

Full Length Research Paper

Discovery study of the outcome of inland fisheries decree on sustainable exploitation of inland fisheries in Lagos State, Nigeria

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To achieve sustainable and socially beneficial exploitation of the fishery resources led to the promulgation of the Inland Fisheries Decree 108 of 1992. The objective of this study was focused on whether the inland fisheries decree has significantly curbed the various threats to inland fishery stocks and the development of artisanal fishery. Four communities (Ibeshe, Iyagbe, Agbowa-Ikosi and Ebute-Afuye) in Lagos State were purposively selected. With the aid of simple random sampling, 309 fisher folks were interviewed. Thirty (30) fisher folks were arranged for FGDs in each of the communities and group discussants were stratified into adult men, women and youths. The key informants interviewed were traditional rulers and the head of fisher folks. Data was analysed using descriptive statistic and Pearson Chi-square. The results reveal that with the level of significant (0.05) the null hypothesis was rejected. The study concludes that the fisher folks' perception of the fisheries decree is significantly related to conformity with the decree. The provisions of the decree did not exhaust the register of threats to artisanal fishery. The decree did not address the problem of pollution and open access regime in artisanal fishery. The decree is grossly violated by the artisanal fisher folks. They use small mesh nets and unorthodox (plant derived poison) fishing methods. The reasons for the violation of the decree were: penalties for violation are too cheap to have any impact; and poor monitoring and enforcement of the decree. The study recommends that government should invest the authority to manage and control the exploitation of fishery resources on the artisanal fisher folks. The decree should be reviewed and be well enforced. Such review should accommodate wider consultation of fishery experts, as well as participatory in-puts, mobilization and sensitization of artisanal fisher folks.

Key words: Explorative analysis, inland fisheries decree, artisanal fishery sector.

INTRODUCTION

In developing countries, especially, Nigeria, fishery resources constitute a major component of natural resources. Fish provides an estimated 40% of the total animal protein consumed by an average Nigerian. In some parts of the country, especially in Lagos, fish accounts for up to 80% of animal protein consumed by the people (Nigerian Environmental Study/Action Plan Team, 1991).

About 22% (or roughly 787 Km²) of Lagos State is covered by fresh water, brackish water, extensive swamps

and flood plains that produce between 60 - 70% of fish resources consumed in the state (UNDP-FGN NIR/AI, 1996). These inland water bodies include functional rivers like Majidun, Yewa, Ogun, Aye, Solodo, Owa, Osun, Mosafejo and Sunmoge, which empty into the Lagoon. Others include Lagos, Lekki and Badagry Lagoon, Ologe Lagoon, Kuramo Water, Five Cowries and Omu Creek (Ajayi, 1992). The fish resources exploited from these inland water bodies include prawns, shrimps, crabs, oysters, pelagic and demersal fish species (Isiebor et al., 2006).

Inland water fisheries are mostly exploited by the artisanal fisher folks. Artisanal fishery covers the operation of small-scale canoe fisheries operating in the

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coastal and inland waters. The fisher folks in this sector operate within a limited fishing range with small canoes of about 3 – 6 m mostly powered with paddles (FAO, 1994). The limited fishing range and lack of other tangible employment opportunity in the coastal communities confine them to fishing (Mathew, 2000). Following this, the artisanal fisher folks have no option but to continue exploiting the available fish resources. Hence, the consequences of remaining in fishing have resulted to over fishing and its attendant effect of stocks depletion. Even with the problem of over fishing, the fisher folks still employ various unorthodox means to continue exploiting the degraded stocks (Solariu and Kusemiju, 2003).

This problem of over fishing may have been having serious implication on fish supply for the Lagos population (UNDP, 1998). Also, when the fish resources are exploited intensively and frequently than what the water body can supply, even though it has the capacity to renew itself naturally, the water body will begin to deplete and the fisher folks' income, welfare and sustenance will begin to be affected.

The implication of over fishing resulting from exploiting the available fish resources intensively and frequently suggests the need to address sustainable exploitation of the fishery resources. Sustainable exploitation of fishery resources is such that requires concern for preservation of the ecological and biophysical resources. This suggests fish exploitation that meets the need of the present generation without compromising the ability of the future generation to meet their need (Williams, 1997). The need, as well as the urge to move toward inland fishery development through a sustainable and socially beneficial exploitation of fishery resources led to the promulgation of the Inland Fisheries Decree 108 of 1992. The overall goal of the decree was to ensure that fish production is secured for the present and future generation and is sustained at optimum level through the exploitation that do not exceed limit determine by the natural biological productivity of the environment. Toward the realization of this goal, the purpose of the decree is to stop: various threats to inland fisheries, which could lead to over fishing, depletion and deficit in fish supply to feed the growing population and loss of livelihood of the fishing communities.

Before the decree, especially during the colonial period and after political independence in 1960, the affairs of fisheries development were handled by the then Federal Fisheries Services (FFS). By 1966, the Federal Fisheries Services was transferred to the Federal Ministry of Agriculture and was upgraded to a department in 1970. This department eventually grew into an autonomous department called Federal Department of Fisheries in 1976. Its duties included advising the Federal Government on matters relating to development of fisheries, monitoring fishing industries, fisheries statistics, planning and surveillance/Inspectorate, licensing of fishing crafts and working hand – in - hand with the States Fisheries

Department to exercise management and control of inland waters (Federal Department of Fisheries, 1998).

Against this background, this study hypothesized that the fisher folks' perception of the fisheries decree is not significantly related to conformity with the provisions of the decree. Also, the study attempted the explorative analysis of the effect of the inland fisheries decree on artisanal fishery sector in Lagos State. To address this, the objective of this study was focused on identifying whether the inland fisheries decree has significantly curbed the various threats to inland fishery stocks. In specific term, these threats include the use of small mesh nets, unorthodox method of fishing, pollution and open access. These threats pose major problem of over fishing and depletion of inland fishery stocks and the development of artisanal fishery.

MATERIALS AND METHODS

Lagos State is bounded in the North and East by Ogun State and West by the Republic of Benin and stretches several kilometers along the coast of Atlantic Ocean (Enaikelé, 2007). The areas of study were basically artisanal fishing communities in Lagos State. The communities are coastal settlements along the Lagoon. These communities (that were purposively selected) are Ibeshe, Iyagbe, Agbowa-Ikosi and Ebute-Afuye.

With the aid of sampling frame, simple random sampling technique was used to select the sampled population from each of the communities. Respondents were identified through household listing after which, they were randomly selected. A total of three hundred and nine (309) respondents were sampled with structured interview. The data was analyzed using descriptive statistics with the aid of statistical package of the social science (SPSS). Thirty fisher folks were also purposively selected for the focus group discussion (FGD) in each of the communities. The group discussants were stratified into adult men, women and the youths. Each of these stratified groups had two sessions of five discussants, at a time. The essence was to have a manageable team of discussants. On the other hand, key informants were also interviewed. These key informants were the traditional rulers and the heads of fisher folks in each of the communities.

RESULTS AND DISCUSSION

Personal characteristics of respondents

The composition of data on Table 1 showed that the economic active age group of the respondents ranged from 21 – 30 years (17.1%), 31 – 40 years (21.7%) and 41 – 50 years (21.4%). This means that overwhelming majority of respondents (60.9%) fell within the economic active age. While 11.3% were below 20 years, 14.9 and 13.6% were 51 – 60 years and above 60 years respectively. This finding is in agreement with study that showed the economic active age group of farmers in developing countries (Vabi and Williams, 1991).

In this study, profound majority (85.4%) of respondents were male while 14.6% were female. The implication of this finding is that the harsh ecological and physical

Table 1. Distribution of respondents by personal characteristics.

Age (in years)	Parameters				Total freq.	Total (%)
	Ibeshe freq.	Iyagbe freq.	Agbowa-Ikosi freq.	Ebute-S fuye		
< 20	13	05	08	09	35	11.3
21 - 30	17	9	14	13	53	17.1
31 - 40	21	13	19	14	67	21.7
41 - 50	19	16	15	16	66	21.4
51 - 60	12	11	09	14	46	14.9
> 60	15	11	07	09	42	13.6
Total					309	100.0
Gender						
Male	78	57	59	70	264	85.4
Female	19	08	13	05	45	14.6
Total					309	100.0
Level of education						
No formal education	54	41	45	33	173	56.0
Primary	28	15	16	21	80	25.9
Secondary	14	09	11	19	53	17.1
Tertiary	01	-	-	02	03	1.0
Total					309	100.0
Fishing experience (years)						
1 – 5	15	09	12	11	47	15.2
6 – 10	33	25	18	13	89	28.8
Above 10	49	31	42	51	173	55.9
Total					309	100.0
Any other employment						
Yes	28	16	11	23	78	25.2
No	69	49	61	52	231	74.8
Total					309	100.0

conditions of the coastal waters make fishing in the wild a male dominated activity. Also the study revealed that 56% of respondents had no formal education while 25.8, 17.2 and 1.0% had primary, secondary and tertiary education respectively. The implication of this finding is that significant percentage of the respondents may not be able to read, write or have favourable disposition toward appreciating and conforming to what the provisions of the decree says.

On the other hand, 15.2% of respondents had had between 1 - 5 years fishing experience while 28.8 and 56.0% had had 6 - 10 years and above 10 years fishing experience respectively. The implication of this finding is that profound majority (84.8%) of respondents had significant years of experience (6 - 10 years and above 10 years) in fishing, that naturally, should make them develop attitudes and practices responsive to sustainable exploitation of fishery resources.

Above all, this study showed that significant percentage

(74.8%) of respondents solely engaged in fishing without any other form of employment while 25.2% of respondents had other employment in addition to fishing. This percentage (25.2%) of respondents represents the women who engaged in fish processing and few men who engaged in boat building and repair of out-board engine. The implication of this finding is that the fisher folks are confined to fishing. This finding is in agreement with studies by Mathew (2000) that fisher folks are confined to fishing because of lack of tangible employment opportunities in the coastal communities. The consequences of being confined to fishing have resulted to over fishing and its attendant effect of stock depletion (Solarin and Kusamiju, 2003).

Perception of the fishery decree

The composition of data on Table 2 showed that 7.8% of

Table 2. Distribution of respondents by perception of the fisheries decree as capable of addressing sustainable exploitation of fishery resources.

	Ibeshe freq.	Iyagbe freq.	Agbowa-Ikosi freq.	Ebue-Afuye freq.	Total freq.	Total (%)
Perception						
Yes	08	01	10	05	24	7.8
No	89	64	62	70	285	92.2
Total					309	100.0

Table 3. Distribution of respondents by fisher folks conformity with the provisions of the fishery decree.

	Ibeshe freq.	Iyagbe freq.	Agbowa-Ikosi freq.	Ebue-Afuye freq.	Total freq.	Total (%)
Conformity						
Yes	39	15	19	32	105	34.0
No	58	50	53	43	204	66.0
Total					309	100.0

respondents perceived the fishery decree as capable of addressing sustainable exploitation of fishery resources while 92.2% of the respondents did not perceive the fishery decree as capable of addressing sustainable exploitation of fishery resources. Since profound majority (92.2%) of the respondents did not perceive the fishery decree as capable of addressing sustainable exploitation of fishery resources, the implication of this finding is very critical to the action (attitudes and practices) directed toward conformity or non-conformity with the provisions of the fishery decree.

Conformity with the fishery decree

The composition of data on Table 3 showed that 34.0% of respondents stated that generally fisher folks conform to the provision of the decree while 66.0% of the respondents stated that fisher folks are not conforming to the provisions of the fishery decree. The FGDs and KIIs results corroborated this finding and further confirmed that poor monitoring and enforcement of the decree exacerbated the problem of non-conformity with the fishery decree. The implication of this finding is the attendant effect of stocks depletion.

Test of hypothesis

To determine whether there is a significant relation between fisher folk's perception of the fisheries decree and conformity with the provisions of the decree, a Pearson Chi-square test was undertaken with the statistical package of the social science (SPSS). The result shows that since the probability value of 0.000 is less than the 0.05 level of significant, the null hypothesis which states that the fisher folks' perception of the decree is not significantly related to conformity with the decree is

rejected. Instead the alternative hypothesis, which states that the fisher folks' perception of the fisheries decree is significantly related to conformity with the decree, is accepted.

In all, it is possible to infer that the fisher folks did not perceive the decree as capable of addressing the sustainable supply and exploitation of fishery resources. Following this, they did not see the need to conform to the provisions of the decree, perhaps, because they have a non-empirical explanation for the depletion of stocks and how to achieve abundant supply of fish resources. The FGDs and KIIs results corroborated this that the fisher folks belief in the benevolent ability of the river deities to influence abundant fish supply. This is so because this study discovered that the fisher folks offered ritual sacrifice to appease the river deities (Ota, Itoo, Omolokun and Yemoja) for bumper fish supply. Following this finding, it is sociologically useful to observe that the river deities has, in a way, assisted the fisher folks to adjust to their social and physical environment and provide explanation for the frustration associated with the depletion of the stocks and how to achieve abundant fish supply.

Regulation on use of fishing gears (Mesh size of fishing nets)

The use of small mesh nets posed a major problem of over fishing and depletion of the fishery stocks. This was so because nets with small mesh sizes have a great toll on the juvenile fish species (Solarin and Kusemiju, 2003). The Inland Fisheries Decree 108 (1992) states in part:

"No person shall fish with a gear constructed withnet webbing (mesh size) of less than 76 millimeters. Any person who contravenes this provision is guilty of an offence and liable on conviction to a fine of N500 or

imprisonment for a term of six months or both and in addition, the net and catch shall be forfeited to the government of the state in which the offence was committed”.

The standard diameter size of mesh of fishing nets (76 mm) approved by the government was traditionally determined with three fingers by fisher folks. The fact that the fisher folks used their fingers to determine the government prescribed mesh size implies irregularity or non-standardization in size. This suggests that the size of a mesh is very much a function of the fingers of the net weaver.

The discussants and the key informants confirmed that the use of small mesh nets was very rampant and this was mostly common at night. The law was not well enforced because no one has ever been arrested or prosecuted for using small mesh net for fishing. Even, the traditional rulers have no power to sanction or punish anyone using small mesh net. Obviously, the existence of the inland fisheries decree represents the taking over of the management and control of fishing activities by the government. This probably accounted for the break down of the traditional authority. Ekong (2003) writes on the consequences of government laws noting that since the law of the land has become centralized, the authority of the traditional rulers had broken down and the erstwhile powerful traditional rulers now have their power reduced to mere titular heads.

Regulation on unorthodox fishing methods

Unorthodox methods of fishing constitute serious threat to inland fishery stocks and development of artisanal fishery (Kallie et al., 2000; Solarin and Kusemiju, 2003). The Inland Fisheries Decree 108 (1992) states in part:

“Except for electro-fishing and the use of chemicals for the purpose of research, no person shall take or destroy or attempt to take or destroy any fish within the inland waters of Nigeria by any of the fishing methods”; that is:

- (a) The use of explosive substances
- (b) The use of noxious or poisonous matter
- (c) The use of electricity

Any person who contravenes a provision of this section is guilty of an offence and liable to conviction to a fine of N3, 000.00 or imprisonment for a term of two years or both. The use of plant-derived poison (unorthodox method) to fish in the mangrove swamp was very common, especially among youths. The mangrove swamp is endowed with mangrove vegetation (*Rhizophora racemosa*) and interaction of the estuaries water budget from the lagoon. The importance of the mangrove swamp is such that this ecosystem sustains the Lagoon ecology and provides life

support for the people and bio-diversity of aquatic organisms including wide variety of fish species. But where the mangrove swamp was seriously subjected to the use of plant-derived poison, this had resulted in serious threat in environmental sustainability and social consequences on the sustenance of the fisher folks.

The discussants and the key informants also confirmed that no one has ever been legally prosecuted in the fishing communities. Where offenders were caught, they were rarely reported to the law enforcement agents or agencies responsible for enforcing the decree. The artisanal fishing communities had their unique way with which they handle such problem. Often times, offenders were made to pay a fine and took an oath to have their access to the wild restored. Where a stranger was involved, s/he was immediately barred from the wild and asked to leave the community.

The fact that offenders were rarely reported to the relevant agencies responsible for enforcing the decree implies a notable lack of confidence in the agencies. This lack of confidence may have ensued from the agencies poor monitoring and enforcement of the decree.

This finding triggers a notable sociological concern, arising from the social control evolved by the fishing communities to regulate the behaviour of their members. This social control system evolved largely as a response to the seriousness of the social and environmental consequences of using poisonous substances to fish. In essence, the fishing communities' *de facto* role of managing the biophysical (fishery) resources for their continuous sustenance is expressed through this social control system.

Pollution

Pollution was also identified as another major threat to inland fishery stocks and in particular, the sustainable development of artisanal fishery. Unfortunately, there is nowhere in the inland fisheries decree where the problem of pollution was specifically mentioned or addressed. This implies that the provisions of the decree did not exhaust the register of threats to inland fishery stocks and the development of artisanal fishery. This omission tended to give an impression that fishery experts were not widely consulted for proper input or that the promulgation of the decree was conducted in a hasty manner. However, this finding is relevant for this study because of the need for the review of the decree. More importantly, the omission is a serious oversight. Even if the problem of pollution was addressed in the Federal Environmental Protection Decree, it is still a matter of necessity that the inland fisheries decree should have, in specific terms, mentioned the problem. Isiebor et al. (2006) confirm that inland water bodies in Lagos state are significantly polluted with raw sewage, contaminants from sawmills, domestic and industrial wastes and that the practice is such that these wastes are thrown, dumped or

discharged directly into the water bodies. The rapidly increasing urbanization and population of the city of Lagos may be responsible largely for the increase in discharge of sewage and other domestic and industrial wastes into the water bodies.

The above finding is significantly useful in showing the threat posed by pollution because in Lagos state where there is poor control over such environmental problem as eutrophication, the problem had recorded decimated impact on domestic fish supply for the population of Lagos and impoverishment of the fisher folks. This is because the organic wastes are decomposed by microorganisms. These microorganisms require oxygen from the water and as such, there is competition for oxygen with the fish and other aquatic animals. Thus, where there is poor control of pollution, the oxygen demand of the microorganisms will be so high that other aquatic animals and fishery stocks may die due to lack of oxygen (GEF et al., 2003)

Open access

The nature of access to fishing in the wild was open access. Open access regime in artisanal fishery implies free entry and free exit and that whoever wants to take up fishing is free to do so and no fisher folk can prevent others from exploiting the same fishery resources. Open access regime in artisanal fishery connotes common property rights regime. Sociologically, common property rights regime has more to do with the relationship and interaction between people because it is basically "private" property of a group of co-owners who have rights to the usage of the resources.

Open access regime in artisanal fishery of course, produces fishing pressure that contributes, among other factors, to over fishing and depletion of fishery stocks otherwise known as the "tragedy of the commons" (Utomakili and Fabiyi, 1993; Hardin, 1968). The problem of over fishing was something the fisher folks were aware of and expressed concern for because it is something that affected their livelihood. The discussants and key informants revealed further that even with the open access regime in place, the exploitation and management of fishery resources are linked to the communities' values, taboos and belief system. Various studies (Ruddle, 1994; Akande and Lawal, 2004) similarly confirm that traditional beliefs and taboos are employed as indigenous means of conserving resources endowment in rural areas.

The above findings are considerably relevant for sociological interest because of the problem of the "tragedy of the commons" resulting from fisher folks-environmental interaction. This problem of "the tragedy of the commons" could, indeed, have social consequences such as dissipation of domestic fish supply for the population of Lagos and impoverishment of the fisher

folks themselves.

Though studies have linked the effect of open access to over fishing and depletion of fishery stocks (Utomakili and Fabiyi 1993; King and Faasili 1998) there is no provision in the inland fisheries decree that, in specific terms, mentioned the issue of open access regime. What is contained in the Decree 108 (1992) is that:

"No person shall operate a motor fishing craft within the inland waters in Nigeria unless a license in respect of that craft has been issued to the owner or operator of the craft. Any person who operates or causes to be operated a craft in contravention of this provision is guilty of an offence and liable to conviction to a fine not exceeding N500.00 or imprisonment for a term of six months or both fine and imprisonment"

This provision, perhaps, expresses hope that licensing the motor fishing craft (outboard engine fishing boat and diesel engine fishing vessels) will check or control the influx of motor fishing crafts exploiting fishery resources in inland water bodies. But what about paddle canoe? The word "motor" in the provision technically exempted small canoes powered with paddle because they are not motorized. Given the fact that the artisanal fishery sector is intensively dominated by small canoes powered with paddles (FAO, 1994), it is possible to infer that the decree did not fully address the open access regime in artisanal fishery, which allows the influx (that is, free entry) of paddle canoes exploiting fishery resources in inland water bodies.

Conclusion

In summary, the Pearson Chi-Square analysis shows that the alternative hypothesis, which states that the fisher folk's perception of the fisheries decree is significantly related to conformity with the decree, is accepted. The provisions of the inland fisheries decree did not exhaust the register of threats to inland fishery stocks and the development of artisanal fishery. The decree did not address the problem of pollution and open access regime in artisanal fishery. This oversight tends to give an impression that the fishery experts were not widely consulted for inputs in the decree.

The inland fisheries decree is grossly violated. The artisanal fisher folks still use small mesh nets, especially at night and unorthodox (plant derived poison) fishing method. Several reasons could be attributed to why the decree is seriously violated in artisanal fishery sector. One painful fact is the penalties for non-compliance with the decree. The penalties were too cheap to have any serious impact. This explains the reason for the careless impunity with which the fisher folks violate the decree. Also important is the poor monitoring and enforcement of

the decree. The monitoring and enforcement of the decree is a combined responsibility of the Federal Department of Fisheries (FDF) and the State Department of Fisheries in the Ministry of Agriculture. The fact is that neither the inspectorate of the Federal Department of Fisheries nor that of the State Department of Fisheries can be relied upon for effective monitoring and enforcement of the inland fisheries decree in the artisanal fishery sector.

The study concludes that the development of the artisanal fishery sector depends critically on the sustainable exploitation (not over fishing) of fishery resources. To achieve adequate fish production for present and future exploitation and to sustain it, this study recommends that government should invest some authority on the artisanal fishing communities (as *de facto* managers) to exercise management and control over exploitation of fishery resources. Such community based management demand setting up communal social control vigilante (with the assistance of the Federal and States Department of Fisheries, as well as the Agricultural Development Agencies) to monitor and control the use of small mesh nets, harvesting of juvenile fishery stocks, night fishing and unorthodox fishing methods, etc. Through this, the fishing communities would be involved in the enforcement of the fishery law to stop various threats to inland fisheries. Also, the Inland Fisheries Decree should be reviewed and be well enforced. Such review should accommodate wider consultation of fishery experts, as well as mobilization and sensitization of artisanal fisher folks.

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