

Socio economic importance of freshwater capture fisheries: a case study of Western Kavango.

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Declaration

I hereby declare that this work is the product of my own research efforts, undertaken under the supervision of Mr. K. Stephanus and Dr. M. Issacs and has not been presented elsewhere for the award of a degree. All the sources have been duly and appropriately acknowledged.

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Certification

This is to certify that this report has been examined and approved for the award of a degree of Bachelor of Science in Natural Resources (Fisheries and Aquatic Sciences) of the University of Namibia.

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Abstract

The research serves to assess the social and economic importance of freshwater capture fisheries in the livelihoods of the people living in West Kavango, the effect of regulations are also considered to determine the effect they have on the community's livelihoods. This was done by assessing the proportion of livelihoods that constitute income from freshwater capture fisheries and defining the effects of regulations on their livelihoods and contrast between pre and post regulation times through focus group discussion, direct observations and key informant interviews. The objectives were narrowed down to two in order maintain simplicity and to minimize financial and time constraints. The study focused mainly on the social aspects of the fishing activities that are practiced in the area of study. The economic study was isolated from the study because it is difficult for fishermen to talk to a stranger about their finances. A qualitative approach to the study was carried out because a quantitative approach would not allow the capturing of sensitive information; there will also be no rapport with the community hence deprivation of valid information, while qualitative data tackles all of these areas and more. Triangulation allows comparison from different sources in order to verify data. Tvedten (2002) argues that it is difficult to assess the accurately the number of households involved in fishing in Caprivi, historically fishing was community-based activity, involving entire villages at specific times and on specific occasions but this is not the case anymore, because fishing now is largely an individual or household based activity. This is why the proportion of livelihoods that constitute income from freshwater capture fisheries could not be estimated. The data indicated that the proportion is not significantly high as to consider freshwater capture fisheries as a

livelihood strategy on its own; it has to be incorporated with other activities such as livestock farming and crop farming. This conclusion is based on direct observation and the group discussion. According to the fishers, there were more people who used to fish before regulations were introduced to them. People used mosquito nets as fishing gear and the large numbers in the landings encouraged people to fish. Although people know about the regulations, not everyone is adhering to them.

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CHAPTER ONE

1. Introduction

The Kavango River is one of the most important perennial rivers, and freshwater fish are important food source for local inhabitants, thus the protection of this resource is of utmost importance to secure the future food availability of the riparian population in this region of Namibia (Hay et al, 2000: 100).

Freshwater fishing forms are one of the important activities in the livelihoods of people living in the north eastern part of Namibia, incorporated with agricultural activities such livestock and crop farming. This research project serves as a contribution for other scientists / researchers to look at the fishing industry in the Kavango region and how it can be contribute to alleviate poverty and uplift / improve the livelihoods of people in the Kavango region.

Communities' living in rural areas' literacy and numeracy rates are relatively low; this makes it very difficult for the people to understand the dynamics of aquatic resources, hence they will not be able to manage their aquatic resources properly and sustainably. This research provides some contributions to the Ministry of Fisheries and Marine Resources on the management of freshwater fishing industry in the Kavango and Caprivi regions in order to improve the livelihoods of people in villages.

The communities that were studied are situated west of Rundu in the Kavango region, only one of the communities is a considerably notable fishing community. The other communities consist of seasonal fisherman.

2. Review of related literature

The concepts of co-management and ecosystem approaches to governance in order improve people's livelihoods are important to consider when dealing with freshwater fishing and how it contributes to poverty alleviation and food security. Through literature review I have found that these are the fundamental concepts that drive management of natural resources, especially in fisheries management. Fisheries system is complex and needs more than just one concept of management; it needs a product mix in order for the management strategy to be successful.

We will first look at the origin of the river, as well as some general information about the Kavango river. We will also look at the different concepts that may be considered in aquatic resource management.

2.1 The Kavango river

The Okavango River originates in the central highlands of Angola Katwitwi, (approx. 1700m above sea level) the river forms the border between Namibia and Angola before turning south towards Botswana (Hay et al, 2002). The ten most important species according to Hay et al (2002) in the gill net catches account for 78% of the total catch by numbers and 73% by weight. These were Silver catfish (*Schilbe intermedius*) which is the single most important species in gill net catches, both by numbers (26%), weight (20%), and frequency of occurrence (32%). Bulldog (*Marcusenius macrolepidotus*) is the second most important species by numbers and frequency of occurrence (17% and 25%, respectively), while sharptooth catfish (*Clarias gariepinus*) is the second most important species by weight (14%). Striped robber (*Brycinus lateralis*) is the third

most important species by numbers (10%), while tigerfish (*Hydrocynus vittatus*) is the third most important species both by weight and by frequency of occurrence (10% and 19%, respectively). Important species in catches with other gears than gill nets were as follows: The three most important species by numbers are the southern mouthbrooder (*Pseudocrenilabrus philander*) and banded tilapia (*Tilapia sparrmanii*), and the dashtail barb (*Barbus poechii*) (11%, 7% and 6%, respectively); The three most important species by weight are the redbreast tilapia (*T. rendalli*), sharptooth catfish (*C. gariepinus*) and redeye labeo (*Labeo cylindricus*) (12%, 9% and 7%, respectively); The three most important species by frequency of occurrence are the southern mouthbrooder, banded tilapia and Zambezi happy (*Pharyngochromis acuticeps*) (71%, 62% and 47%, respectively). The Synodontis species is also prominent in these catches, constituting 14% and 13% by numbers and weight, respectively.

2.2 Concept of Community

Community is a place where or location in which members interact with each other. Community also describes a shared sense of identity held by a group of people who may share the same geographic place and is a distinct social grouping (Flora et al: 1978: 7-8). Although current writings on community based conservation assert that community is central to renewable resource management, they seldom devote much attention to analyzing the concept of community, or explaining precisely how community affects outcomes (Gibson, 1999: 4). Institutions associated with management of natural resources are not only linked to the ecosystem itself, but are embedded in the combined social-ecological system (SES), thus affecting and being affected by social and cultural institutions, human relationships, and the resource itself (de la Torre-Castro, 2006).

2.3 Co-management

Co-management involves a partnership between government, stakeholder groups and research institutions, participatory process of management decisions- making that involves a partnership between government agencies, research institutions and stakeholder groups (Isaacs, 2008). In Africa co-management institutions have mainly been established at local and district level and often exist within a nested (entangled) system, however, several examples of consultative management institutions also exist at the national level. Generally, co-management arrangements have been implemented to encourage the resource users to become involved in establishing operational rules such as gear type restrictions (minimum mesh size and maximum length of seine or gill net), closed seasons and protected areas (Sverdrup-Jensen and Nielsen). In Africa, co-management is mostly used as a tool to resolve conflicts rather than a tool to achieve sustainable use of natural resources. According to Pinkerton (1999), the barriers lie rather in the distrust and resistance of management agencies and the lack of broadly organized political support.

2.4 Livelihoods, poverty and food security

According to Degen et al (2000) the basic parameters in fisheries management are vulnerability of flood plain fisheries, fish production and food security, income generation & employment, the structure of fisheries management, and Areas of conflict. These are the parameters that form part of the social and economic issues in inland fisheries, but this research project only focused on the concepts of livelihoods, and the effect of livelihood on poverty alleviation (freshwater capture fisheries). A Livelihood may be considered as a means of securing the necessities of life or an economic and social system, made up of assets and activities, and influenced by factors outside the control of individuals and households.

There are different definitions of poverty, these are in terms of:

- UNDP human development index
- Food entitlement
- Income poverty
- Livelihoods approach
- Millennium development goals

The UNDP classifies those that spend 60% of their total income on food to be in poverty, and those that spend 80% of their total income on food to be in extreme poverty. There is also the notion that considers those that spend a dollar or less on food per day. Food security is a condition when all people, at all times, have physical and economic access to sufficient, safe nutritious food to meet their dietary needs and food preferences for a healthy and active life (Isaacs, 2008). Bene (2003) argued that argues that the literature on small-scale fishing leads to the conclusion that “fisheries ¼ poverty” and maintains “an overwhelming impression that fishermen are members of low-status, marginalized households”. This is a stereotype that is often considered to represent important truths, but it is also thought to be too narrow to provide a sufficiently robust and transferable model of the livelihood functions of inland fisheries. In contrast to the stereotype that all fishers are poor and that fishing is the activity of last resort.

Ecosystem approaches and governance

Recent efforts addressing institutions for natural resource management have pointed out the need to include ecosystem dynamics consider non-equilibrium solutions, introduce complexity and diversity approaches, design flexible and open institutions and multilevel governance systems,

and to move beyond regulative elements of institutions into normative and cultural-cognitive ones (Jentoft 2004, de la Torre-Castro 2006 in de la Torre-Castro, 2006). By ecosystem approach in this case, we mean fisheries management that recognizes that fisheries are set within ecosystems, uses knowledge about the relationship between fisheries and ecosystem and, and where knowledge is lacking, makes robust decisions in the face of uncertainty (such that the outcome is likely to be benign, and unlikely to be irreversible) (Sissenwine and Mace). The arguments above combined bring about governance of natural resources using an ecosystem approach.

A study that was carried out by Bene et al (2003) in the Lake Chad Basin Area revealed that for the entire area, households, irrespective of their wealth levels, still rely to a very large extent on subsistence-based economy where the three major activities (fishing, farming, and herding) are closely integrated, and this was also observed in my study area. The livelihood functions of inland fisheries can be complex, requiring an analytical framework which can integrate assessment of a wide range of issues and which is robust, flexible and transferable (Smith et al, 2004). Actual fishing communities are likely to be varied in terms of wealth, social status, fishing methods and livelihood roles performed by fishing. (Smith et al, 2005, pg. 375). Fisheries experts now recognize that resource conflicts can be diminished and resources better managed when fishers and other resource stakeholders are more involved in management, and access rights are distributed more effectively and equitably. (Pomeroy, 1995).

2.6 Adaptive Management

An option that may be considered in resource management is adaptive management, which is defined by Holling (1978) and later by Walters (1986) in Lee (1999) -- implementing policies as

experiments -- is a methodological innovation in resource management. Like any method, the adaptive approach implies revised ends as well as novel means: as its name implies, adaptive management promotes learning to high priority in stewardship. Berke and Folke (1998: 9) defined adaptive management as dealing with the unpredictable interactions between people and ecosystems as they evolve together also taking the view that resource management policies can be treated as 'experiments' from which managers can learn.

2.7 The Inland Fisheries Resources Act, 2003

This act is chosen because it provides regulations for the conservation and protection of aquatic ecosystems and the sustainable development of inland fisheries resources; to provide for the control and regulation of inland fishing; and to provide for related matters. This is relevant for the research in order to analyze the effects of regulations on the community's fishing activities and how effectively these regulations have been communicated to the communities. The information contained in this section is from the Government Gazette of the Republic of Namibia that was released and promulgated on the 23rd of April 2003.

The Minister from time to time reviews the of economics, environment, and the social aspects of Namibia and draws the general policies with regard to sustainable usage of the Namibian inland fisheries resources with the aim of good management of the inland aquatic ecosystems; the promotion and sustainable usage of inland fisheries resources. This is done with consideration of the best scientific information available. When the policies are applied, the Minister consults with the regional council and any local authority councils or traditional authorities in that area. The Minister is in charge of promoting sustainable harvesting, management, conservation and

protection arrangements for freshwater fish and their ecosystems in accordance with international law, international agreements and arrangements to which Namibia is a party.

2.7.1 Inland Fisheries Council

There is a council known as the Inland Fisheries Council, which is in charge of advising the Minister in relation to any matters on which the Minister is requires to consultation. The Council under this Act and any matter which the Minister refers to the Council for investigation and advice. This council consists of the permanent secretary and other persons that the minister may appoint which may include:

- one staff member of the Ministry;
- two persons nominated by the Association of Regional Councils;
- one person nominated by the Association of Local Authorities;
- three persons nominated by the Council of Traditional Leaders;
- four persons who, in the opinion of the Minister, have knowledge in matters relating to inland fisheries and ecosystems, recreational fisheries or any other expertise of relevance to the issues on which the Minister is required to consult the Council under this Act.

The Minister may also on such terms and conditions appoint any person to assist the council in an advisory position. The first meeting of the Council must be held at such time and place as the Minister may determine, and thereafter, meetings of the Council are held at such times and places as the Council may determine, but the Council must hold at least one meeting every year.

2.7.2 Fishing Activities

A person may not engage in fishing in any inland waters by means of any regulated fishing gear without being the holder of a fishing license issued by the Minister or a designated officer

authorizing fishing by means of the particular type of regulated fishing gear which the person is using or intends using; contrary to any condition applicable to the license in terms of section 13. An application for a fishing license must be made in the prescribed manner to the Minister or a designated officer and can be made, at the election of the applicant, for a fishing license authorizing fishing by means of a rod, reel, line and hook only; a net only; or both a rod, reel, line and hook and a net. A person who holds a fishing license must make it available for inspection at the place where he or she fishes when required to do so by an inspector. These licenses are only issued upon payment of license fee and are valid for such a period as may be prescribed. This fishing license is not transferable.

The Minister, or a designated officer, may cancel or refuse to renew a fishing license if the license holder has failed to comply with a condition/s applicable to the license; the license holder is convicted of an offence in terms of this Act; or the sustainable utilization of any species of fish or inland fisheries resource in general is threatened. No person is allowed to have in their possession a net, unless authorized by the Minister or a person appointed by the Minister.

A person may not use for fishing - any chemical, poison, poisonous plant or any noxious or other injurious substance; any explosive, firearm or electrical device; or any light at night to lure or attract fish. A person who uses a net for fishing may not use the net - within 100 meters of a bridge, culvert or spillway when water is flowing through such structures; or in a manner that obstructs more than one half of the width of any watercourse where fishing is carried out.

A license does not authorize any person to fish in an area which has been declared as a game park or a nature reserve under section 14(1) of the Nature Conservation Ordinance, 1975 (Ordinance No. 4 of 1975), except if the holder of the fishing license is permitted under the provisions of that Ordinance to fish in such area; to enter any land owned by or under the control of any board, institution or authority established by any law for the purpose of fishing in the inland waters extending over that land without the permission of that board, institution or other authority.

Any power conferred by any law on an authority to grant permission for the construction of a dam, or the erection or installation of any structure in a river or stream must be exercised after consultation with the Minister.

The Minister, on his or her own initiative, or in response to an initiative of any regional council, local authority council or traditional authority, and in consultation with the regional council, local authority council or traditional authority concerned, may by notice in the Gazette declare any area of inland waters as a fisheries reserve if the Minister considers that special measures are necessary.

Subject to the Public Service Act, 1995 (Act No. 13 of 1995), the Minister may designate any staff member in the Ministry as an inspector for the purposes of this Act. The powers of inspectors perform any act necessary to ascertain whether the provisions of this Act have been or are being complied with; **Act No. 1, 2003 INLAND FISHERIES RESOURCES ACT, 2003** seize any vessel or fishing gear which the inspector has reason to believe has been used for

fishing contrary to this Act or a condition of a fishing license; seize any fish that the inspector has reason to believe has been caught or is being possessed in contravention of this Act or a condition of a fishing license; seize any equipment, article or substance that the inspector has reason to believe has been used for fishing in contravention of this Act or a condition of a fishing license.

2.7.3 Some of the offences and their penalties

A person is guilty of an offence when they contravene any of the provisions of sections 11(1) or (3), 16, 17(1) or (2), 19, 21(2) or 22(2); without the required permission fishing or attempts to fish in any waters referred to in section 18(a) or (b). Catches or attempts to catch fish by a method other than a prescribed method or by a method which is prohibited under this Act; dumps or allows to enter or permits to be dumped or discharged in inland waters anything which is or may be injurious to fish, or which may disturb or alter the ecological balance in such waters, or hinders the catching of fish; assaults, obstructs, threatens or intimidates an inspector in the exercise or performance of the inspector's powers or duties in terms of this Act; uses a forged license. A person convicted of an offence - for a contravention of section 19 or an offence referred to in subsection 1(b) or (f), is liable to a fine not exceeding N\$1000 or imprisonment for a period not exceeding 3 months; for a contravention of section 17(1) or (2), or an offence referred to in subsection (1)(c), is liable to a fine not exceeding N\$10 000 or imprisonment for a period not exceeding 12 months; (c) for a contravention of section 21(2), section 22(2), or an offence referred to in subsection (1)(d) or (e), is liable to a fine not exceeding N\$20 000 or to imprisonment for a period not exceeding 3 years or to both such fine and such imprisonment. A person who commits a second or subsequent offence under this Act is on conviction liable to a

penalty not exceeding N\$20 000 in additions to any other penalty which may be imposed in respect of that offence.

The act clearly indicates its intentions and plans to promote conservation of the inland aquatic resources through fisheries councils, who sets the regulations, and how the community may be involved in conservation matters. There are harsh penalties to pay upon misconduct which should be a motivating factor for the communities to comply with the regulations. Most of the decisions are made by the Minister and the Fisheries Council. The information in the Act is used to compare with what the fishers in the villages know to determine the effect that the introduction of the Act has had on fishing activities. Also determine the changes in fishing activities pre and post the promulgation of the Act.

3. Study Area

3.1 General information

These three villages are situated west of the main town of the Kavango region (Rundu), and east of the newly proclaimed town of Nkurenkuru. According to the 2001 Census Preliminary Results that were released in March 2002, the total population of the region is 201093, with 105168 females and 95925 males. The constituencies in which the study was carried out were Kahenge, Kapako, and Mpungu. Bunya in Kapako constituency, Tondoro and Kahenge in Kahenge constituency, Nkurenkuru in Mpungu constituency.

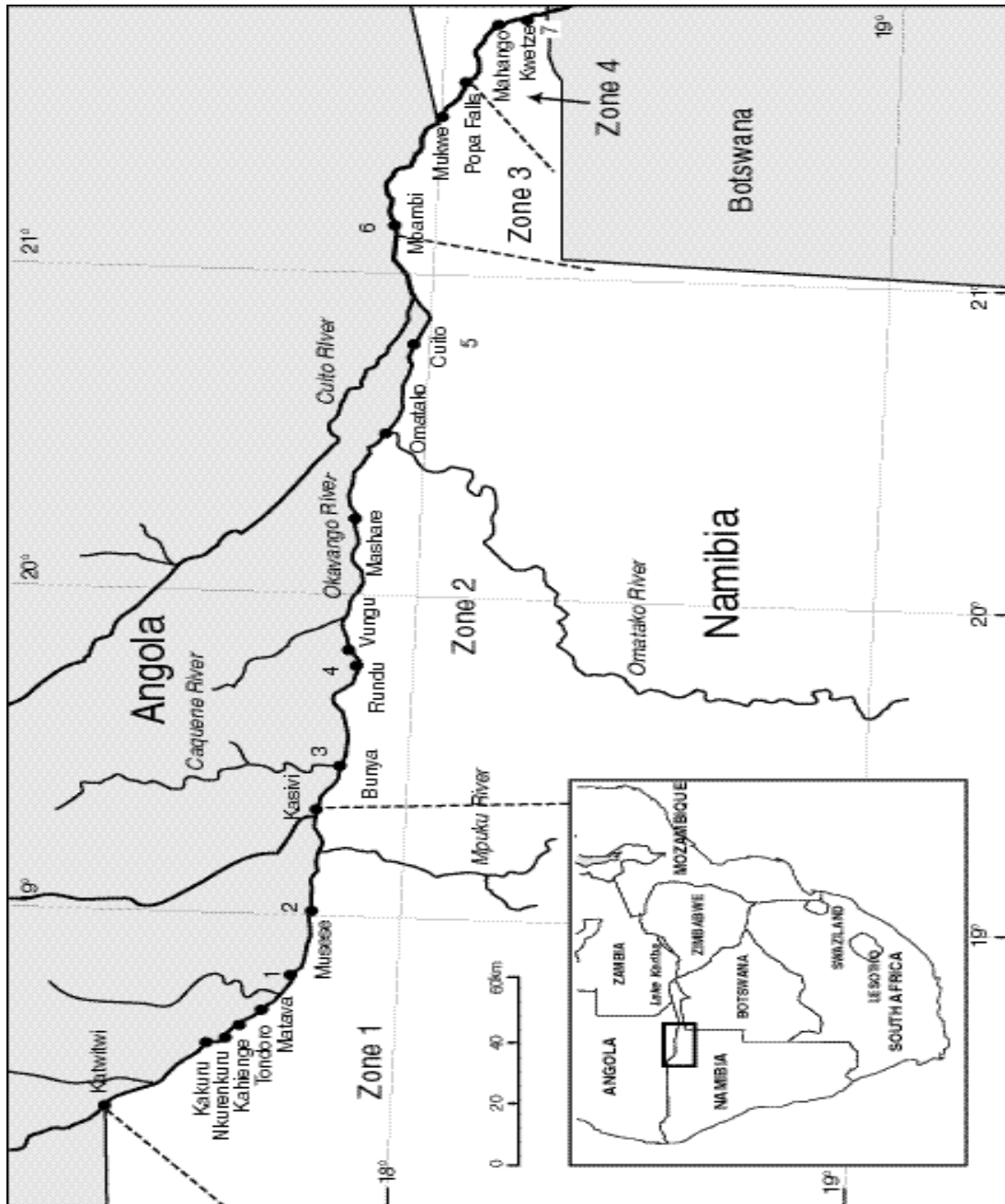


Fig 1: Study area

Source: Hocutt et al., 1994; Hay et al, 2002

Bunya is situated in the Kapako constituency. The constituency has a total of 25653 inhabitants with 13569 females and 12084 males. It has an average size of 6.5 people per household in a total of 3920 households.

Both Tondoro and Kahenge are situated in the Kahenge constituency. This constituency has 30180 inhabitants. This constituency also has more females than males with a total population of 15761 females and 14419 males. In a total of 4446 households there are 6.8 people per household.

The Mpungu constituency has the highest population on the western side of the Kavango region with a total population of 18332 people. There are a total of 9390 females and 8942 males in a total of 2498 households with an average of 7.3 people per household.

4. Objectives of study

The general objective is to assess the social and economic importance of freshwater capture fisheries in the livelihoods of the people living in the villages understudy, also determine the effect of regulations. Recommend ways in which the fishery can be regulated so it better suits the livelihoods of the local people. The objectives of the research were:

- i.) Assess the proportion of livelihoods that constitute income from freshwater capture fisheries.
- ii.) Define effects of regulations on their livelihoods and contrast between pre and post regulation times.

The objectives were narrowed down to two in order maintain simplicity and to minimize financial and time constraints.

CHAPTER TWO

5. Methodological approach

Socio-economical studies focus on two main classes of data and these are qualitative and quantitative data. This study focused mainly on the social aspects of the fishing activities that are practiced in the area of study. The economic study was isolated from the study because it is difficult for fishermen to talk to a stranger about their finances. Given more time, there would have been a possibility of gaining trust and a proper economic survey could have been carried out.

A qualitative approach to the study was carried out because a quantitative approach would not allow the capturing of sensitive information; there will also be no rapport with the community hence deprivation of valid information, while qualitative data tackles all of these areas and more. Triangulation allows comparison from different sources in order to verify data. Consistent information within the three methods would indicate that the data is valid.

5.1 Field work

The research method followed the method triangulation by use of focus group discussions, key informants and direct observation (Participation). Focus group discussion (FGD) is a more specific type of group interview. Observation is considered the archetypical method of scientific research. However, people often forget this simplest and basic of all scientific methods.

Observation can be defined as the act of noting a phenomenon, often with instruments, and recording for scientific and other purposes. The combination of these research methods put together gave strong support to the conclusions drawn in the community.

Groups of people were gathered at one place and these were the focus group discussions. Questions were constructed on an interview guide to determine the role and importance of freshwater capture fisheries to the livelihoods of the local community. The sampled villages in this study's replication were done in four (4) villages, which were Tondoro, Bunya, Kahenge and Nkurenkuru. The villages were visited once and together with the Key Informant and detailed notes were taken while the Focus Group Discussion was being carried out. The questions were prepared prior to the discussions in an orderly fashion so that the conversation would flow like a very normal one. These questions had three themes which were the General information, Livelihood strategies, and Management issues. It is also important to note that some sort of reward was necessary for these people and in this case the attendants were offered traditional soft drink (Sikundu). The inhabitants in the villages of western Kavango all speak Rukwangali, thus the discussions were conducted in Rukwangali.

After the focus discussion had ended some of the issues were discussed with the Key Informant so that a more private and personal viewpoint is observed, these views were also taken note of. The villages were visited starting from the one nearest to town first and ending with the one furthest from town. On our way back we would still search for fishers along the road.

The possible effects of regulations on livelihoods were isolated; this helped in determining how much management policies have affected the livelihoods of the people directly or indirectly involved in freshwater capture fisheries.

5.2 Limitation

Resource management as a branch of applied ecology is a difficult field in which to carry out scientific research, as Hilborn and Ludwig (1993) put it, the difficulty is easy enough to explain: experiments take longer, replication, control, and randomness are harder to achieve and ecological systems have the nasty habit of changing over time (Berke and Folke, 1998: 9).

The main limitation of the research was time. This is a social research paper and when carrying out such research activities one needs to enough time to study the community well and gain their trust in order to better understand the livelihoods of the community. Also the observations needed to be carried out systematically and repeatedly so that an average closer to reality is deduced. It was also very costly to travel to and from the study area, this is the combination of financial and transport constraints. Resource management as a branch of applied ecology is a difficult field in which to carry out scientific research, as Hilborn and Ludwig (1993) put it, the difficulty is easy enough to explain: experiments take longer, replication, control, and randomness are harder to achieve and ecological systems have the nasty habit of changing over time (Berke and Folke, 1998: 9). Fishing in these communities mainly takes place during warm seasons (Summer), and during colder seasons people engage in other activities because the

waters are cold at this time. The study was carried out during the Winter season, hence there were not so many people found selling fish across the streets.

Tvedten (2002) argues that it is difficult to assess the accurately the number of households involved in fishing in Caprivi, historically fishing was community-based activity, involving entire villages at specific times and on specific occasions but this is not the case anymore, because fishing now is largely an individual or household based activity. This may also be the case in Kavango.

CHAPTER THREE

6. Results: Case studies

6.1 Bunya

This community's focus group discussion consisted of 2 females and 8 males, their ages ranged from 20 to 35 years old.

The fishers that were interviewed on depend on fishing as their main livelihood strategy. They do not have specific permanent jobs, they only take part in part time jobs when they available in town or in the village itself. The lady fishers sell traditional soft drink (Sikundu) at the market as a supplement to the fish they sell. Most fisher households own livestock and are involved in crop farming as well. These agricultural activities are at a small scale, purely at subsistence level. The species they harvested are mostly Catfish, Tigerfish, Tilapia, and Squeaker. There is no species that has greater demand than another; this solely depends on the household preference. The fish that is caught is mainly for sale, but when the need arrives some of the fish are consumed,

especially when there is fish left over from the market. When fishers cooperate in the fishing process the fish is sold and each fisher gets only one fish from the catch for consumption. All the different species are sold at the price, i.e. a 45cm fish is sold for N\$10.00 and a 30cm fish will be sold for N\$8.00 and a 15 to 20cm fish may be sold for N\$5.00. In a household, different people may prefer different species. None of the fish is sold as processed fish because the consumers do not like their fish to be touched, they prefer to process it themselves. The market is not specific; everyone comes to buy at the market in the village, people from town, local people, and tourists as well. There is nothing done with regard to marketing, the usual customers already know when fish is available and they just come to the market to buy the fish.

The local people are aware of some of the regulations that are in place such as:

- A fisher is only allowed to catch two Tigerfish per day
- If a fisherman uses nets, the net needs to have a valid permit
- Mosquito nets should not be used as fishing gear

Failure to comply with these rules results in a fisher losing their net. Recent incidents have only resulted in perpetrators being warned. At the moment there is no committee known to the fishers that is responsible for enforcing these rules and regulations. The fishermen feel that these rules are not fair to them because one cannot control how many Tigerfish fall in a trap or will be caught by the net. Fishers are not worried about the depletion of stock because they feel that there are people in the ministry who are responsible of taking care of the stocks and there is enough fish in the river. There are no other strategies being implemented to see to it that overfishing does not take place except for the people employed by the ministry. The fishers have

lost faith in the government; they felt that they cannot rely on the government for assistance because there is nothing that will be done.

6.2 Tondoro

A group of 2 female and 4 male fishers was interviewed, with an age range of 15 to 35. The women were middle aged and the men were the older than the women.

The women sell their fish along the street and are involved in selling traditional soft drink (Sikundu). The male fishers are full time fishermen, but are also involved in small scale livestock and crop farming (Mahangu). Livelihood strategies are seasonal in these areas, thus there are seasons when they are only involved in one activity. During the rainy season the main activity is farming Mahangu. The fish species caught the most are Catfish, Tilapia, Squeaker, and Tigerfish. Tilapia and Tigerfish are most preferred; the elderly prefer Catfish and the younger people like Tilapia better. The catch is mainly for sale and the left over are eaten, but the fish usually finishes at the market. When there is a need for fish to be consumed in the household, it is decided prior to fishing the catch will be for consumption purposes. Normally prices differ by size. A 45cm fish would cost N\$10.00, a 30cm fish would cost N\$8.00, and a 15cm fish would cost N\$5.00. People in the community don't like their fish to be processed, thus the fish is sold unprocessed. The fish is mainly bought by the local community, and sometimes by people from other areas too. There are not enough facilities available; it is only the fishers themselves that have built shelters where they sell their fish.

There are some regulations that are known by the fishermen which are announced over the radio.

The rules are:

- If a fisherman uses nets, the net needs to have a valid permit
- Mosquito nets should not be used as fishing gear
- Some fish species should not be caught at large numbers (Tigerfish)

Those that do not have permits for their nets end up losing their nets. It is unknown by the fishers if one may end up in jail upon breaking these rules because they do not know of anyone who has been taken to jail for it. There are no committees that are in charge of making sure that these regulations are adhered to. These rules are only enforced by the offices of the Ministry of Fisheries and Marine Resources. The fishers feel that the people from the Ministry are just trying to do their jobs, but the apparent problem is that treated mosquitoes poison the water but we are not allowed to use untreated mosquito nets too. They also feel that there is enough fish in the sea and that there is no evidence that the stocks are being depleted. There are no committees that enforce the rules and regulations set by the Ministry, nothing is done by the community itself to sustainable fishing. Fishing has been part of their livelihoods for generations; there are people in the community who are known to be born fishermen.

6.2 Kahenge

There were no people found in this village that could be interviewed. The reason behind this is that these interviews were done during the winter and they do not fish during winter, hence it was difficult to find people who are involved in fishing activities.

6.2 Nkurenkuru

The interviewed fishermen in this village consisted of 3 gentlemen, there were no women found in this village, if there was enough time women could have been found, but in this case there were no women. The ages of the gentlemen's ages ranged from 30 to 45.

One of the gentle men works as a salesman in Ndjovhu hardware and the other two sell traditional brew at the local market. They mainly harvest Tilapia and Catfish which is for consumption purposes in order to supplement to their household diet. Fishing for these men is solely for subsistence purposes, they do not sell any of their harvest, and they only fish during weekends because during they get back to their normal jobs. These men claim to know a few people in the village who are fulltime fishermen, but this practice is not a livelihood strategy anymore due to the developments that are taking place in the village.

Regulations that are known to these men are only about fishing nets, there are no other regulations to them about fishing. These men only use fishing lines; therefore they are not concerned about regulations about fishing nets.

7. Results of study

i) Proportions of livelihoods that constitute income from fresh water capture fisheries.

The results of the study indicate that everyone in these different communities depend on fishing activities one way or the other. Those who derive income directly from the fishing are only those households that have fishermen or women in their household, this is because there is no employment derived from it or and only the fisher financially benefit from fishing activities. The rest of the community's benefits are that there is fish readily available for them to buy and supplement to their diets. Fishing is an integral part of the livelihoods in these communities, but there are very few people who are actively involved in fishing activities as a form of income. The people who are actively involved in fishing are not full time fishers; they are also involved in agricultural activities such as livestock and crop farming. Although there are many people that depend on fishing as a way of living, there are no people that were found that constitute income solely from fishing activities. What can be derived from the data is that the proportion is not significantly high as to consider freshwater capture fisheries as a livelihood strategy on its own; it has to be incorporated with other activities such as livestock farming and crop farming. This is based on the observation that there were no respondents that derive income from fishing only.

ii) Effects of regulations on livelihoods and the contrast between pre and post regulation times.

The introductions of regulations set by the government have not been effectively informed to the different communities. This has been indicated by the fishers not having enough knowledge about the rules and regulations regarding freshwater capture fisheries. Fishers only know a few of the regulations that are in place, such as that a fisher is only allowed to catch two Tigerfish per

day; if a fisherman uses nets, the net needs to have a valid permit and that mosquito nets should not be used as fishing gear. Although they know what is against the rules, they do not know what the penalty for not adhering to these regulations is. Some of the regulations are perceived as unfair by the fishermen upon consideration of the type of gear that they use. When asked if they think that the regulations are fair to them one of the participants said “how can I control how many Tigerfish I catch in my gear, that is impossible, I am a hungry man when I catch a fish I take it to the market and sell it or take it home so that it can be eaten”. According to the fishers, there were more people who used to fish before regulations were introduced to them. People used mosquito nets as fishing gear and the large numbers in the landings encouraged people to fish. Although people know about the regulations, not everyone is adhering to them.

CHAPTER FOUR

8. Conclusion

Most of the fishers in the community are part time fishers, but it is still largely considered as an important livelihood strategy. Fishing in most of the villages studied is mainly done to supplement their diets.

The people in the communities are not well informed about the Act of Parliament thus they do not know the consequences of non compliance of the rules and regulations. The community feels that some of the regulations are not fair to the fishers in the community because they are hard to comply with (e.g. 2 Tigerfish per fisher per day). One of the fishermen while conducting a group discussion said: “how can I control how many Tigerfish I catch in my gear? that is impossible, I

am a hungry man when I catch a fish I take it to the market and sell it or take it home so that it can be eaten". Given that the Act is has already been promulgated, there are many loopholes, which need to be looked into. There are excellent initiatives in the Act but not all of them are being put into practice, such the concept Fisheries reserves and Village committees.

The form of management in place is a top-down form of management. The Minister and the Permanent Secretary are the main decision makers on management decisions with the advice of experts appointed by the Minister. According to the Inland Fisheries Act the council may consist of people nominated by traditional leaders, associations of traditional leaders and associations of regional council. Local people's perspective would be imperative in management decisions, but there is no person known appointed by the community to represent them in the council. The livelihoods of the communities include fishing and agricultural activities, but they have very little to say about the management of the resources that form part of their livelihood. For poverty alleviation to be successful the community needs to be empowered through having decision making power, and this can be achieved through co-management

Inspectors appointed by the Minister are in charge of enforcing the regulations in the Inland Fisheries Act. The Inspectors are based in Rundu, and this is a problem because enforcement cannot be done from a distance. There are no inspectors on site the main fishing villages; they only appear at the villages once in a while.

9. Recommendations

Commercialization of the fish resources in the Kavango is not an economically and ecologically viable option; this conclusion is based on the present state of the fish resources in the river and the high human population densities along most of the river. Although some species may be preferred for food, the local fisheries spend more effort to increase the quantity of fish (and thereby food supply) rather than to Catch specific species. (Hay et al, 2000. p. 100). Hence fishing can only be considered as a small scale livelihood strategy that is used to supplement the diets of people in the communities, incorporated with other activities, poverty reduction can be achieved.

Local groups are usually the least powerful among the different parties interested in conservation. (Gibson, 1999: 12). As is the case in Namibia, the fishermen have no say about the conservation of the fish. The decisions are made by the Ministry and communicated down to the fishers. Local people should be given the chance to have a say on how they would want to manage their aquatic resources. This will bring about the self regulation in the communities where the community will take care of the fish stocks with the assistance of professionals appointed by the Minister. The concept of including stakeholders, government, and the community is called co-management and in this way the communities are empowered and feel a sense of ownership, thus they would want to conserve their resources.

Adaptive management may also be considered as an option of resources management, this is a form of management that deals with experimentation and trying to find out how the resources can be best managed. In this case the people who know the most about the resources would be

the local people; they have done resource management ‘experiments’ for generations.

Collaboration between the local community and the professionals appointed by the Minister would bring about proper resource management. Who would know about their resources better than the local people themselves? This still boils down to co-management.

Berke and Folke further argue that the way forward is adaptive management which is management that emphasizes the importance of feedbacks from the environment in shaping policy, followed by further systematic experimentation to shape subsequent policy, and so on. The process is iterative; it is feedback and learning-base. The important questions that need to be asked are if resource management can be improved by supplementing scientific data with local and traditional knowledge? Can information from resource users themselves broaden the base of knowledge necessary for decision making for sustainable resource use? Research on adaptive governance of social-ecological systems illustrate that the management of ecosystem and landscapes is complex to apprehend and implement and, therefore, cannot easily be subject to planning and control by a central organization, such as a national government. However, the conditions creating the opportunities for adaptive co-management to self-organize, such as enabling legislation, flexible institutions, and recognition of bridging organization, are good candidates for governmental actions, which can be carefully tested and evaluated. (Folke et al, 2005: 22). Scientific data would be irrelevant to society without knowledge of the impact this data would have on the community, resource users should be an important aspect in determining the management system that should be followed because they are the ones being affected the most, it is their livelihoods at stake, and they would want to protect it. Fishing in the communities’ mainly takes place during warm seasons; this helps in the sustainable development

of the resources, because the resources are not exploited as much during colder seasons. This can be considered a form of a closed season. Adaptive management is a good recommendation for the Namibian case; regulations are flexible, but not flexible enough to suit the needs of the community.

Awareness of the Act can be done through radio discussions, translation of the Act in local languages and distributing them to the local communities. The people only find out that something is unlawful after they have committed the crime.

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11. Addenda

11.1 Attendance Lists

Bunya

1. Mobi Kazana
2. Michael Haingura
3. Elisabeth Hausiku
4. Dolly Hausiku
5. Paulus David
6. Mukondjereni Michael
7. Marvin Shininge
8. Hafeni Siteketa
9. Nekaro Oswaldt
10. Philip Mukoroli

Tondoro

1. Nangura Haita
2. Mwarengwa Sikongo
3. Matjayi Nekaro

4. Kandjimi Haita
5. Becky Mukongo
6. Nimrod Haingura

Kahenge

NONE

Nkurenkuru

1. Ndara Tjameya
2. Haingura Bartholomeus
3. Jonas Kandjimi

Key Infomants:

1. Samora Mvambo (Teacher)
2. Kandjimi Michael (Nkurenkuru Town Council)

11.2 Interview guide for fisher households

Date_____ Village_____ Questionnaire
number_____

General

1. Gender: male () female ()
2. Age
 - <15 ()
 - 15-20 ()
 - 20-25 ()
 - 25-30 ()
 - 30-35 ()
 - 41-50 ()
 - >50 ()
3. Ethnicities
4. Level of education

Livelihoods

5. What is your main livelihood strategy?
6. What other activities are you involved in?
7. What species do you catch the most?

8. What species has the most demand?
9. How much do you sell the fish for?
10. Why do you fish?
 - Consumption ()
 - Selling ()
11. What is the ratio between the fish that you sell and the fish that you eat?
12. Do you process any of the fish that you catch, if so how?
13. Who are your main customers?
 - Local people
 - The whole region
 - The whole country
14. Are there enough facilities for you to market your products properly? (Ranking out of ten)

Management

15. Are you aware of any regulations that are in place?
16. If yes, what are some of these regulations?
17. How are perpetrators punished?
18. Is there a committee of some sort in the community that sees to it that regulations are followed?
19. Do you think these regulations are fair to you, if they are not name the ones which you think are not fair?

20. Are you not afraid that stocks may be depleted?
21. What is being done to see to it that stocks are not depleted?
22. Is there anything else you would like to say about fishing in general in this area?