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Community management of capture fisheries in Zimbabwe, current experiences and future directions: a Case of Deka-Drum Fishing Camps along the Zambezi River in Hwange District, Matabeleland North Province

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ABSTRACT **:** The study was conducted to investigate challenges and opportunities facing community management of capture fisheries, post Fast Track Land Reform FTLR systems in Zimbabwe. Particular reference was made to fishing camps dotted along the Zambezi River at Deka Drum resettlements in Matabeleland North province. Centrally the research sought to evaluate the extent to which the adopted management practices have led to viability and sustainability in the enterprise through reduction of overexploitation of the fishery resources, thus improving fish catches and composition.To achieve this thirty fish farmers were purposively sampled from a population of 152 fishers, comprising both Kapenta and gillnetters from the fishing camp. These were used for the purposes of generating primary data through a questionnaire and face-to-face interviews. The study also made use of secondary data which was gathered from records and archival material from responsible authorities such as Parks and Wild Life Authority and its partners such as the Zimbabwe's Communal Areas Management Programme for Indigenous Resources CAMPFIRE, the Environmental Management Authority EMA, as well as partaking Non-Governmental Organizations NGOs in Zimbabwe. Data obtained were subjected to descriptive statistics where frequency counts, mean and percentages were employed, with major findings revealing that since the commencement of the inshore fishing industry on Zimbabwe's waters the department of parks and wildlife had the mandatory authority to manage all fisheries and aquaculture resources in the country. Thus resource users were not taken into consideration in the formulation of policy and management strategies, compromising the incorporation of the vital indigenous technologies in the integrated management systems. Such top-down, centralised non-participatory approach has created a hostile working relationship between government departments and the fishers. Such conflicts have led to fishing families resorting to wide scale use of un-prescribed and unsustainable management practices of capture fisheries, characterised with high scales of poaching. The research therefore recommended Participatory Fisheries Management approaches (PFM), where government departments would consult fishers and local communities for effective and sustainable management of capture fisheries in the country.

Key words: Aquaculture, Capture fisheries, Community management, Economic impacts, Poverty alleviation, sustainable management

Acronyms

CAMPFIRE Zimbabwe's Communal Areas Management Programme for Indigenous Resources
CBNRM Community-Based Natural Resource Management
CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora
EMA Environmental Management Authority
FAO Food and Agriculture Organization
FTLRP Fast Track Land Reform Program
GDP Gross Domestic Product
GOZ Government of Zimbabwe
HWC Human and Wildlife Conflicts
IRDNC Integrated Rural Development and Nature Conservation
NGOs Non-Governmental Organizations
PFM Participatory Fisheries Management
Zim-Asset Zimbabwe Agenda for Sustainable Socio-Economic Transformation

CAADP Comprehensive African Agricultural Development Program
DCAPF Draft Comprehensive Agriculture Policy Framework
NSP Nutrition Security Policy,
ZAIP Zimbabwe Agriculture Investment Plan
SADC southern Africa development community
COMESA The Common Market for Eastern and Southern Africa
USAID United States Agency for International Development

I. Introduction

Zimbabwe's agrarian reform of the year 2000, popularly known as the Fast Track Land Reform Program FTLR witnessed major transformations in land ownership and tenure systems in the country as the government, in a bid to decongest overpopulated communal areas, engaged in massive acquisition of farms to resettle the black majority small holder farmers under the A1 and A2 Models. The new tenure systems did not respect former property and water rights which regulated the usage of land and water resources in the country. The reluctance of the government to formulate and implement sound policies with an inclination towards aquaculture development jeopardized all efforts made to resuscitate fisheries and aquaculture conservation; the country had made in the period pre-Fast Track Land ReformProgram. The potential of Zimbabwe's aquaculture expansion was severely impaired as local communities took it upon themselves to design management strategies which best suited their needs and resources at their disposal. Such management practices however proved to be highly unfavorable for the self-sustenance and sustainability of small-scale fisheries in Zimbabwe's rural and resettlement communities, hence impacting negatively on the enterprise's potential to create new jobs and improve food security among poor households.

As the new farmers scramble for resources it has become a common phenomenon that un-prescribed harvesting techniques such as poisoning, use of mosquito nets, sack and fishing baskets are widely used by the crop farmers cum fisher-men; leading to overexploitation and if unchecked, total extinction of the aquaculture resources. The scenario is expected to be worsened by massive pollution of the water bodies which are a natural habitat for the fisheries due to small-scale mining activities and the dwindling water levels due to impacts of climate change. It is therefore imperative that the study sought to investigate challenges facing community management of capture fisheries and explore opportunities which are likely to restore sanity in Zimbabwe's small-scale aquaculture industry. The study was mainly conducted to examine the virtues of community management of capture fisheries in Zimbabwe as a panacea to poverty and food insecurity among fish-farmers resettled along the shores of Zambezi River at Deka-Drum.

II. Background to the Study

Capture fisheries refers to all kinds of harvesting, of naturally occurring living resources in both marine and freshwater environments, on a broader level, they are classified as industrial (commercial), artisanal (small scale) and recreational, (Greenfacts, 2001). According to FAO, (2015) Capture fisheries are extremely diversified, comprising varying types of fisheries that are categorized by their different scales of operation. On a broader perspective capture fisheries can be classified as industrial, small-scale/artisanal and recreational. A more specific classification can also be based on cite and size of the fishing area, equipment used and the main target fish or marine species. According to Nugent, (2007) there are over 10,000 dams in more than 60 District Council jurisdictions in Zimbabwe with most of them holding a net capacity of more than 1,000,000 m3 of water each. The availability of fresh waters has given rise to sprouting of capture fishery activities of varying scales along the country's major rivers, dams and lakes. With notable commercial fish stocks exploited by fish-farmers coming from five major reservoirs in the country namely; Kariba, Chivero, Manyame, Mutirikwi and Mazvikadei. The largest fisheries are however on Lake Kariba, which contributes almost 90 per cent of the country's fish production. Lake Kariba supports an open water commercial (industrial) and semi-industrial fishery that exploits Tanganyika sardine *Limnothrissamiodon* locally known as Kapenta fish Nyikahadzoi, (1998), and an artisanal inshore fishery restricted to the shallow inshore waters where exploitation is based on the use of gillnet (bream) fishing. Bowmaker, (1973) ; Kenmuir (1975) ; Mitchell, (1976), however established that there are over 130 fish species in Zimbabwe recorded from river systems such as Zambezi, Limpopo, Save-Runde and Pungwe. From the130 fish species, about 41 species were recorded in Lake Kariba and of these; 65% are predators, 26% omnivorous and 9% are herbivores. These are distributed and confined to specific habitats and particular geographical zones in the waters. Local people in communities along lakeshores have normally been noted to exploit the artisanal fishery (FAO, 2007).

The pelagic (Kapenta) fishery and gillnetting (bream) of Lake Kariba is shared between Zimbabwe and Zambia. On the Zimbabwean side of Lake Kariba there are about 1,154 artisanal (small scale) fishers in 41 fishing camps (Zimbabwe Lake Kariba Fisheries Frame Survey Report, 2011), while on the Zambian side according to Mbewe

et al, (2011) there are about 4,653 artisanal fishers in 63 permanent fishing camps. In terms of catches on the Zimbabwean side, Karenge and Kolding, (1995) noted that production from the artisanal fishery was about 5,000 tons per year. Diffey, (2012) however observed that it is necessary to build capacity for strengthening reconnaissance and community based monitoring and management strategies to boost productivity.
According to Nyikahadzoi, (2002), in 1999, the governments of the two countries established a protocol for joint management practices of the fishery resources. The Zambian government adopted a community-based integrated management system that encompassed both the inshore gillnetting and the kapenta fisheries. It has however been established that a non-participatory decision-making arrangement was preferred in Zimbabwe, where it was the mandate of the government to craft policies and implement them through its various departments. Viswanath *et al*, (2003) cited that, as a result the modern fisheries management practices failed to address the fundamental concerns of fishing communities hence were irrelevant in achieving the set objectives and desired outcomes of local communities.
In Africa as a whole it has been noted that there is increased policy support towards aquaculture development, and in the entire region, aquaculture expansion has proved to have great potential in creation of new jobs and improvement of food security among poor households.However according to Nyikahadzoi, (1998), Zimbabwe's fish industry has been characterised with numerous challenges ranging from marine resource depletion; persistent absolute poverty among fish farmers; poor management practices; limited fishing space due to massive drying of water sources as a result of climate change, to aquatic resource conflicts. The reluctance of the government to formulate and implement sound policies favouring the development of aquaculture and fisheries has therefore jeopardized the prospects of generating meaningful benefits from the enterprise. Worsening the situation was the launch of the new land tenure systems which have forced many fisheries to operate at subsistence level. The potential of Zimbabwe's fisheries to expand was therefore severely incapacitated and rendered ineffective as a tool for fostering rural development.

Poverty is one of the most serious challenges facing Zimbabwe, a country once dubbed the bread basket of Africa, but now with a staggering 50 per cent of the country's population living with the reality or the threat of extreme poverty, and 30 per cent living in a state of poverty so abject that it threatens survival. According to Gustavo and Kostas, (2007) poverty is a multi-facetted affliction as well as a raging economic and social phenomenon that manifests in the inability of the victims to acquire the basic necessities of life. Poverty goes beyond material deprivation to include insecurity, vulnerability and exposure to risks, shocks and stress. It specifically includes not having enough to eat, poor drinking water, poor nutrition, unfit housing, a high rate of infant mortality, low life expectancy, low level of energy consumption, low education opportunity, low employment opportunities, inadequate health care, and lack of active participation in decision making process (Ajayi, 2008). Poverty in Zimbabwe has been described as "widespread and severe" World Bank, (1996), as it continues to be a rural phenomenon despite efforts by the government to empower the populace through formulation of policies such as indigenization, community share ownership, agrarian reform and the Zimbabwe Agenda for Sustainable Socio-Economic Transformation Zim-Asset, which either were wrongly implemented or died a natural death on paper.

Zimbabwe's increased policy support towards aquaculture development will facilitate Zim-Asset's Cluster on Food Security and Nutrition, the attainment of its mandate or thrust of creating a self- sufficient, food surplus economy and see Zimbabwe re-emerge as the "Bread Basket of SouthernAfrica"; through building a prosperous, diverse and competitive food security and nutrition sector that contributes significantly to national development through the provision of an enabling environment for sustainable economic empowerment and social transformation. As the cluster'sprograms are aligned to and informed by the Comprehensive African Agricultural Development Program (CAADP), Draft Comprehensive Agriculture Policy Framework (2012-2032), the Food and Nutrition Security Policy, the Zimbabwe Agriculture Investment Plan (2013-2017), SADC and COMESA Food and Nutrition Frameworks should incorporate aquaculture and fisheries which are an integral component in human diet, as fish are a great source of protein and minerals, are low in saturated fats and are a good source of essential fatty acids. This will go a long way in enabling Zimbabwe to be food secure. And according to USAID (1995), to be food secure, households and individuals need to have food available to them, have access to food, and also have the ability to fully utilize the food once it is consumed. Tacon, (2001) noted that aquaculture can contribute to improved food security and nutrition through various channels. He cited an example where, local food supplies can be improved through increased availability of low-cost fish, and how increased consumption of fish and other foods consumed by the poor will reduce under-nutrition within rural communities.

To have a noticeable impact in the Sub- Region, Zimbabwe's aquaculture needs to be integrated into the country's existing farming systems to enhance rural employment and income through additional, off-seasonal

production activities; improve food security and nutrition; and decrease risk through diversification. Aquaculture can also improve water availability and nutrient recycling and environmental benefits through enhanced resource flows and sustainability (Tacon 2001; Edwards 2000). A well-planned aquaculture has been known to be a vehicle for development programs such as job creation, improved food security, smooth household income flow, and increased farm efficiency and sustainability. It is therefore imperative that the study sought to investigate challenges facing community management of capture fisheries and explore opportunities which are likely to restore sanity in Zimbabwe's small-scale aquaculture industry. The study which was conducted in Matabeleland north province examined the virtues of community management of capture fisheries and interrogated its potential as a panacea for cushioning poverty and food insecurity among fish-farmers in the country.

2.1 Statement of the Problem

Un-sustainability of management practices of capture fisheries, limited fishing space and aquatic resource conflicts in Zimbabwe's fishing communities post FTLR are mainly attributed to the new tenure systems following the agrarian reform programs, which did not respect former property and water rights, which regulated the usage of land and water resources in the country. The reluctance of the government to formulate and implement sound policies with an inclination towards aquaculture development jeopardized all efforts made to resuscitate fisheries and aquaculture conservation; the country had made before independence and the launch of the Fast Track Land Reform Program. The potential of Zimbabwe's aquaculture expansion was severely affected as it became the mandate of the local communities to formulate and adopt own management strategies, hence designed strategies which best suited their needs, but highly unfavorable for the self-sustenance and sustainability of small-scale fisheries in the country's rural and resettlement communities, thus impacting negatively on the enterprise's potential to create jobs and improve food security among the poor households. The study was therefore conducted to examine the virtues of sound community management practices of capture fisheries as a panacea for poverty reduction among fish-farming communities resettled along the shores of the mighty Zambezi River in Zimbabwe.

2.2 Objective of the Study

Identify the most exploited fish species/aquaculture resources in communally managed fishing camps along the Zambezi River in Zimbabwe

Establish existing policy on capture fisheries management and its impact on sustainability of fishing as a viable enterprise for smallholder farmers

Outline recommended and violated capture fisheries management practices adopted by the local fish farming communities

III. Materials and Methods

Population of Study

Centrally the research sought to evaluate the extent to which the adopted management practices have led to viability and sustainability challenges in aquaculture/capture fisheries in Zimbabwe's smallholder fish farming communities. To achieve this thirty fish farmers were purposively sampled from a population of 152 fishers, comprising both Kapenta and Gillnetters from selected fishing camps in the study area. These were used for the purposes of generating primary data through a questionnaire and face-to-face interviews. The study also made use of secondary data which was gathered from records and archival material from responsible authorities such as Parks and Wild Life Authority and its partners such as the Zimbabwe's Communal Areas Management Programme for Indigenous Resources CAMPFIRE, the Environmental Management Authority EMA, Traditional Chiefs Council TCC, Zimbabwe Republic Police ZRP as well as partaking Non-Governmental Organizations NGOs in Zimbabwe. Data obtained were subjected to descriptive statistics where frequency counts, means and percentages were employed, to analyse and make conclusive deductions from the findings.

IV. Presentations and Discussion

Most exploited fish species in fishing camps along the Zambezi River

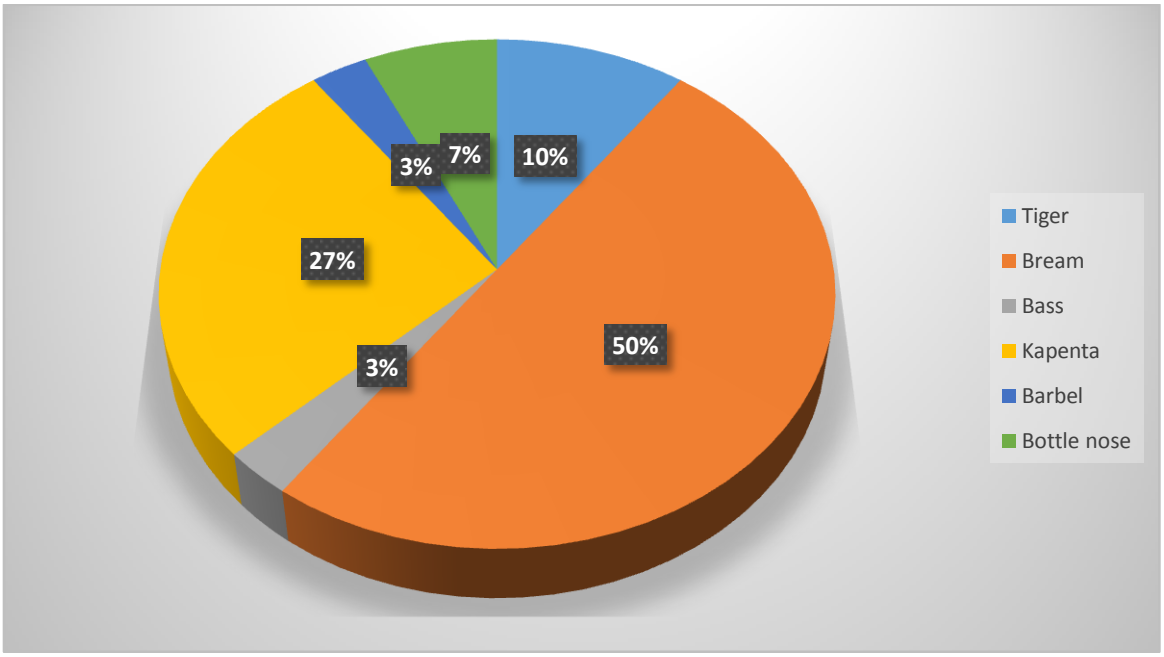

Figure 4.1: Most exploited fish species in the study area

Figure 4.1 indicates that the most exploited fish species in camps dotted along the Zambezi River; the study area are breams, Kapenta, Tiger, Bottle Nose, Barbel and Bass with Breams being the most exploited as indicated by 50% of the sampled fish farmers. Bass and Barbell are the least exploited species as only 6% of the sampled fishers indicated that such fish types have low demand on the local market. Fishers who use gillnets indicated that they prefer breams because of their high populations in most fishing sites and their capacity to out compete other species on feed resources and space. However on catch sizes most fishers pointed that there is a marked decline in fish catches as compared to previous harvesting seasons, suggesting overexploitation of aquaculture resources in the study area.

Existing policy on capture fisheries and its impact on sustainability of management practices of Zimbabwe's smallholder fish farmers

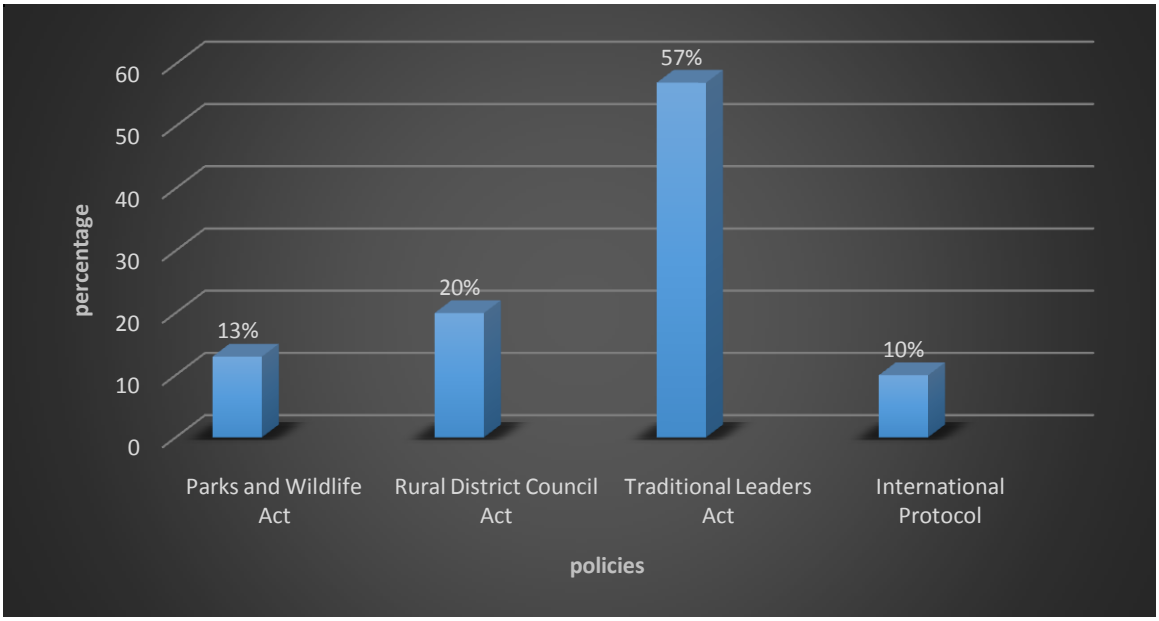

Figure 4.2: Policies in achieving sustainability

From figure 4.2 above, shows that many stakeholders and institutions are involved in the formulation and implementation of policies which guide utilisation and conservation of aquaculture and fishery resources in Zimbabwe, however recognizable in the area were; the Traditional Leaders Act, Rural District Act, Parks and Wildlife Act and International Protocols. Nevertheless, on crafting of policies which foster sustainability in the communal management strategies of capture fisheries 57% of the sampled fishers preferred the adoption of the Traditional Leaders Act policy into the existing policy framework. They cited that such an act would facilitate active participation of local communities in developing own by-laws, ideal and appropriate in the management of fisheries and aquaculture resources in their localities.

Possible Impact of sustainable capture fisheries management practices on productivity

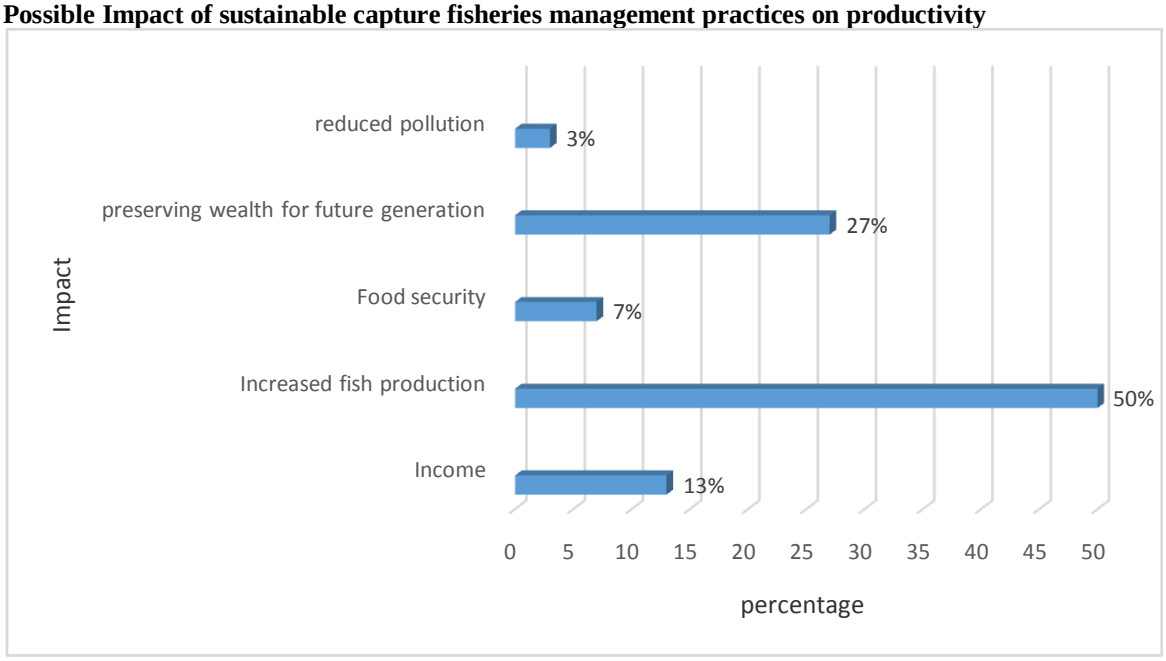

Figure 4:3 Impact of sustainability of management practices of capture fisheries

Figure 4.3 above shows that, most fishers suggested that sustainability of management practices of capture fisheries will lead to increased fish production, preserving wealth for future generations, increased income, food security and reduced pollution. The highest percentage of fishers which is 50% of 30 sampled fishers indicated that sustainability of management practices of capture fisheries will lead to increased fish production in camps dotted along the Zambezi River.

Recommended and Violated Management Practices of Capture Fisheries in Zimbabwe

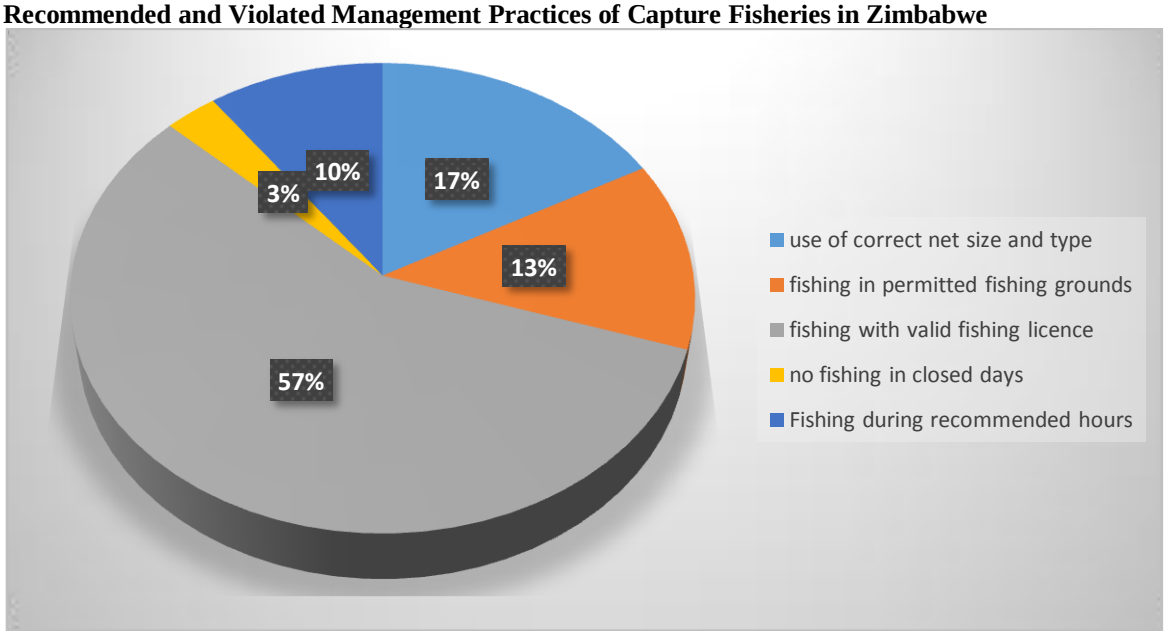

Figure 4.4: Recommended management practices of capture fisheries

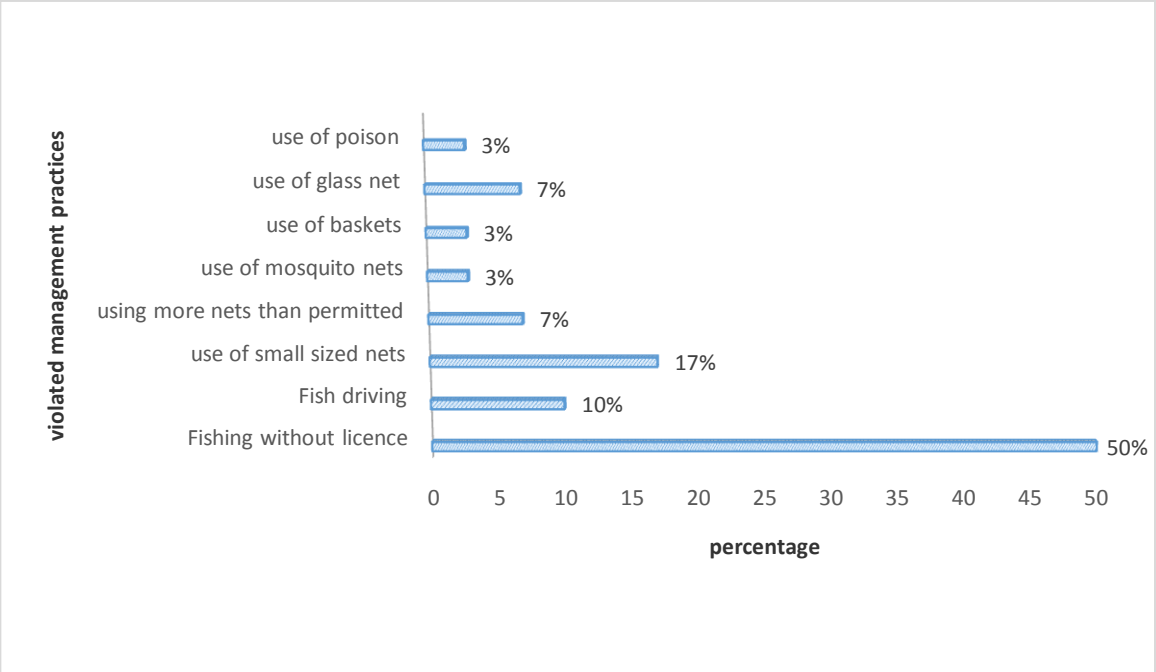

Figure 4.5: Violated management practices of capture fisheries

Figure 4.5 shows that fishers in the study area are aware of the recommended management practices of capture fisheries. The figure above illustrates that 57% of the sampled fish farmers indicated that they know that they should have valid fishing licences issued by the relevant authority; the Zimbabwe Parks and Wildlife Authority, but raised concerns about the processing time because of the bureaucracy and the centralised nature of the system which promotes corruption. The other management practices mentioned by participants were use of correct net size and type, fishing in permitted fishing sites, and fishing on recommended hours of the day.

V. DISCUSSIONS

Inhabitants of the Zambezi valley had been fishers for decades and this has been central to their livelihood as a perennial source of food and income through facilitating trade with tribes in other regions. The period after fast track land reform in Zimbabwe however ushered in a new era in the artisanal fisheries as it was marked with high influxes of new inhabitants from other counties thereby causing unnecessary pressure on aquatic resources in the river system. Interviewed participants revealed that the competition has resulted in dwindling fish populations as some fish species have suffered total extinction due to use of un-prescribed harvesting methods such as poisoning and poaching at undesignated points. As a result the only fish species available in numbers and significantly exploited in camps dotted along the Zambezi River are Breams, Kapenta, Tiger fish, Bass, Bottle-nose and Barbel as opposed to Bowmaker, (1973) and Mitchell, (1976), who cited that there are over 130 fish species in Zimbabwe's river systems. Participants in the study indicated that vulnerable fish species have been overexploited hence the reason why witnessing low fish catches averaging less 5kg per fishing household per day in the year 2015 as compared to more than 25 kg per fishing family per day in 2010.

On existing policy most of the participants indicated that stakeholders and government institutions were actively involved in the formulation of policies which guided the utilisation and conservation of aquaculture and fishery resources in Zimbabwe. They cited that; the Traditional Leaders Act, Rural District Act, Parks and Wildlife Act and International Protocols were the recognizable ones. Nevertheless, on crafting of policies which foster sustainable development in the management of smallholder artisanal capture fisheries majority of the interviewed farmers showed that they preferred the adoption of the Traditional Leaders Act policy into the existing policy framework. They cited that such an act would facilitate active participation of local communities in developing own by-laws, ideal and appropriate in the management of fisheries and aquaculture resources in their localities.

Although fishers proved to know the recommended management practices of capture fisheries such as use of correct net sizes and type, fishing in permitted fishing grounds, fishing with valid fishing licence and fishing during recommended hours, they said the violation of the prescribed management practices of capture fisheries was attributed to lack of knowledge by some of the new occupants, and failure by responsible authorities to co-

opt local communities who had the feeling that their participation would boost management and productivity through adoption of sustainable indigenous technology systems. As opposed to the current existing fisheries management practices, largely based on top-down, command and control non-participatory approaches, adopted from the former colonial administrative system. However experiences within the terrestrial wildlife and forestry sectors have clearly demonstrated that such centralized approaches are pricey and highly ineffective in promoting sustainable utilization of resources. It was also deduced that such practices lack legitimacy and are primarily based on average characteristics of large water bodies and commercialized capture fisheries, hence not appropriate for small-scale artisanal fisheries.

VI. Conclusions and Recommendations

6.1 Conclusions

Inhabitants of the Zambezi valley had been in to fishing, hunting and gathering for decades, these have been central to their livelihood as sources of food and income through facilitating trade with other tribes from within and outside Zimbabwe. The period after fast track land reform however brought in major changes in the survival and livelihood patterns of the local communities as the era was marked with high influxes of new inhabitants, with varied cultures and life styles from other counties thereby causing unnecessary pressure on aquatic resources in the river system. The exerted pressure on fewer resources had negative consequences on conservation of vital resources as it finally resulted in dwindling of fish populations with some species becoming a victim of total extinction. Efforts to resuscitate the industry were put in place by government and other stakeholders through formulation of policy which guided the use and conservation of aquatic and fisheries in the country. Nevertheless, crafted policies faced resistance and poor adoption as the communities preferred policies which had their input, and captured the concept of indigenous technologies in the management of their resources. The violation of the prescribed management practices of capture fisheries to a greater extent was however attributed to lack of knowledge by new settlers, and failure by responsible authorities to co-opt local communities in to local resources management systems or structures. It was therefore established that participation of local communities in resource conservation would boost management and productivity of artisanal ventures in these marginalised rural communities.

6.2 Recommendations

- Central government should harmonize legislation of aquaculture and fisheries management and conservation to eliminate contradictions in the management and development of capture fisheries. It has to mandate appropriate authorities such as rural district councils and traditional structures to manage and develop fisheries under their jurisdiction for the benefit of their entire communities.

- Zimbabwe Parks and Wildlife Authority should uphold participatory holistic management systems which involve a wider range of stakeholders to facilitate the understanding of various inter relationships between aquatic ecosystems, hydrology, household socioeconomic issues and resource use patterns.

- Fishing communities need to participate in policy making and consultative forums so that their views are captured and, be co-opted in to policy making frameworks. Funds generated by fisheries in particular districts should be used to fund district and ward level fisheries management operations.

- On wide scale poaching, Zimbabwe should work with neighboring countries to enhance biodiversity conversation in the region through drawing up and implementing trans-boundary management agreements; set up mechanisms that promote the integrated management and sustainable use of shared natural resources, including exchange of information on shared natural resources.

- The government should nurture and enforce appropriate international protocols that are designed to promote sustainable aquatic/fisheries management and development to which the country is a signatory or member state.

- There is need to create an enabling environment through enactment of legislation that facilitates the establishment of fisheries management institutions and structures at local village/community level to

ensure effective participation of local communities and be able to tailor strategies ideal to local situations, but in consonance with national policy.

- Government has to be gender sensitive, hence promote the involvement of women at all levels of aquatic/fisheries resources management to achieve equitable resource distribution and utilization to curb poverty and famine among rural families.

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