

SMALL-SCALE FISHERIES DEVELOPMENT
IN NIGERIA: STATUS, PROSPECTS,
CONSTRAINTS/RECOMMENDED SOLUTIONS

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ABSTRACT

The Small-scale Fisheries Sector has been contributing immensely towards domestic fish production in Nigeria. According to official statistical information published by the Federal Department of Fisheries (1981), the Artisanal Sector alone (i.e. coastal brackish-water and inland rivers/lakes) contributed 524,127 metric tonnes (MT) (69.6%) in 1979; 461,346 MT (64.7%) in 1980; and 481,783 MT (65%) in 1981 to the total fish supplies of 753,435 MT; 713,596 MT and 741,211 MT for the three years. The Inshore fishery sector contributed fin-fish and shell-fish to the tune of 11,308 MT, 18,232 MT and 14,438 MT during the same period. Despite these considerable contributions by the small-scale fishermen, with few exceptions, they continue to live at the margin of subsistence. This paper attempts to review the sector and propose strategies of integrated approach towards Small-scale Fisheries Development in order to ensure that efforts at improving the rural fisheries succeed in over-coming identified constraints which include socio-cultural, political, economic, technological and other barriers.

BACKGROUND INFORMATION

Nigeria, with a population of about 80 million people and a total land area of 923,773 km², is naturally endowed with a vast network of rivers/flood plains, natural and man-made lakes and reservoirs, as well as brackishwaters, lagoons and creeks. Coupled with these is over 800 km of often surf-beaten coastline with sand and mud beaches with slopes of various gradients and a continental shelf ranging in width from about 14 km in the West to 45 km in the East.

Brackishwaters

With a claim of 30 n.mls (i.e. about 55.56 km; 1 n.ml = 1.852 km territorial sea and about 800 km of coastline, Nigeria has territorial waters of 44,448 km². The first two n.mls of the coastal waters is reserved as a non-trawling zone for canoe fishing operations; thus about 2,963.2 km² coastal waters are reserved for canoe fishermen. The surface areas of Nigeria's estuaries, lagoons, and mangroves were estimated in CECAF/Tech/81/36/(En) (1981) by J.M. Kapetsky to be:

Estuaries (Km ²)	Coastal Lagoons (Km ²)	Mangroves (Km ²)	Approximate Total of Enclosed Area (Km ²)
2,267	937	9,700	12,940

The minimum estimate of Estuaries, Coastal Lagoons, and mangroves resources available to artisanal fisheries within the CECAF area is 41,000 km². The break down is as follows:-

- Estuaries 5,000 km²
- Coastal Lagoon 11,000 km²
- Mangroves 25,000 km²

In comparison with the whole of Africa the CEECAF Countries possess 65% of the estuarine area, about 50% of lagoon surface and about 70% of the total mangrove area. As for Nigerian brackishwaters, the exact total brackishwater areas i.e. creeks, estuaries and swamps have not been fully determined although Scott (1956) estimated that permanent saline creeks of Niger Delta occupy an area of about 999.7 km², while the extent of the intertidal mangrove swamps is 5,048 km². Scott also estimated the intersection rivers and estuaries together with beach ridges to be 679 km² and 688.9 km² respectively. Thus, the Niger Delta area is in the neighbourhood of 7,415.6 km².

Freshwaters

The Nigerian drainage is principally characterised by the Niger/Benue Rivers system with major tributaries which include Rivers Sokoto, Kaduna, Anambra etc. Many other rivers e.g. Ogun, Oshun Benin, Owena, Forcados, Cross, Imo, and Qua flow southwards. These rivers, their flood plains and other perennial waters in Nigeria offer considerable potentials for small-scale inland capture fishery. However, these are only partially exploited because of several factors. The potential yield can be up to 40kg/ha (Henderson) if simple impoundment and weir devices are introduced. The Nigerian River Systems etc., should be catalogued to allow for properly planned fisheries development and management. Meanwhile, under the development programme of the eleven River Basin Development Authorities, about fifty-one dams have been completed, while others like Oyan, Shiroro etc are nearing completion (Pers. Comm. with F.M.W.R.). These dams are planned to store 10's of billion of cubic meter of water for irrigation farming and other purposes including fishing. Moreover, the man-made Kainji Lake with a total area of 1,250 km² (about 136 km in length and widest portion of 24 km) supports up to 2,660 artisanal fishing craft from three border States of Kwara, Sokoto and Niger. Comparatively, the natural Lake Chad has diminished in size since the Sahelian draught of 1974 resulting in reduction in size from about 22,000 km² to 7,000 km² (ORSTOM Information).

DEFINITION OF SMALL-SCALE FISHERIES

There is no precise definition of Small-scale fisheries. Gerhardtsen (1977) defined the fishery as one (including artisanal aquaculture practices) in which the poorest one half or two thirds of a developing country's fishermen are engaged. Sreennivasan (1978) described the small scale fisheries to include traditional and other fisheries possibly operating up to about 13 m L.O.A. Eventhough, the FAO reports on small-scale fisheries used to refer only to improvements in traditional craft and their motorisation but not mechanisation, yet in the Nigeria context and for the purposes of this paper small-scale fisheries is described to cover both Canoe fishery and Inshore mechanised fishery operating up 13 m LOA Vessels and take cognisance of the linkage of Coastal Lagoon and estuarine fisheries with freshwater fisheries. Thus, the term "Small-scale" fishermen will not only be taken in its literal sense to imply the size of operation but also to recognise the choice of technology, the operators' socio-economic and cultural status. Contrary to the experience in developed countries which have no sizeable traditional fishing communities, and in which fisheries resources have been depleted by aggressive and sometimes too efficient techniques of fish harvesting (this situation has led to the rigid enforcement of quotas for fishing and significantly, wherever possible, the encouragement of small-scale fishing operations), in the Nigerian situation, like in other developing countries, the potentials of

resources are yet, in many cases to be fully determined and exploited. Traditional Small-scale Fishermen are still among the poorest sections of the society consequently there is an understandable emphasis on improving their lot. In this paper, the word fishermen is not intended to embrace a very wide and heterogenous section of the fishing community but it applies to the category of persons who earn their living by actively being involved in the process of catching fish using traditional or improved medium-sized craft and traditional modern gear. This clear definition is adopted because the wide and liberal usage of the word "fishermen" has often led to the failure of well-designed and well-intentioned Fisheries Schemes.

The present defunct, dormant or inactive status of most Fishermen's Co-operatives in Nigeria is traceable to the fundamental generalisation of who a fisherman is.

PRESENT STATUS AND DEVELOPMENT PROSPECTS
OF SMALL-SCALE FISHERIES IN NIGERIA

Small-scale fisheries can be categorised into coastal mechanised and canoe fisheries, brackishwater/lagoon subsistence fisheries and the capture fishery of man-made, natural lakes, rivers and flood plains. The Federal Department of Fisheries put the number of fishing crafts and fishermen which operated in Artisanal and Inshore Fishery sectors between 1971 - 1979 and 1973 - 1979 respectively as shown in Tables 1 and 2. About 10% of the artisanal craft were fitted with outboard motors of mostly 8, 15 and 25 HP engines for lagoon, lake/river and sea fishing respectively in 1979. Thus, the landing per full-time fisherman was between 1.1 T/Yr and 1.2 T/Yr for all categories of artisanal fishermen. For the inshore fishery sector, each Inshore Trawler lands about 122 Tons annually including fin-fish and shell-fish (Fisheries Statistics of Nigeria, 1971-79).

Table 1 - Fishing crafts 1971-79

Years	Inshore	Trawlers	Artisanal	Canoes
	Fishing	Shrimping	Powered	Non-Powered
1971	13	26	4,204	90,923
1972	26	29	5,364	90,523
1973	27	30	6,224	91,732
1974	33	39	7,856	10,032
1975	33	30	8,240	20,381
1976	30	29	11,704	122,633
1977	43	36	12,187	125,256
1978	38	49	10,118	128,129
1979	44	48	12,510	121,218

Table 2 - Number of artisanal fishermen by category 1973 - 1979

Year	1973	1974	1975	1976	1977	1978	1979
Total	353,939	384,717	399,083	413,832	424,838	425,298	446,152
Full-time	247,806	269,354	279,413	289,682	297,317	293,309	312,306
Part-time	106,133	115,363	119,670	124,140	127,421	121,989	133,846

CHARACTERISTICS OF SPECIES EXPLOITED

BY SMALL-SCALE FISHERMEN

The Artisanal brackishwater and marine fisheries can be further sub-divided into three categories; viz:-

The brackishwater canoe fishery which operates in the estuaries, creeks and lagoons. In the artisanal fisheries settlements of various sizes have been established in numerous scattered locations along the coastline, river and lake banks etc. The sizes of the villages which may be permanent or temporary vary according to the intensity of fishing activities and the other factors.

The coastal canoe fishery operates up to and sometimes beyond seven nautical miles of the inshore waters. While the Nigeria Sea Fisheries Decree (Now Act) of 1971 reserves a 2-mile non-trawling zone exclusively for the artisanal fishermen, they normally go farther than this range particularly when operating motorised craft. The distance from the coast depends on the range and size of the motorised or non-motorised canoe and the stocks fished for. The artisanal coastal inshore fishermen can set their fishing gear mostly in waters less than 40 m depth. It is necessary to state here that because of the limited area in some places along the coast, where the artisanal fishermen can set their nets, and because the same stocks are fished in those locations, interference between them and trawlers occur.

The Artisanal Shark Fishery

The artisanal shark fishery usually operates overnight in the high seas quite a distance from home base using drift netting for the sharks, sword fishes, sail fishes etc.

Type of Craft and Gears Operated in Small-scale Fisheries

The brackish water canoe fishery operates from small traditional dug-out canoes of about 6 m LOA using gears such as set nets, cast nets, bonga drift net, as well as lift and scoop nets and hooks. The coastal canoe fishery employs the large Ghana type canoes which is about 9.6 m in length and sometimes motorised. The gear used include beach seines, cast nets, drift and set gill nets as well as longlines and trawl nets. There is room for further development of the small-scale fisheries with greater degree of motorisation. However, the provision of repair yards for the outboard engines, other basic infrastructure and adequate quantities of fishing equipment should be prioritised. The resources potentials have a bearing, however, on the extent to which Small-scale Fisheries should be expanded. Full-time fishermen in the coastal and brackish water areas fish between 180 - 200 days annually depending on weather conditions and other factors. They are very active during the dry season from January to April, and October to December. However, fishing activity is reduced during the rainy season especially in June and July when the sea is particularly rough.

The distribution of the commercially exploited fish species group is known. Information is also available in respect of the composition of the fish communities and the spatial and temporal distribution. Coastal fisheries resources are multi-species and include shell-fish i.e. Penaeus duorarum etc. There is evidence of migration of species from the open sea to estuaries and creeks and vice-versa.

Brackishwater Species

In the brackish waters including estuaries and creeks, the family Sciaenidae (Croakers) are common including Pseudotolithus elongatus, Pseudotolithus typus and Pseudotolithus senegalensis. P. typus and P. elongatus are the dominant species and their distribution extends to 20 m depth. P. typus and P. senegalensis occur both in the coastal inshore waters and the creeks. Ethmalosa fimbriata (bonga fish) and Ilisha africana exist both in the brackishwater and nearby

coastal waters. Clupeids sardinella spp. (family Clupeidae) are also important. It is known that the artisanal fishery catches Sardinella spp. to the west of the country and Ethmalosa spp. in the Niger Delta area to the east. This is the most significant species in this area. Polydactylus quadrifilis (thread fin family Polynemidae) exists in the estuarine creeks. Chrysichthys nigrodigitatus and Arius spp are important catfishes in the estuaries. Palaemon hastatus are the dominant shrimps in the lagoons and are considerably exploited by the artisanal fishermen.

Marine Coastal Inshore Species

Marine species include Polynemus quadrifilis, Galeoides decadactylus, Cynoglossus spp (Soles), Lutjanus dentatus (Snappers), Pamadasys jubelini (Grunters), Arius spp (Marine catfish). Croakers Pseudotolithus spp are also important along with Sphyraena spp

The freshwater fishery resources fall under:-

- (i) Riverine Fisheries
- (ii) Lake and Reservoir fisheries
- (iii) Fish Pond/Farming (Aquaculture).

Major centres of inland fish production areas include Lake Chad, Kainji and a number of large rivers and their flood plain as well as large numbers of irrigation dams. The freshwater species include Clarias lazera, Heterotis sp., Gymnarchus sp., Alestes sp., Tilapia sp., Lates sp. etc.

THE POTENTIAL OF NIGERIA FISHERIES RESOURCES

Since the early 1960's survey works were embarked upon to determine the biomass of Nigerian waters and the potential fish and shell-fish yield of the country's multispecies stocks. Notable among the survey work are those undertaken by Longhurst (1961) which estimated Nigerian Inshore fishing grounds from 5 - 30 m depth with an annual potential of 10,000 metric tonnes (MT). Bayagbona (1965) examined catch and effort data of 1959 - 63 to arrive at a potential yield of 1,036 tons in Cotonon-Lekki grounds. Longhurst (1965) obtained a potential of 11,000 Tons for the supra thermoche Sciaeonid Community, 3,500 tons for the Sparids. An analysis of the 1963 demersal survey which trawled 6 transects off Nigerian coast led to the prediction of 25,000 tons for marine artisanal fishery. Other surveys on some stocks carried out in Nigerian water have yielded useful information eventhough full materialisation of such surveys were hindered by time and vessel size e.g. (Violent Survey, 1977).

National efforts by Fisheries Research Institutes have been intensified to assess the potential of fisheries resources in Nigeria Coastal/brackishwaters, E.E.Z. and some inland waters (Ref. World Bank Fishery Sector Report - Nigerian Consultants). Apart from Artisanal pelagic fin fish and demersal Fish, there is also a traditional fishery for shrimps (Palaemon hastatus) and some Penaeus notialis (P. duorarum) particularly in the estuaries and coastal waters in the Delta areas and eastwards. The shell-fish (Pink Shrimp) P. notialis has a potential yield of 35,000 MT (Bayagbona, 1979; Ajayi, 1982). Furthermore, various surveys have indicated that the stocks of royal red shrimp (Parapenaeus longirostris) in deep water are considerable though, the potential is yet to be evaluated. Squid, Illex illecebrosus, also appears abundant. Potential yield of about 10,000 tonnes is estimated for Kainji Lake based on the biomass 1,400 tons/annum by Otobo (1974), Ita (1982) reported current annual catch rate of about 5,000 tonnes which can be improved upon by improved management. The current estimate of the potentials of Lake Chad is about 40,000 MT. As for the rivers, reservoirs and flood plains it appears that exploitation is only moderate. Though the total freshwater area is vast, yet there is need for adequate inventory of perennial freshwater bodies

in order to embark on proper national development planning in these areas. In summary (Ajayi, Pers. Comm.) and FAO/World Bank Fishery Sector Review Mission (Nigerian Consultants) report indicate the following underlisted estimated potentials exploitable by the Small-Scale Fisheries:

			MT
Fin Fish	Inshore	Demersal	21,000
"	Artisanal	"	10,000
"	"	Pelagic	120,000
Shell fish	"		48,000
Kainji Lake			11,000
Lake Chad			40,000
Rivers and Reservoirs			130,000
			380,000
			380,000

However, it will be noted that the total landings from Lakes, Rivers Brackishwater and Inshore Fishing were recorded to be 535,435 MT in 1979. It must be noted that both the statistical information and the Fisheries potentials have been the subject of internal and external controversy. Obviously there is room for improvement in the data collection, collation and analysis while a thorough and full assessment of the potentials of the resources of rivers/reservoirs, flood plains, estuaries, creeks and lagoons have to be accomplished. Furthermore, more thought should be given to the appropriate role of aquaculture development in the general management and development planning of coastal lagoons and estuaries. For instance, in many South China Sea Countries, e.g. Thailand, Indonesia and particularly the Philippines, the utilization of lakes and impoundments with a total area of 199,567 ha for fish production yielded an estimated harvest of 99,757 tonnes per year (i.e. approximately 500 kg/ha/yr). The Laguna de Bay in Philippines also has a lot of fish pens yielding large quantities of different fish species.

MAJOR CONSTRAINTS HAMPERING SMALL-SCALE

FISHERIES DEVELOPMENT

(i) Eventhough small-scale fisheries contributes immensely towards increased domestic fish production, its annual growth rate is said to average 3%. The current record of overall fish landings from Small-Scale Fisheries is almost if not in excess of presently estimated potential resources for the fisheries. This poses a major problem because fishing efforts should be based on optimum sustainable yield to ensure rational exploitation and good fisheries management.

(ii) A wide differential between the prices that the fishermen received and the prices at which fish is sold in the consuming areas.

(iii) Lack of basic infrastructure such as drinking water, medical and health care facilities and improved fishing equipment and techniques has caused the drifting of fishermen from the remote fishing settlements to urban areas and the unwillingness of fishermen to encourage their off-springs to take up fishing.

(iv) Inaccessibility of remote fishing settlements, and poor communication network.

(v) Use of crude methods of fish preservation resulting in high losses and hence diminished earnings.

(vi) Many fishing settlements lack shore-based processing and preservation infrastructure such as fish storage and processing plants, repair workshop, net sheds, landing jetties etc. The non-availability or inadequacy of such facilities lead to loss of production time, especially when the fishermen have to carry their outboard engines to the main-land for repairs.

(vii) Even among the coastal States where fishing is the dominant activity in many areas, budgetary allocations to small-scale fisheries appear grossly inadequate when compared with allocations to other sectors.

(viii) Poorly organised and not well-managed fishermen Cooperative Societies.

(ix) Shortage of adequately trained and well-motivated Fisheries Extension Workers.

(x) Inadequate co-ordination in development planning and project implementation particularly with regards to the optimal utilization of supplied production inputs and established shore based facilities.

RECOMMENDED SOLUTIONS TO THE PROBLEMS FACING

SMALL-SCALE FISHERIES DEVELOPMENT IN NIGERIA

(i) Conduction of fisheries resources survey of perennial fresh-water bodies, lagoons and flood plains because they are of high potentials for fish production.

(ii) Undertaking as a matter of urgency, acoustic survey of pelagic resources off-Nigeria's Coastline.

(iii) Setting in motion the machinery for mapping Nigerian Territorial Sea, and EEZ as well as fully strengthening all inspectorate patrol services in order to promote an effective protection of our waters from poachers.

(iv) Rational drive towards improvement/modernization of traditional craft and introduction of mechanisation. Traditional fishing crafts operated from open or sheltered beaches, creeks and inland waters require more than mere motorisation because of their limited carrying capacities for fuel, drinking water, gear, crew and catches. This handicap, apart, the stability and buoyancy of these boats coupled with the attendant hazards and inconveniences tend to make them unattractive to young operators. It is therefore, recommended that as the next logical step to succeed the motorisation of traditional craft operated by small-scale fishermen should be their modernisation into fibre glass. However, this step should be further followed by mechanisation of various types of small and medium-sized craft suitable for operation in difficult coastlines, open beaches and inland waters. These should gradually replace dug-out motorised canoes. These Glass reinforced plastic boats could range from 6 - 10 m LOA and fitted with outboard or small inboard operated engines found economically desirable. Existing boatyards/or boatbuilding activities at the Kainji Lake Research Institute, Lake Chad Research Institute, States Fisheries Division and Federal Department of Fisheries should be strengthened financially and expanded by appropriate authorities to ensure the availability of these boats at prices within the reach of small-scale fishermen.

(v) Establishment of Capacity for Building Fishing Boats in the Country. As a long term measure and in the interest of the fishing industry, it is necessary for the country to organise its own industry either in the public or private sector to build the types of fishing boats required for the fishing industry. This programme should aim at establishing or developing existing

boat yards by necessary strengthening for building exclusively fishing boats. These yards need not be gigantic organisations, as they will be building only small fishing boats to start with. The boatyards will also serve as training centres for boat-building technicians. The possibility of assisting small boat builders in the country to take up fabrication of GRP Canoes and fishing boats on a cottage industry basis should be explored.

(vi) Training of small fishing Boats Operators: A very important activity which should precede the introduction of large number of mechanised fishing boats is the training of operators who will man these boats - categorised as motor-men. This training which will be more vocational will be oriented towards teaching the elements of handling of small engines, navigation and fishing. Three such training and extension centres have been proposed for the artisanal small-boat operators.

(vii) Embark on an immediate feasibility study for cage/pen fish culture in lagoons and lakes to complement the harvest from capture fisheries.

(viii) Undertake full statistical survey of the Small-scale Fisheries Sector assessing all socio-economic parameters of Fishermen - total structure of the fishing community household, sanitation, education, social amenities, earners, dependants, non-earners, craft, gear types etc.

(ix) Massive manpower development and training:-

- Fishing Vessel Engine Room Officers
- Fishing Vessel Deck Officers and Skippers
- Ad-hoc courses for Ice Plant and Cold Storage Operators
- Establishment of Fishermen Training Centres (Mechanics, Fishing gear, Fishing boat operators)
- Refresher courses for old Fishermen and Extension workers

(x) Re-framing of statutory rules for manning of fishing vessels in consultation with the Federal Ministry of Transport.

(xi) Review of the policy of allotment of mechanised fishing boats because of the poor performance of most Cooperative Societies in Nigeria. Trained/Practising Fishermen could be allotted boats under guarantee of Government or Private Agriculture financial institutions.

(xii) Increase in fish production, preservation, processing and transportation inputs.

CONCLUSION

To compare the performance of Nigeria's Small-scale Fisheries a case of another developing country is focussed upon in Annex I of this report. It will be observed that different types of craft similar to those operating in or envisaged for Nigeria are already introduced or planned for introduction in Sri Lanka. Their performances are quite encouraging and with the correct institutional arrangements for setting up appropriate modules, comprising capture, landing, processing, transporting, supply and marketing services, for coastal and inland fishing locations the ultimate goal of attaining greater fish harvest from domestic sources and raising the socio-economic status of indigenous fishermen will be achieved. The South China Sea experience has shown that past efforts have met with the limited success because

they were operated on too broad a scale, thus spreading of Government resources for guidance, management and technical assistance to fishermen Cooperative Societies or groups was too thin. Future effort might be more effective if it was channeled into particular areas i.e., a pilot scheme approach which would provide models for further cooperative development.

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Number of Fishing Boats 1979/83 - Coastal Fishery

<u>28 - 32 Foot Boats</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
1. No. of Boats at beginning year	2,240	2,305	2,505	2,619	2,751
2. No. of Boats going out during year	285	200	286	268	127
3. No. of Boats introduced during year	350	400	400	400	400
4. Total boats end year	2,305	2,505	2,619	2,753	3,026

17 - 24 foot FRP Boats

5. No. of boats at beginning year	2,850	2,250	3,750	4,250	4,750
6. No. of engines replaced during year	150	250	360	660	610
7. No. of boats introduced during year	400	500	500	500	500
8. Total boats end year	3,250	3,750	4,250	4,750	5,250

Indigenous mechanized Boats

9. Total boats at beginning year	3,150	4,290	4,750	4,900	5,080
10. No. of engines replaced	160	290	410	750	690
11. No. of engines issued	1,300	750	640	840	890
12. No. of craft mechanized during year	1,140	460	230	100	200

Non-Mechanized Indigenous craft

13. No. of boats at beginning year	13,800	13,230	13,000	12,885	12,835
14. No. of boats mechanized during	1,140	460	230	100	200
15. Total boats end year	13,230	12,000	12,885	12,835	12,735

Estimated Output 1979-83 - Coastal Fishing Vessels

<u>3½ Ton Boats</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
Catch per boat year (tons)	21	22	22	22	22
Operating craft	2,273	2,405	2,563	2,685	888
Output	47,733	52,910	56,364	59,070	63,536

17-24 foot Boats

Catch per boat year (tons)	11	12	12	12	12
Operating craft	3,050	3,500	4,000	5,030	5,000
Output	33,550	42,000	48,000	54,000	60,000

Indigenous Mechanized Craft

Catch per boat year (tons)	7.5	8	8	8	8
Operating craft	3,720	4,520	4,865	5,030	5,180
Output	27,900	36,160	38,920	40,240	41,440

Non-Mechanized Craft including CraftOperating Beach seines

Catch per boat year (tons)	3.5	4	4	4	4
Operating craft	13,315	13,115	12,943	12,860	12,785
Output	47,303	52,460	51,772	51,440	51,140
Total Output	156,486	183,530	195,056	204,750	216,116