in Kumi and Mukono districts, Uganda. MSc. Thesis. Environmental Policy Group, Wageningen University.

Béné C, Neiland AE (2006). From participation to governance. A critical review of governance, co-management and participation in natural resources management. Policy, Economics and Social Science Discussion Paper Series, P 74.

Béné C, Barange M, Subasinghe R, Pinstrup-Andersen P, Merino G, Hemre GI, Williams M (2015). Feeding 9 billion by 2050–Putting fish back on the menu. Food Secur. 7:261-274.

Berkes F (2010). Devolution of environment and resources governance: trends and future. Environ. Conserv. 37: 489-500.

Beuving J (2013). Chequered fortunes in global exports: the sociogenesis of African entrepreneurship in the Nile perch business at Lake Victoria, Uganda. Eur. J. Dev. Res. 25(4):501-517.

Biot Y, Blaikie PM, Jackson C, Palmer JR (1995). Rethinking research on land degradation in developing countries. The International Bank for Reconstruction and Development. The World Bank Discussion Papers, pp. 289. 139.

Blaikie P (1996). New knowledge and rural development: a review of views and practicalities. In: 28th International Geographical Congress. The Hague, Netherlands.

Blaikie P, Brown K, Stockin, M, Tang L, Dixon P, Sillitoe P (1997). Knowledge in action: local knowledge as a development resource and barriers to its incorporation in natural resource research and development. Agric. Syst. 55:217-237.

Bodin Ö, Crona B, Ernstson H (2006). Social networks in natural resource management: what is there to learn from a structural perspective. Ecol. Soc. 11 (2):r2.

Bowen RE, Riley C (2003). Socio-economic indicators and integrated coastal management. Ocean Coast. Manage. 46:299-312.

Boyd C, Slaymaker T (2000). Re-examining the "more people less erosion" hypothesis: Special case or wider trend. Natural Resource Perspective 63:1-6.

Campbell DJ (1981). Land use competition at the margins of the rangelands: an issue in development strategies for semi-arid areas. Afr. J. Ecol. 47:55-61.

Carswell G (2003). Continuities in environmental narratives: The case of Kabale, Uganda, 1930-2000. Environ. Hist-UK 9:3-29.

Carvalho N, Edwards-Jones G, Isidro E (2011). Defining scale in fisheries: small versus large-scale fishing operations in the Azores. Fish. Res. 109:360-369.

Cheong SM (2004). Korean fishing communities in transition: limitations of community-based resource management. Environ. Plann. 37:1277-1290.

Cheung SN (1970). The structure of a contract and the theory of a non-exclusive resource. J. Law Econ. 13:49-70.

Cox M, Arnold G, Tomás SV (2010). A review of design principles for community-based natural resource management. Ecol. Soc. 15(4):38.

Cundill G, Fabricius C (2010). Monitoring the governance dimension of natural resource co-management. Ecol. Soc. 15(1):15.

De Groot WT (1992). Environmental Science Theory: Concepts and Methods in a One-World, Problem-Oriented Paradigm. Elsevier Science Publishers: Amsterdam, The Netherlands.

DoF (2014). (Unpublished). Frame Survey Report: 2014 Census of Fishers, Fishing Gears and Craft. Lilongwe, Malawi.

Donda S (2001). Theoretical Advancement and Institutional Analysis of Fisheries Co-management in Malawi: experiences from Lakes Malombe and Chiuta. PhD Thesis. Aalborg University.
Dowsett-Lemaire F, Dowsett RJ (2006). The Birds of Malawi: An Atlas and Handbook; Tauraco Press and Aves: Liège, Belgium.
Evans L, Cherrett N, Pemsl D (2011). Assessing the impact of fisheries co-management interventions in developing countries: A meta-analysis. J. Environ. Manage. 92:1938-1949.
Flaherty M, Vendergeest P, Miller P (1999). Rice paddy or shrimp pond: Tough decisions in rural Thailand. World Dev. 27:2045-2060.
Garcia S M, Kolding J, Rice J, Rochet M J, Zhou S, Arimoto T, Beyer JE, Borges L, Bund, A, Dunn D, Fulton E A, Hall M, Heino M, Law R, Makino M, Rijnsdorp AD, Simard F, Smith, ADM (2012). Reconsidering the consequences of selective fisheries. Sci. 335:1045-1047.
Government of Malawi (1997). Fisheries conservation and management act. Government Printer: Lilongwe, Malawi.
Government of Malawi (2000a). Fisheries conservation and management regulations. Government Printer: Lilongwe, Malawi.
Government of Malawi (2000b). Fisheries conservation and management rules. Government Printer: Lilongwe, Malawi.
Government of Malawi (2001). National Fisheries and Aquaculture Policy. Government Printer: Lilongwe, Malawi.
Grimble R, Chan MK (1995). Stakeholder analysis for natural resource management in developing countries. Natural resources forum 19: 113-124.
Gutiérrez NL, Hilborn R, Defeo O (2011) Leadership, social capital and incentives promote successful fisheries. Nat. 470:386-389.
Hara M, Nielsen JR (2003). Experiences with fisheries co-management in Africa. In: Wilson. DC, Nielsen JR, Degnbol P (eds). The fisheries co-management experience: Accomplishments, challenges and prospects (pp. 81-97). Kluwer Academic Publishers: Dordrecht, The Netherlands.
Hardin G (1968). The Tragedy of the Commons. Science 62: 1243 1248.
Heck S, Ikwaput J, Kirema-Mukasa CT, Lwenya C, Murakwa DN, Odongkara K, Onyango P, Owino JP, Sobo F (2004). Cross-border Fishing and Fish Trade on Lake Victoria.IUCN/LVFO Socio-economics of the Lake Victoria Fisheries Phase II. International Union for the Conservation of Nature and Natural Resources (IUCN): Nairobi, Kenya.
Hughes RH, Hughes JS (1992). A directory of African wetlands: with a chapter on Madagascar. IUCN (Geneva), UNEP (Nairobi), and WCMC (Cambridge).
Inter-Agency Working Group on Protected Areas (1997). Protected areas: their role and future in Malawi's land budget. A memorandum submitted to the presidential commission of inquiry on land policy reform. Lilongwe, Malawi.
Isaacs M (2012). Recent progress in understanding small-scale fisheries in Southern Africa. Curr. Opin. Environ. Sust. 4:338-343.
Jentoft S (1998). Fisheries co-management: Delegating government responsibility to fishermen's organisations. Marine Policy 13:137-154.
Jentoft S, Chuenpagdee R (eds.) (2015). Interactive Governance for Small-Scale Fisheries. Springer International Publishing: Netherlands.
Johnson OEG (1972). Economic analysis, the legal framework and land tenure systems. J. Law Econ. 15:250 276.
Jul-Larsen E, Kolding J, Overa˚ R, van Zwieten PAM (2003). Management, Co-management or no Management? Major Dilemmas In Southern African Freshwater Fisheries: 1. Synthesis Report. FAO Fisheries, Technical Paper No. 426/1. Rome.
Kellert SR, Mehta JN, Ebbin SA, Lichtenfeld LL (2000). Community natural resource management: promise, rhetoric, and reality. Soc. Nat. Resour. 13:705-715.
Kolding J, van Zwieten PAM (2006). Improving productivity in tropical lakes and reservoirs. Challenge Program on Water and Food–Aquatic. Ecosys. Fish. Rev. Ser. 1:139.
Kolding J, van Zwieten PAM (2011). The tragedy of our legacy: How do global management discourses affect small scale fisheries in the south? Forum for Development Studies 38:267-297.
Kolding J, van Zwieten PAM (2014). Sustainable fishing of inland waters. J. Limnol. 73:132-148.
Kosamu IBM, de Groot WT, Kambewa PS, de Snoo GR (2012). Institutions and Ecosystem-Based Development Potentials of the Elephant Marsh, Malawi. Sustainability 4(12):3326-3345.
Kosamu IBM (2015). Conditions for sustainability of small-scale fisheries in developing countries. Fish. Res. 161:365-373.
Kosamu IBM, de Groot WT, Kambewa PS (2016). Actor-Based Design of a Management System for the Elephant Marsh Fishery in Malawi. Soc. Nat. Resour. 1-16.
Lockwood M, Davidson J (2010). Environmental governance and the hybrid regime of Australian natural resource management. Geoforum 41:388-398.
Mahonge CPI (2010). Co-managing complex social-ecological systems in Tanzania: The case of Lake Jipe wetland. PhD Thesis, Wageningen University, The Netherlands.
McCartney MP, Houghton–Carr HA (2009). Working Wetland Potential: An index to guide the sustainable development of African wetlands. Nat. Resour. Forum 33:99-110.
Medard M, Geheb K, Okeyo-Owuor JB (2002). Conflicts among Resource Users: The Case of Kabangaja Fishing and Farming Community on Lake Victoria (Tanzania). In: Kim Geheb K, Sarch M (eds.). Africa's Inland Fisheries: The Management Challenge (pp. 195-210).
Mvula P, Haller T (2009). Common pool resource management in Lake Chilwa, Malawi: A wetland under pressure. Dev. S. Afr. 26:539-553.
Natale F, Carvalho N, Paulrud A (2015). Defining small-scale fisheries in the EU on the basis of their operational range of activity The Swedish fleet as a case study. Fish. Res. 164:286-292.
National Statistics Office (NSO) (2008). Malawi Population and Housing Census Report. NSO: Zomba, Malawi.
Neumayer E (2001). The human development index and sustainability—a constructive proposal. Ecol. Econ. 39:101-114.
Njaya F, Donda S, Béné C (2012). Analysis of Power in Fisheries Co-Management: Experiences from Malawi, Soc. Nat. Resour. 25:652-666.
Njaya FJ (2009). Governance of Lake Chilwa common pool resources: evolution and conflicts. Dev. S. Afr. 26:663-676.
Njiru M, Van der Knaap M, Taabu-Munyaho A, Nyamweya CS, Kayanda RJ, Marshall BE (2014). Management of Lake Victoria fishery: Are we looking for easy solutions? Aquat. Ecosyst. Health 17:70-79.
Nunan F, Hara M, Onyango P (2015). Institutions and Co-Management in East African Inland and Malawi Fisheries: A Critical Perspective. World Dev. 70:203-214.
Olsson P, Folke C, Berkes F (2004). Adaptive co-management for building resilience in social–ecological systems. Environ. Manage. 34: 75-90.
Ostrom E (1990). Governing the commons: The evolution of institutions for collective action. Cambridge University Press: Cambridge, United Kingdom.
Ostrom E (2005). Understanding Institutional Diversity. Princeton University Press: Princeton.
Ostrom E (2009). A General Framework for Analyzing Sustainability of Socio-ecological Systems. Sci. 325:419-422.
Pahl-Wostl C, Hare M (2004). Processes of social learning in integrated resources management. J. Community Appl. Soc. 14:193-206.
Persoon GA, van Est DME (2003). Co-management of Natural Resources: The Concepts and Aspects of Implementation. In: Persoon GA, van Est DME, Sajise PE (eds.). Co-management of Natural Resources in Asia. Nordic Institute of Asian Studies (NIAS) Press: Denmark.
Pomeroy RS (2016). A research framework for traditional fisheries: Revisited. Mar. Policy 70:153-163.
Pomeroy RS (2003). The Government as a Partner in Co-management. In: Wilson DC, J. Raakjær Nielsen J, Degnbol P (eds.). The Fisheries Co-management Experience: Accomplishments, Challenges, and Prospects. Kluwer Academic Publishers: Dordrecht, The Netherlands.
Ribot JC, Agrawal A, Larson AM (2006). Recentralizing while decentralizing: how national governments re-appropriate forest resources. World Dev. 34:1864-1886.
Seixas CS Davy B (2008). Self-organization in integrated conservation and development initiatives. Int. J. Commons 2:99-125.

Smith R (1981). Resolving the Tragedy of the Commons by Creating Private Property Rights in Wildlife. CATO J. 1:439-468.
Soliman A (2014). Using individual transferable quotas (ITQs) to achieve social policy objectives: A proposed intervention. Mar. Policy 45:76-81.
Sutinen JG, Rieser A, Gauvin JR (1990). Measuring and explaining non-compliance in federally managed fisheries. Ocean Dev. Int. Law 21: 335-372.
Turpie J, Smith B, Emerton L, Barnes J (1999). The Economic value of the Zambezi Basin Wetlands.http://www.anchorenvironmental.co.za/Documents/Pdfs/Turpie%20et%20al.%201999%20EconVal%20Zambezi%20Basin.pdf.
United Nations Development Programme (2014). Human Development Report 2014 - Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience. Available at: http://hdr.undp.org/en/content/human-development-index-hdi.
Van den Bossche JP, Bernacsek G M (1990). Source book for the inland fishery resources of Africa (Vol. 1). Food & Agriculture Organisation. Rome.
Ward W, Weeks P (1994). Resource managers and resource users: field biologists and stewardship. In: Dye CL, McGoodwin J (eds.). Folk Management in the World's Fisheries . University Press of Colorado, Colorado, USA. pp. 91-113.
Young OR (2013). Compliance & Public Authority: A Theory with International Applications. Routledge, London, United Kingdom.