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The Challenges of Fishery Resource Management Practices in Mayo Ranewo Community in Ardo Kola Local Government Area (LGA), Taraba State Nigeria

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Abstract- Taraba State is well endowed with abundant surface water which includes ponds and rivers. This include rivers Benue (second largest river in Nigeria which traverse the state for over 390km), Taraba and Donga and their tributaries. The state has about 500,000 hectares of water body and 142 natural ponds. Fishery is therefore an important local resource bases of the rural communities in the State especially those along the river Benue. Conflict over access and ownership of this local resource base as a result of increasing population and demand for fish has been a source of concern to many people in recent times. This study examines the challenges of the fishery management practices in the local community in the face of declining fishery resources, increase degradation and climate change among others. The study focuses on artisanal inland fishery on the River Benue and its tributaries using the case study of Mayo Ranewo. It considers the challenges of operating fisheries in a sustainable way, the principles and management practices adopted in the rural community. The survey design method was used to collect data. The instrument involves the use of questionnaire which was randomly administered on 65 respondents in Mayo Ranewo community. Focus group discussion method was also used to generate additional information to compliment the questionnaire data. Descriptive statistics was used to analyse the data collected. The study is important because it provide information that will guide small scale fisheries management in the face of social, economic and environmental changes and allow for more adaptive response to new circumstances and opportunities.

Keywords: *community, challenge, fishery, management, resource and rural.*

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I. INTRODUCTION

Fisheries involve many activities and processes such as catching (or harvesting), processing, preservation, distribution and marketing of the landings (Moses, 2002 and Omorinkoba et al, 2011). It involves all the processes of taking the fish from the water and to the final consumer. Small scale fisheries have been observed to be important part of the rural economy in many parts of Nigeria, and have supported the livelihoods of thousands of rural people for whom

national and state government are remote and ineffective in meeting their needs (Neiland et al, 2005).

According to Eyo (1992) and Akeredolu (1990), the sector serves as an income source, facilitates the development of cottage industries and provides employment opportunities for the myriad of people engaged in fishery production, processing and marketing. It equally serves as an important protein supplement to meat protein, more so because of the persistent rise in cost of meat (Oladedji and Oyesola, 2002). The artisanal fisheries sector supplies about 90% of domestic fish need in Nigeria, with the balance coming from the industrial sector, largely regarded as fish imports (FDF, 2007). Omorinkoba et al, (2011) reported that the inland water bodies in Nigeria are estimated at over 14million hectares that are being fished predominantly by artisanal fishermen. Daw et al., (2009) observed that fish are major sources of livelihood, providing direct and indirect employment to over 200 million people of the world, majority of who live in developing world.

The fishery sector has been very important as it contributed about 50% of the animal protein intake of the country's population especially the resource poor in Nigeria (Ahmed and Yusuf, 2014). The national demand for fish resource is put at over 2.6million metric tonnes with whole sale value of more than \$1.5billion while the local production has been estimated at about 700,000 metric tonnes (Ahmed and Yusuf, 2014). This made the country to depend heavily on fish importation to meet the needs of the local populace. It is observed that Nigeria is the largest fish consumer in Africa with total consumption of 1.2million metric tonnes (Ahmed and Yusuf, 2014).

Taraba State is well endowed with abundant surface water which includes ponds and rivers. These include rivers Benue, Taraba and Donga and their tributaries. The state has about 500,000 hectares of water body and 142 natural ponds (TSEED, 2004). River Benue traverses the state for a distance of over 390km passing through Ibi, Wukari, Gassol, Karim Lamido, Ardo Kola and Lau LGAs (SEMA, 2012). River Taraba passes through Gashaka, Bali and Gassol LGAs before

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emptying into the Benue system. River Donga on the other hand passes through Sardauna LGA where it took its source, to Kurmi, Ussa, Donga and Wukari LGAs. The Katsina Ala River passes through Kashimbila in Takum LGA. There are so many other smaller rivers such as rivers Kam, Suntai, Gazabu, Pai, Bantaji etc and creeks in Ibi LGA. Out of the 16 LGAs in Taraba State, only 3 LGAs (Jalingo, Zing and Yorro LGAs) are not traverse by the 3 large rivers of Benue, Taraba and Donga. This high surface water resource makes fishing the second most important human economic activity after crop farming in Taraba State. The types of fish caught in these rivers include: Tilapia (*Oreochromis niloticus*), Mudfish (*Clarias anguillaris*), Nile perch (*Late niloticus*). Silver side (*Alestes macroleptilotos*), Silver catfish (*Bagrus bayad*), Butter fish (*Schilbemystus*), Tiger fish (*Hydrocymus forscalii*), Catfish (*Synodontis nigrita*), Osteoglossid (*Heterotis niloticus*), Sailfins (*Polypterus senegalus*), Electric catfish (*Malapterus electricus*), African lungfish (*Propterus annectens*), Trunkfish (*Moruyrus rume*) etc.

The importance of fishing activity in the state is clearly expressed in Ibi LGA that has an annual fishing festival, the Nwonyo. The 2009 episode of this event saw the catching of the largest size of fish that weighed 230kg. Towns such as Bantaji, Tella, Gindin Dorowa, Ibi, Donga and Lau are well known fishmarket towns in the state attracting people from far and near who came to buy fresh, dried and smoked fish (Oruonye and Abbas, 2011). The average production of fish in the state is about 1,987 metric tonnes per annum (TSEED, 2004). Daily fish catch in some LGAs like Ibi, Lau and Donga is about 3000kg. The state has over 30,000 fishing families fully engaged in daily fishing (TSEED, 2004). In recent times, fish farming is gradually gaining popularity and attracting many people into the business. The fishery sub sector contributes greatly to the state economy in the provision of employment opportunity, income generation and food supply. Fish represent about 40% of the total animal protein consumed in the state (TSEED, 2004).

Although extensive works have been done on traditional management of artisanal fisheries in north eastern Nigeria (Neiland 1997, Neiland et al, 1997, Neiland et al, 2000a,b, Neiland and Bene, 2004, Ladu and Neiland, 1997 and Sarch et al, 1997) this study scales down to examine the fishery resource management practices and challenges in Mayo Ranewo fishing community of Ardo Kola LGA, Taraba State Nigeria. The study attempt to address the following research questions;

1. Who owns the fishery resources in the area?
2. Are there fishing regulations in the area?
3. Who enforces the fishing regulations if they exist?
4. What are the difficulties of improving fishing in the study area?

5. What can be done to improve fishing in the study area?

II. MATERIAL AND METHODS

Data for the study were collected using a combination of secondary desk review and structured questionnaires. Interviews were conducted with villagers, including fishermen, traders, community leaders, and the village chief to obtain information about fisheries policies, regulations and challenges in the local community. Direct observation was also conducted in order to understand the livelihood aspects and the relationship between the communities and fishery resources. Issues that were examined included species diversity, fishing ground, ownership and accessibility, time used for fishing (season), fishing gear, fish capture and production and total fishery households involved in fisheries management. This study employed the purposive sampling technique for data collection on 65 respondents who live in the community. Descriptive statistics were used to analyze the data collected.

a) Description of Study area

Ardo Kola LGA is one of the four LGAs created in 1996 in Taraba state. The LGA was carved out of Jalingo LGA. It has a population of 86,921 people (44,020 male, 42,901 female) according to the 2006 national population census. It has a landmass area of 2,312km². Ardo Kola LGA is roughly located between latitude 8o35'N to 9o08'N and longitude 10o52'E to 11o35'E. It is bordered by Lau LGA to the north, Jalingo LGA to the northeast, River Benue to the west, Gassol and Bali LGAs to the south and Yorro LGA to the south east (Fig 1).

Mayo Ranewo is one of the largest districts and political wards of Ardo Kola LGA. It is located in the south western part, at the confluence of River Fan Mangel with the Benue river (Fig. 1). The town of Mayo Ranewo is located on the bank and floodplain of the Benue River and was founded by Mohammed Borgu (Yahya Kachalla) in the 19th century around 1840. The people traced their origin to Bauchi emirate and had to migrate to Muri emirate following some political upheaval. The name 'Mayo Ranewo' was derived from the ponds in the community surrounded by locust bean trees named Mayo Nareje meaning locust Bean River. The town is roughly located between latitude 8o 47' to 8o 53'N and longitude 10o50' to 10o55'E. It was an important station of the French and British colonial masters along the River Benue during the colonial period. Mayo Ranewo town has a population of about 11,000 people according to the 2006 National Population Census. The dominant ethnic groups are the Fulani, Hausa and Jukun Kona. The people of Mayo Ranewo are fishermen and farmers.

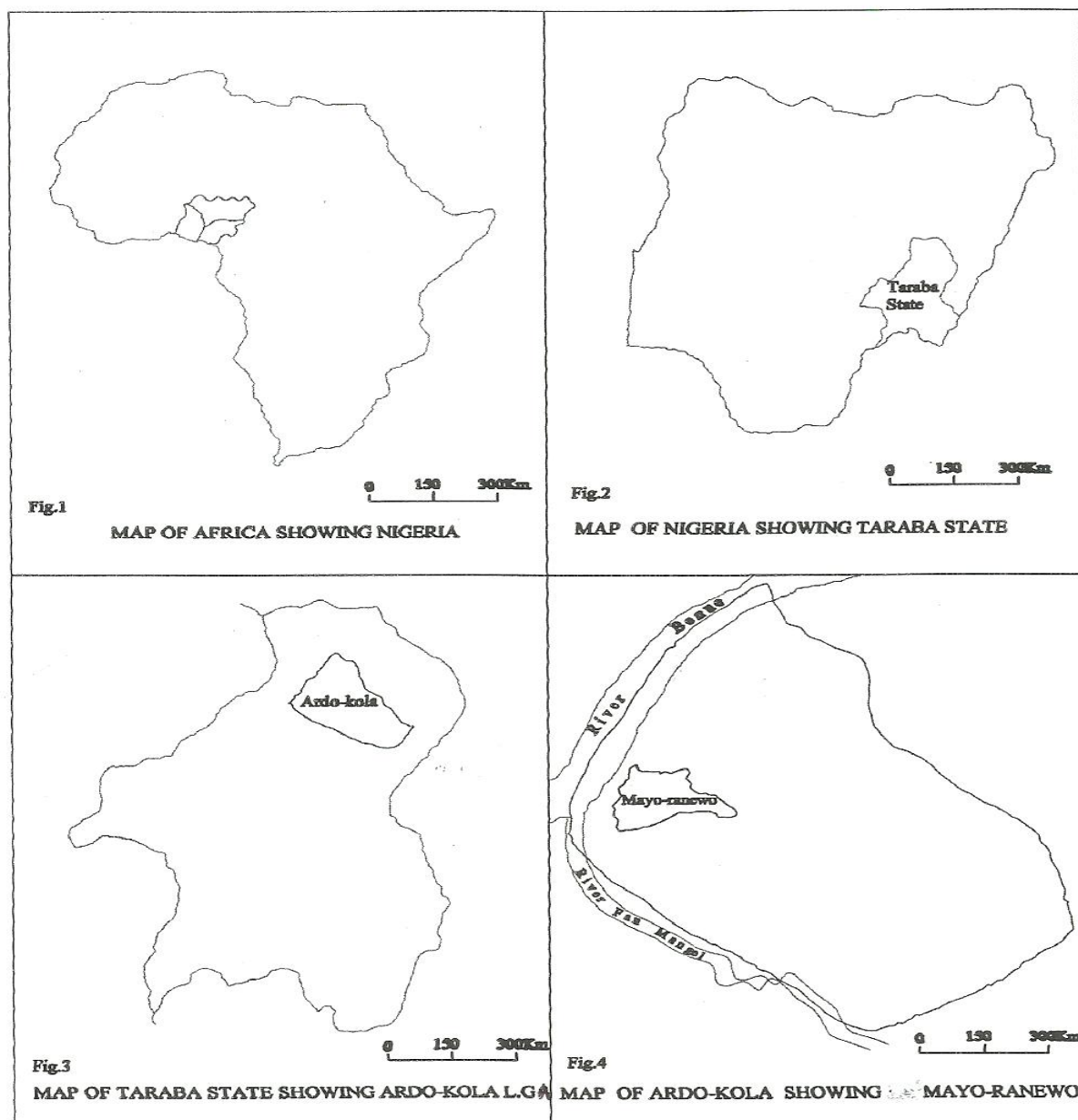


Fig. 1 : Map of the study area.

Fishing activities is at its peak during the dry season when the water level in the river is low and the farmers are observing their off-farm period. Harvesting of fish is usually around the month of March when the water level in the river and ponds have reduced drastically. This is because when the volume of water is high in the river valley and ponds, fishing are difficult and the people have to wait. The fish are caught using fishing net, hand paddled canoe and motorized boat. People come from different parts of the country to buy fresh, dried and smoked fish. The women are actively engaged in smoking and trading of the fish. There are about 25 fishing ponds in the community. The largest is the Mariwo. Others include Abarku, Anji, Kinkau, Nahuta, Ruwan barau, Yoride, Nubi, Ji and so on. The road to most of the fishing communities including Mayo

Ranewo is seasonal and many places are inaccessible especially during the rainy season.

Mayo Ranewo is located on a sedimentary formation with extensive flood plains on both side of the River Benue. The soil consists of sandy loam soil and clay loam. The vegetation is the wooded savanna, comprising of few trees scattered in the area and a riparian forest along the banks of the river. Most residents of the community are crop farmers and fishermen. The cattle Fulanis are also found grazing along the banks of River Benue. Important crops in the community include yam, tomatoe, cassava, rice, maize and beans etc.

b) *Results of the Findings*

The demographic data shows that 74% of the respondents are male and 26% are female as shown in Table 1 below. The dominance of male in artisanal fishery sub-sector has been reported by Akpoko (2003) and Onemolease and Oriakhi (2011). The risk associated with inland water fishing activities may be responsible for the low female participation in the activity. In the study area, female participation in fishery is restricted to processing of catch (mainly smoking) and trading in fish. The demographic data also shows that 46.2% are within the ages of 20-30 years, 38.5% are between 31-40years, 10.8% between 41 -50 years and 4.6% are above 51years. The result also shows that 43.1% of the respondents are married, 38.5% are single,

10.7% are divorcee and 7.6% widow. It is also evident from Table 1 that 29.2% of the respondents had primary education, while 23.1% had secondary education. The remaining (47.7%) had no formal education. This implies that artisanal fisher folks have a low educational background. The low educational status of the respondents may influence their acceptance of improved fishery practices (Onemolease and Oriakhi, 2011). The positive influence of education on farmers' acceptance of improved farm practices has been established by several studies (Onemolease et al, 2000; Tshiunza, Lemchi and Uloma, 2001). This by extension could also affect the behavioural attitude of fishermen in responding to innovative practices in fishery resources management.

Table 1 : Demographic characteristics of respondents

GENDER		
Gender	Frequency	Percentage (%)
Male	48	74
Female	17	26
Total	65	100
AGE		
20 - 30yrs	30	46.2
31 – 40yrs	25	38.4
41 – 50yrs	07	10.8
51yrs and above	03	4.6
Total	65	100
MARITAL STATUS		
Married	28	43.1
Single	25	38.5
Divorcee	07	10.7
Widow	05	7.6
Total	65	100
EDUCATION		
No formal education	15	23.1
Primary education	19	29.2
Secondary education	31	47.7
Total	65	100
Occupation		
Farming	19	29.2
Fishing	18	27.7
Artisan	07	10.7
Retiree	05	7.7
Civil servant	10	15.4
Traders	06	9.3
Total	65	100

Source: Fieldwork, 2014.

The findings of this study reveal the prevalence of co-management system of fishery in the study area as shown in Table 2. This includes the individual (private) and state (open access) ownership system. The open access property comes under the jurisdiction of the local authorities such as village heads, heads of fishermen, district heads, state and federal government who enforce regulations to control fishing activity in the open water. The government control and regulate fishing activities in the open water at various tiers through its fisheries officers in the Ministry of Agriculture. Government officials from the Fishery department work together with the local communities and their leaders in enforcing the fishery regulation in the study area.

The confined waters (fishing ponds) (plates 1) are dominated by individual ownership. It is a private property. Findings from the study show that the system of rights in the confining waters (ponds) is similar to that of farmlands. The fishing ponds are appropriated like that of land and a system of ownership and

management similar to that of land tenure are developed (Olomola, 1998). The respective individuals and families in the study area claimed descent right over the use and management of the fishery resources in the confined waters (ponds). During the dry season, individuals in the community identify suitable areas (which can retain substantial volume of water) within the flood plains of the river valley and convert them into fishing ponds. This conversion is usually carried out with the help of family labour and in some cases hired labour. Thus, the individuals that owns the fishing ponds makes decisions about the time and method of fish harvesting and takes steps to prevent other members of the community from fishing in the pond. This they do by employing private security guards to guard the ponds. The security guards usually built a temporary tent beside the pond (Plates 2) and watch over it day and night. This individual ownership of fishery resources is inheritable and usually passed from the father to sons who are interested in fishing.

Table 2: Prevailing Water Management System

S/No	Management System	Frequency	Percentage
1	Open access	23	35.4
2	Private property	37	56.9
3	Co-management	05	7.7
4	Others	0	0
5	Total	65	100

Source: Fieldwork, 2014.

The ponds are usually dried up during the dry season and during the rainy season they are flooded. This individuals who owns the fishing ponds usually rent them out to prospective fishermen who also rent it out to others or at least collect fees from smaller artisanal fishermen. The fishing ponds are of different sizes and the fish contents also varies. The owners of the fishing ponds rent them out for a period of up to 3 years at an amount ranging from two hundred to three hundred thousand naira (N200,000 – N300,000 – \$1,200 – \$1,800) depending on the size of the fishing ponds and fish potentials. The individuals that rent the fishing ponds in turn collect fees of about ten thousand naira (N10,000 - \$62) from smaller fishermen to allow them catch fish in the pond.

The bidding of rent of the fishing ponds are often very competitive and in some cases result into conflict among the fishermen. It also involves a lot of risk taking because once the rent is paid, it cannot be revoked whether there were enough fish in the pond to cover the cost or not. Thus, some form of agreement is usually entered between the owner of the pond and the individual renting it or paying to fish in the pond. The village head (Mai Ungwua) and the Head of fishermen (Sarkin Ruwa) are most often times witnesses to this agreement. Thus, the individual fishermen renting the fishing ponds have very good knowledge of the fish

potentials of the ponds. The ponds are usually very rich in fish resources. This made the owners and individuals that rent the fishing ponds to employ security guards to protect the fishing ponds from poachers and illegal fishermen from exploiting the resources. An interview with a cross section of the fishermen revealed that thieves (poachers) do come in the night to use chemicals such as gamalin 20 to catch the fish. The use of chemicals enables them to catch as much fish as they can within the shortest time. This situation results into serious loses to the owners of the fishing ponds and those that rented them. This made the issue of security an important challenge to artisanal fishery in the locality.

III. DISCUSSION

The fishery resources ownership rights are derived from the prevailing water tenure system in the study area which includes communal ownership, family (kin group) ownership and individual ownership. This also depends on the types of fishing grounds (open river, fishing ponds etc). Findings from the study show that the system of rights in the confining waters of rivers and ponds is similar to that of farmlands. The fishing ponds are appropriated like that of land and a system of ownership and management similar to that of land tenure are developed (Olomola, 1998). The open waters in the river Benue is an open access resource free for

any member of the community and non members of the community to exploit. As common property, the fishery resources are subject to rights of common use by all. Over the years, fishing regulations and prohibition relating to fishing season, fishing gears and location are adopted and enforced.

The findings of this study shows that there are so many local fisher folk operating from several fishing villages and settlements dotting the banks of River Benue engaged in part-time and full-time fishing all the year round. Fishing in the study area is artisanal in nature as it involves small scale fisheries whose gear is generally simple and hand-operated (hooks, gillnets, traps and baskets) and its craft is simple and traditional (constructed with timber planks and plywoods). As outlined by Moses (2002) and Onuoha, (2009), the artisanal fisheries' in the area are characterize by very low capital investment, poor infrastructure facilities such as lack of cold storage and processing plants, labour intensive.

Fishing units are numerous and generally highly scattered in remote hardly inaccessible settlements which makes evacuation, distribution and marketing of the fish products rather difficult. This leads to high rate of post harvest losses. It is also observed that the fisheries lacked access to credit from commercial banks and other financial institutions.

The result of the findings shows that there are Fishery officer from the state government in the rural community who undertake tour of the area. The Fishery officials and the Nigerian Police have their patrol boat and canoes which they use to patrol the Benue River to apprehend offenders and ensure strict compliance to the regulations. Anybody from anywhere can go and fish in the open water at anytime as long as he adheres to the fishing regulations. The fishing regulations forbid the use of chemicals in fishing and the use of small gears to catch fingerlings. The work of the fishery officials and security operatives are mainly to enforce government regulations on fishery such as apprehending and prosecuting those that use chemicals in fishing and prevent the use of small size nets in fishing or harvesting of fingerlings'.

Traditional authority in the communities also play important role in ensuring compliance with fishery resource management practices such as assignment of use rights, arbitration in tenancy regulation, non use of chemicals in fishing and adherence to approved fishing gears. For example, no tenant fisher is allowed to engage in any unproductive activity in the area other than fishing. The fishers are also not allowed to use fishing techniques/gears other than the ones for which the prescribed rents have been paid for.

a) *Challenges to fishery resources management*

Akankali and Jamabo (2011) observed that several empirical evidences existing in literature shows that the fisheries yield from artisanal sources is on the

decline in Nigeria. The greatest challenge to fishery in the area is that it is operated by artisans who have learnt the art of fishing informally from their parents. Most of the fishermen are not educated and can hardly read or write. They lacked modern fishing equipment and can hardly maximize their catch in the face of declining fishery resources, climate change and economic recession. This made the local fishermen to resort to the use of chemicals and small fishing gears. This development has necessitated the deployment of government fishery officials and police to patrol the length of River Benue and entrench sustainable fishery practices in the area.

Some fish species are fast disappearing and the number of stocks caught are decreasing in average size due to over fishing and other harmful fishing practices. Fishermen use small eyed-nets which catch small and immature fish. The prices of fishing gears are continuously increasing in the market and out of the reach of the local fishermen. The increasing cost of fishing gears in recent times is making it difficult for most fishermen to afford. This increases the cost of fishing in the area.

Etim (2010) attributed the problem of overexploitation to invention and increased sophistication of fishing gear in recent times. The number of fishermen have been increasing while the average catch per week continue to declined, the sizes of individual fish in the catch are also becoming smaller and large sized fishes becoming rare to encounter. The occasional and intermittent release of water from the Lagdo dam, in Cameroon Republic upstream of River Benue affects fishing activities in the area. This problem is worsened when the water is released in the dry season, the peak period of fishing in the area. The people have to wait for the water level to reduce before they can continue with fishing activity again. This may last for several weeks or months.

The open access nature of the open waters of River Benue in which there is no restriction of entry into the property because there is no property right (Johnson, 1992) is the main problem of artisanal fisheries in the area as in other parts of Nigeria (Imaobong and Mandu, 2013). According to Etim (2010) open access is a situation in which there is no restriction of entry into a common property irrespective of whether the property is owned by an individual, community or state. Artisanal fisheries in the open waters of the Benue river is open access property. Unrestricted entry into the fisheries has resulted in heavy fishing pressure on stocks and attempt at using chemicals. This has resulted in serious challenges of enforcement of extant regulations in artisanal fisheries in the area.

Omorinkoba et al, (2011) highlighted the problems associated with fish handling practices in artisanal fisheries in the Kainji Lake area of Nigerian to include lack of credit facilities for artisanal fisheries and

revolving loan scheme to fishers. Since artisanal fisheries provide crucial roles in the socio-economic and political well-being of the state and Nigeria at large, there is a great need to ensure complete protection, development, management and sustenance of both its aquatic environments and its vast resources to avoid stock depletion and species extinction (Imaobong and Mandu, 2013).

Most peasant fishers including children and the aged as well as poachers sometimes use Gammalin 20 and root, leaf, fruit and flower extracts of certain poisonous plants in fishing. This is a wrong method of fish exploitation since other useful macro- and micro-organisms essential for the stabilization of the ecosystem is exterminated. These plant extracts pollute the aquatic ecosystem and reduce the fish stocks through uncontrollable mortality. Enyenihi (1990) noted the wrong use of gear such as nets of very small mesh sizes to catch fish as being a method of destabilizing the ecosystem. This leads to over-exploitation whereby the juveniles which would have been recruited into the fishery are caught along with the adults. Most of the fishing is mainly done using the traditional method of using hand pull boats, a few use engine boats; materials used in fishing e. g. nets, hook, trap, etc. are very costly and many people cannot afford them; the main sources of the above mentioned are also far and costly in terms of transport from the major town of purchase to the local community.

Generally, artisanal fisheries is characterized by lack of or hired processing and storage facilities. This condition leads to high rate of post-harvest fish losses. Bolorunduro (1996) had observed that despite the subsistence nature of capture of fisheries in Nigeria, as much as 50% of post-harvest losses has been recorded. Fish is a highly perishable commodity and as such it is usually frozen or canned in order to prevent post harvest losses (Nkeme et al, 2013). Once they are taken out of their natural habitats, decomposition processes set in. Thus, they must be handled, processed, preserved and stored in good hygienic conditions and facilities.

According to Ipinmoroti (2012) fishery is influenced by climatic factors. Ekpo and Nzezbule (2012) reported that a change in the key water variable such as temperature, salinity, wind speed and direction affect the abundance and distribution of fish population and fisheries activities. The impact of climate change on aquatic ecosystem include increased in mean annual temperature, latitudinal and depth shift in range, lower dissolved oxygen concentration, coral bleaching, threat of mangrove swamps, phenology of marine organisms and ocean acidification (Daw et al, 2009).

It has been observed that artisanal fishers are very likely to be the worst affected because many of them (if not all) depend on this as their source of livelihoods (Enin, 2012). The anthropogenic stressors such as fishing, pollution and habitat alteration,

accentuate climate impacts on aquatic ecosystems and the exploited fish populations, by reducing their resilience and increasing their sensitivity to climate change (Enin, 2012). According to Akankali and Jamabo (2011) apart from climatic and environmental changes, certain institutional inadequacies are largely responsible for poor fish production in Nigeria, viz:

1. Changes in government policy thus affecting fish production.
2. Poor funding of research and extension services in institution and Universities.
3. Lack of effective institutional support and linkages
4. Monitoring, control and surveillance mechanisms are not fully developed
5. Illegal exploitation of the marine fisheries resources particularly by foreign vessels
6. Poor management and non effective utilization of most of the nations numerous water bodies
7. Shortage of competent and experienced manpower
8. Lack of training and demonstration facilities for transferring technologies

Fisheries in the country are largely the responsibility of the Nigerian institutions. Unfortunately, these same institutions often times are grossly underfunded and therefore ill equipped in terms of manpower, equipment and infrastructure to carry out credible and far reaching researches that would enhance sustainable development of the Nigerian Artisanal fisheries (Akankali and Jamabo, 2011). More so, where fishery policy exists, there is lack of implementation capacity, such as adequately trained manpower and equipment. Neiland et al, (2005) observes that many state fisheries departments in Nigeria have been constrained for various reasons, including financial under-resourcing in their ability to assume the responsibilities of overseeing and regulating fisheries in their areas. There is paucity of data on fish stocks inevitably warrant the over dependency on precautional approach as the only management option in the country.

Several efforts to make Nigeria self sufficient in fish production and supply still remain a mirage (Azionu et al, 2005). With about 14 million liters of inland water bodies, Nigeria could be self sufficient in fish production and a major exporter of fish. The repeated events of declining yields and economic returns, stock collapse and crises of social dislocation and loss of biodiversity could be arrested if the contemporary fisheries management precepts and practice are adopted and vigorously sustained (Akankali and Jamabo, 2011).

IV. CONCLUSION

This study has examined the challenges of fishery resource management practices in Mayo Ranewo community in Ardo Kola LGA, Taraba State, Nigeria. The findings of the study shows the existence of

private and open access management practices over the surface water bodies in the area. The study shows that fishing regulation in the study area include prohibition on use of chemicals/toxic substance in fishing, adherence to the use of approved fishing gears and prohibition on the catching of fingerlings. The findings from the study shows that the challenges to fishery management in the area include the artisanal nature of the fishery, high level of illiteracy among the fishing folk, security, open access nature of the water resulting in overexploitation, lack of credit facilities, activities of poachers, use of chemicals in fishing and difficulties in effective enforcement of fishery regulation in the area.

V. RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made.

- i. Although the people claimed that there is association of fishermen in the study area, there is need to mobilize the fishermen into organizing themselves into cooperative societies which will serve as a platform for empowerment creation of awareness on the dangers of using chemicals and toxic substance in fishing activities.
- ii. Fishing community should be encouraged to mobilize or pool their financial resource in order to ameliorate the constraints imposed by lack of or inadequate capital. Alternative economic ventures such as downstream activities and other allied activities during closed area/ seasons for conservation purposes, should be encouraged and supported by the relevant agencies, as a means of inducing the fishers to cooperate with defined conservation and management programmes unimpeded.
- iii. This study also recommends support to the fishermen in terms of fishing and processing equipments such as motorized boat, cold storage facilities at subsidized rate.
- iv. To prevent the declining trend of fishery resources in the study area, there is need to develop alternative sources of income to substitute practices that are negatively impacting present source of income and livelihood.
- v. There is need to employ and deploy more Fishery Officers in the study area to help improve sustainable fishery practices in the study area. The officers could help in public awareness campaign and training of local communities on issues of illicit use of chemicals and toxic substance in fishing.
- vi. There should be an enhanced re-equipping of all existing Agencies such as the Licensing, monitoring and Enforcement unit of Federal and states department of fisheries to ensure that they possess the requisite manpower and equipment that would

enable them effectively implement and enforce conservation policies and regulations for the sector at all times.

- vii. Establishment and enforcement of fishing laws, edicts, rules and regulations should be done through partnership and linkage with the local communities in such a way that it will promote income generation and desirable livelihood activities in the area.
- viii. Conservation policies and regulations should be developed to conform to scientific research findings that are focused on artisanal fisheries conservation and management for the various fisheries of the region.

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Plate 1 : Fishing pond



Plate 2. : Temporary tent of a hired security man guarding the Fishing pond



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