

Impact of Closed Fishing Season on the Livelihood of Fishers: A Case of Stratum I of Kafue Fishery

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Abstract: A study to determine the impact of closed fishing season on the livelihood of fishers was conducted in Stratum I of the Kafue fishery. A simple random sampling method was used to pick 34 respondents from different fishing villages/camp out of a list of 136 registered fishers obtained from the Department of Fisheries. Questionnaires were administered to the selected respondents who were involved in fishing as their source of income, employment and food. The results evidently showed that fifty eight (58%) percent of the fishers were negatively impacted by the closed fishing season. Furthermore, another 55% of the respondents also indicated that complete stoppage of fishing denied them the opportunity to have a regular income. Most fishers considered fishing to be an important occupation that provided their main source of income to keep their families well, considering that there were no viable alternative income generating activities. Furthermore, it was observed that those that continued to fish illegally during the closed fishing season, made little income of less than \$189 that was unable to effectively sustain them. However, in spite of the challenges they faced during the closure, some fishers supported the move taken by the government to conserve their much treasured natural resources on which their livelihood was dependent upon.

Keywords: Impact, closed fishing season, livelihood of fishers, Stratum I, Kafue fishery.

I. INTRODUCTION

Fisheries were an important commodity traded within Zambia and across national borders into the region, and the demand for fish and fish products was still growing due to population growth (Lungu and Hüsken, 2010). The Zambian fishery is important as it continues to contribute significantly to improvement of rural livelihood in terms of employment and income generation, reducing poverty and as a source of food (Musumali *et al.*, 2009). Fish is a source of the much needed protein especially where meat is scarce or expensive (Kairu, 2001). However, demand for domestic fish for consumption still exceeds production (APFM, 2007). In recent years, the resources of the Kafue River have come under severe pressure due to a variety of economic and ecological factors associated with over-fishing and a significant decline in fish species (APFM, 2007). Because of the heavy pressure on fish resources, catches were declining with increase in fishers and wrong fishing methods (CSO and DOF, 2006), which has resulted into increasing evidence of hardship amongst the fishing household (Geheb and Crean, 2003). Illegal fishing methods like, 'Kutumpula', which involved driving the fish into nets by beating the water surface with wooden planks occurred on the Kafue River. Fishers had also resorted to fish poisoning, using mosquito nets and Chikukula, a net made of potatoes sacks, which went up to 400m and caught fish of all ages (CSO and DOF, 2006).

In order to ensure the sustainable utilization of the fisheries resources in line with the provisions of the Act, the Department of Fisheries in the Ministry of Agriculture and Livestock was mandated through the Fisheries Act, cap 22 of 2011 of the laws of Zambia, to manage the fisheries resources of the country. The annual fishing closure was imposed from 1st December to 28th February the following year (MAL, 2014). The fishing ban coincides with the rainy season and was introduced to protect the breeding of the commercially preferred species (mostly *Tilapia* species) whose breeding peaks in that period (FAO, 2004). The Kafue River had a variety of species; breams such as *Tilapia rendalii*, *Tilapia spamanii*, *Oreochromis niloticus*, *Seranochromis* species, and *Barbus species* (Nchenga), African catfish (Mulonge) and many more. However, the bream was caught in abundance in fishers' nets and were by far the most preferred species by consumers, especially *Tilapia rendalli* that sold very quickly at the market.

During the closure, fishers were economically cut off from fishing on which they were entirely dependent upon for their livelihood. The closed fishing season was imposed on all the major gazetted fisheries of Zambia which included Upper Zambezi River, Lake Mweru-wa-ntipa, Lake Mweru Luapula, Lukanga, Lake Bangweulu and Kafue River except for Lakes Tanganyika and Kariba. If properly managed and developed, the fisheries of Zambia had the capacity to meet the country's requirements in fish supply and to make significant contribution to economic growth (ECZ, 2001). Other than that the government introduced permanently closed areas as sanctuaries and breeding grounds for commercially important species, the restriction allowed for new recruits to attain a minimum size before being exploited (FAO, 2004). However, some of the challenges included: ineffective enforcement of the fishing ban, lack of equipment and inadequate trained enforcement staff, inadequate funding directed towards the exercise and inaccessibility to some fishery areas. This study therefore, was done to evaluate the effects of closed fishing season on the livelihood of fishers in Stratum I of Kafue Fishery.

II. MATERIALS AND METHODS

The study was undertaken in stratum I of Kafue fishery. The Kafue River basin covers an area of approximately 6,500 km². The periodically inundated floodplains are a home to a population of around 12,000 people who relied on the fresh water fishery as fishers, fish traders and auxiliary service providers (Nyimbili, 2006). Based on Department of Fisheries' stratification, Stratum I of Kafue River covers all areas from Kafue Gorge to Nanga (Fig. 1).

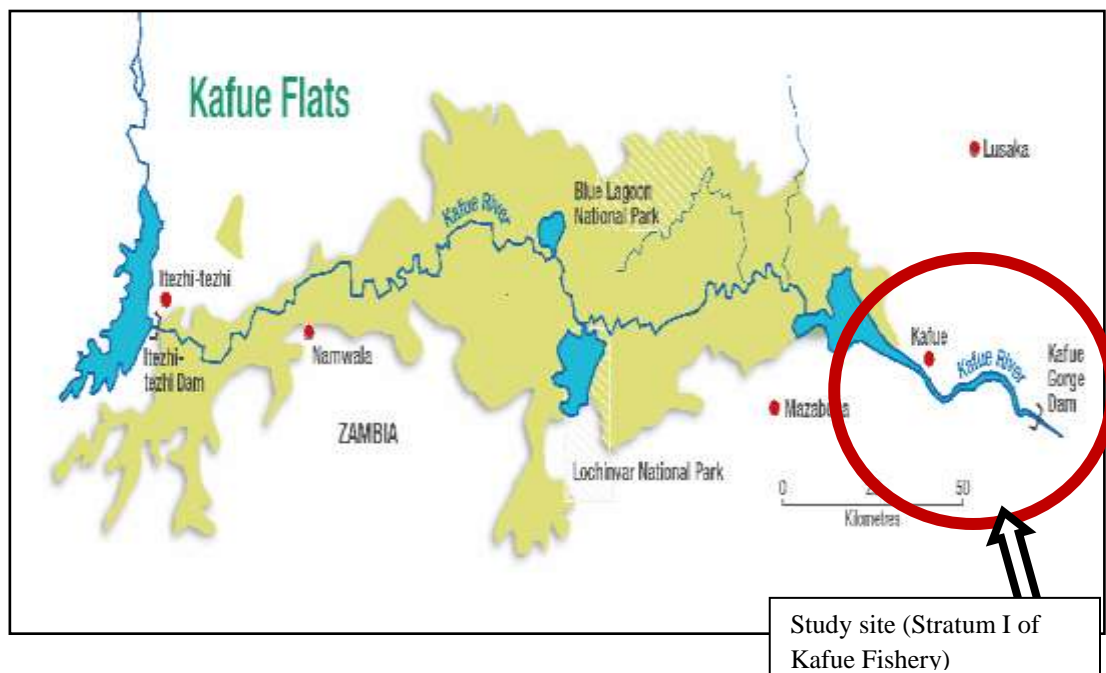


Figure 1: Map of Kafue flats floodplain. (Source WWF-Zambia, 2003)

Stratum I of Kafue fishery was chosen as a study area because it had the largest representation of local and migrant fishers from other provinces, such as; Western, Northern, Luapula and North-Western province. The total number of fishers in stratum I was 600 while those who had registered with the Department of Fisheries in various fishing villages/camps were only 136.

A random sample using simple lottery method was used to select 34 respondents (i.e. 25%) out of the registered fishers. According to Kress (1992), sampling intensity of 25% increases the probability of minimising the sampling error. In the same vein, Struwing and Stead (2001) stated that 25% sampling intensity was recommended when questionnaire surveys were used as it limits the costs involved. The Newbold *et al.* (2010) formula was used to calculate the sampling intensity.

Semi-structured questionnaires were administered to selected fishers who were scattered in the 6 different fishing villages/camps as indicated in Table 1. In some instances focus group discussions were conducted with 2 or 3 fishers, which helped those who were sceptical to freely discuss the topic in line with the information required.

Table 1: Total number of registered fishers interviewed from different fishing villages/camps

No.	Name of fishing Village/camp	Total number of registered fishers per fishing village/camp	Total Number of fishers interviewed
1	Kafue Road Bridge fishing Village	16	4
2	Kabeubeu fishing camp	8	2
3	Ph fishing village	16	4
4	Dobe fishing camp	32	8
5	Chilumba island fishing camp	28	7
6	Chanyanya fishing village	36	9
Total		136	34

Data collection

Data collection included: gender of fishers, marital status, number of children/dependants, duration of fishing, circumstances that led to them becoming fishers, how they fished, preservation methods, fish consumed, fish prices, investment, other sources of livelihood, knowledge and views of closed fishing season and impact of fishing ban. Detailed interviews with the fishers focused on the issues such as income generated and utilisation before and during the closed fishing season, as well as income generated from other activities that the respondents were involved in during the closed fishing season.

Data analysis

The data was analysed using the statistical package for social sciences (SPSS) version 17.0 for windows.

III. RESULTS

The study clearly showed that males were dominant (98%) as fishers compared to females (2%) in Stratum I of Kafue fishery (Fig. 2).

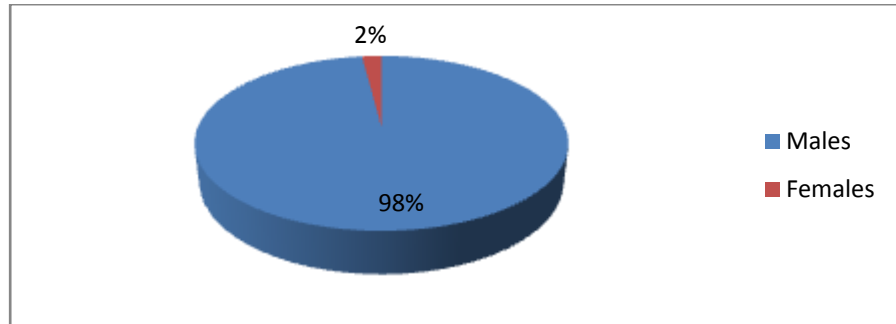


Figure 2: Gender composition of respondents

At the same time, more than half (58.82%) of the fishers were married, 29.41% were single, 8.82% were widow(er)s and 2.94% were divorced (Fig. 3).

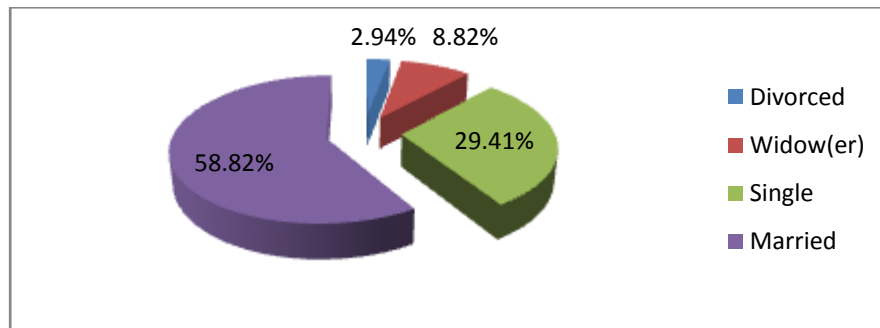


Figure 3: Marital status of respondents

Over thirty-two per cent (32.4%) of the respondents indicated that they had between 1 and 3 children, 29.4% between 4 and 6 children, 23.5% had no children, and 14.7% had between 7 and 10 children (Fig. 4).

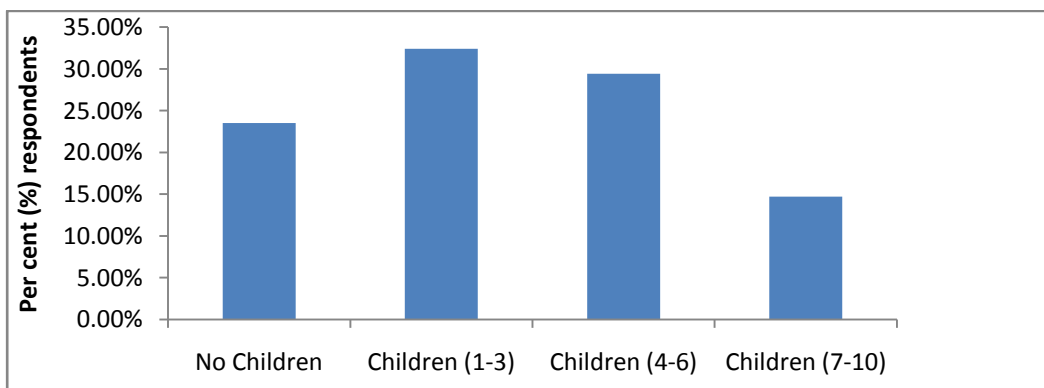


Figure 4: Number of Children

It was also noticed that most fishers kept dependants; 44.1% indicated that they kept between 1 and 3 dependants, 32.4% did not keep any, 14.7% kept 3 to 6 dependants and 5.9% kept dependants of between 6 and 9 (Fig. 5).

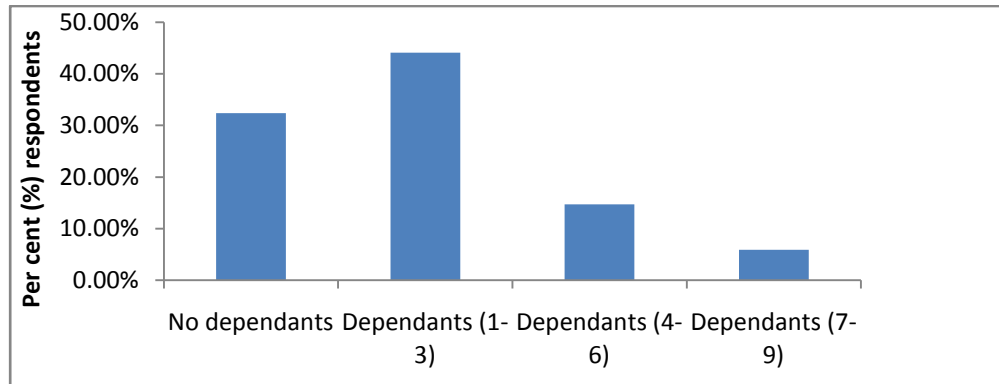


Figure 5: Number of Dependants

It was also noted that 58.82% of the respondents had been fishing for more than 10 years, 17.65% between 6 and 10 years, 11.76% between 2 and 5 years, 8.82% for less than six (6) months and 2.94% between six months and one year (Fig. 6).

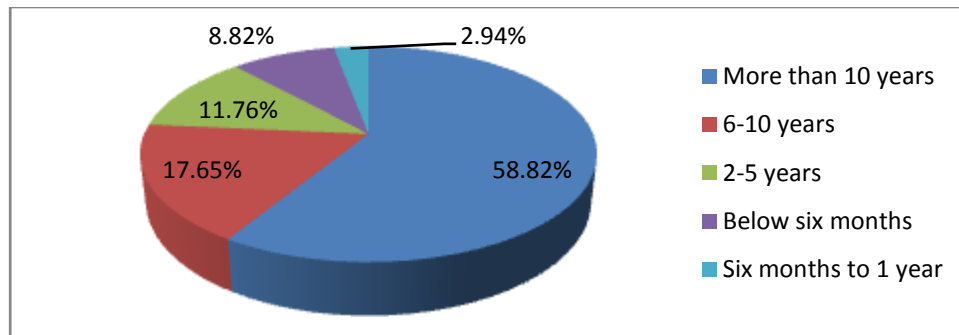


Figure 6: Duration of fishing in stratum I

From the study, it was noted that 76.47% of fishers went into fishing due to lack of employment, 17.65% due to family background, and 2.94% due to own interest and encouragement from friends respectively (Fig. 7).

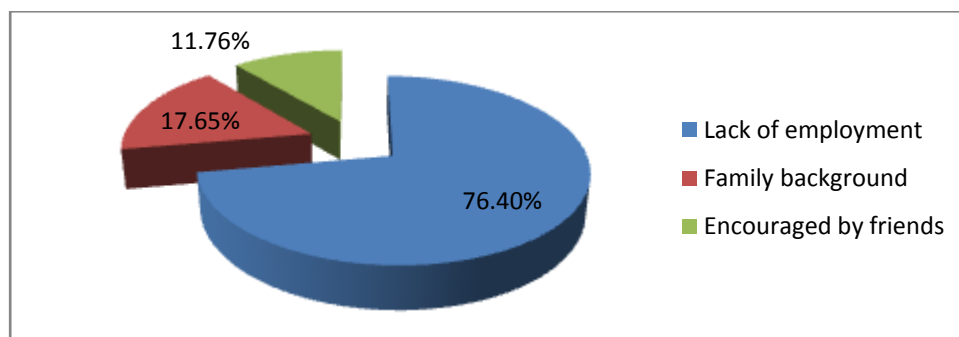


Figure 7: Circumstances that led the fisher to go into fishing

About 61.76% of the respondents indicated that they did their fishing with helpers, 17.65% fished with relatives, 11.76% fishers had employed others to fish for them and 8.82% fished alone (Fig. 8).

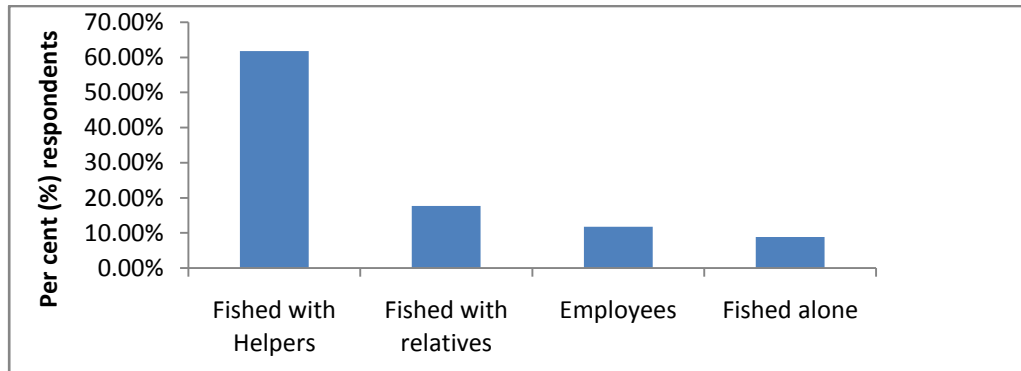


Figure 8: Composition of fishing team

Fishers in Stratum I of Kafue fishery used several ways to preserve their fish to minimize spoilage, 85% used traditional methods of covering the fish with grass/weeds, 9% did not cover their fish, while 6% used ice blocks placed in crates (Fig. 9).

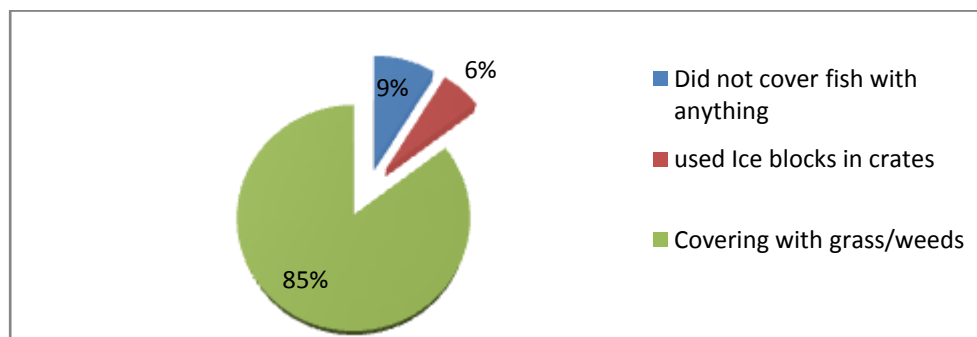


Figure 9: Preservation methods

Of the fishers interviewed, 67.67% indicated that they took 1 to 3kg from their fish catch home for consumption, 23.53% took less than 1kg fish home for consumption, 5.88% indicated that they did not take any fish home for consumption but sold all of it while 2.94% indicated that they took more than 4kg of their fish catch home for consumption (Fig. 10).

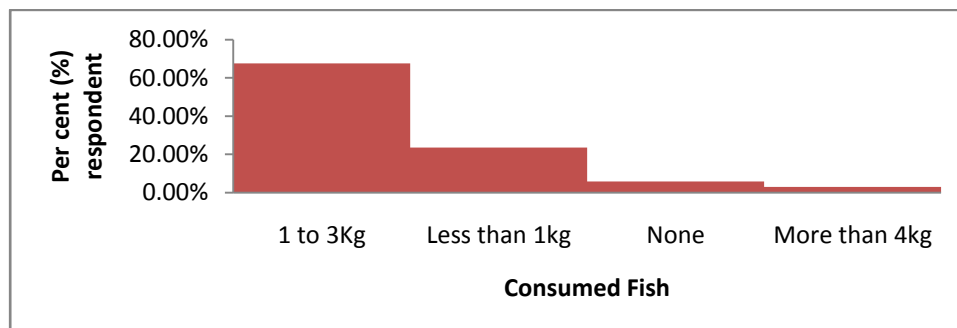


Figure 10: Fish taken home for consumption

Over 41.18%, indicated that they sold their fish between K15 (\$2.73) and K20 (\$3.64), 29.41% sold their fish at less than K10 (\$1.73) while 23.53% indicated that they sold their fish between K10 (\$1.73) and K15 (\$2.73) and 5.88% sold their fish above K20 (\$3.64) (Fig. 11).

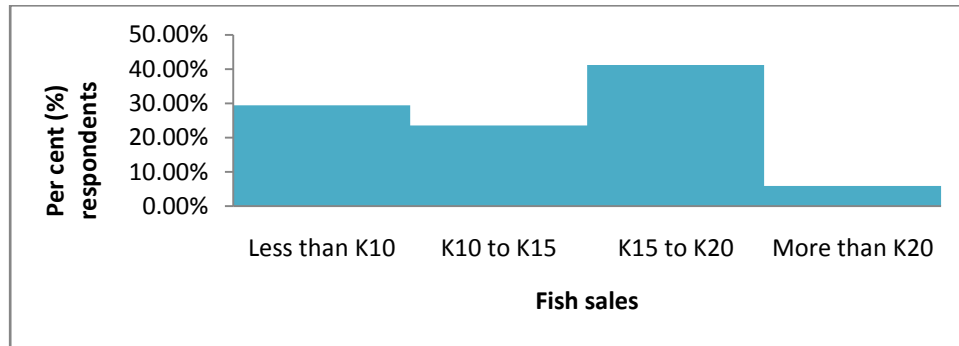


Figure 11: Price of fish/kg.

During the open fishing season, most respondents (55.88%) indicated that they generated incomes in the range of K2, 000 (\$377) to K4, 000 (\$755), 29.41% generated below K1, 000 (\$189), 5.88% between K4, 000 (\$755) and K6, 000 (\$1,132), another 5.88% indicated that they generated above K7, 000 (\$1,321) while 2.94% indicated that their fish was not for sale (Fig. 12).

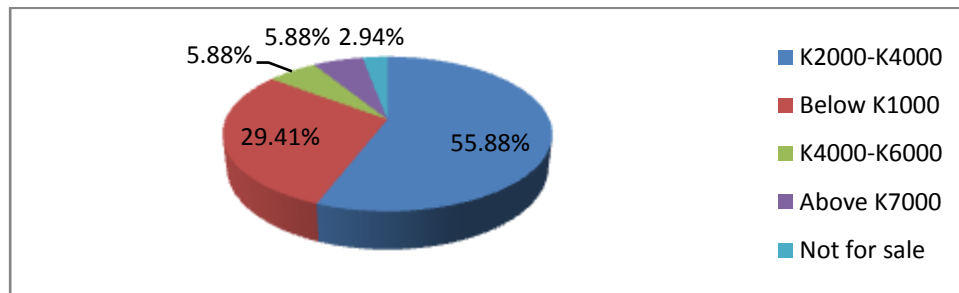


Figure 12: Annual income from fish sales

It was also noticed that 38.24% of the fishers were unable to invest their surplus money after selling their fish, 23.53% invested in agriculture and another 23.53% procured fishing requisites, 8.82% invested in charcoal sale business while 5.88% invested in small grocery shops (Fig. 13).

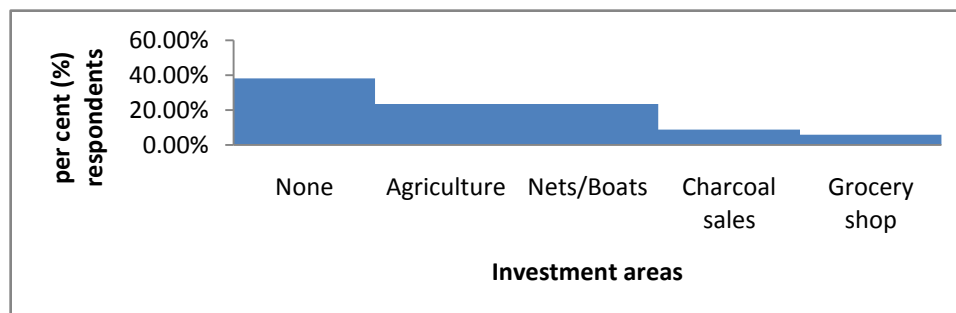


Figure 13: Areas where money was invested in

Figure 14, shows how the income from fishing was utilised at household level.

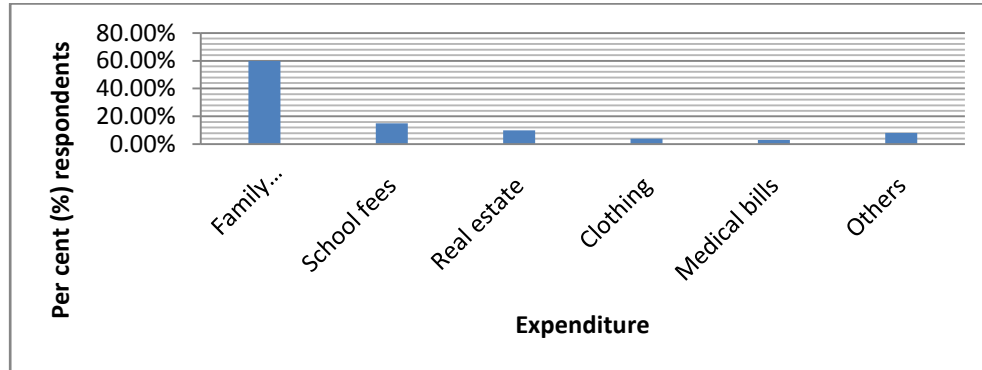


Figure 14: Utilization of various incomes generated by fishers

Generally, the main source of income (74%) for the people in stratum I was fishing, while 26% revealed that agriculture was their main source of income because fish were not enough in the river anymore like it previously was, hence their diversion into agriculture (Fig.15).

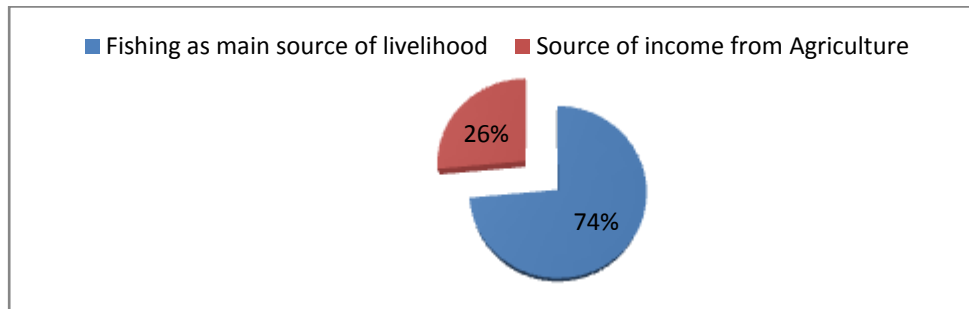


Figure 15: Sources of Livelihood

The majority of the fishers were aware of the importance of closed fishing season. Over ninety (91.2%) per cent had full knowledge of its importance and viewed it as a good move meant to conserve fish while a partly 8.8% considered the practice as a bad vice (Fig. 16).

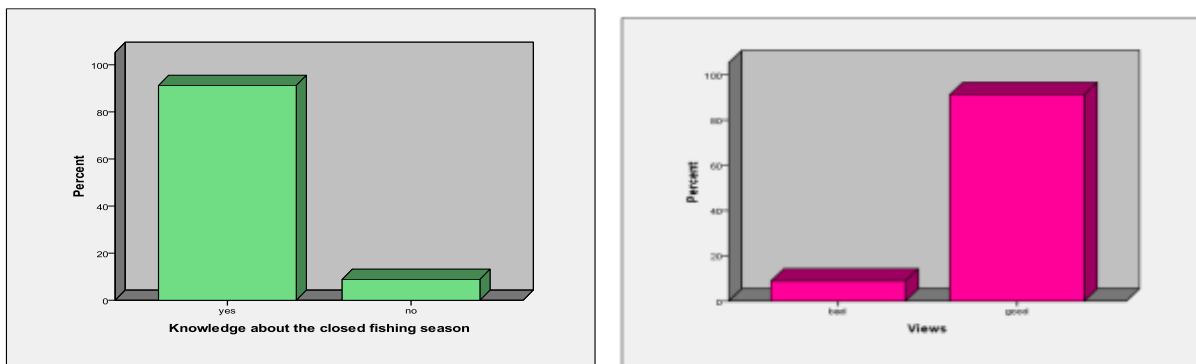


Figure 16: Knowledge and views about the closed fishing season

However, there were some fishers who defied the fish ban that comes into effect from 1st December and remains in force until 28th February the following year. The results revealed that 38.24% generated below K1, 000 (\$189), 2.94% generated between K2, 000 (\$377) to K4, 000 (\$755), 2.94% generated above K7, 000 (\$1,321) and 55.88% remained without any income (Fig. 17).

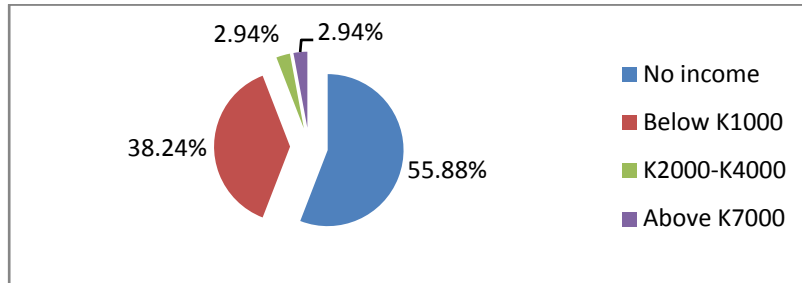


Figure 17: Income generated from illegal fishing during the closed fishing season

During the closed fishing season, some fishers were involved in other activities to earn an income. The results indicated that 32.35% were into agriculture, 23.53% were not involved in any income generating activities, 20.59% traded in charcoal to earn a living, while 17.65% hired themselves as casual workers and 5.88% ran small grocery shops (Fig. 18).

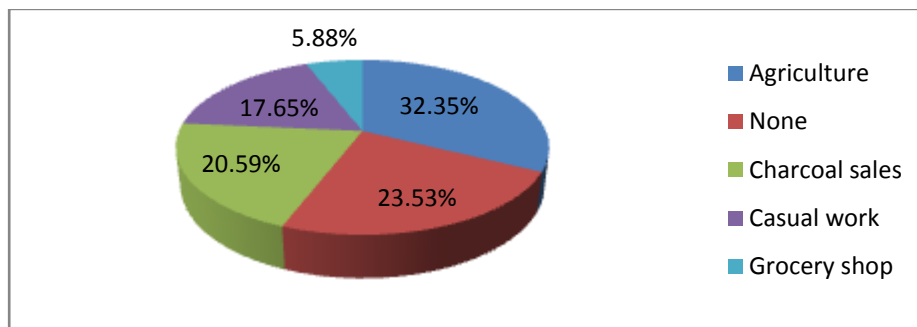


Figure 18: Sources of income during the closed fishing season.

During the closed fishing season, fishers revealed that incomes generated from other activities were very low, 44.12% generated incomes below K1, 000 (\$189), 29.41% indicated that they did not generate income, 11.76% indicated that they generated between K2, 000 (\$377) and K4, 000 (\$755), 8.82% generated between K4, 000 (\$755) and K6, 000 (\$1,132) while 5.88% indicated that they generated above K7, 000 (\$1,321) (Fig. 19).

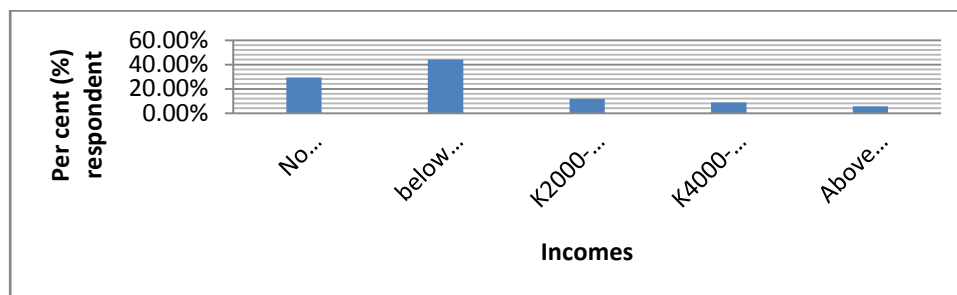


Figure 19: Income generated from other activities during the closed fishing season

The majority of the fishers (59%) indicated that the closed fishing season impacted them negatively while 41% indicated that the impact was positive (Fig. 20).

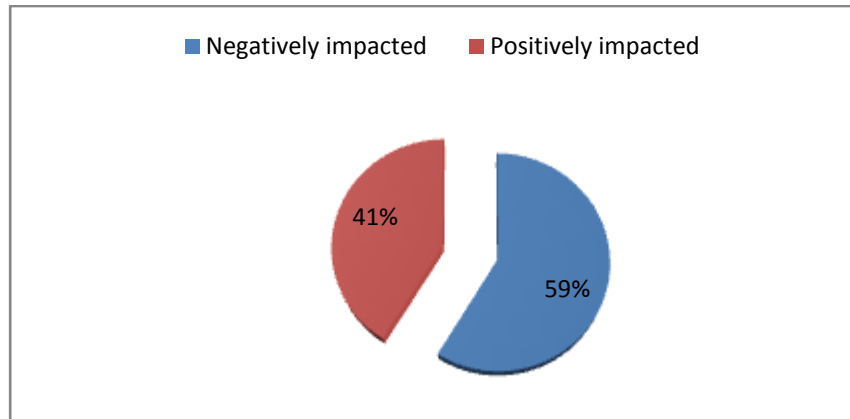


Figure 20: Impact of closed fishing season on the livelihood of fishers

IV. DISCUSSION

The study has revealed that like everywhere else, males do dominate in the fishing industry as women in most cases only assisted with net mending while the majority were involved in fish trading. Men took up fishing due to lack of employment as most prominent companies in Kafue town ceased operation or shut down and probably because there were no viable alternative income generating activities. Malasha (2008) observed that the fisheries served as buffers in the national and regional economies of rural and urban households. Some of Zambia's fisheries also serve as 'safety net' function for urban and rural families either seasonally or in times of economic downturn. Therefore, they considered fishing as an important occupation that provided their main source of income to keep their families well for a considerable period of time. Similarly, there was a tendency for the fishers themselves to temporarily give up fishing when productivity declined or when better economic opportunities elsewhere arose (Malasha, 2008).

According to Ferrer (2005), other options were limited because of their lack of employable skills, which was a result of their low formal educational levels, isolation, preference for a particular way of life, and lack of knowledge and exposure to opportunities. Kebe and Tallec (2006), noted that fishing contributes to employments of the population making a living directly or indirectly from fisheries products (selling, processing, handling, sale or repair of canoes). Fishing was made possible in part by the flexible nature of the management systems that allowed fishers to exit and re-enter the fisheries sector in response to changing economic fortunes (Malasha 2008). Equally, Kimaro and Fidelis (2005) observed that livelihoods were an outcome of how and why people organize to transform the environment to meet their needs through technology, labour, power, knowledge, and social relations.

Most of the fishers in stratum I had been fishing for more than ten (10) years, either individually or with helpers. According to FAO (2004), no restrictions were imposed on the number of craft or nets that an artisanal fisher owned. Musumali *et al.* (2009) observed that fishing in Zambia was dominated by artisanal fishers who were found in all the country's fisheries, waterways and contributed most of the national production using traditional vessels. With that kind of stability in the industry, most of the fishers settled down and had families of their own, with between one and three children. However, many of them had an added responsibility of looking after orphans (dependants); majority of whom lost their parents due to HIV/AIDS pandemic.

Based on this study, it can be inferred that fish consumption by the majority of artisanal fishers is very low, hence low protein intake. Most fishers took only 1 to 3kg of fish home for consumption regardless of the family size. There is need to encourage them to increase fish consumption as it is by far the only cheapest source of protein.

It was further observed that in order to minimize spoilage, fishers used all kinds of preservation methods, some of which were not very effective. There was need to conduct mobile training to fishers on fish Post harvest technology to help them maintain high standards of hygiene. The study revealed that better prices were offered to good quality fish. Fish prices were very attractive and ranged from \$2.73 to \$3.64. However, most fishers did not invest their money in any other form of business apart from using it entirely on home requisites (feeding, paying school fees, building their new houses, buying clothes, etc.). Those with entrepreneurship mind have invested their money in income generating activities, such as charcoal trading, agriculture and grocery shops.

Fishers had noticed that the number of kilograms of fish caught per day had greatly decreased, which probably could be attributed to wrong fishing methods; some which completely wiped out fish of all ages. It was further noted that, catch per unit of effort had drastically reduced to unprecedented levels. The quantity of catch was different for each day, on average, fishers caught between 5 to 20kg/day, and in some cases they went back home with no catch at all. Such situations, forced the majority of fishers to set their nets far away in order to have a catch. Declining fish stocks resulting from excessive amount of effort in the fishery translated into low fishing income (Ferrer, 2005).

The closed fishing season can contribute negatively or positively to the improvement of the livelihood of fishers. According to Lungu and Hüsken (2010), closed fishing season can have socio-economic impacts on the livelihoods of fishers, fish traders and fishing villages/camps at large. At the same time, food security is threatened, as fish provides one of the cheapest sources of animal protein to the poor. Hargraves (2011) argued that closed fishing seasons prevent people from fishing at certain times of the year to protect species at vulnerable times in their life cycle, such as during spawning seasons. The closed fishing season lasted for 90 days and during that period, no one was allowed to fish, hence the fishers that entirely relied on fishing as their source of income/employment, food and protein for their livelihood were economically handicapped as the alternative sources of income which they engaged in were unable to sustain them during that time of the year. It was further observed that poverty levels and malnutrition increased among the local communities who were deprived off their main source of employment and income. According to Churchill (2010), these rules impose extreme hardship on the fishers, their household as well as larger towns where fish are the staple diet, although insufficient enforcement of the closed fishing season somewhat mitigates the hardship. As the closed fishing season is in effect, these fishers who entirely depend on fishing are affected especially that these low-income fishers spends a greater proportion of their household expenditure on fish because fish provides the cheapest source of animal protein and income source. The World Fish Centre (2005) also reported that closed fishing season had socio-economic impacts on the livelihood of fishers. Food security was threatened, as fish provided one of the cheapest sources of animal protein to the poor and sustained a variety of livelihoods ranging from those who caught the fish to those who processed and traded the catch. Fisheries allowed for income generation almost year-round and participation in the sector was very broad including women, youth and urban poor who had a few alternative income opportunities (Musumali *et al.* 2009). Churchill (2010) observed that the closed fishing season represented a distinct low point in the food security of many families in the fishing villages/camps since fish were a staple food and primary protein source for most households. However, Clement *et al.* (2007) questioned whether closed fishing seasons were an effective means of increasing reproductive output. The authors highlighted that there was a growing gap between how much fish was available to be caught and humanity's desire to catch them, a problem that got worse as the world population grew. Similar to other environmental issues, there could be conflicts between the fishers who were dependent on fishing for their livelihoods and fishery scientists who realised that if future fish populations were to be sustainable then some fisheries must reduce or even close (Clement *et al.* 2007).

Most fishers were aware of the closed fishing season because every year, the Department of Fisheries carried out awareness programmes on the same before embarking on the exercise on 1st December of each year. Hence most fishers had full

knowledge about the importance of closed fishing season as the period that fish breeds. Shyam (2007), in his study on the monsoon trawl ban and its effects on the livelihood of trawl labourers provided reflections on the possible impact of monsoon ban on the livelihood and standard of living of the fishers in the state. But its impact on the income level of the labourers and the unemployment they face during the period forced some fishermen to oppose the ban on trawling. However, in spite of the unemployment problem they faced during the period, most of the experienced labourers in the field gave a positive opinion about the ban, which shows their concern towards the conservation of resources, which they count on, for their livelihood.

Some fishers viewed the closed fishing season as good as their catches were high soon after the opening of the fishery and during the subsequent first few months of opening. However, most of the fishers acknowledged that the closed fishing season certainly impacted them negatively because they mainly depended on fishing and the fishery resources for their livelihood. During the closed fishing season, they experienced a lot of difficulties in raising money for home use and it also coincides with the opening of schools in January.

The closed fishing season, gave opportunities to fishers to engage themselves in different income generating activities in order to support their families, which included crop production mainly for home consumption, charcoal trading, casual works and running grocery shops. However, the study has revealed that such income generating activities failed to sustain them and their families during the closed fishing season because very little monies were realised from such kind of ventures. Ferrer (2005) observed that alternative sources of income and chances to diversify income sources were very limited. Chunga and Phiri (2008) equally highlighted that violations of the 'fishing ban' and other fishery management practices were high partly due to the absence of adequate alternative livelihoods which seemed limited.

The difference in the income levels of fishers during the closed fishing season and before the closed fishing season was very high, which made a great difference in their lives. The study indicated that fishers made more money between \$377 and \$755 during the open fishing season than during the closed fishing season. Those that indulged themselves in illegal fishing during the closure are only able to generate as little as \$189. The study has also shown that less income was generated from other activities fishers were involved in to sustain them during the closure. That in itself was proof enough to show the impact the closed fishing season had on their livelihoods.

V. CONCLUSION

Male fishers in stratum I, who were in majority, with a lot of experience (i.e. some going up to ten years), relied entirely on fishing as their source of income/employment, food and protein for their livelihood. Some basically fished for consumption and the income earned from the surplus fish sales, was barely enough for family survival. Women on the other hand, only assisted with net mending while the majority were involved in fish trading. In the same vein, huge numbers of migrant fishers from other provinces were recorded, with the youth entering fishing because of unemployment and lack of employable skills, which was as a result of their low formal educational levels. During the closed fishing season most fishers become economically handicapped, all because of being deprived off their main source of employment and income. However, in spite of the challenges they faced during the closure, some fishers supported the move taken by the government to conserve their much treasured natural resources on which their livelihood was dependent upon.

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REFERENCES

1. APFM (Associated Programme Flood Management), 2007, *Strategy for Flood Management for Kafue River Basin*, viewed 17/10/ 2011, <http://www.preventionweb.net/english/professional/publications/v.php?id=2733>.
2. CSO and DoF (Central Statistical Office and Department of Fisheries), 2006, *Report of Kafue Floodplain Frame Survey*, CSO/DoF, Lusaka.
3. Chunga, Y. and Phiri, S., 2008, *Kafue Flood Plain Fishery Situation Analysis Report*, MACO, Southern Province, Zambia.
4. Churchill, A., 2010, *Uncertainty is the Grievance: Livelihoods influx on the Kafue Flats*.
5. Clement Arendse, J, Anesh Governder and George Branch, M. 2007, *Environmental Impact of Fishing, 'Are Closed Fishing Seasons an Effective Means of Increasing Reproductive Output?'*, Fisheries Research, Vol. 85, Issue 1-2, Pages 93-100, Marine Biology Research Institute, Department of Zoology, University of Cape Town, South Africa. <http://dx.doi.org/10.1016/j.fishres.2007.01.001>.
6. ECZ (Environmental Council of Zambia), 2001, *State of Environment 2000*, ECZ, Lusaka-Zambia.
7. FAO, 2004, *Fishery and Aquaculture Country profiles, Fishery and Aquaculture Country Profiles*, FAO Fisheries and Aquaculture Department, 17/10/12, http://www.fao.org/fishery/countrysector/FI-CP_ZM/5/en.
8. Ferrer, AJG., 2005, *'Factors Influencing the Entry of Young People into the Fishery Sector in the Visayan Sea'*, Final Report, Funded by the Vis Sea Project of the German Technical Cooperation (GTZ) and the Department of Agriculture- Bureau of Fisheries and Aquatic Resources (DA-BFAR).
9. Geheb, K and Crean 2003, *Community-Level Access and Control in the Management of Lake Victoria's Fisheries*, *Journal of Environmental Management*, 67: 99-106.
10. Hargraves, K., 2011, *Why Do We Have Closed Seasons?* http://www.dpi.qld.gov.au/28_3055.htm.
11. Kairu, J.K., 2001, *'Wetland Use and Impact on Lake Victoria, Kenya Region'*, *Lake and Reservoirs: Research and Management*, Volume 6, No. 2, pp 117 – 125.
12. Kebe, M. and Tallec, F., 2006, *Contribution of Fisheries to National Economies*. Food and Agriculture Organisation (FAO), Paris.
13. Kimaro, T.A. and Fidelis, R., 2005, *'Impact of Lake Victoria Level Change to the Communities around the Lake'*, Case Study Missungwi, Tanzania, viewed 17/10/11, www.bscw.ihe.nl/pub/bscw.cgi/d2607356/Kimaro3.pdf.
14. Kress, G., 1992, *Marketing Research*. 2nd Ed, Restone Publishing Company, Virginia, USA.
15. Lungu, A. and Hüskén, S.M.C., 2010, *Assessment of Access to Health Services and Vulnerabilities of Female Fish Traders in the Kafue Flats, Zambia, Analysis report, Regional Programme Fisheries and HIV/AIDS in Africa: Investing in Sustainable Solutions*. Project report. The World Fish Centre.
16. Malasha, I., 2008, *Fisheries Co-management, Mobility and Poverty Alleviation in Small-Scale Fishing: Examples from Lake Kariba (Zambia)*. <http://www.cmi.no/file/?787>
17. MAL (Ministry of Agriculture and Livestock) (2014). Department of Fisheries. [Http://www.agriculture.gov.zm/index.php?option=com_content...](http://www.agriculture.gov.zm/index.php?option=com_content...)
18. Musumali, MM., Heck, S., Husken, SMC., Wisht, M., 2009, *Fisheries in Zambia: An Undervalued Contributor to Poverty Reduction*. The World Fish Centre/The World Bank, Policy Brief 1913.
19. Newbold, P., W. L. Carlson and B. Thorne, 2010, *Statistics for Business and Economics*, Pearson Education, Prentice Hall, New Jersey.
20. Nyimbili, B., 2006, *An evaluation of fish population changes in the Kafue Flats floodplain fishery of Zambia from 1980 to 2005*. *Department of Biology*, 66.
21. Shyam Salim, S., 2007, *Monsoon Trawl Ban and Its Effects on the Livelihood of Trawl Laborers*, The case with Versova Fishing Village in Maharashtra, Vol. 34, Pages 115-122, Central Institute of Fisheries Education, Versova, Mumbai-400 061, India.
22. Struwing, F.W. and Stead, G.B., 2001, *Planning, Design and Reporting*, Pearson Education, Cape Town, South Africa.

23. MAL, 2014, The Fisheries Act 2011, *The Fisheries Act No. 22 of the Laws of Zambia*, Government Printers, Lusaka.
24. World Fish Centre, 2005, *Fish and Food Security in Africa*, World Fish Centre, Penang.
25. World Wide Fund for Nature- Zambia 2003, *A Report on Integrated Management of Kafue River Basin*, An annual report of WWF – Zambia.
26. World Wide Fund for Nature- Zambia 2005, *Summary of Study Findings on Kafue Flats Communities Livelihoods Options and The Effect of a Changed Flooding Regime*,
27. www.africanews.com/site/create_user.