
ILLEGAL FISHING OF INLAND WATER BODIES OF NIGERIA: KAINJI EXPERIENCE.

Raji, A., Okaeme, A.N., Omorinkoba, W., and Bwala, R.L.
National Institute for Freshwater Fisheries Research (NIFFR), P.M.B. 6006, New Bussa
Niger State, Nigeria.

ABSTRACT

It is a common knowledge that illegal fishing which includes use of wrong gears, explosives, excessive exploitation of choice stocks, enhancement and stocking of water body and pollution has devastating effects on the critical biomass of fish biodiversity and livelihood activities associated with fishing. Efforts worldwide to arrest these menace are significant because it has been found that illegal fishing has made fishing non sustainable, resulted in poor fishermen catches, and exacerbated the use of illegal gears in an effort to a must catch. Conflict between fisher folk and policies has continued to generate different strategies in the control of illegal fishing. Some of these strategies at regional and National levels include creation and implementation of fisheries laws, fishing edicts, code of conduct for responsible fisheries, policing of inland water bodies, capacity building and capability through training of fishermen, creating necessary awareness, arrest and punishment of offenders. There are also other initiative on conservation and management of freshwater ecosystems which have interrelation with illegal fishing. This paper examines efforts in promoting and boosting the fisheries of Lake Kainji, through creating necessary awareness, campaign visits, radio programmes, gear control, reward systems, integration and diversification of livelihood activities, community based management and policing. It further analyses what is working, problems, and prospect of fisheries laws, the need to integrate factors of political policies, other global initiative on water management for people and nature. Recommendations on strategies including protection of fishing grounds, establishment of catch data base, integration of other intervention as alternative source of income to enhance livelihood, reduce fishing pressure, and capacity building of fisher folks, development of rules and regulations that is community based are highlighted.

KEYWORDS: Illegal, fishing, inland, Kainji, Nigeria, Experience.

INTRODUCTION

The complex issues of illegal fishing activities and related matters have remained unsolved in spite of efforts made toward conservation of aquatic species in Nigeria. While there are Laws and regulations Nnoli *et al* (1981), Gana and Yaro (2005), Allison *et al* (2006), to reduce, ban and prohibit illegal methods of fishing, the persistence of the problems can be attributed to inability to integrate all the issues namely, ownership of the laws, the authority and overriding policies, level of awareness, logistic of implementation and who are the beneficiaries. This paper discuss the various matters involving illegal fishing, activities contributing to illegal fishing methods, interventions to control illegal fishing based on studies of Lake Kainji; other campaign including global living water campaign, capacity building in code of conduct for responsible fishing and sustainable livelihood activity, and the lessons learnt.

The objective is to emphasise that integration of cutting issues that affect fishing including aquaculture and other activities; considered illegal in the fishing industry, play major part on the impact expected in the control of obnoxious fishing method. The understanding of a holistic approach to the matter will help in developing strategies with recommendations for enabling rules and regulation for lasting implementation and successful elimination of illegal fishing.

FISHERIES LAWS AND REGULATIONS

Historical perspective

In the early years, it was thought that no matter the extent of fishing (gross catch), this product of nature can never be exhausted due to their great numbers. This assumption probably informed the doctrine of the freedom - of - the - seas (a principle put forth in the seventeenth century, essentially limiting national rights and jurisdiction over the oceans to a narrow belt of sea surrounding a nation's coastline) to which the oceans had long been subject to. This doctrine allows for the rights of nations on the resources of the seas beyond the narrow coastal belt regarding such resources as "free to all and belonging to none". This situation prevailed into the twentieth century. But by the mid - century, there was a move to extend national claims over offshore resources. This was as a result of many factors which threaten to transform the oceans into an arena of conflict and instability; chief among these factors were the growing concern over the toll taken on coastal fish stocks by long - distance fishing fleets and the hazards of pollution threatening all forms of ocean life. In 1945, the United States of America, responding in part to pressure from domestic oil interests, unilaterally extended her jurisdiction over all natural resources on that nation's continental shelf. This was the first major challenge to the freedom - of - the - seas doctrine. Other nations soon followed suit: Argentina - 1946, Chile and Peru - 1947, Ecuador - 1950, Egypt, Ethiopia, Saudi Arabia, Libya, Venezuela and some eastern European countries - soon after the second world war, then later, Indonesia and Canada in 1970. All such moves by the different states defined the legal framework within which fishing activities are presently carried on. This was achieved through the evolution of the concept of the Exclusive Economic Zone (EEZ) [http://www.un.org/Depts/los/convention_agreements/convention_historical_perspective.htm]. Nigeria being a coastal state with several other inland water bodies cannot be left out in this move. A quick rundown of the status of fisheries regulations in Nigeria as reported by Allison *et al* (2006) shows that the move has been on for a long time. It started as taxation or toll imposed on fishers around Lagos in 1864. Immediately after independence, the Sea Fisheries (Lagos) Act was promulgated for licensing of fishing vessel while the Sea Fisheries Decree No. 30 of 1971 and Sea Fisheries (fishing) Regulation of 1972 were geared towards responsible inshore fishing practices and management. The Exclusive Economic Zone (EEZ) Decree 1978 extended Nigeria's territorial waters by 200 nautical miles seawards. The Harmful Wastes Criminal Provisions Decree No. 42 of 1988 was enacted to regulate dumping of wastes in Nigeria water systems. The Inland Fisheries Decree No. 108 of 1992 was to maximally protect Nigeria's Inland Fisheries resources from depletion and ensure safer production and consumption of fish products amongst others.

Fisheries laws, edict and regulations by various legislations at Federal, State and Local government level in Nigeria is to encourage responsible fisheries management approaches as intervention. This is to improve the utilization of fisheries resources at sustainable level, livelihood of fishing communities, protecting consumers and the conservation of aquatic resource. The level of awareness of fishing policies of the poor resource fisher folk is low because of lack of understanding of the benefits. Also the high cost of implementation and the control of illegal fishing continue to be a problem. An impact assessment in Niger State by Gana and Yaro (2005) showed that fisheries legislations are not in operation in the area studied as most of the banned fishing gears are still in use. It was also observed that the implementers of such rules and regulations are rarely or not seen at all. At the Federal level which supercedes the States and local governments, regulation is by the Federal Fisheries Inland Law Decree 108 1992 . The laws provide necessary regulations on gears, registration of fishing craft and licensing access to aquatic resource. The States and Local governments develop regulations to deal with some peculiar problems of the fishing communities of their area, but with emphasis on use of various gears. The common gears are cast net, seine and dragnet, clap nets, hook and lines, gill net, traps, cages, lift net as to limits and what practice is prohibitive in their usage. There are 28 States of the 36 with existing edict and regulations as summarized in Table 1. Although the edict, and regulations are not the same in general the various component covered are:

- Power to lease water
- Licensing to fish
- Registration of fishermen and gears

- Permits to fish with certified standard gear
- Prohibitions on use of explosives and chemicals
- Prohibitions on use of certain net, cage, traps, fixed engines except in private water body
- Power to arrest
- Power for penalties
- Protection for removal of certain fish species
- Power on exposure, sale and marketing of fish
- Prohibition on use of Barriers.

There are other agencies, in particular the Nigeria Inland water Authority and River Basin Authorities (Decree 25, 1976) which are 12 in number covering the river basins of inland water bodies. While some of their mandate includes control of flood and erosion, development of irrigation scheme, construction of dams for rural water supply and regulation of use of water, there is little within their authority protecting fish resources. The overall goal is that through implementation of these Laws and regulations, the biodiversity, fisherman catches, fish quality to consumers, the markets and transportation of fish are within acceptable safety and public health standards. The draw back is lack of implementation of these regulations, because of lack of infrastructure and logistics. Also the main interest of some states is revenue generation through issuing of licenses with no effort to see that the regulations are observed.

FISHING ACTIVITIES THAT ARE NOT RESPONSIBLE

For the purpose of this discussion illegal fishing will include those practices and factors that are not responsible and impact negatively, unsustainable and contribute to the decline of species diversity, affect fish breeding grounds, directly cause reduction in fishermen catch and may result in unhealthy competition between species, thereby endangering or threatening species and leading to decline or elimination. A number of fish exploitation activities are considered illegal because of the impact these practices exacts on fishing. Some of these include the gears, explosive, transportation, and enhancement.

Gear

- Beach seine nets: This usually targets both adults and juvenile fish resulting in species decline (Yem *et. al.* 2007).
- Purse seine net:- This gears extensively used in Niger Delta regions is to target some adult and juvenile species such as *Ethmalosa fimbriata* (Bonga) resulting in decline (Ama-Abasi *et al.*, 2007).
- Use of Drift and gill net: The long-line drift and gill net covering several kilometers is a common practice in Lake Chad fisheries. It does not discriminate hence endangers species diversity.
- Use of undersize gear:- Target all commercial species (both adult and juvenile). Found in most rivers and lakes where there is over fishing and currently a problem in lake Kainji (Balogun ,1985).

Use of chemical/herbs

A number of chemicals and local herbs have been associated with fishing, the consequence affect all ages of fish and is a serious hazard to consumers. Local herbs are used in many parts of the world as a simple means of obtaining fish from water bodies. According to Jennes (1967), some fifty plants are known to be used for this purpose in West Africa. Although discouraged by local authority, farmer-fishermen of the Kainji area, particularly of the tribes Larawa, Kamberi and Gungawa, make widespread, timely, and effective use of several plant poisons for taking fish. Table 2 shows some plants used as poison and some of the active ingredients found in the plants.

Use of Explosives

This is in other terms known as blast or dynamite fishing in which apart from killing school of fish, it is also extremely destructive to the surrounding ecosystem that supports the fish. It also means danger for the fishermen as well, with accidents and injuries. The local fishermen find the technique to be easier than the traditional methods used as it results in higher numbers of catches. It involves the use of bombs made with

kerosene and fertilizer. The use of explosives is on the increase among fishermen. One 1999 report highlighted in an FAO Essay in memory of Jean Carroz, estimated that some 70,000 fishermen (12% of the Philippines' total fishermen) engaged in the practice. However, the experience on Kainji lake has been encouraging in this regard as there has been limited or no reports of the use of explosives on the lake.

Use of enclosure pens/Barriers

This practice is usually found in the arid and forest zones of Nigeria where the lakes and rivers recede before the arrival of raining season. The practice involves grass pen enclosure for Savanna areas and wooden pen for forest to block and trap species within a limited area followed by harvest with baskets, hooks, spear, poisoning etc. It also prevents the movement and free migration of fish. The consequence is not only on removal of fish species, it also endangers breeding habits of migrating species leading to disruption and reduction in their population.

Fisheries Enhancement

In fish enhancement it is expected to promote genetic diversity, reduce overfishing, conserve endangered species, pest control and enhance the productivity of foraging species through translocation of fish species. However, in spite of these benefits there are a number of non responsible practices which are contributing to unhealthy survival of species, some of the unacceptable practices which can affect existing fish resources include:

- Enhancement where local species are intact in the sole interest of increasing fish production affects local fish population
- Enhancing with species that are genetically bred and will not reproduce.
- Enhancing and release of fish to water bodies where the risk of escape to natural waterbody is high.
- Enhancing with high risk of fish disease transfer.
- Enhancing with no data base on risk of habitat changes.

The common species used for enhancing waterbodies in Nigeria including reservoirs, lakes, and dams are *Lates niloticus*, *Heterotis niloticus*, *Tilapias*, *Citharinus citharinus*, clupeid. The readily visible impact is increase in fisherman catch, fish size and weight, and overall fish production. The knowledge as it affects fish diversity, genetic, pathogen transfer invertebrate status and habitat remains uninvestigated.

Stocking

The purpose of stocking waterbodies is to improve production and rehabilitation of depleted fish stock due to negative effect of natural or human activities. Unfortunately this practice is sometimes not responsible by:

- Stocking with wild collection of broodstock
- Stocking with wild collection of fingerlings
- Stocking with hatchery bred fishes
- Stocking with no knowledge of habitat assessment and control
- Stocking with high risk of pathogen transfer.

INTERVENTIONS TO CONTROL ILLEGAL FISHING

Lake Kainji Experience

The problem of over fishing and low fishermen catches of Lake Kainji led to the intervention by German funding agencies in collaboration with Federal department of fisheries, Kebbi and Niger state governments, and National Institute for Freshwater Fisheries Research as counterpart funding agencies and for providing data to move the project. The Nigerian German Kainji Lake Fisheries Promotion Project took off in 1993 and lasted for a period of nine years (Terminated 2001). The purpose was based on the assumption that the catches of the lake fishery has declined from 28,000mt in the 1970's to a level of 5,000mt in the 1980's (Salzwedel, *et al* 2000). It was further assumed that an increase of production could be possible and that post harvest losses in the range of 30% of the total catch was occurring. The overall goal of the project was

to increase the fish production of Lake Kainji in quality and quantity on sustainable basis by addressing issues of over fishing, fishing practices, enhance linkages between fishermen and fishing communities, improve capacity of fishermen through training and knowledge to enable ownership, and the sustainable management of fisheries resources of the lake.

The achievement of the project purpose was intended to contribute to the overall benefit of seeing:

- Standard of living of the fishing communities around Kainji Lake being improved
- Increased fish availability to consumers, enhance fishermen income and improved livelihood of consumers.

After launching the programme in 1993, data generated and evaluated by the project revealed that the fish production of Kainji Lake was actually higher than previously assumed.

A preliminary marketing survey indicated that post-harvest losses were also much lower than previously anticipated. However the fishery of Lake Kainji is not sustainable because of unacceptable and non-responsible fishing practices. The following development activities were undertaken to arrest some of the problems militating against sustainable fishing of the lake.

- i. A community-based fisheries management approach was established.
Fishermen were made to develop practices and strategies on how to manage the fisheries resources of the lake with the funding agencies providing the resources, technical data and skill training. The project identified implementation of fishing laws, rules and regulation on acceptable gears, licenses to fish, policing and punishment for offenders. The fishermen, head of fishermen (sarkin ruwa) and Emirs were the authorities ensuring implementation.
- ii. An effective extension delivery system for Kainji Lake was operational. Extensive campaigns to eliminate use of obnoxious methods of fishing, namely: gear size limits, type of gear, chemicals and use of explosives. Also rewards, effective policing of the lake through radio messages, dance, dramas with technical advice by funding agencies were adopted.
- iii. Sustainable control of water hyacinth on Kainji Lake was achieved.
Aquatic weed problem was addressed through communal effect of removal, burning and burying of weed was introduced. Also a mechanical boom was build across the lake at Rofia/Zamari to enhance collection and removal of floating aquatic weed.
- iv. A monitoring and evaluation system for Kainji lake fishery was functional.

This involved series of meetings with communities and technical partners as feedback mechanism to enable proper monitoring and implementation of various component of the project.

In implementing the community participation in the development process, the project did not establish institutions that were alien to the local communities. Rather the channels of communications in the fishing villages that had always been in existence were utilized, the communities were made to own the project. The achievement of the project is that it attained most of its targets and priorities:

- The level of awareness on the consequences on the use of obnoxious fishing practices increased to over 90%
- 80% of the fishing entrepreneurs paid license fees by the end of 1999
- The number of beach seines removed was 422 (88%) out of 478 by 1999. In order to remove the beach seines an incentive programme was put in place, this implied that for every 50 metres of beach seine surrendered, a fishermen would receive in return 100 metres of standard gillnet with all accessories.
- Fish productivity of the lake was increased.
- The establishment of the Kainji Lake Fisheries Management and Conservation Unit (KLFMCU) a body made up of key stakeholders was inaugurated and became operational.
- Annual license to fishermen on the lake increased between 75 -80% .
- The fisheries statistics of Kainji Lake was published annually.

- Development of linkages, livelihood and income of fishing communities increased.

The project identified the need to create alternative sources of income in the project area in order to reduce the total dependence on fishing activities as the only means of livelihood. Under this arrangement were; the Cockerel exchange and Small Woodlot programmes.

Under the cockerel programme, genetically improved cocks were given to families in the target areas in exchange of local cocks to upgrade the offspring and egg production of local hens. This programme was very popular among the women folk because it was providing income to the household. Woodlots are small pockets of forest plantation established to meet immediate fuel wood and later fruit requirements. It was estimated that one acre of woodlot could meet the needs of a family of ten. It also provided wood for cooking, fish smoking, and for building houses. The programme led to development of orchards and woodlot in some communities of the Kainji lake basin providing income to owner. Another source of income was sustainable control of water Hyacinth. The control programme provided avenue for community interaction, linkages for common good through manual, biological, and mechanical control: construction of floating barrier (boom) upstream of the lake. The programme removed the negative influence of water hyacinth control which include: snake bite, dislodgement of gillnets, disturbance to setting fishing gears, reduced fishing. The overall benefit was increase in the income of the fishermen.

Lessons Learnt

The lessons learnt from this approach which was intended to improve sustainable fisheries reveal that in pursuit of a goal of stopping illegal fishing to enable increased fish production there is need for integrated approach as shown from the Lake Kainji intervention project. In a paper by Mshelia *et al* (2005), it was highlighted that the intervention by the Nigeria-German (GTZ) Kainji Lake Fisheries promotion project brought about an estimated annual yield of 38.244 tonnes in 1996, which was an increase of 18% from the yield recorded in 1995 in the lake.

- The objective of institutionalizing sustainable exploitation of the fishery resources of Kainji Lake was achieved using existing local authorities and political policies and enhanced by existing Federal and State fisheries laws
- The need to avoid destructive fishing gears was well accepted by majority of the fisherfolk, because of extension delivery using local mode of communication creating necessary awareness through existing institution, ownership of the activities by fisherfolk.
- Effective enforcement of the State fisheries laws resulted in the ban and withdrawal of the bulk of beach seines within the lake, because the ownership, policy and enforcement belong to the fisherfolk
- These measures contributed to the increased productivity and maintenance of the bio-diversity of the lake ecosystem and to the improvement of the standard of living and income situation of the fishing communities.

It was observed through experience (Okomoda and Alamu, 2003) that there were problems despite the Community Based Resource Management (CBRM) approach undertaken by the Nigerian-German Kainji Lake Fisheries Promotion Project (KLFPP), the Niger and Kebbi States to ban the use of beach seines. These problems are still existing which part of them is the high logistic cost (also observed and reported by Nnoli *et al* 1981) which has reduced the level of achievement since the withdrawal by the International funding agency. It is therefore clear that for the Law, rules and regulation to be effective the following strategies should be encouraged:

- Rules and regulation must be developed by the beneficiary
- The Regulating Institution must be local and follow the political policies of the communities
- There must be a budgetary line to support the logistics of implementation, policing and reward system.
- Alternative sources of income should be developed as supportive for integration, enhanced livelihood activities, household income and sustainability of the project.

- Capacity of fisherfolk, regulating local institution, awareness campaign must be on continuous bases.

Aquaculture Programme

In Nigeria the numbers of programmes to enhance production of culturable species are a huge success in catfish and tilapia production. The activities in the implementation of aquaculture programmes can affect adversely the issues of conservation of species and management of inland waterbodies. Some of these include hybrids and trigenic breed production, disposal of effluent from hatcheries and aquaculture facilities into natural waterbodies. If there are no rules and guides regulating the use of hatchery bred fishes in translocation, stocking, and releases of water that may harbour eggs, fingerlings, broodstock and hatchery based pathogens to natural rivers, it carries the risk of undesirable biological changes as it affects species diversity, disease out break and habitat well being .

Global Living Water Campaign

The discussion on illegal fishing will be incomplete without the recognition of other global management initiatives such as climate change and the freshwater uses for people and nature. The degrading of world's freshwater ecosystem gave rise to initiatives on conservation of freshwater ecosystems (WWF, 2002). The promotion of these initiatives is the World wide fund for Nature (WWF) under the campaign on the "Living water Campaign". The major priorities, as it affect aquatic systems in west African Sub-region are:-

- "The Niger River, Rivers of Rivers must live"
- Consideration of marine and coastal ecosystem
- Other initiative on conservation of wetland peat-swamps

Nigeria collaborating as part of the West-African region and host of River Niger is participating in the development of policies as it affects biological diversities of the aquatic ecosystem of the River Niger and other livelihood activities to support the integration. The issues are not just on conservation, laws and regulations but partnership with communities, World Fish Center in furthering the course of proper resource utilization including matters of illegal fishing and into any existing initiative for integration, linkages, collaborating in water management for the 21st Century, ensuring that water being a common property must be available both for people and nature, for success to be achieved.

CCRF and Capacity building

The code of conducts for responsible fisheries (FAO 1995) and fish trade (FAO 2009) have no legal status but it provides general guideline for local and international best practices. While the code of conduct on fish trade provide guides on principles, right on World trade organization (WTO) standards as it affects sustainable utilization of fisheries resources, the code of conduct for responsible fisheries provides protection for endangered species, protection of consumers, access to market based on scientific data in line with necessary international agreed rules. While highlighting the fact that there is a conflict between government subsidy programmes and restrictions on the importation of fishing materials, Mabawonku, and Olomola (1986) showed that subsidy in the importation of these materials was designed to increase the rate of modernization which will in turn bring about a change in our approach to attaining self-sufficiency in food production. In the area of capacity building, Ita et al (1983) recommended on the basis of high response of fishermen in the operation of a small-scale revolving loan scheme in Kainji lake intended to alleviate poverty, that government should embrace such ventures as it will help introduce fishery regulations on the lake. Ojike, N.A. (1980) also suggested education, patrols, cooperatives as some of the control measures to be taken if the threat of the destruction of the aquatic resources by poisonous herbs, chemicals and explosives is to be reduced.

ILLEGALITIES ON ISSUE OF FISHING

Many of these activities as stated above at the various tier of government namely Federal, State, Local Authorities lack proper existing laws and restrictions. Moreover there are no existing guidelines on these activities while it is difficult to implement some of existing fishing laws because it involves the poor rural

resource farmers. The poor resource farmers lack the capacity and are unaware of the value of laws to restrict the utilization of natural resource.

The community structures are also highly influenced by politics, they include few powerful groups (Emirs, Chiefs, Sarkin Ruwas), unelected bureaucrats; individuals and faceless power brokers (Youth). These various factors must be addressed and integrated, the rules and guideline must be owned by the communities for them to appreciate why rules must not be broken. This was affirmed by Krings and Sarch (2002) in their report, showing the importance of the local elites in determining fishing rights, the extent to which their influence in non-fishing arenas enables them to manipulate interest groups within the fishery and the divergence between their objectives and those of the federal fisheries department. The current practice now in Nigeria will not be sustainable unless the following are incorporated into local political structure that will enhance implementation.

RECOMMENDATIONS

The introduction of fisheries laws and edict at states and federal level in Nigeria is well established but with limited impact and problems of illegal fishing continue to exist.

Based on the experiences discussed, the implementation and positively desired impact can be achieved and sustained if the following criteria are followed in the establishment and implementation of fisheries laws and edicts in Nigeria.

- There must be partnership, linkage and ownership with affected stake holders in the establishment and implementation of the laws.
- The implementation of the laws must integrate livelihood activities of the fishing communities to enhance sustainability.
- There must be alternative sources of income to substitute practices that are negatively impacting present source of income and livelihood.
- The establishment of the laws must have a resource base and supporting annual budget for establishment and implementation.
- Public awareness and training on issues of illegal fishing for policy makers, fisherfolks and all stake holders must be on continuous bases.
- All laws, edicts, rules and regulations must have a human face through the establishment of partnership and linkage that will promote income generation and desirable livelihood activities.

Table 1: Status of Fisheries Laws and Regulations in various states of Nigeria

State	Legal status*	Level of Coverage						
		Water bodies	Gear	License	Trade	Aquaculture	Transport	Other
Abia State	5	+	+	+				
Adamawa State	3	+		+				
Akwa Ibom State	1	+	+	+				+
Anambra State	4 (1985)	+	+					
Bauchi State	3 (1997)	+	+	+				
Bayelsa State								
Benue State	1/2	+	+	+				
Borno State	1	+	+	+				
Cross River State	3	+	+					
Delta State	2 (1993)	+	+	+				
Ebonyi State								
Edo State	3	+	+					
Ekiti State	1	+	+	+				
Enugu State								
FCT Abuja	6	+	+					
FDF	1	++	+++	+++	++	++	++	++
Gombe State	6 (1997)	+	+					
Imo State	3 (2000)	+	+	±				
Jigawa State	1	+	+	+				
Kaduna State	6 (1998)	+	+					
Kano State	1 (1985)	+	+	+				
Katsina State	5	+	+	±				
Kebbi State	1 (1997)	+	+	++				
Kogi State	1/2	+	+	+				
Kwara State	1	+	+	+				
Lagos State	1	+	+					
Nasarawa State	2 (1998)	+	+	+				

Niger State	1 (1997)	+	++	++				
Ogun State	1 (1999)	+	+					
Ondo State	5	+	+					
Osun State	3	+	+	+				
Oyo State	1	+	+	+				
Plateau State	2 (1984)	+	+	+				
Rivers State	2	+	+	+				
Sokoto State	1 (1988) 4 (1996)	+	+	+				
Taraba State	1 (1989) 4 (1994)	+	+					
Yobe State	1	+	+	+				
Zamfara State	1 (1988)	+	+	+				

*Legal status: 1 Fisheries Edict/Law gazetted; 2. Fisheries Regulations gazetted; 3. Fisheries Edict/Law approved, not gazetted; 4. Circular; 5. Other (MoU, by-laws, Draft); 6. Fisheries Edict/Law draft.

Source: Modified Salzwedel *et al*, 2000

Table 2: A list of some plants used as poison for fishing around Kainji

Latin name	Hausa name	Active ingredient
<i>Tephrosia vogelii</i>	<i>Magimfa</i>	Tephrosin ($C_{23}H_{22}O_7$). It is closely related to rotenone ($C_{23}H_{22}O_6$).
<i>Mondulea sericea</i>	<i>Magimfa</i>	Mundulone ($C_{26}H_{26}O_6$). Also similar to rotenone.
<i>Perkia clappertoniana</i>	<i>Doruwa</i>	Unknown but made from crushing the mature pods
<i>Lasiosiphona krussianus</i>	<i>Tururubi</i>	Unknown but highly poisonous to cattle and human without antidote
<i>Boerhaavia coccinea</i>	<i>Kashin shanu</i>	Unknown but speeds up the effect of other poisons

Source: Jennes (1967)

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Corresponding author

Bwala, R.L.

National Institute for Freshwater Fisheries Research (NIFFR), P.M.B. 6006, New Bussa, Niger State,
Nigeria.

Email: richardl669@gmail.com