MARKETING AND DISTRIBUTION OF FISH FROM LAKE CHAD

BY

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INTRODUCTION

Neiland *et al* (1977) indicated that the management of inland fisheries in African by modern government organisation is severely constrained by lack of accurate and regularly updated data necessary for decision-making. In Nigeria, the lack of adequate funding is the major factor responsible for poor fisheries statistics and hence the often, divergent nation fisheries production estimates available for the country.

The FAO (1997) Technical guideline for responsible Inland fisheries States that "In accordance with their capacities, States should establish or promote the establishment of systems to monitor riverine and lacustrine environments as part of the basin management process using physical, chemical, biological and social parameters"

The majority of fish monitoring systems and appraisals carried out in the lake Chad Basin, have in the past, been predominantly biological (Mainly catch assessments which are expensive and difficult to sustain). For effective management strategy and policy formation, it is necessary to adopt a multi disciplinary approach to monitoring which include biological, economic, social, institutional and environmental data to provide sufficient and appropriate information for decision-making at both national and international levels.

The concept of FIMS (Fisheries Information Monitoring Statems recently introduced by Neiland *et al.* 1977) draws on a combination of methodologies at it is based on a fisheries-wide holistic approach using market surveys and key interviews". The method integrates issues of economics, social institutional and environment data required for effective management strategy and policy decision-making. The overall objective of FIMS in this study is therefore to provide information on the status and performance of the fisheries for the purpose of fisheries planning and management recent estimate of fish production from Lake Chad is over 40,000mt/y (Neiland, *et al* 1997). The fisheries employ about 10,000 fishermen including about 150,000 persons associated with the fisheries business (Sagua, 1991). At least 70% of the catch is sold for cash, providing 30 - 50% of annual household for the fishers (Neiland *et al* 1994). Nutritionally, the fisheries of Lake Chad also provide the bulk of the protein requirement of the rural community. Additionally, fish supply from the region is known to account for over 70% of fish product traded in large urban markets of southern Nigeria, namely Onitsha, Enugu, Lagos, Ilorin and Ibadan (Neiland *et al* 1997, Ladu *et al*, 2000).

Though no resent comprehensive studies of fish commerce and trade in Chad Basin have been undertaken and documented, it is evident that processed fish products from the Basin are economically significant to the riparian countries, and particularly Nigeria, despite the impact of the Sahel drought on fisheries production (Maembe an Gubio, 1981: Neiland *et al* 1994).

This study attempts to provide information on fish quantities, economic data and flows using a key nodal point (Doro fish market near Baga) known to be the major fish market on the Nigerian section of lake Chad.

THE STUDY AREA

Doro fish market (about 2.5 ha in size) is located on the western shored of the Nigerian sector of the Lake Chad Basin. It operates on weekly basis (usually every Wednesday) and it receives processed fish products (mainly smoked or charred) from the numerous Islands on the Nigerian shores of the lake. Doro is a "centre of activity: (Reiger *et al* 1989) and"hot spot" (Sedell *et al* 1989) for fish marketing in the Chad Basin Area. the Market is divided into sections according to the destinations of fish commodities.

METHODOLOGY

Processed fish products in terms of fish species, quantity (Volume sold), unitrice/total sale value, origin and export destination were monitored for a period of 12 months (June 200 to May 2001) in Doro fish market. The fish market was visited every Wednesday (main market day) and fish trade, with respect to above parameters, assessed using specially trained enumerators.

The enumerators were identified and selected from available fisheries officers from the locality and trained by NIFFR Scientists - using structured interview questionnaires. Packaged fish (in cartons and sacks of standard weight) were wanted and re-weighed when sold/or loaded on to lorries for transportation to various Southern Nigerian fish markets

Type of Fish commodity
Processed fish species were identified as much as practicable in the market

Total sale volume
The number of cartons sold and loaded on to Lorries was recorded. Various cartons and sacks were weighed with a suspended spring balance. These were used as standards during the monitoring exercise.

Unit value and total sale value
Unit price for individual cartons and sacks was recorded and used to calculate total sale value.

Origin of fish
Origin (source) of fish (open water, flood-plain area etc) brought to the market for sale was recorded.

Export destination of fish products
Record of name of city or area outside Doro where fish is transported (destination) for retail distribution was made.

RESULTS

Commercial fish species traded of the over 80 fish species belonging to about 17 families traded at Doro market, only nine species belonging to nine families were assessed to be of commercial importance (Table 1). these include Lates, Gymnarchus, Labeo, Protopterus, Bagrus, Heterotis and Clarias species, Citharinus species and Tilapia species. The fish sellers claimed that since 1974 Clarias species have dominated the fish catch from Lake Chad.

Table 1: Commercial fish species traded in Doro Market, Baga Nigeria.

S/No.	Fish General	Family
1.	Lates	Centropomidae
2.	Gymnarchus	Gymnarchidae
3.	Labeo	Cyprinidae
4.	Protepterus	Lipidosirinidae
5.	Bagrus	Bagridae
6.	heterotis	Osteoglossidae
7.	Clarias sp.	Clariidae
8.	Citharinus	Citharinidae
9.	Tilapia	Ciclid

Sources: Doro market survey data, May 2001.

It was also noticed into market that large Clarias species are coiled head to tail in a ring and then skewed into a pointed stick known as "Tonkoso: Heterotis and Tilapia species were cut into chunks (mangala) before smoking. Small Clarias and some Tilapia Species are either smoked whole or charred, while Protropterus are gutted and coiled before smoking. Alestes and small Tilapia are usually sun-dried for sale in the market.

Unit price and total sale value
Table 2 shows that unit price for various cartons and sacks of dried fish at Doro fish market. Clarias species packaged in Onitsha and Enugu carton (Samtole) weighing 40 -50kg sold for between N4,000.00 N5,000.00 while sacks of sun dried mixed fish species weighing 35 - 40kg sold for N700.00/sack. Tobacco cartons destined for Ilorin weighing between 15 - 25kg sold for N1,500.00 - N2,000.00/cartons. Pure Clarias in tobacco cartons weighing 30kg - 40 kg sold for N2,000.00 - N3,000.00.carton depending on fish supply to the market.

Various cartons and sacks of fish cost differently depending on the type of fish product.

Total weekly and monthly sales (in weight and cash) of fish product are presented on Table 3a and 3b, respectively, Weekly sales ranged from

TABLE 2: UNIT PRINCE FOR VARIOUS CARTONS AND SACKS OF DRIED FISH AT DORO FISH MARKET

PACKAGING ITEMS	WEIGHT(kg)	PRICE (N)
Enugu carton	40 - 50	4000.00 - 5000.00
Sacks of Dried Fish	35 - 40	700.00 /sack
Ilorin Carton	15 - 25	1500.00 - 2000.00
Tobacco Carton (Ilorin)	30 - 40	2000.00 - 3000.00
Samatola Carton	40 - 50	3500.00 - 4000.00

Source: Doro Market survey data, May 2001.

TABLE 3: TOTAL WEEKLY VOLUME AND TOTAL SALE VALUE OF FISH FOR ONE YEAR (JUNE 2000 - MAY 2001) AT DORO MARKET

DATE	TOTAL VOLUME SOLD (TONNES)/ WEEK	TOTAL SALE VALUE (N)/WEEK
09/06/2000	53.3	2,585,000.00
15/6/2000	88	5,209,.000.00
22/6/2000	109	13,170,000.00
29/6/2001	82.3	9,568,000.00
06/07/2000	264	25,740,000.00
13/7/2000	154.55	23,877,500.00
20/7/2000	235.5	45,225,000.00
01/08/2000	195.1	45,200,000.00
10/08/2000	197.84	48,645,000.00
17/08/2000	213.7	53,530,000.00
24/08/2000	234	58,115,000.00
31/08/2000	125.79	22,215,000.00
07/09/2000	100.2	16,262,000.00
14/10/2000	202.9	40,447,000.00
21/09/2000	255.8	54,085,000.00
28/09/2000	122.5	18,620,000.00
05/10/2000	233.4	50,340,000.00
12/10/2000	272.42	56,662,000.00
19/10/2000	325.55	60,750,000.00
26/10/2000	182.9	27,978,000.00
02/11/2000	217.4	47,500,000.00
09/11/2000	212.1	38,104,500.00
16/11/2000	270.5	55,666,000.00
23/11/2000	187.6	35,940,000.00
30/11/2000	215.4	57,291,600.00
07/12/2000	176.15	49,590,000.00
14/12/2000	231.2	70,150,000.00
21/12/2000	220.4	53,090,000.00
28/12/2000	154.15	28,320,000.00
04/01/2001	161.95	24,187,500.00
11/01/2001	230.85	46,765,000.00
18/01/2001	230.85	49,360,000.00
25/01/2001	156	35,578,000.00
01/02/2001	282.75	74,990,000.00
08/02/2001	262.2	68,560,000.00
15/02/2001	276.1	99,975,000.00
22/02.2001	233.95	71,250,000.00
01/03/2001	225.05	66,060,000.00
08.03.2001	398.6	107,275,000.00
15.03.2001	263.3	64,060,000.00
22/03/2001	300.75	78,558,000.00
29/03/2001	300.8	65,280,000.00
05/04/2001	104.7	23,850,000.00
12.04.2001	330.75	82,050,000.00
19/04/2001	254.75	69,230,000.00
26.04.2001	219.35	66,170,000.00
03.05.2001	254.75	60,810,000.00
10.02.2001	229.4	55,820,000.00
17/05.2001	282.92	64,677,000.00
24/05/2001	281.7	73,872,000.00
31/05/2001	277.7	53,335,000.00

Source: Doro Market survey data, May 2001.

TABLE 3B: MONTHLY TOTAL VOLUME AND TOTAL SALE VALUE (N) OF FISH FOR A PERIOD OF ONE YEAR (JUNE 2000 - MAY 2001)

MONTHS	TOTAL VOLUME SOLE (TONNES)/ MONTH	TOTAL SALE VALUE (N)/
June 2000	332.8	3,052,200.00
July 2000	870.7	136,298,500.00
August 2000	840.64	22,770.500,00
September 2002	581.2	12,941,400,00
October 2002	1016.27	195,730,000.00
November 2002	1103	234,502,000.00
December 2002	781.9	201,140,000.00
January 2001	779.4	155,890,500.00
February 2001	1055	314,774,000.00
March 2001	1488.69	381,658,000.00
April 2001	909.55	241,300,000.00
May 2001	134.92	308,514,000.00
Total	**9,894.07**	**2,208,571,100.00**

Source: Doro market survey data May 2001

53.3 (June 2002) to 398 6mt (March, 2001) Weekly monetary value ranged from N2.6m (June 200) to N107.3m (March 2001) Corresponding monthly values ranged from 581.2mt (September 200) to 1488. 8mt (March 2001) and N30.53m June 2000) to n38166mm in March 2001. The volume of fish trade fluctuated seasonally depending on a number of factors such as flood regime of the lake, supply and demand, socio-political issues e.g ethnic conflicts etc. Fish demand and supply was found to be high at periods of major Christian and Moslem Holidays.

Annual sale volume for the period covered by this study (June 2000 - May 2001) was 9903.07mt and N2,557,448,5000.00)Approx. N2.6b) Average weekly sale was 244. 25m or N45.740,000.00

Fish packaging

packaging of smoked fish was found to be an important industry in the market. The fish brought from the various parts of the Lake are heaped on mats spread on the ground for repackaging in various cartons (see plate 1) Depending on the destination of the product in southern Nigeria.

Repackaging of fish products in the market is a well organized business.

Tying of cartons

The cartons were usually re-enforced it steel stripes and then tied very strongly with ropes before loading into Lorries (See plate 2) for transportation to distant destinations. The making and sale of ropes is a thriving business in the region. A special group of people are involved in the typing process.

Loading of packaged fish

Stacking cartons and sacks of fish unto trucks by labourers (dandoco) is another business observed in the market (See Plate 4). The biggest trucks (German Benzs) can carry up to 5 - 6 tonnes offish when fully loaded (see Plate 5)

Origin and destination

According to the fish sellers, the open lake accounts for up to 90% of the fish product with only 10% coming from the swampy lake shores.

The fish were packaged in cartons and transported mainly to southern Nigerian market of Onitsha, Enugu, Lagos, Ibadan and Ilorin (Fig 1) A total of 949 trucks loaded fish from Doro market to various destinations in Nigeria during the reporting period (Table 4 Fig1) A hundred and eighty one (181) trucks representing 19.1% loaded fish to Onitsha, while 122 lorries (12.8%) loaded fish products to Ibadan. Enugu received the Highest,

FIG. 1: POLITICAL MAP OF NIGERIA SHOWING VARIOUS DESTINATIONS OF FISH FROM LAKE CHAD.

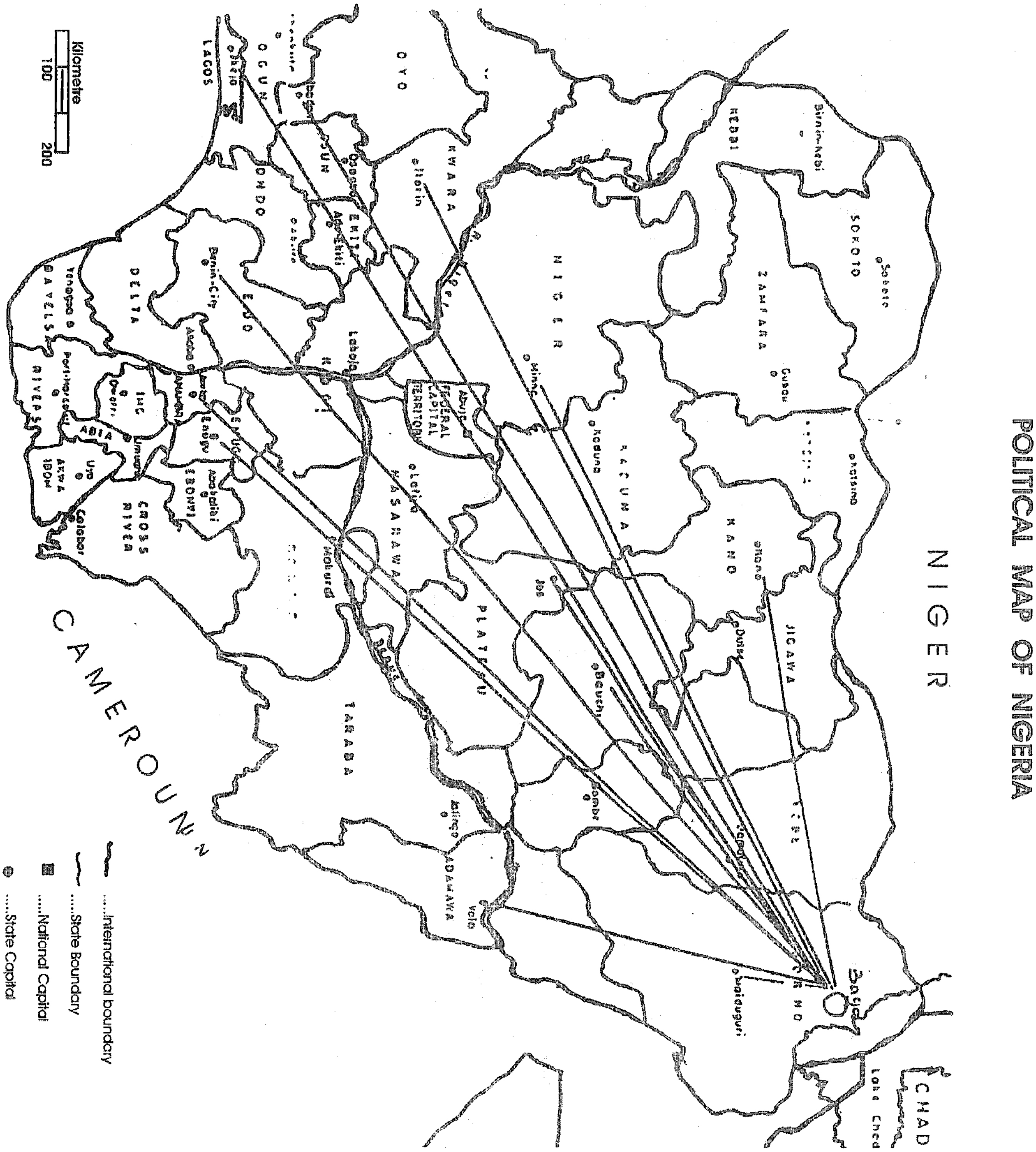

TABLE 4: PERCENTAGE NUMBER OF TRUCKS (911) THAT LOADED FISH TO VARIOUS DESTINATIONS FROM JUN 2002 - MAY 2001 AT DORO

DESTINATION	NUMBER OF TRUCKS	PERCENTAGE (%)
Onitsha	181	19.1
Ibadan	122	12.8
Enugu	190	20.0
Maiduguri	67	7.1
Benin	70	8.6
Kano	82	8.9
Lagos	85	8.9
Ilorin	82	8.6
Mubi	24	2.5
Jos	29	3.1
Potiskum	5	0.5
Minna	2	0.2
Bauchi	1	0.1
Yola	3	0.3
Total	949	100

Source: Doro market survey data, may 2001

accounting for approximately 20.0% of the trucks, Lagos Ilorin and Kano received similar number of vehicles (Approx 9%), while other cities occupy lower intermediate levels.

WULGO FISH MARKET

Aside from Doro, Wulgo (Fig 2) a border town between Nigerian and Cameroon is thought to be strategically located (being at the deltaic mouth of the River EL-Beid and the Chari-Logone system) and represents a major source of fish outlet from the Lake Chad Basin. we visited this town between the 16th and 20th of July 2001 to estimate the possible contribution of processed fish product from this area. We found no commercial fish market here but we were informed that the village serves as a seasonal loading centre for fish product brought in from Kinasarum (Chad Republic), Kofia (Cameroon) and Darrak (Nigeria) during the rainy season. The three village have weekly fish market days on Tuesdays, Mondays and Sundays, respectively. In the dry season, transportation vehicles are able to go farther into the flood plain to Katikime (see Fig 2) to load fish from this area. This was the cases when we visited in July 2001.

From interviews, we were informed that fish products from his area, either from Wulgo (rainy season) or Katikime (dry season) are brought directly to Muna fish market (every Thursdays) in Maiduguri for sale. Using the same standard method as in Doro fish market, attempt was therefore made to estimate the volume of fish from this area. the estimate yielded a weekly volume of approximately 3750 bags with a total weight of about 150t (approximate 40kg/bag) and a sale value of N7.5m. This represents a large fish trade but more detailed seasonal study is required before any firm conclusion can be drawn from this preliminary work.

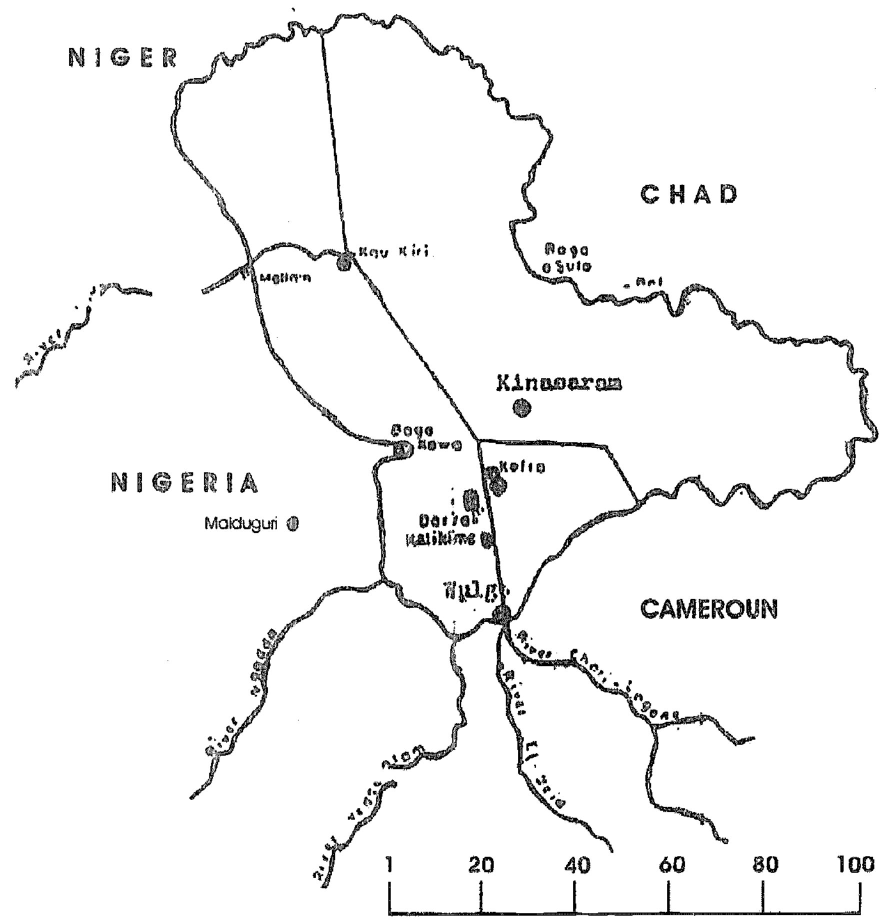

Fig 2: Map of Lake Chad showing Kofia, Darrak, Kinasaram fish Markets and Wulgo fish loading centre

DISCUSSION

Doro fish market near Baga had been established from previous studies to be the major fish market receiving the bulk of fish caught within the Nigerian territory of the Lake Chad Basin (Neiland *et al*, 1997; Ladu *et al*, 2002). the volume of fish trade obtained in this study indicates the significant contribution of the country. The open water and to a small extent the marshy area of the lake constitute the major source of the fish products. The Southern Nigerian markets of Onitsha, Enugu, Lagos, Ibadan and Ilorin continued to be the major receiver of fish products from the Basin. Fish commodity types are not different from previous records as the commercial species continued to be dominated by Clarias, heterotis, lates, Gymnarchus, Citharinus, Labeo, Protepterus etc.

Using a conversion factor of 4.5 (Sagua 1986), the total annual fish volume of smoked fish product (9903mt) from Doro market is equivalent to 4453.5mt fresh weight. This value (44563mt) when put together with domestic consumption by fishermen and their familiar, limited quantity sold fresh for immediate domestic needs in addition to supply from other minor routes such as Wulgo, agrees largely with the over 40,000mt estimated for this region by Neiland *et al* (1997).

It was observed that the marketing and destruction of Lake Chad fish was controlled by experienced fish traders who form a complicated chain of buying and selling. These middlemen called the "Fatomas and "Belbelas" are actively involved in the marketing of processed fish.

"The Belbelas are big fish merchants who purchases fish from the fishermen, employ labour to process, smoke and transport the fish from the Islands to Doro feeder market for sale. The "Fatomas" (spokesman for fishermen) and the "Delatis" are the go-between commission agents of the customers and the Belbellas, the involvement of these middlemen in fish marketing, has to some extent, increased the overall cost of fish from the region.

It is noteworthy that despite this huge trade in fish product from the region, no official tax is paid to Local, State or Federal Government. The enterperenuers however, claimed that the joint patrol team consisting of Nigeria and Chadian soldiers and Nigerian Customs Officers extort some unofficial tax from them. No receipts were issued for such collections. Rural communities are usually not well disposed to tax payment and this makes a recommendation on the issue very difficult. However, considering the huge fish trade from the region, it is worthwhile looking into the possibility of limited taxation as a means of generating some revenue for the State.

To a large extent, the overall aim and objectives of this study, which was to provide a multidisciplinary information performance and status of the fisheries and as means of complementing previous fisheries research in the Lake Chad Basin, have been achieved. the study demonstrates the feasibility if operation of a FILMS at a regional level and could provide a model for the establishment of a regional fisheries data based. The model if well planned, organized and implemented could be more cost effective than Catch Assessment Survey.

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