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## Property rights and benefit sharing: a case study of the Barotse floodplain of Zambia

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**Abstract:** The study sought to expose the underlying complexity of benefit sharing of ecosystem goods and services among multiple actors in the Barotse Floodplains of Zambia. This case study is based on the rationale that theories of property rights have not been adequately used to understand and implement benefit sharing arrangements in natural resources governance. The study was descriptive, longitudinal and qualitative in nature. Data collection techniques used in the study included in-depth interviews and documentary sources using thematic analysis for coding and analysis. The study revealed an overwhelming variation of benefit sharing outcomes between eras as a result of varying configuration of bundles of property rights. The variation in eras illustrates a critical relationship between the establishment and enforcement of bundles of property rights and benefit sharing outcomes. This consequently provides insights into the consequences of failing to recognize, establish and enforce bundles of rights in benefit sharing arrangements. In this way, the case study illustrates how the theory of property rights offer a useful perspective through which to better understand and manage benefit sharing arrangements for socio-ecological systems.

**Keywords:** Barotse floodplain, benefit sharing, institutions, property rights

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## I. Introduction

The advent of the 1980s saw community based conservation being accepted as an alternative and legitimate form of conservation of natural resources (Dzingirai and Breen 2005; Shyamsundar 2005). This development was partly buoyed by emerging research on common pool resources that showed evidence in which locally designed institutions sustainably managed shared resources under certain conditions (Ostrom 1990; Agrawal and Ostrom 1999; Black 2000). It eventually resulted in policy shifts that aimed at incorporating local communities in the management of natural resources (Agrawal 2001). This 'new' conservation approach manifested itself in several forms including: Community Based Fisheries Management; Integrated Conservation and Development Projects; Community Wildlife Management; Integrated Water Resources Management (IWRM) and Joint Forest Management (JFM), all of which focused more on managing social behaviour towards natural resources than the resource per se as well extending benefits of conservation to local communities (Dzingirai and Breen 2005; Natcher et al. 2005).

Despite several decades of implementing various benefit sharing arrangements, the performance of these approaches varies significantly both spatially and temporally (Shackleton and Campbell 2000; Murphree 2004; Nkhata and Breen 2010). The limited performance of these approaches in Southern Africa is to a large extent occluded by the failure to establish enduring institutions for the governance of natural resources (Collomb et al. 2010; Nkhata et al. 2012a,b). From an epistemological perspective, the problems associated with benefit sharing implementation are as a result of inadequate understanding of the specific dynamics and complexity in which benefit sharing occurs (Agrawal and Ostrom 1999). This has consequently resulted in policy prescriptions that aim at extending decision making responsibilities, while benefit sharing remains as a rhetoric process often with ineffective results (Murphree 2004). In this sense, the enthusiasm of policy and practice towards devolved benefit sharing arrangements has run ahead of research into how it actually works or does not work (Marshall 2008).

This paper seeks to expose the underlying complexity of benefit sharing in fisheries among local users on the Barotse floodplain of Zambia as a case study. This is based on the premise that an appreciation of theories of property rights is necessary for understanding and implementing effective benefit sharing arrangements for natural resources (Nkhata et al. 2012a,b). In doing so, this paper is organized as follows: the first section provides the conceptual framework underpinning the case study with a focus on benefit sharing and property rights. The second section presents the methodology used in the research. The third section aims at highlighting the results of the study and their implication for theory. The fourth (and last) section concludes by way of suggesting recommendations for further research and practice.

## 2. Benefit sharing

Benefit sharing as a concept has multiple meanings and dimensions depending on the field in which it is applied (Schroder 2000). Benefit sharing in the ethical sense highlights questions of justice and who should access and benefit from a gain as conceived in the United Nation Educational, Scientific and Cultural Organization (UNESCO) declaration on human genome and human rights adopted in 1999 (Peslett 2011; Schroder 2000). Over time, the concept has evolved into the natural resources discourse (Nkhata et al. 2012a,b). A departure is therefore made from definitions that are rooted in ethical considerations to those concerned with institutional considerations that focus on access and use of natural resources (Peslett 2011). Literature on benefit sharing under the Convention on Biological Diversity's (CBD's) and Framework Convention on Climate Change under the United Nations (UNFCCC), entered into force on 21 March 1994, offers a useful distinction between these definitions (Morgera and Tsioumani 2010).

In this paper, benefit sharing is conceived as having two dimensions: firstly, the allocation or sharing of benefits – monetary or non-monetary – among defined actors, and secondly, decision making processes regarding the resource system (Nkhata and Breen 2010). These two dimensions are important elements of benefit sharing conceived as an implementation of environmental governance (Agrawal and Ostrom 1999). The first dimension denotes aspects of social accountability and responsibility in directing gains from a natural resource system to defined actors through socially – or mutually-designed mechanisms (Nkhata et al. 2012a,b). The underlying assumption in this dimension is that while pursuing conservation of natural resources could be an explicit goal, these arrangements should improve livelihoods for communities living near or alongside these resources (Zeka 2005).

The second dimension of benefit sharing entails the involvement of all actors in decision making processes through devolution, decentralization and co-management approaches as alternative environmental governance approaches (Agrawal and Ostrom 1999; Murphree 2004). Apart from devolving authority from state government to local institutions, benefit sharing arrangements typically aim to defend and/or legitimize indigenous resources and property rights (Shyamsundar 2005). The shift to more inclusive forms of governance that incorporates all actors in decision making processes comes at the wake of research on common pool resource governed under common property and the pressing need for alternative forms of governing natural resources other than through the state (Ostrom 1990; Berkes 2010).

Therefore, benefit sharing in this paper is conceived as involving the creation and regulation of relationships between actors that take into account issues of accountability, participation and responsibility in decision making and benefit distribution processes (Ostrom 1990; Natcher et al. 2005; Shyamsundar 2005; Nkhata et al. 2008). This definition underscores two critical aspect of benefit sharing: Firstly, who benefits and who is involved in the allocation of ecosystem goods and services; and secondly who is involved in decision making processes

regarding the benefit. These two aspects form the two most common features of benefit sharing arrangements (Shyamsundar 2005). It is argued that an effective arrangement should recognize and enforce both of these dimensions through governance processes of participation, accountability, transparency and shared governance (Lemos and Agrawal 2006).

### 3. Property rights

The issue of who is involved in decision making and benefit allocation processes involves a consideration of property rights (Ostrom 1990). Property rights refer to the claims that people hold to a resource and the capacity of the collective to support those claims (Bromley 1991). In essence, property rights describe relationships between participants in relation to a shared resource system (Demsetz 1967). We argue that the establishment and enforcement of property rights influence the effectiveness of benefit sharing arrangements. Long-term secure and well-defined property rights provide an incentive for resource users to manage the benefit stream sustainably and equitably, while incompletely defined and distributed property rights create ambiguity and conflict in benefit sharing (Schlager and Ostrom 1992; Ostrom 1997).

According to Schlager and Ostrom (1992), property rights can be categorized in two groups: collective-choice rights and operational level rights. Collective-choice rights influence or change operational level actions and therefore allow right holders to participate in the definition or modification of operational level rules. Rules refer to the collectively agreed and enforceable prescriptions that require, forbid or permit specific actions (Ostrom 2001). Operational level rights are exercised in everyday activities and are prescribed by operational level rules (Adger and Luttrell 2000). Property rights are further categorized into bundles of rights that include: rights of access, withdrawal, management, exclusion and alienation (Schlager and Ostrom 1992). Collectively, these rights are referred to as bundles of property rights with their configuration determining incentives available to the right holders (Ostrom 2005).

Rights of access are an important set of operational choice rights that define or stipulate which individuals are allowed to enter a defined resource. Withdrawal rights on the other hand refer to the authority to obtain or harvest products from a defined natural resource system (Schlager and Ostrom 1992; Ahmed et al. 2008). Enforcement of withdrawal rights in appropriation scenarios help in limiting the number of appropriators as the creation and enforcement of access rights is not enough – there should be rules that limit appropriation as well (Ostrom 1990). Individuals who have access and withdrawal rights may not have rights authorizing their participation in collective-choice actions. This forms the distinction between operational and collective level rights and consequently distinguishes users from managers of natural resources (Meinzen-Dick and Knox 1999).

The right to manage is a collective choice right that enables the right holder to define operational level actions (Schlager and Ostrom 1992). Management refers

to regulation of use patterns as well as improvement of the resource (Adger and Luttrell 2000). For example, a group of fisher-folk who develop a management plan that limits the various types of fishing methods to specific areas are exercising rights of management to the fishery. Individuals who hold management rights have the authority to determine how, when and where withdrawal of and access to the resource may occur (Schlager and Ostrom 1992).

Exclusion and alienation are collective level rights and are the highest forms of rights in the bundle of rights typology. Exclusion rights refer to the authority to exclude other users by setting a criterion for access to and withdrawal of the resource (Ostrom 2001). The right of alienation permits the holder of the right to transfer collective level rights in part or fully to another individual or group of individuals. This may be through selling or leasing the rights such that he/she can no longer exercise authority over the resource (Ostrom 2005).

Our attention to property rights is based on the premise that the configuration of rights determines the structure of incentives that appropriators face. Well defined and secure property rights provide an incentive structure for individuals through assuring them that the benefit accruing from the resource will not be reaped by other users (Ostrom 1990; Meinzen-Dick and Knox 1999). As a result, local appropriators have greater interest in resolving appropriation and provision problems. Appropriation problems refer to problems affecting utilization of the resource while, provision problems refer to challenges in maintaining and protecting the productivity of the resource (Blomquist et al. 1991). Without the rights to regulate and exclude others from exploiting the resource, local appropriators cannot maintain the integrity of the resource and the associated benefit stream (Meinzen-Dick et al. 1997).

## 4. The study area and methods

### 4.1. Study area

This study focused on the fishery on the Barotse floodplains in Western Province of Zambia ( $13^{\circ} 50' S-22^{\circ} 45' E$ ,  $16^{\circ} 40' S-23^{\circ} 45' E$ ). The floodplain is formed as the Zambezi River re-enters Zambia after passing southward through Angola (IUCN 2003). Although the exact extent of the plain is not easy to determine as occasionally inundated areas are fed by other catchments, it is estimated that it extends between 15 km to 45 km across and 160 km in length, reaching coverage of 5500 km<sup>2</sup> and with a maximum flooded area of 10,750 km<sup>2</sup> (Timberlake 2000). It is the second largest wetland in Zambia and one of Africa's greatest wetlands (Pollard and Cousins 2008).

Administratively, the floodplain falls under dual administration – traditional and state. Traditionally, the Barotse Royal Establishment (BRE) falls under the rule of the Litunga through a network of village headmen and advisors that govern socio-cultural aspects of the area covering the Western and North Western provinces of Zambia. The area is further sub-divided in administrative units – equivalent to districts – known as *silalos* (IUCN 2003). Under the state administration system,

the floodplain covers four of six districts in Western Province of Zambia including Mongu, Kalabo, Lukulu and Senanga governed through provincial and district line ministries (CSO 2012). Although the use of floodplain resources was in the past managed according to traditional systems, today formal control over natural resources has seen been passed over to government departments. However, the Barotse Royal Establishment still maintains great influence over use patterns and the regulation of natural resources in Western Province (WetlandAction et al. 2007).

Western province is estimated to contain fewer than 225,000 people with the *Lozi* being the predominant ethnic group (CSO 2012). Other ethnic groups include Mbunda, Nkoya, Lutana, Illa, Tonga and Luvale (CSO 2012). Livelihood strategies on the Barotse floodplains combine crop farming, cattle keeping, natural resource exploitation with fishing as the main livelihood option with more than half of the population estimated to be involved in fishing activities (IUCN 2003). The floodplain hosts about 80 different species of fish of which bream, tilapia, minnows, bottlenose and barbel constitute the majority of the catch (IUCN 2003). The fishing season occurs during the dry months between May to December after floodwaters recede. During flooded months, fish move from the main river channels into the floodplain where they spawn before the height of the floods (WetlandAction et al. 2007).

#### 4.2. Methods

The study employed a qualitative field research approach as its core scientific methodology. This is based on an understanding that an analysis of behavioural processes in benefit sharing necessitates a qualitative field research methodology to adequately frame field situations (Welman et al. 2005). The techniques used in the study were premised on a longitudinal case study. The longitudinal case study aimed at assessing benefit sharing arrangement on the Barotse floodplain between 1936 and 2012 using bundles of property rights as a theoretical lens. Field work was conducted between January and May, 2013 as part of a research project towards a Master of Philosophy academic degree.

Reference of a study as a case denotes the spatial and/or temporal delimitation of a phenomenon from which an inference can be made to explain that phenomenon (Gerring 2007). Therefore, the purpose of case study research is to intensively study a single case or a small number of cases in order to infer knowledge that applies also to a larger class of cases. Where the research seeks to analyze within-case observations, the study is referred to as a single case study while analysis of variation between two or more separate cases is referred to as a cross-case study (Blanche et al. 2006). However, selection of the cases for observation – or study – is not made on the basis of their representing an entire population (Gerring 2007). Often the units (observations) in the population are not homogenous, more the reason why case study research does not involve sampling (Tellis 1997). Instead, selection of the cases is done on the basis of maximizing inference from the cases within the timeframe of the research (Babbie 2014).

Respondents were selected from among various stakeholders in order to incorporate different aspects that influence sharing of benefits on the floodplain (Flint 2009; Leonard 1995; Pollard and Cousins 2008). Key informants included: two representatives of the traditional authority (*Indunas* responsible for conservation and development of the floodplain); one representative of the Zambia Wildlife Authority (ZAWA); Two officials from the Department of Fisheries; two officials from the local Government; one official from the Forestry Department; two representatives of the WorldFish Center Mongu office; one representative of the Lyambai Development Institute; two representatives from Concern World Wide Mongu office and community organizations and 14 local fisher-folk on the Barotse floodplain. The total number of research participants was twenty seven (27).

In-depth interviews and documentary analysis were used for data collection. In-depth interviews provide a means of collecting interview data in its natural context – this fits well with the interpretive approach to research (Blanche et al. 2006). Open ended questions provided a means of capturing emerging themes not necessarily included in the conceptual framework. Documentary analysis refers to the systematic collection, reviewing, and evaluating of documents – in soft and hard copies – in order to elucidate meaning (Bowen 2009). Documentary sources included minutes of meetings, letters, official documents, and newspaper articles (Blanche et al. 2006). Bowen (2009) suggests three uses of documentary sources: providing a context in which research participants operate through fostering historical insights; providing a means of refining interview questions based on new insights into the phenomenon; and as a means of tracking change and development. The themes that formed the basis for data collection included: rules governing access and appropriation of fisheries on the floodplain; collective choice actions governing creation and enforcement of rules; dynamics between state and traditional authorities; equity and institutional change; influence of institutions on collective behaviour.

Data analysis in qualitative research involves a thorough and careful reflection upon and interpretation of the data within the context in which it was collected (Blanche et al. 2006). This study employed thematic data analysis as a means of identifying and redefining themes emerging from interview transcripts and documentary sources through the use of codes. Due to the open-ended nature of in-depth interviews, new themes emerged that were not initially in the interview schedule. Inducing themes provided a means of identifying and reflecting on the meaning of the texts. Barbour (2007) suggests thinking in terms of processes, functions, tensions, and contradictions, with particular attention being paid to the phrasing and non-verbal cues attached to the sentences by respondents. Interpretation involved developing a written account of phenomena using themes as subheadings (Silverman 2010). This stage provided an opportunity to reflect on the researcher's bias in collecting and interpreting the data. In addition, the conceptual framework was used as a general frame for interpreting the data. However, care was taken to recognize unique concepts and relationships not reflected in the theory (Blanche et al. 2006).

## 5. Findings and Discussion

The following section presents and discusses the findings using the conceptual framework earlier outlined. The section is structured according to eras corresponding to the periods in which management and control shifted from traditional authority to the state and finally under co-management between local communities and the state. The presentation of results and discussions are not meant to be exhaustive but rather aimed at illustrating by way of supporting or disputing current discourse in community based natural resources management.

## 6. Traditional authority centered era

We propose that the traditional authority centered era of the Barotse floodplain was strongly associated with traditionally enforced use and control of rights and also characterized by sustainable sharing outcomes. This era dated from 1936 to 1974 and was associated with the period in which natural resources management was under the complete authority of the Barotse Royal Establishment (BRE) as the traditional authority. Local fisher-folk, through the BRE, strictly established and enforced access and withdrawal rights.

Access rights were collectively held and defined on the basis of residence, kinship, and political status thereby determining who was allowed to benefit from fishery resources defined according to the type of water body. The pattern of access rights incorporated both individual and communal rights to fisheries. In this manner, local users carefully matched particular types of access rights – whether communal or individual – to fishing grounds according to the type of water body. For instance, one of the key respondents from the traditional authority stated that an individual had the right to access fish from the main river channel of the Zambezi River (*Nuka*) while access rights to fisheries in tributaries (*Siko*) and lagoons (*Natikowa*) were subject to residence in the village. Residents of villages in which the tributary (*Siko*) occurred had the right to access fisheries in that water body whereas non-members of that village had to seek permission from the village headmen.

The occurrence of varying regimes of access according to types of water bodies can be partly explained through the theory of economic dependability of human territoriality (Thomas 1996). According to this theory, territorial behaviour among local users is influenced by the prospective gains of exclusive appropriation of the resource in relation to the resource (Dyson-Hudson and Smith 1978). The costs include: time, effort, and risk of exclusion as well as the potential negative consequences of depending on a spatially limited area. The physical characteristics of a resource system have a large influence on the type of property regime prevailing over a resource system (Thomas 1996). It is therefore argued that given lagoons and small ponds were characterized by discrete and definable boundaries, it is probable that local users found it easier to exclude others and hence enforce restricted access. But in the case of river tributaries and the main

channel of the Zambezi River, that are too large such that the costs of exclusion outweigh exclusive or private use of the resource, communal access became the most feasible type of property rights regime. We assert that for certain types of resources, communal property rights promote optimum access and productivity while bestowing on the entire community responsibility for conservation measures that will protect the resource (Ostrom 1990; Thomas 1996).

In this era, local users devised rules for limiting appropriation. Analysis of the Barotse Native Government Orders and Rules for natural resource management (Lewanika 2001) revealed the existence of rules that prescribed allowed and forbidden actions in exercising withdrawal rights according to defined criterion such as: (a) fishing to be done only after the fish breeding season in March of every year; (b) prohibition of use of small sized fishing nets and poison; (c) overnight fishing in specified lagoons was not permitted; and (d) the duration for which fish traps – weirs – were set up in lagoons was determined by the individual who had exclusive use rights to that particular lagoon. An interview with an official from the fisheries department highlighted that although these regulations limited the extent of appropriation by local users, the focus was primarily on technical externalities and allocation problems but did not address stock externalities. Technical externalities result from physical interference between the equipment of users during appropriation. Stock externalities refers to the effect of current activities on future availability of the resource (Blomquist et al. 1991).

These findings are consistent with a study of inland fisheries in West Africa and Bangladesh where Bene et al. (2003) found that traditionally managed fisheries rarely had strict measures for controlling harvesting quantities. In all cases, there was no evidence of traditional regulation of net size, fish size, and/or catch limits (Bene et al. 2003; Deacon 2012). Unlike contemporary fisheries management, traditional management systems focus more on technical externalities and allocation problems such as assignment and the effect of crowding and less on appropriation externalities that address the subsidiarity of the resource (Bene et al. 2003; Marschke et al. 2012). The underlying rationale for this phenomenon, especially in floodplain ecosystems which are characterized by the non-permanence of water bodies, is that it facilitates fish capture so as not to lose the fish resource before the end of the flooding season (Ostrom 1990).

During the traditional authority centered era of Barotse floodplain, local fisher-folk were included in decision making processes by means of established governance structures. Through collective choice rights, decision making rights were established, recognized, and adjusted according to social relationships enforced by traditional authorities. This was observed in one of the interviews with local community members:

“When we had problems or wanted to discuss an issue, we would gather and meet at the house of the Village Induna. Some of the issues would include, helping a member of the village with a grievance or a sick member of the village, with fishing gears and quantities” (Local community member).

According to members of the traditional authority, technical staff from the fisheries department would merely provide technical advice and guidance to traditional authorities. This arrangement helps to shed light on the role of the state in benefit sharing systems. Agrawal (2001), in his study of forest councils, found that in councils composed of local users of forests, traditional leaders were regarded by the Forest Department as subordinate employees with substantial autonomous control over local forests. The role of the Forestry Department was primarily to arbitrate disputes between villagers and the forest council office holders. The role of the state was not to control but rather to support effective benefit sharing arrangements (Reed and Bruyneel 2010).

## 7. State centered sharing era

The state centered sharing era was mostly characterized by ineffective benefit sharing outcomes. This period is between 1975 and early 1990s. This is associated with the period in which authority regarding management of fisheries on the Barotse floodplains was under the complete control of the state through its fisheries department and other line ministries. It is argued that weak enforcement of operational level rights, due to limited institutional capacity by the Fisheries Department and resentment of local users towards Government officials, resulted in parallel systems of *de jure* and *de facto* property rights. *De jure* rights included the rights that draw their legitimacy from the Fisheries Act of 1974 while *de facto* rights included those observed to be in operation.

Responsibility for the enforcement of access and withdrawal rights between the Government department and traditional authorities was unclear. For example, according to the Fisheries Act of 1974, access rights were supposed to be granted on the basis of fishing licenses. However, it was observed during interviews with government officials that fishing licenses were never issued on the Barotse Floodplain in this period:

“Ideally, fishermen had to obtain a license from the department. This does not happen in Western Province. Unfortunately we as a department have had a problem with the traditional authorities in terms of who collects revenues from the issuance of licenses” (Local Government Official).

This raises serious questions regarding benefit sharing arrangements in the context of fisheries: (a) the applicability of fishing licenses as a means of access restriction in floodplain contexts; and (b) usufruct rights in benefit sharing arrangements. In fisheries management, two forms of regulatory instruments are used to grant access rights – limited entry and territorial use rights (Charles 2002). Limited entry is a management tool in which the Government issues a limited number of licenses with the aim of controlling fishing effort in a fishery. Territorial use rights are a management tool according to which individuals or groups are assigned rights to fish in certain locations where they have rights of management and exclusion (Siar et al. 1992; Charles 2002). But in the case of the Barotse floodplain, fishing

licenses were regarded as a regulatory tool that limited entry to fisheries only to those who held rights granted by the Fisheries Department.

According to the District Fisheries Office, fishing licenses were not issued in the Western Province of Zambia. Instead, access rights to fisheries were granted on the basis of the boundary of the resource and residence of the fisher-folk. This occurred as a form of Territorial Use Rights for Fisheries (TURF) for local fisher-folk. It is argued that in the case of floodplains, the use of TURFs is a more effective mechanism for granting rights of access as opposed to fishing licenses. TURFs are more effective where boundaries of fisheries are well defined, as in the case of small lakes, small lagoons and coral reefs (Siar et al. 1992). This provides an opportunity to self-manage lagoons within the territory of users as well as a practical approach in overcoming transaction costs for monitoring and reducing conflicts among fixed and mobile fishing gears (Cauley et al. 1999). In addition, TURFs are more effective when implemented within an existing social institution that reinforces positive beliefs, customs, and practices (Siar et al. 1992; Charles 2002). In this way, TURFs can potentially incorporate context specific knowledge of the system gained from long generations of continuous use by fisher-folks thereby providing an opportunity for community based fisheries management (Siar et al. 1992). However, TURFs may not be the solution to the problem of overfishing in an already crowded fishery and hence must be coupled with alternative livelihoods options (Siar et al. 1992; Charles, 2002).

In the state centered sharing era Barotse floodplain, the prevailing legal instrument – Fisheries Act of 1974 – did not make any provisions for the participation of local communities in decision making regarding fisheries resources. This resulted in resentment by local communities and lack of interest in government policies and practices pertaining to fisheries. In a review of 129 secondary sources, Yami et al. (2009) identified joint decision making between formal and informal institutions as a conditions for optimum performance of governance of CPRs. Also, Chlatre and Agrawal (2008) in their study of forest councils in India found a positive relationship between local enforcement and forest biodiversity. Local residents not only had rights of access but also exercised claimant and proprietor rights. The ineffective benefit sharing outcomes associated with this era are perhaps explained by the lack of involvement of local users in the management of the fisheries. Ostrom (1997), in her design principles for enduring institutions, includes the rights of appropriators to devise and enforce their own institutions with little interference from the state as condition for successful benefit sharing arrangements.

## 8. Collaborative sharing era

The collaborative sharing era – 2000 to 2012 – was strongly associated with positive sharing outcomes. During this era, benefit sharing arrangements were characterized by collaboration between local communities, traditional authority, and Government departments. Local fisher-folk, through the Village

Natural Resources Management Committees (VNRMCs), created and enforced operational level rights. This points to an unresolved issue in research and policy regarding community based conservation as to whether or not residence within a geographical or administrative area should be a basis for membership in a user association or committee (Campbell and Shackleton 2001).

An analysis of the constitution of the Village Natural Resources Management Committees (VNRMC) based on the Barotse floodplains revealed that rights of access to fisheries during this era were granted on the basis of residence in which the committees occurred. These findings are consistent with other studies (Campbell and Shackleton 2001; Mosimane and Aribeb 2008), in which individuals were required to apply for registered membership. In other cases, the type of fishing gear provided the basis for membership in the committees. However, this has the disadvantage of causing conflicts between fisher-folk using different fishing gears, as the fishery consists of many fish species (Njaya 2007). The challenge for community structures with regard to membership lies in devising membership criteria that are context specific (Mosimane 2003) especially in floodplains that are subject to changing land use practices due to shifting hydrologic regimes (Bene et al. 2003).

During the collaborative era Barotse floodplains, benefit sharing arrangements consisted of organizational structures involving natural resources management committees at village and district level. Analysis of the community based natural resources management program report outlined the VNRMC structures established at community, district and provincial levels (Mubita 2002). It is argued that the membership composition at district level failed to truly represent the interests of the community and only extended the authority of the Fisheries Department and elite traditional leaders. The local communities were represented only at village level and not district level. In this way, representatives at district level were not downwardly accountable to local communities. In addition, such an institutional arrangement resulted in misunderstanding between traditional leaders and Government departments as regards to whom the executive member of the VNRMC would report to. According to a local government official:

“Co-management in Western Province of Zambia does not operate in the conventional sense of forming local natural resources management committees. They are often seen as parallel structure where the authority for natural resources management is taken away” (Local Government Official).

This seems to form a pattern that characterizes benefit sharing structures in collaborative benefit sharing arrangements in Southern Africa (Sen and Nielsen 1996; Kapungwe 2000; Nkhata and Breen 2010). In an evaluation of decentralized benefit sharing arrangements, Larson and Soto (2008) observed that benefit sharing arrangements have a positive effect if the users are empowered and accountable to themselves (Agrawal and Ostrom, 1999; Berkes 2004). It has been argued that while traditional leaders create legitimacy in benefit sharing arrangements, involving them is undesirable as they are not elected members of these institutions (Njaya 2007). However, the design and implementation of

user committees should consider the influence of traditional authorities on the behaviour of the community as custodians of local beliefs, norms and values (Nawa 1990; Sen and Nielsen 1996).

## 9. Conclusion

This study sought to understand the underlying complexity of benefit sharing of ecosystem goods and services among multiple actors. This was based on the premise that an appreciation of theories of property rights is necessary for the successful design and implementation of benefit sharing arrangements for natural resources, especially in developing countries. By assessing benefit sharing arrangements on the Barotse flood plain of Zambia, the paper has attempted to provide insights into the consequences of failing to recognize, establish, and enforce bundles of rights. It is evident from the findings that different eras had different configuration of rights that determined the nature of relationships between actors and concomitantly sharing outcome on the flood plain. The lack of establishment or non recognition of any of the property rights in the different eras resulted in either stable or unstable relationships between local communities, government and traditional authorities and consequently sharing outcomes.

This paper further sought to illustrate how a property rights perspective provides a useful way of understanding the relations underlying social institutions such as property rights and integrity of ecosystems. This is important especially in contexts in which utilization of shared ecosystem services is susceptible to externalities that make governance difficult and complex. Property rights are increasingly being viewed as a concept of great importance for dealing with a wide range of problems including climate change, genetic resources, and trans-boundary ecosystems. It is now generally acknowledged that improving the performance of environmental governance approaches requires an emphasis on property rights. Property rights can be conceived as a key governance mechanism for achieving key societal goals such as environmental justice and sustainable development. As a governance tool, they regulate and facilitate access to and use of natural resources. Importantly, they govern who is involved, what they can do, and when and how ecosystem goods and services are utilized. With increased trends in globalization and the role of markets, property rights go beyond central Governments to include other stakeholders such as the private sector, civil society, and local communities in the governance of natural resources. These changes are an indication that the theme of property rights might be replacing the perception that governance of natural resources can be treated as a discrete technical and ecological problem isolated from the contextualizing social system.

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