

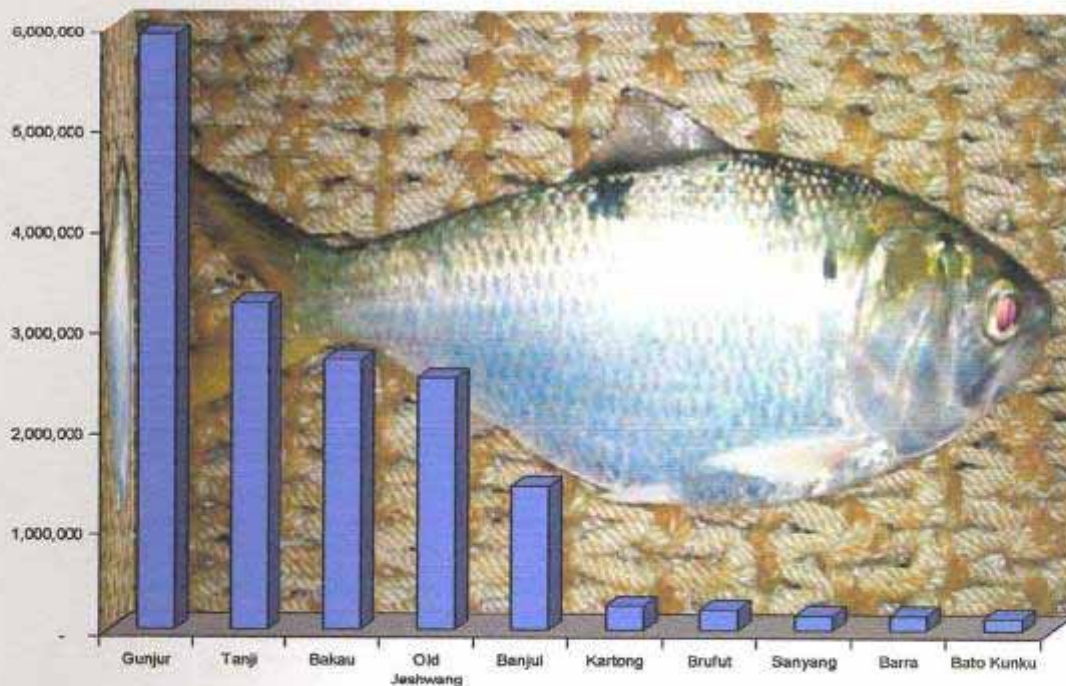
THE REPUBLIC OF



THE GAMBIA



2008 CATCH ASSESSMENT SURVEY REPORT



**GAMBIA ARTISANAL FISHERIES DEVELOPMENT PROJECT
DEPARTMENT OF FISHERIES
MINISTRY OF FISHERIES, WATER RESOURCES AND NAM
BANJUL, THE GAMBIA**

Executive Summary

The fisheries sector of the Gambia has huge potential to contribute immensely towards social, economic and cultural advancement of the country. Although both the industrial and artisanal fisheries sub-sectors play their role in the necessary benefits to the Gambian populace, the artisanal fisheries is the main supplier of vital animal protein supplement to the Gambians and also the major source of raw fish material for the fish processing establishments operating in the country.

It is estimated that the artisanal sector which has now become an important fishing industry provides direct employment to 1 410 head fishermen and 4 694 fishing assistants operating from the 154 landing sites in the Gambia (2006). Fishing operations in the artisanal sub-sector target all species using different fishing gears. Catch assessment survey, a sampled based survey collects data on effort employ on catching fish and estimates amount of fish caught over a given period. The 11 fish landing sites in the Atlantic Coast were all covered in 2008 while 13 sample landing sites were selected and covered in the same period from the other four fisheries administrative areas due to human and technical limitations.

A total artisanal fishing effort of nearly 233 000 fishing days were used to catch 43 000 tonnes of fish in 2008. Of this effort, just under 100 000 fishing days were attributed to catching fish in the Atlantic Coast Stratum and the rest (133 000) were employed inland. Total national fisheries (artisanal and industrial) production in 2008 was estimated at nearly 46 000 tonnes. The coastal artisanal fisheries contributed the bulk (75%) of the total fisheries production in 2008 and inland fisheries 18.3 percent. Almost 12 000 tonnes were *Ethmalosa frimbriata* (Bonga/Shad).

The two most important fishing gears employed in the artisanal fisheries operations in the Gambia are encircling/surround gillnet and Set/bottom gillnet. These gears are used in fishing operations all year round and are responsible for most fish landings. Surround gillnet targets small pelagic fish, particularly bonga which is an inshore and estuarine species while Set/bottom gillnet target a wide range of demersal and sub-demersal fish species. Landings depend on the abundance and availability of target fish species and these may have some bearing with seasons. Fish abundance and catchability normally vary with seasons among other things. This phenomenon was observed with the highest catches in the months of June and October.

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CHAPTER 1

1.1. INTRODUCTION / BACKGROUND

Bordered on three sides by the Republic of Senegal and on the west by the Atlantic Ocean, the Gambia is one of Africa's smallest coastal states (sea coastline: about 80 km). It is located in the highly productive upwelling zone of the Atlantic Ocean. Surveys of the fisheries potentials of the marine waters of The Gambia were conducted between 1964 and 1965 and in 2004 indicated that the country has considerable marine and estuarine fisheries resources and that the exploitation and utilization of the resources can contribute significantly to national socio-economic development. This led to the creation of the relevant public institutions, the enactment of legislation and the elaboration of fisheries policy objectives for the development and management of fisheries. Two types of fisheries operate in the Gambia; artisanal fisheries and industrial fisheries. These fisheries are distinguished by their mode of operation but target and compete for the same fish stocks.

Fisheries production is monitored through established information collection systems. Artisanal and industrial fisheries fish catches and efforts used in total production estimates for both sub-sectors are captured through a sample survey (Catch Assessment Survey [CAS]) and Fisheries Observer programme respectively. The data collected through these systems are used in the planning, development and management of our fisheries. This report focuses on artisanal fisheries production.

Policy objectives and socioeconomic importance

The fisheries policy objectives are linked to some key national development objectives such as: increased food self-sufficiency and security; a healthy population and enhanced employment opportunities for nationals; increased revenue generation and foreign exchange earnings; and the attainment of national social and economic development. The sectoral policy objectives have basically remained unchanged over the years but the strategies for their attainment are being continually amended (and some discarded) to reflect the changing situations in fisheries at the national, sub-regional, regional and global levels.

There were about 1 785 artisanal fishing canoes operating in both the marine and the River Gambia in 2006. In the same year, it was estimated that the artisanal fisheries sub-sector provided direct employment to 1 410 head fishermen and 4 694 assistant fishermen. Important to note is the ancillary workers such as boat builders, fish processors, fish retailers, etc associated with fishing. Over 200 000 people were estimated to directly or indirectly depend on artisanal fisheries and its related activities for their livelihoods in 2003. The artisanal fishing industry is the major source of raw fish materials for the fish processing establishments in the Gambia and the major supplier of food fish for the Gambian population. The bulk of fish exports from the Gambia could be traced back to the artisanal fishery.

The development of industrial fisheries has been relatively limited in the Gambia. Most industrial vessels operating are mostly foreign owned they land their catches in foreign ports where the fish is processed, packaged and labeled as products originating from those foreign ports. It is estimated that less than 2000 people are employed in the industrial sub-sector the majority of who are factory workers (mainly women).

1.2 SCOPE OF THE SURVEY

The ultimate goal of the catch assessment survey (CAS) is the continuous production of catch and effort statistics from the Artisanal Fisheries sub-sector. A sampled based survey, CAS is done in space and time covering all the landing sites in the Atlantic Coast and pre-selected landing sites or Primary Sampling Unit [PSU] in inland. It records catch and effort by gear-type (6 canoes) and species caught and landed.

1.3 ITEMS OF INFORMATION COLLECTED

Information on number of canoes per gear-type that went fishing on the sampling day for each PSU including catch and effort are collected by the field staff. The types of species and crew size of six canoes (by gear-type) sampled are also recorded. Information on the number of Fishing Units operating from the selected PSUs are also collected.

1.4 CATCH ASSESSMENT SURVEY TEAMS

There are five fisheries administrative areas in the Gambia namely; the Atlantic Coast, Lower River North Bank [LRNB], Lower River South Bank [LRSB], Upper River North Bank [URNB] and Upper River South Bank [URSB]. Of these, the ACS is fully covered and in each site there is one or more field staff equipped with the necessary equipment and materials conducting the survey. Despite financial and human resources constraint, the Fisheries Department has posted staff to selected PSUs to conduct CAS among others. Field-based staff are continually trained and re-trained on biological and statistical data collection and processing. A data entry was also constituted and is based in the office. Two field supervisors visit landing sites regularly to observe and monitor the activities of the field staff. The overall responsibility for assuring data quality rests on the head of the unit.

1.5 TRAINING

Class room and on site training are regularly organized to refresh field staff. In 2008, three field and class room training on a wide range subjects including fish species identification, statistical methods, the use of CAS equipment, data analysis, biological parameters measurement, etc. were conducted.

1.6 QUALITY CONTROL OPERATIONS

The timely availability of accurate is paramount in effective planning and management of the fisheries sector. To ensure data quality, checks were carried out in the field by supervisors. They checked for completeness and accuracy of the data collection forms before submitting them for processing in the office. The data is verified and entered in a main frame computer for processing and analysis.

1.7 DATA PROCESSING

CSPPro 3.0 software was adapted for fisheries data entry. However, data were coded prior to being input into computer. Validation rules were assigned to the variables to avoid duplication, typographical and other errors. The SPSS, Version 17.0 Software was used to produce the necessary output tables for the report.

1.8 BASIC CONCEPTS AND DEFINITIONS

In order that the reader understands and appreciates the amount and quality of data herewith provided, it is imperative that certain concepts are explained.

Artisanal fisheries

Traditional or artisanal fishing is a low capital investment activity with fishers operating from fish landing sites throughout the country. Primitive to simple fish capturing techniques were being used as it was purely to provide food fish to members of the fishermen households. This has since evolved into commercial enterprises supplying raw material fish to fish processing plants and market centres in the municipalities and up country.

Fishery

Refers to the economic activities of capture or culture of aquatic animals and plants.

Capture

Refers to the catching or gathering of aquatic animals and plants. Normally, capture involves living aquatic animals and plants, although gathering of shells, corals, etc., which is already dead, is also considered as capture.

Catch refers to total fish hauled during fishing operations. The catch may not all necessarily be landed as some unwanted fish may be discarded at sea. Landings refers to those fish that are kept and landed at home ports or landing sites for consumption and sale.

Fisherman

Fisherman refers to a person who engages in fishing at sea or on inland open water. A person who works on land for net repairing, loading fishing material, unloading catch, etc. is excluded.

Landing Site

The site or village from which fishing units operate.

Fishing Unit:

A Fishing Economic Unit (FEU) consists of fishing canoe, fishing gears and fishermen. Fishing units are classified in categories according to the type of fishing gear employed. Hence, when the same fishing canoe employs two different types of gear or uses more than one type of gear at different times of a year, the number of fishing units is counted for each gear employed separately, although the same fishing canoe is used.

1.9 SAMPLE SURVEY DESIGN**a. Sampling in space**

Sampling was done in accordance with the stratified fishing areas as given table 1.

Apart from the ACS where all landing sites are covered for CAS, in the rest of the fisheries administration areas, a number of fishing sites (Primary Sampling Units) were selected for further sub-sampling (secondary sampling units). The rationale behind the concepts of PSU and SSU could be found in the previous reports.

b. Sampling in time

Catch Assessment Survey used a predetermined reference period (normally 10 days per month); five days in the first half and five day in the second half of the month.

The data collected during the survey period were used to produce monthly catch estimates by gear/boat and by species for the artisanal sub-sector.

1.10. Selected PSU

All fish landing sites along the coast (Atlantic Coast Stratum) were all selected for catch and effort data collection. For the inland fisheries, attempts were made to select representative landing sites in each fishery administrative area. However due to human and technical limitations, some constraints were imposed on the selection of sample landing sites. Fishing sites with no resident enumerators were withdrawn.

Table 1. Sample Description of the 2008 Catch Assessment Survey (2008)

Stratum/Landing Sites Selected	Landing Sites	
	Population Number	Sample Number
Atlantic Coast*	10	10
Kartong		
Gunjur		
Sanyang		
Bato Kunku		
Tanji		
Brufut		
Bakau		
Old Jeshwang		
Banjul		
Barra		
Lower River North Bank	30	4
Albreda		
Salikene		
Tuba Kolong		
Farafeni		
Lower River South Bank	45	5
Mandinary		
Bintang		
Kemoto		
Jappineh		
Pirang		
Upper River North Bank		
Kuntaur	26	1
Upper River South Bank		
Jarreng	43	3
Bansang		
Basse		
TOTAL	154	23

1.11 Sample Days

Sampling of landings by gear type is carried out 10 days in a month; 5 days in the first 15 days and the other 5 in the last 15 days but consecutively for each period. The catches and effort employed are then raised to account for the days that sampling was not done.

1.12 Estimating Process

Catch and effort data for each PSU was summed for each gear type surveyed. The sample totals for each gear type were then raised to reflect the number of days fished in the month by multiplying them by the ratio of days fished to days sampled in the reference period (R2). In this manner, the monthly total estimates of catch and effort by gear type for each PSU were obtained. Total production for each PSU in a Stratum are summed and raised to give an overall catch in that stratum. The raising factor used here was the ratio for each gear type in the stratum to boats in the PSUs (R3). Each PSU therefore,

produced a different estimate of effort and production for any given gear type within the stratum.

1.13 The Estimations

The same process expressed in a mathematical way will be as follows:

Assuming that,

h = stratum (1, 2,)
i = selected PSU
j = boat sampled
k = gear used
M = number of days in the calendar month
D = number of days in the reference period
d = number of actual fishing days sampled
n = number of boat in the PSU
l = number of boats sampled
N = number of boats in the stratum
Y = catch (effort)
S = number of sampled villages in the h stratum
L = number of boats landed

$$k^Y_{hi} = \sum_1^d \left[\frac{L}{l} * \sum_{j=1}^l k^Y_{hidj} \right]$$

Gives the total catch (sample date) landed in PSU "i" in stratum "h" by boats using gear "k" during the days sampled.

$$\text{(monthly)} \quad k^Y_{hi} = k^Y_{hi}(d) * \frac{M}{D}$$

Gives the monthly total catch (sample date) landed in PSU "i" in stratum "h" by boats using gear "k" during the month.

$$\text{(stratum)} \quad k^Y(i)h = k^Y_{hi} * \frac{N_{kh}}{n_{khi}}$$

Gives the monthly total catch landed in stratum "h" by boats using gear "k" estimated using sample data from PSU "i". The final estimated monthly total catch landed in stratum "h" by boats using gear "k" is obtained by taking the average of the different stratum estimates calculated from the sample date of the PSUs weighted by the number of landings in each PSU.

1.14. POSSIBLE SOURCE OF ERROR

a) Non sampling errors

The following were identified as possible source of non sampling errors.

- i) The field staff does not collect the information or complete forms correctly.
- ii) The field staff is not present at the beach when the fishing boats are landing and collects data by enquiry.
- iii) The field staff cannot weigh the catches because he does not have proper weighing scales and estimates the landings.
- iv) The field staff incorrectly identifies fish species.

For case (i) and (ii) the only solution is to increase supervision.

The supervisor will be able to check the work done by the field staff and correct possible mistakes at the source.

Case (iii) has one possible solution, the purchase of appropriate weighing scales and buying whatever material is needed to keep them in good working condition.

Case (iv) becomes a very important source of error when catch estimates by species groups are produced. A possible solution is to organize local training courses for the fish recorders. These training courses could be useful also to present to and discuss with the enumerators how to solve problems arising in particular situations.

It should be mentioned that all enumerators have been adequately trained to conduct catch and effort data collection. Also put in place, a system for supervising the fieldstaff and to monitor their activities by carrying out spot checks.

b) Sampling Errors

Sampling errors may arise from the following:

- i) The underestimation of the various fishing units operating from a PSU in a stratum. The number and distribution of units are used to calculate the raising factors which result in the estimation of total catch and effort for the strata. An error in the number of boats per stratum or in the gear distribution would therefore affect the estimates.
- ii) The sampling Frame no longer reflects the reality on the ground; there are changes in the number and distribution of fishing units per gear-type (movement/migration) especially in the inland fisheries.

- iii) Boats changing fishing gears/changes in the fishing pattern and the fishery structure may affect the final estimates.

c) Other sources of error

Geographic boundaries and national borders do not mean much to the fishermen. It is well known that, along the Coast, groups of fishermen migrate in pursuit of fish and changes in general economic conditions in the different countries or areas along the coast. These movements would greatly affect the stratum estimates unless they were limited to the boundaries of one stratum.

Nevertheless, seasonal fluctuation in number of boats operating could be obtained by studying the migratory pattern fisheries units operating in the PSUs to update the sampling frame. This pattern could be established by the supervisor collecting data movement of fishermen in the PSUs

CHAPTER 2

GENERAL FINDINGS

2.1 Catch Assessment Survey (Artisanal Fishing)

Fisheries statistical data collection is an integral part of the functioning of the Fisheries Department. Catch assessment survey estimates amount of fish caught and the effort used in the extraction/harvesting of the fish by the artisanal fisheries operators. Annual artisanal fish production is the sum of all estimates of landings (production) by the artisanal fisheries sub-sector.

2.2 Fisheries Production (Trends)

The artisanal fisheries sub-sector is divided into two fishing areas namely; the Atlantic coast and inland. Table 2 and figure 1 shows total fish landed by the artisanal fishermen operating from the major fish landing sites (Atlantic Coast Stratum, [ACS]), inland and the industrial sub-sector for 2006, 2007 and 2008 with indication of changes in production levels over the previous year. There was a 2.6 percent increase in landings in the ACS; a negative growth of 11.2 and 23.6 percent were registered in the inland and industrial fisheries respectively in 2008. Overall, there was a 2.3 percent decrease in total landings in 2008 compared to 2007. Tanji and Gunjur were observed to have increased their production 18.3 and 11 percent respectively while all other landing sites in the ACS recorded a decrease (Table 2).

Table 2: Total Catches for 2006, 2007 and 2008 for the Atlantic Stratum*

Stratums	Total Catches (Kilogram)			% change 2007-2008
	2006	2007	2008	
Atlantic	32,975,896	33,575,249	34,464,094	2.6
Gunjur	9,402,964	9,589,588	10,641,383	11.0
Tanji	7,334,273	7,466,895	8,835,340	18.3
Brufut	4,957,713	4,991,776	4,211,604	-15.6
Bakau	3,226,383	3,078,562	2,924,232	-5.0
Banjul	2,728,956	2,972,728	2,815,055	-5.3
New/Old Jeshwang	2,505,354	2,803,174	2,727,828	-2.7
Sanyang	1,648,426	1,678,212	1,477,607	-12.0
Kartong	548,853	512,991	480,518	-6.3
T/batokunku	308,607	293,450	231,719	-21.0
Barra	314,367	187,182	119,374	-36.2
Inland	8,904,796	9,432,137	8,377,168	-11.2
Upper R. South Bank	4,310,689	4,566,185	3,416,695	-9.3
Lower R. South Bank	3,610,712	3,824,270	3,940,793	-15.9
Lower R. North Bank	721,613	764,383	802,565	-1.0
Upper R. North Bank	261,783	277,299	217,115	-5.1
Industrial	2,829,518	3,891,361	2,973,907	-23.6
TOTAL	44,710,210	46,898,747	45,815,171	-2.3

In 2008, total national fisheries production was estimated at just over 45 815 tonnes (Table 2) this represented a 2.3 percent net decrease in fish landings over 2007. Of this total catch, 75 percent came from the most productive area (ACS), 18 percent inland and 7 percent industrial (Figure 1). The most important fishing industry in the country is the artisanal fisheries contributing about 93 percent to the overall catches in 2008.

Figure 1 : Total Catches by Atlantic, Inland and Industrial Stratum (2007)

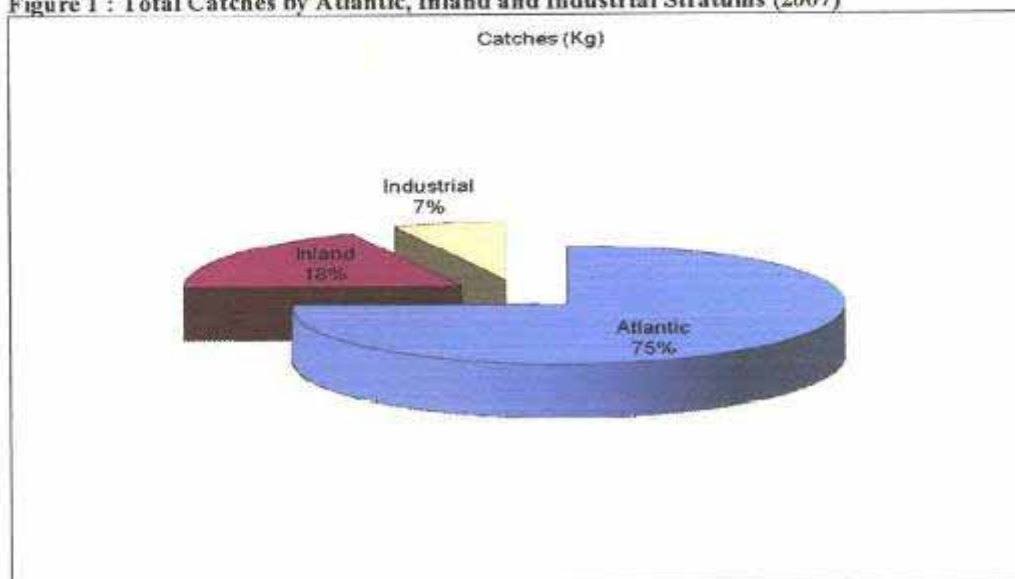
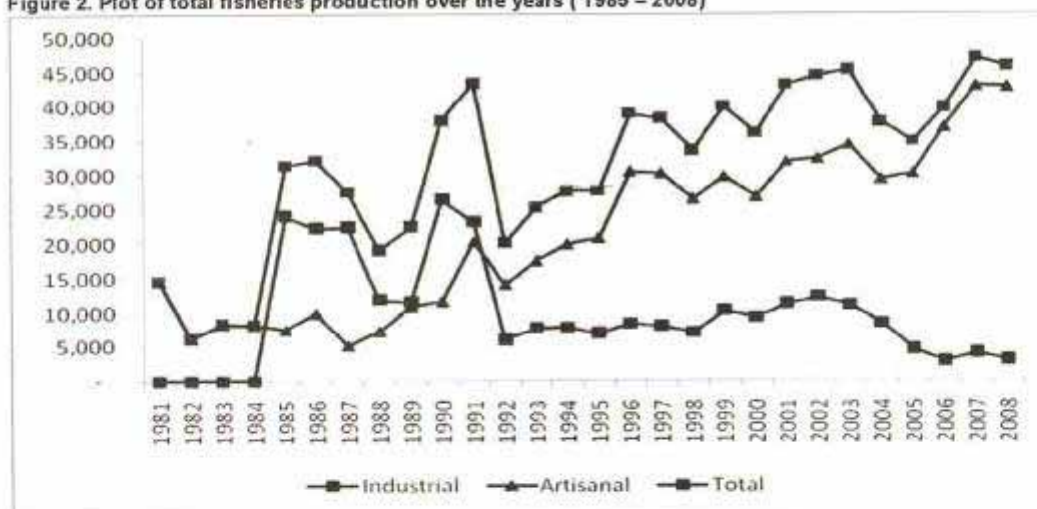


Figure 2 below indicates total fisheries production (artisanal and industrial). Although total annual fish catches had been fluctuating, the overall trend is an upward one. A similar trend could be observed for the artisanal fisheries production; this fishing industry being responsible for the bulk of fish landings dictates the overall trend (Figure 2). As opposed the gradual increase in catches observed in 2006 and 2007, a downward notch was registered for the artisanal fisheries. The industrial production which has been declining in the recent years was observed to have picked up in 2007 and then declined in 2008.

Time series of total annual landings by species for both the artisanal and industrial fisheries sub-sectors are given Annex 1.

Figure 2. Plot of total fisheries production over the years (1985 – 2008)



2.3 Fishing Effort

Fishing effort estimation is an important and necessary aspect in fisheries production monitoring. It indicates the amount of effort employ in producing number of kilogramme of fish at a given period; change in catch rates points to how the fishery reacts to fishing pressure being exerted. In artisanal fisheries, effort is given in number of fishing trips undertaken at a given period. In 2008, about 232 800 fishing trips were undertaken producing nearly 43 000 tonnes of fish. A total of 99 650 fishing trips were used in producing about 34 500 tonnes of fish in the Atlantic coast while 133 150 trips caught 8 400 tonnes of fish inland (Table 3). The rate of catch (Kg/fishing trip) varies according to the fishing method and the target species. Gunjur and Tanji registered the highest catch rate (618 and 421 respectively), this is due mainly to the fact that these sites mainly target small pelagics which the most abundant species (Figure 3). Although Brufut had employed more effort, the catch rate was low because they were targeting so called white fish which are scarce.

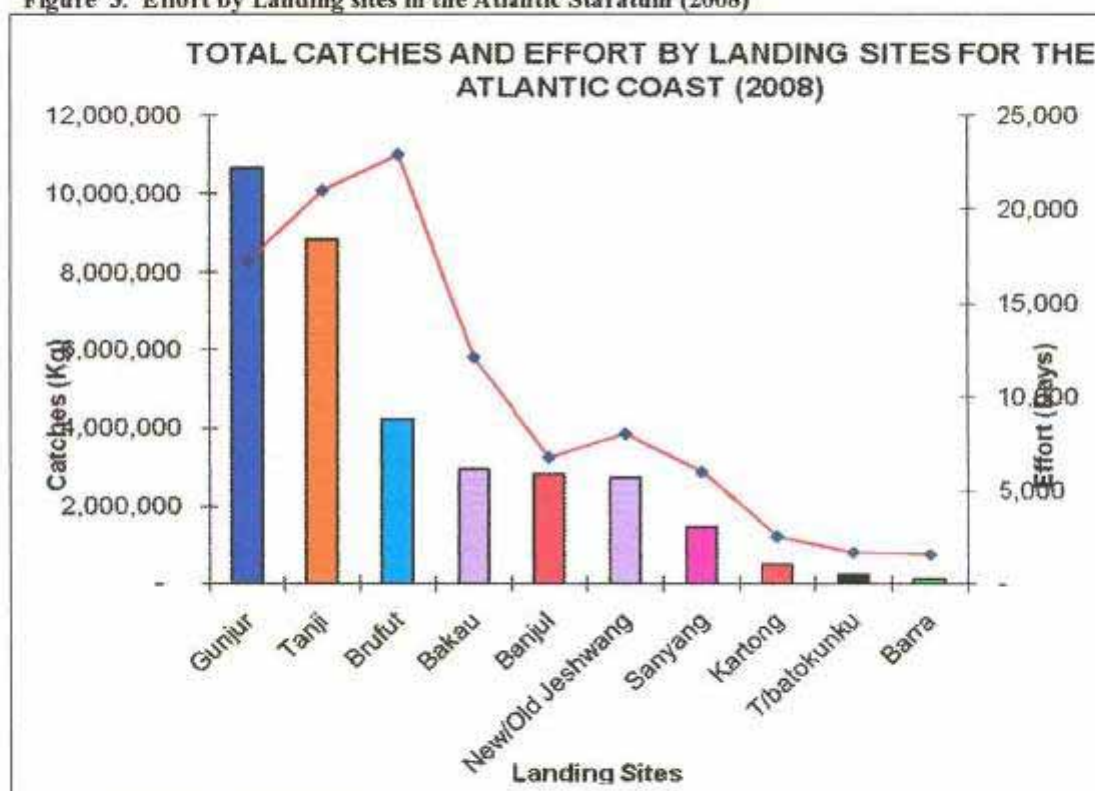
Table 3. Total Catches and Number of Boating Days (Trips) by Landing Sites (2008)

Startum/Landing Sites	Total Catches Kilogram	% of Total Catches %	Effort (Total Boating Days) Days	% of Total Effort %	Catch Per Unit Effort Kilogram
Atlantic Coast	34,464,094	80.4	99,650	42.8	346
Gunjur	10,641,383	24.8	17,216	7.4	618
Tanji	8,835,340	20.6	20,965	9.0	421
Brufut	4,211,604	9.8	22,872	9.8	184
Bakau	2,924,232	6.8	12,062	5.2	242
Banjul	2,815,055	6.6	6,746	2.9	417
New/Old Jeshwang	2,727,828	6.4	7,986	3.4	342
Sanyang	1,477,607	3.4	5,967	2.6	248
Kartong	480,518	1.1	2,570	1.1	187
T/batokunku	231,719	0.5	1,697	0.7	137
Barra	119,374	0.3	1,568	0.7	76
Inland Stratum	8,377,168	19.6	133,150	57.2	63
Upper R. South Bank	3,416,695	9.7	32,469	13.9	128
Lower R. South Bank	3,940,793	7.5	68,967	29.6	47
Lower R. North Bank	802,565	1.8	28,559	12.3	26
Upper R. North Bank	217,115	0.6	3,155	1.4	83
Total All Startums	42,841,265	100.0	232,800	100.0	184

Total inland fisheries production in 2008 was estimated at about 8 400 tonnes and the total effort put in by the fishermen to catch this amount of fish was estimated at 133 150 fishing trips compared to more the productive ACS with 99 650 trips. The difference in

landings per unit effort is partly due to the efficiency of FEU being employed in fishing operations and the availability of fish. The efficiency of FEU is greater in the ACS than inland as they employ larger and better fishing gears.

Figure 3. Effort by Landing sites in the Atlantic Staratum (2008)



2.4 Catch by species

The Gambia enjoys rich and diverse species harvested by multi-gear fishing industry. The artisanal fishing industry targets all fish stocks in all the four fish groups: demersals, small pelagics, cephalopods and crustaceans, table 4. *Ethmalosa fimbriata* (Bonga/Shad), an estuarine species constitutes the bulk (nearly 12,000 tonnes) of total fish landed in 2008. Individually, the flat and more coastal sardinella (*Sardinella madeirensis*) and rough head sea catfish featured prominently in landings the same year. Table 4 below gives total catches by species and region. Overall, the Atlantic continues to dominate total artisanal fisheries production contributing over 80 percent in 2008. The sardinella fishery has become very important in terms of landing and usage in the country. Catfish is highly sought due to its lucrative market in Europe and the USA.

Table 4: Gives total catch by species and fishery region

Species	Fishery Region:					
	Atlantic Coast	Lower R. North Bank	Upper R. North Bank	Lower R. South Bank	Upper R. South Bank	Total
	Total Catches (Kg)					
Shad/Bonga	11,568,266	163,055	-	12,244	-	11,743,564
Long Neck Croaker	59,882	12,568	-	630	-	73,080
Madeiran Sardinella	4,757,158	930	-	989	-	4,759,077
Cassava Croaker	2,158,599	16,167	-	25,303	-	2,200,070
Bobo Croaker	133,196	54,367	-	208,989	-	396,451
Meagre	12,766	-	-	-	-	12,766
Canary drum	-	-	-	499	-	500
Rubberlip Grunt	189,246	3,397	-	-	-	192,642
Sompat Grunt	1,488,230	12,146	-	40,632	-	1,541,008
Round Sardinella	2,315,392	-	-	-	-	2,315,392
Bastard grunt	2,008	-	-	-	-	2,008
Pignout grunt	1,722	-	-	-	-	1,722
Gorean Snapper	9,517	-	-	-	-	9,517
African Red Snapper	524,648	1,577	-	-	-	526,225
African forktail Snapper	453	-	-	-	-	453
Golden african Snapper	63,956	-	-	-	-	63,956
White Grouper	74,091	299	-	-	-	74,390
Dusky Grouper	75,124	-	-	-	-	75,124
Dog tooth grouper	-	804	-	-	-	804
Royal Threadfin	19,414	1,946	-	130,978	-	152,338
Giant African threadfins	176,711	79,442	-	780,043	-	1,036,196
Lesser African Threadfins	414,458	787	-	9,691	-	424,936
Rough head sea catfish	2,872,365	70,938	-	444,782	-	3,388,087
Smooth mouth sea catfish	132,648	2,344	-	-	-	134,992
Atlantic Horse Mackerel	325,580	-	-	-	-	325,580
Cuene Horse Mackerel	827	-	-	-	-	827
Alexandria pompano	424,919	-	-	-	-	424,919
Pompano	1,795	-	-	-	-	1,795
Leerfish	-	2,776	-	-	-	2,776
Blue runner	203,293	12,528	-	48,886	-	264,707
Cravelle jack	362,020	5,150	-	8,294	-	375,464
False scad	404,275	-	-	-	-	404,275

Table 4 continues

Table 4 continues

Species	Fishery Region:					
	Atlantic Coast	Lower R. North Bank	Upper R. North Bank	Lower R. South Bank	Upper R. South Bank	Total
	Total Catches (Kg)					
Guinean Barracuda	3,532	770	-	-	-	4,303
Great Barracuda	300,967	4,941	-	9,249	-	315,158
Guachanche Barracuda	14,235	232	-	95	-	14,562
Grooved mullet	9,159	3,088	-	-	-	12,247
Banana mullet	3,171	-	-	585	-	3,756
Leaping African mullet	207,399	87,215	-	236,501	-	531,115
Curema mullet	18,411	43	-	3,068	-	21,520
Wahoo	2,499	-	-	-	-	2,499
Club mackerel	19,135	-	-	-	-	19,135
West African Spanish Mackerel	77,135	-	-	-	-	77,135
Africana sicklefish	237,164	12,548	-	7,160	-	256,873
Butterfish	357,225	7,076	-	514	-	364,815
West African ladyfish	907,843	60	-	8,504	-	916,407
Senegalese ladyfish	24,276	-	-	-	-	24,276
Senegal seabream	10,690	242	-	-	-	10,933
Common two-banded seabream	1,142	-	-	-	-	1,142
Nigerian touquesole	3,933	-	-	-	-	3,933
senegalese tonquesole	137,878	3,586	-	26,861	-	168,325
Wedge sole	39,013	133	-	1,201	-	40,348
Bastard sole	-	100	-	-	-	100
Senegalese sole	571,348	17,412	-	64,110	-	652,770
Bluespotted triggerfish	421	-	-	-	-	421
Bonfish	24,149	2,195	-	-	-	26,344
Largehead hairtail	113,437	448	-	455,871	-	569,756
Guinean parrotfish	1	-	-	-	-	1
West African goatfish	97	-	-	-	-	97
Prickly puffer	36,335	-	-	24,988	-	61,323
Smooth puffer	70,793	33	-	33,387	-	104,213
Atlantic Lizardfish	4,418	-	-	-	-	4,418
Bluntnose lizardfish	828	-	-	-	-	828
Guinean stripped mojarra	507	-	-	-	-	507

Table 4 continues

Species	Fishery Region:					
	Atlantic	Lower R.	Upper R.	Lower R.	Upper R.	Total
	Coast	North Bank	North Bank	South Bank	South Bank	
	Total Catches (Kg)					
John dory	102,083	-	-	-	-	102,083
Pink shrimp (Southern)	614,368	88,875	-	929,358	-	1,632,601
Striped shrimp	8	-	-	-	-	8
African spider shrimp	22,854	20,222	-	-	-	43,076
Pink spiny lobster	27,094	598	-	-	-	27,691
Royal spiny lobster	8,152	2,152	-	-	-	10,303
Common cuttlefish	498,267	25,119	-	24,834	-	548,221
Common cuttlefish	-	50	-	-	-	50
Elegant Cuttlefish	30,697	-	-	24,321	-	55,017
Blacktip shark	103,643	1,594	-	-	-	105,236
Milk shark	113,758	531	-	-	-	114,289
Nurse shark	1,283	-	-	-	-	1,283
Scalloped hammerhead	29	-	-	-	-	29
Great hammerhead	21	-	-	-	-	21
Gulper shark	15,531	-	-	-	-	15,531
Lowfin gulper shark	19,701	-	-	-	-	19,701
Kitefin shark	220	-	-	-	-	220
Daisy stingray	59,610	-	-	-	-	59,610
Marbled stingray	25,369	-	-	-	-	25,369
Common stringray	36	-	-	-	-	36
White skate	26,113	-	-	-	-	26,113
Whitespotted guitarfish	47,266	2,557	-	-	-	49,823
Blackchin guitarfish	1,252	209	-	-	-	1,461
Isuitanian cownose ray	34,552	16,031	-	1,490	-	52,074
Sea Snail	575,345	15,639	-	292	-	591,276
Captain Fish	53	-	-	-	-	53
Tilapia	85,756	43,588	-	201,165	746,446	1,076,954
Kono Kono	-	332	172,858	-	462,653	635,843
Trippo	-	-	14,638	-	3,146	17,784
Kokolibo	-	2,125	705	-	1,280	4,111
Lamba Ceesay	-	-	-	-	6,560	6,560

Table 4 continues

Species	Fishery Region:					
	Atlantic Coast	Lower R. North Bank	Upper R. North Bank	Lower R. South Bank	Upper R. South Bank	Total
	Total Catches (Kg)					
Nalo	-	-	-	-	85,047	85,047
Kosso	-	365	-	167,777	679,681	847,823
Sanko	-	1,335	883	-	34,643	36,861
Kokriko	-	-	65,193	-	9,532	74,725
Taro	-	-	142	-	151,391	151,533
Kulundomo	-	-	71	-	7,959	8,030
Sokoro	-	-	-	-	14,417	14,417
Sayewo	-	-	-	-	159,111	159,110
Walinyaba	-	-	-	-	724,022	724,022
Tingo	-	-	-	-	311,050	311,049
Fantango	-	-	-	-	12,425	12,425
Ribon Fish	263	-	-	-	-	263
Doctor Fish	6,089	-	-	-	7,335	13,424
Gonda	1,569	-	-	-	-	1,569
Lagoon land crab	331	-	-	-	-	331
Spinous spider	964	-	-	-	-	964
Swim crabs	24,333	-	-	4,179	-	28,512
Red swim crabs	9,641	-	-	1,386	-	11,027
Wrinkle swim crab	773	-	-	2,037	-	2,810
Total	34,426,719	802,565	254,490	3,940,793	3,416,695	42,841,265

2.5 Catch distribution (monthly)

Distribution of catch over the 12 months period shows a fluctuation in catch rates, figure 4. Total production was highest in the second half of 2008, the highest peak was attained in June followed by October. It could also be observed from the figure below that effort used in extracting fisheries resources did not commensurate with the catch; effort exceeded catch except for June and October where there was good return on effort. The amount of fish caught depends on several factors including the physical environment, abundance and distribution of fish. Until an exhaustive study on abundance and distribution is conducted, it will be speculative to attribute the variation in fish catch to any factor.

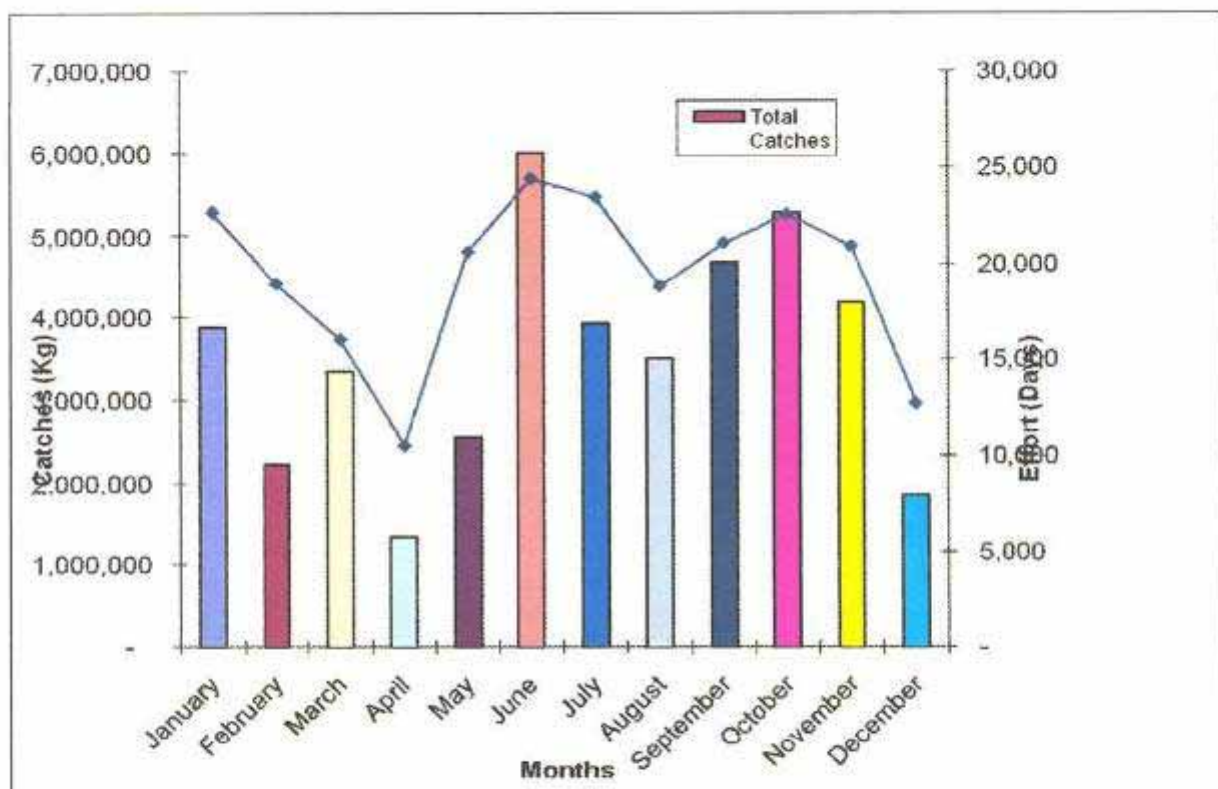


Figure 4: Monthly catches and effort

2.6 Monthly fish production

Table 5 presents catch by species and month. Over time, an indication of probable seasonal abundance and availability of certain fish species will be discernible. For example, it could be observed from the table that bonga landings were highest during the first and third quarters of 2008; if this trend continued for a number of years then it will be prudent to attribute high catches of this species to these periods. It is imperative to note that intensity of fishing operations targeting certain species are dictated by economics (demand and supply). Changes in fishing strategies either because of abundance and catch ability of target species or for economic reasons affect catch level of other species too. Refer to the table for information regarding species of choice with regard landings over the twelve months period.

Species	Total Catches by Months (Kilogram)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Shad/Bonga	1,840,500	816,904	1,436,148	192,256	460,256	851,699	630,954	1,294,954	1,285,695	1,388,280	869,408	676,509	11,743,564
Long Neck Croaker	2,143	2,726	1,395	2,175	3,353	2,420	4,086	7,811	13,932	19,845	13,051	143	73,080
Madeiran Sardinella	385,791	45,402	542,506	49	1,681	1,630,956	705,727	543,776	177,489	721,779	3,525	396	4,759,077
Cassava Croaker	50,058	36,313	74,875	46,143	132,140	21,868	61,146	46,775	450,470	631,549	566,882	81,849	2,200,070
Bobo Croaker	9,509	15,999	10,624	8,527	26,616	70,581	35,752	27,524	34,393	98,614	35,530	22,783	396,451
Meagre	-	-	-	38	25	414	-	276	9,026	-	-	2,988	12,766
Canary drum	-	-	-	-	-	-	-	-	500	-	-	-	500
Rubberlip Grunt	4,776	4,448	25,277	10,639	4,957	14,085	14,153	7,825	34,416	26,315	34,286	11,456	192,642
Sompat Grunt	19,655	21,209	231,605	27,577	87,515	59,856	69,826	219,037	202,243	343,664	224,322	24,500	1,541,008
Round Sardinella	335,443	222,307	5,997	235,339	527,677	527,683	5	-	-	-	233,053	227,387	2,315,392
Bastard grunt	-	-	-	-	-	-	-	-	-	2,008	-	-	2,008
Pignout grunt	-	-	-	-	-	-	1,722	-	-	-	-	-	1,722
Gorean Snapper	-	-	-	-	-	-	-	-	491	-	9,026	-	9,517
African Red Snapper	1,033	1,934	437	4,987	2,219	22,083	36,215	82,277	106,085	142,833	124,844	1,279	526,225
African forktail Snapper	-	-	-	-	-	-	-	-	-	-	226	226	453
Golden african Snapper	-	-	-	-	-	-	-	-	-	63,956	-	-	63,956
White Grouper	1,743	2,582	2,236	4,281	3,133	15,709	5,588	8,558	3,604	5,212	9,429	12,335	74,390
Dusky Grouper	2,277	2,368	-	10,313	4,659	-	24,095	912	122	12,761	8,825	8,792	75,124
Dog tooth grouper	-	-	-	-	-	-	-	-	-	804	-	-	804
Royal Threadfin	61,151	2,896	61,862	89	4,858	268	2,845	230	1,690	11,248	1,921	3,278	152,338
Giant African threadfins	34,018	29,597	19,886	15,823	21,467	91,856	34,333	42,968	220,587	348,704	131,606	45,361	1,036,196
Lesser African Threadfins	32,714	28,848	41,306	21,666	16,605	45,980	44,751	45,477	27,911	45,809	46,309	27,561	424,936
Rough head sea catfish	139,029	104,301	146,223	69,824	201,659	1,568,144	345,627	131,944	142,262	202,517	175,948	160,618	3,388,087

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Senegal seabream	-	-	-	-	-	10,933	-	-	-	-	-	-	10,933
Common two-banded seabream	-	-	-	-	-	-	-	-	-	-	1,142	-	1,142
Nigerian touquesole	-	-	-	-	-	3,933	-	-	-	-	-	-	3,933
senegalese tonquesole	11,122	1,941	6,824	711	11,026	105,300	44	-	-	-	787	30,568	168,325
Wedge sole	-	133	14,264	5,092	-	-	-	-	6,311	6,311	3,716	4,521	40,348
Bastard sole	-	-	-	-	-	-	-	-	-	-	100	-	100
Senegalese sole	31,210	37,003	54,718	82,615	84,675	58,769	60,777	60,794	44,433	52,715	36,346	50,715	652,770
Bluespotted triggerfish	-	-	-	-	-	-	-	-	-	229	192	-	421
Bonfish	2,229	984	199	2,189	3,522	933	1,402	3,575	359	1,340	934	8,677	26,344
Largehead halftail	5,256	6,370	-	1,689	2,396	4,898	3,749	-	3,702	75,481	464,923	1,293	569,756
Guinean parrotfish	-	-	-	-	-	1	-	-	-	-	-	-	1
West African goatfish	-	-	-	-	-	-	-	97	-	-	-	-	97
Prickly puffer	12,522	1,864	777	1,194	583	28,300	226	26	8,040	777	1,194	5,822	61,323
Smooth puffer	18,636	22,656	-	4,691	25,640	2,207	21,868	2,043	-	-	66	6,406	104,213
Atlantic lizardfish	33	90	-	267	4,029	-	-	-	-	-	-	-	4,418
Bluntnose lizardfish	-	-	-	-	828	-	-	-	-	-	-	-	828
Guinean stripped mojarra	-	-	-	-	-	-	-	-	-	-	507	-	507
John dory	-	-	25,521	-	-	-	-	-	25,521	25,521	25,521	-	102,083
Pink shrimp (Southern)	375,324	132,775	108,797	85,441	193,458	142,085	118,214	220,398	163,933	17,938	23,169	51,049	1,632,601
Striped shrimp	-	-	-	-	8	-	-	-	-	-	-	-	8
African spider shrimp	-	-	-	-	-	-	-	-	-	20,222	22,854	-	43,076
Pink spiny lobster	1,334	606	335	851	997	13,637	-	457	1,349	1,906	3,629	2,591	27,691
Royal spiny lobster	68	-	-	-	-	68	488	4,577	1,931	352	1,800	1,019	10,303

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Common cuttlefish	49,130	52,749	64,123	22,113	58,525	67,180	95,485	46,948	18,458	8,632	13,533	51,344	548,221
Common cuttlefish	-	50	-	-	-	-	-	-	-	-	-	-	50
Elegant Cuttlefish	3,185	4,434	530	24,801	647	-	12,354	-	-	-	9,067	-	55,017
Blacktip shark	18,312	10,571	8,150	2,287	4,697	26,960	234	2,962	19,175	3,574	1,484	6,831	105,236
Milk shark	-	2,971	3,215	4,170	72,131	10	496	417	5,986	820	2,729	21,344	114,289
Nurse shark	-	-	-	-	-	-	-	13	-	-	1,270	-	1,283
Scalloped hammerhead	-	-	-	-	-	-	-	-	29	-	-	-	29
Great hammerhead	-	-	-	-	1	-	-	15	-	-	-	5	21
Gulper shark	-	-	-	-	-	-	-	-	-	10,603	2,464	2,464	15,531
Lowfin gulper shark	-	-	1,264	-	-	-	5,593	11,301	-	-	-	1,543	19,701
Kitefin shark	-	-	156	-	-	-	-	64	-	-	-	-	220
Daisy stingray	398	14	805	805	65	19,473	-	-	33,053	-	-	4,997	59,610
Marbled stingray	389	15,262	-	3,682	4,894	-	-	-	-	-	1,143	-	25,369
Common stingray	-	-	-	-	-	-	-	-	36	-	-	-	36
White skate	335	-	-	-	8,943	-	1,197	5,835	-	-	-	9,803	26,113
Whitespotted guitarfish	3,232	1,654	1,717	3,013	1,307	1,362	-	-	35,397	-	2,139	-	49,823
Blackchin guitarfish	-	-	-	-	-	-	1,061	-	190	209	-	-	1,461
Leislarian cownose ray	1,733	1,165	-	416	2,318	2,308	4,378	4,952	2,753	30,661	1,155	234	52,074
Sea Snail	21,043	15,253	18,695	39,489	156,404	74,144	54,229	13,914	125,746	15,484	13,275	43,601	591,276
Captain Fish	-	-	-	-	-	-	-	53	-	-	-	-	53
Tilapia	71,994	128,076	36,265	77,443	66,239	70,845	330,257	22,409	183,809	85,712	963	2,943	1,076,954
Kono Kono	43,416	88,132	20,068	53,688	40,169	13,864	193,653	13,851	103,930	5,627	21,691	37,755	635,843
Trippo	528	2,151	474	2,116	1,518	2,408	1,596	709	2,219	-	-	4,065	17,784

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Kokolibo	-	-	-	27	382	1,101	1,069	184	427	854	-	66	4,111
Lamba Ceesay	158	174	237	158	63	1,581	838	300	901	1,549	435	166	6,560
Nato	-	-	-	-	12,014	1,359	-	-	71,673	-	-	-	85,047
Kosso	54,245	67,935	18,171	65,200	51,376	48,131	232,188	7,438	126,338	86,937	59,919	29,946	847,823
Sanko	2,329	6,339	1,488	5,370	1,646	943	558	100	5,064	4,309	8,378	337	36,861
Kokriko	13,552	63	20,827	1,330	7,780	1,831	2,470	13,866	4,822	2,847	1,291	4,106	74,725
Taro	1,747	646	324	1,747	2,838	4,948	138,154	416	664	-	47	-	151,533
Kulundomo	1,217	395	-	1,217	411	1,470	1,130	-	1,770	-	419	-	8,030
Sokoro	2,166	3,573	1,344	2,166	846	1,454	1,375	119	-	632	743	-	14,417
Sayewo	332	411	-	332	-	-	86,217	-	70,780	169	869	-	159,110
Walinyaba	48,807	60,442	34,319	90,817	55,170	38,437	126,535	-	146,382	42,144	80,969	-	724,022
Tingo	20,218	31,371	-	30,984	16,338	-	125,263	541	86,335	-	-	-	311,049
Fantango	585	2,980	316	585	3,826	609	743	1,130	1,257	-	-	395	12,425
Ribon Fish	-	132	-	-	-	-	132	-	-	-	-	-	263
Doctor Fish	37	159	-	975	8,192	-	28	555	223	3,234	20	-	13,424
Gonda	308	514	-	-	-	-	-	-	746	-	-	-	1,569
Lagoon land crab	-	-	-	-	-	-	-	-	331	-	-	-	331
Spinous spider	-	-	-	-	-	-	-	-	-	964	-	-	964
Swim crabs	138	1,365	-	13	-	1,935	2,894	7,915	-	-	508	13,755	28,512
Red swim crabs	-	267	696	1,850	7,291	45	370	507	-	-	-	-	11,027
Wrinkle swim crab	-	-	-	-	-	-	-	-	-	2,189	620	-	2,810
Total	3,881,185	2,231,314	3,349,278	1,348,192	2,566,725	8,010,410	3,922,720	3,504,207	4,692,799	5,294,730	4,185,182	1,854,522	42,841,265

2.7 Artisanal fishing gears

Artisanal fishing industry is multi-gear in nature. The gear use depends mainly on the target species. The manner in which a fishing gear is set and operated usually indicates the type of species being targeted. Surround gillnet target small pelagic fish, particularly bonga, an estuarine species while Set/bottom gillnet target a wide range of demersal and sub-demersal fish species. In terms of contribution to total fish landings, the three most important fishing gears in 2008 were Set/bottom gillnet, purse seine and encircling/surround gillnet (Table 6 and Figure 5). The two fishing gears have contributed more than 26 000 tonnes of fish to the total national artisanal production. Comparing all fishing gears used in 2008, encircling/surround gillnet was found to be more efficient with an average catch rate 470 kg/fishing trip.

The effort employed by surround gillnet operators in the fishery in 2008 to land nearly 12 000 tonnes of bonga have produced higher catch rate (470 Kg/fishing trip) than any other fishing gear including bottom gillnet. Bonga, the target species for surround gillnet operators seems more accessible and abundant than species targeted by bottom gillnet. Although both gears are operated all year round, the amount of fish caught depends on the abundance and availability of target fish species and these may have some bearing with seasons.

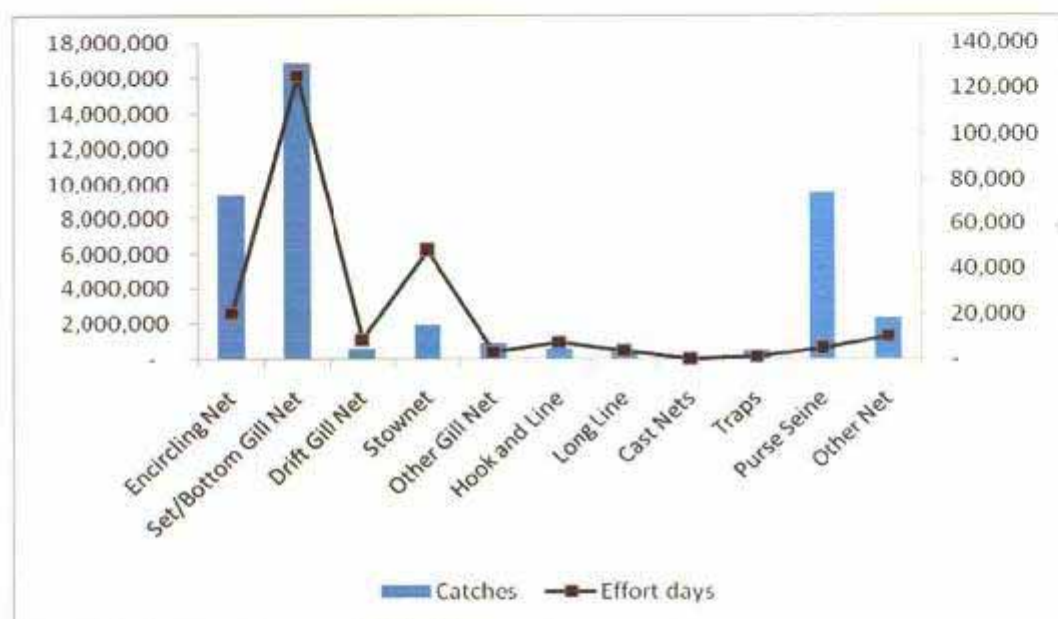


Figure 5: shows catches and effort by gear type

Purse seine nets becoming very much important in terms total landings of the two sardinella species (*Sardinella aurita* and *Sardinella maderensis*) estimated at 7 064 tonnes.

Species	Encircling Net	Set/Bottom Gill Net	Drift Gill Net	Stownet	Other Gill Net	Hook and Line	Long Line	Cast Nets	Traps	Purse Seine	Other Net	Total
Shad/Bonga	8,739,564	549,323	15	9,438						2,445,220		11,743,564
Long Neck Croaker	315	67,280	498	2,799		1,622	564					73,080
Madeiran Sardinella	357,481	32,223	210	332	672,446					3,696,476		4,759,077
Cassava Croaker	2,291	2,130,834	15,447	5,220		37,448	8,796				33	2,200,070
Bobo Croaker	1,225	285,514	4,759	86,070		18,150			63		670	396,451
Meagre		12,719				47						12,766
Canary drum		237	262									500
Rubberlip Grunt	59	184,694		588	5,263	1,262					776	192,642
Sompat Grunt	48,391	474,484		11,800		3,240				1,003,092		1,541,008
Round Sardinella	6,019	527								2,308,856		2,315,392
Bastard grunt		2,008										2,008
Pignout grunt		1,722										1,722
Gorean Snapper		9,517										9,517
African Red Snapper	280	524,099		1,411		435						526,225
African forktail		453										453
Snapper												
Golden african Snapper		63,956										63,956
White Grouper		73,187			120	1,082						74,390
Dusky Grouper		74,608				516						75,124
Dog tooth grouper		804										804
Royal Threadfin	1,577	19,305	80,256	9,033		359	4,808					152,338

Species	Encircling Net	Set/Bottom Gill Net	Drift Gill Net	Stownet	Other Gill Net	Hook and Line	Long Line	Cast Nets	Traps	Purse Seine	Other Net	Total
Giant African threadfins	697	602,218	307,624	8,687		116,074	830				66	1,036,196
Lesser African Threadfins	53,694	338,563		1,295	1,191	6,458					23,734	424,936
Rough head sea catfish	8,660	1,681,437	5,034	64,607		111,420	161,883				1,355,045	3,388,087
Smooth mouth sea catfish		132,180		366	2,392	54						134,992
Atlantic Horse Mackerel	76,931	247,923		88		64					574	325,580
Cuene Horse Mackerel		827										827
Alexandria pompano		22,403				565					401,952	424,919
Pompano		1,795										1,795
Leerfish				2,776								2,776
Blue runner	162	250,806	1,890	11,152	632	45						264,707
Craville jack	17	71,634		3,639		313					299,862	375,464
False scad		398,413				5,863						404,275
Guinean Barracuda		923		671		29					2,680	4,303
Great Barracuda	739	242,703		11,483	5,347	2,210					52,675	315,158
Guachanche Barracuda		14,429		133								14,562
Grooved mullet		12,228		19								12,247
Banana mullet		3,756										3,756
Leaping African mullet	3,879	292,946	36,136	195,631	96	131		33	1,897		365	531,115
Curema mullet		18,396		3,109		15						21,520
Wahoo		2,499										2,499

Species	Total Catches by Type of Gear Used (Kilogram)										
	Encircling Net	Set/Bottom Gill Net	Drift Gill Net	Stownet	Other Gill Net	Hook and Line	Long Line	Cast Nets	Traps	Purse Seine	Other Net
Club mackerel		18,698				437					19,135
West African Spanish Mackerel	5,590	67,872			2,954	719					77,135
Africana sicklefish	537	228,741	4,242	14,837		1,849		66			256,873
Butterfish	2,211	311,796		3,742		181					364,815
West African ladyfish	3,657	892,980	8,504	297	2,077	8,892					916,407
Senegalese ladyfish		24,276									24,276
Senegal seabream		10,690		242							10,933
Common two-banded seabream		1,142									1,142
Nigerian touquesole		3,340							593		3,933
senegalese tonquesole	66	142,039			25,146	1,074					168,325
Wedge sole		39,957		391							40,348
Bastard sole		100									100
Senegalese sole	80	592,961	12,074	36,872	6,380	2,331			2,071		652,770
Bluespotted triggerfish		421									421
Bonafish	296	25,251				697		100			26,344
Largehead hairtail	163	164,164		315		2			405,112		569,756
Guinean parrotfish		1									1
West African goatfish		97									97
Prickly puffer		19,850		529		40,944					61,323
Smooth puffer		68,122				36,091					104,213

LOCAL CATCHES BY TYPE OF GEAR USED (in kilograms)

Species	Encircling Net	Set/Bottom Gill Net	Drift Gill Net	Stownet	Other Gill Net	Hook and Line	Long Line	Cast Nets	Traps	Purse Seine	Other Net	Total
Atlantic Lizardfish		4,329				90						4,418
Bluntnose lizardfish		828										828
Guinean striped mojarra		507										507
John dory										102,083		102,083
Pink shrimp (Southern)		8,079	49,976	1,406,549	167,882	21			94			1,632,601
Striped shrimp				8								8
African spider shrimp				22,854	20,222							43,076
Pink spiny lobster		27,691										27,691
Royal spiny lobster	137	8,015		2,152								10,303
Common cuttlefish		538,185		6,857		9			1,311	1,859		548,221
Common cuttlefish				50								50
Elegant Cuttlefish		55,017										55,017
Blacktip shark		105,051				30			156			105,236
Milk shark		114,113				176						114,289
Nurse shark		1,283										1,283
Scalloped hammerhead		29										29
Great hammerhead		21										21
Gulper shark		15,531										15,531
Lowfin gulper shark		18,354				1,346						19,701
Kitefin shark		220										220

Table 6 continued

Species	Total Catches by Type of Gear Used (Kilogram)										
	Encircling Net	Set/Bottom Gill Net	Drift Gill Net	Stownet	Other Gill Net	Hook and Line	Long Line	Cast Nets	Traps	Purse Seine	Other Net
Daisy stingray		59,210				400					59,610
Marbled stingray		25,333				35					25,369
Common stingray		36									36
White skate		26,113									26,113
Whitespotted guitarfish		49,635							187		49,823
Blackchin guitarfish		1,061		400							1,461
Lsitanian cownose ray		33,651		17,587		835					52,074
Sea Snail		590,105			858	32			281		591,276
Captain Fish		53									53
Tilapia	4,466	942,743	3,675	4,465		52,511		465	60,394	8,235	1,076,954
Kono Kono		393,512	171			90,398	150,655		1,107		635,843
Trippo		17,784									17,784
Kokolibo		2,447				668				996	4,111
Lamba Ceasay		6,371				190					6,560
Nalo		85,047									85,047
Kosso		810,110				37,714					847,823
Sanko	33	30,505	883			269			5,122	50	36,861
Kokriko		9,437	65,193			95					74,725
Taro		151,370	142			21					151,533
Kulundemo		7,959	71								8,030

Total Catches by Type of Gear Used (Kilogram)

Species	Encircling Net	Set/Bottom Gill Net	Drift Gill Net	Stownet	Other Gill Net	Hook and Line	Long Line	Cast Nets	Traps	Purse Seine	Other Net	Total
Sokoro		13,674							743			14,417
Sayewo		159,110										159,110
Walinyaba		724,022										724,022
Tingo		311,049										311,049
Fantango		12,030				395						12,425
Ribon Fish	263											263
Doctor Fish		13,207				216						13,424
Gonda		1,569										1,569
Lagoon land crab		331										331
Spinous spider		964										964
Swim crabs		24,333		4,179								28,512
Red swim crabs		9,636		1,396		5						11,027
Wrinkle swim crab		773		2,037								2,810
Total	9,319,301	16,866,493	597,047	1,956,094	913,007	586,193	364,537	664	479,131	2,308,856	2,305,152	42,841,265

example, Gunjur, Tanji, Old Jeshwang and Bakau were more or less specialized in the bonga fishery (Table 7) hence the bulk of landings in these sites. In 2007, Gunjur recorded the highest bonga catch, approximately 5 000 tonnes followed by Tanji with just over 3 000 tonnes. It must be noted that all landing sites in the coast land all species either as target species or as incidental catches.

Table 7 : Total Catches by Species and Landing Sites for the Atlantic Coast Stratum (2008)

Species	Total Catches by Landing Sites (Kilogram)										
	Brufut	Kartong	New/Old Jeshwang	Sanyang	Bakau	Tanji	Banjul	Barra	T/batokunku	Gunjur	Total
Shad/Bonga	11,437	210,994	2,803,174	548,244	1,500,143	3,117,620	489,399			5,055,145	13,737,157
Round Sardinella				5,880	10,858	1,603,666	15,874			1,140,792	2,777,070
Long Neck Croaker	22,074	3,795		2,158	4,463	312	9,612			1,707	44,122
Madeiran Sardinella		740		5,941	18,375	1,121,131	23,583			437,293	1,607,063
Cassava Croaker	614,052	3,679		17,552	267,287	2,798	163,267	8,754		116,650	1,194,041
Bobo Croaker	531,663			15,885	12,764	41,955	-	10,114		8,554	620,335
Rubberlip Grunt	24,450			49,049	1,457		103,879			7,745	186,581
Sompat Grunt	68,531	7,626		94,493	4,576	430,000	294,869	25,455	312	252,901	1,178,764
Round Sardinella				1,008	449		-			1,844	3,301
Bigeye grunt						303	-				303
Gorean Snapper				508			-				508
African Red Snapper	20,724	59		8,786			91,382			4,501	125,452
White Grouper	6,084	1,215		3,415	117	88	-	5,259	195	336	16,709
Dusky Grouper	89,078			762	4,697		-	13,940		2,869	111,346
Golden Grouper		1,066					-			172	1,238
Royal Threadfin				1,394			-				1,394
Giant African threadfins	38,011	1,605			111,596	24,458	37,695	8,143	688	26,308	248,504
Lesser African Threadfins	33,337	2,421		159,552	132,431	69,590	156,412	5,359		31,777	590,878
Rough head sea catfish	680,164	37,325		124,891	199,737	154,685	285,176	8,568	32,269	1,030,344	2,563,160
Smooth mouth sea catfish	3,147						-				3,147
Atlantic Horse Mackerel		296		2,507	14,793	24,821	-			163,389	205,806

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Species	Brufut	Kartong	New/Old Jeshwang	Anyang	Bakau	Tanji	Banjul	Barra	T/batokunku	Gunjur	Total
Alexandria pompano					262	10,681	-				10,942
Leorfish	818						-				818
Blue runner	4,140			10,593	16,836	21,038	2,829			2,093	57,529
Cravalle jack	133,829			4,954		256,835	-		351	136,837	532,806
False scad					18	1,831	116,612				118,461
Guinean Barracuda		161		363			-				523
Great Barracuda	92,651			3,648	18,658	211,579	33,164	10,434	557	245,898	616,588
Guachanche Barracuda	5,700						-				5,700
Leaping African mullet		5,048		941	11,366	2,533	763,427			2,360	786,175
West African Spanish Mackerel	30,205	192		85,353	45,333	87,065	3,103			154,995	406,846
Africana sicklefish	23,650			8,308	147,292	5,845	34,394	53,619	273	41,932	315,113
Butterfish		7,271		323	143,211	216,818	52,273	32,089	585	4,472	457,042
West African ladyfish	474,711	50,879		8,018	189,239	2,781	-	5,736		175,404	906,767
Canary dentex				6,556			-				6,558
Wedge sole		18,563			4,540		152		5,011		28,307
Senegalese sole	599,611	74,533		260,369	149,851		3,015		31,584	111,162	1,230,124
Bonfish	9,632					10,470	-				20,101
Largehead hairtail					7,172		-				7,172
Prickly puffer	10,506						-	402			10,907
Smooth puffer	634,715	171			25,559	1,557	14,431				676,433
Bluntnose lizardfish	33,379						-				33,379

Contd....

Species	Total Catches by Landing Sites (Kilogram)										
	Brufut	Kartong	New/Old Jeshwang	anyang	Bakau	Tanji	Banjul	Barra	T/batokunku	Gunjur	Total
Pink shrimp (Southern)							65,268		302		65,570
Striped shrimp							12,018				12,018
Pink spiny lobster							-			242	242
Royal spiny lobster	1,641	1,061					-			1,529	4,232
Mediterranean locust lobster						6,136	-				6,136
Common cuttlefish	241,849	25,553		212,161	7,754		-		131,918	94,104	713,340
Common cuttlefish				6,774			-				6,774
Blacktip shark	3,046					42	-			9,982	13,070
Milk shark		1,495					-			442	1,937
Lowfin gulper shark	6,584	3,190		4,962		326	-		2,325	174,133	191,520
Daisy stingray	6,352				69		-				6,421
Common stringray		445			28		-		1,769		2,243
White skate						101	-			15,805	15,906
Whitespotted guitarfish		2,674					-				2,674
Blackchin guitarfish	610	33,784					-				34,394
Leutanian cownose ray		7,407					-		5,774	686	13,868
Sea Snail	317,094	6,302		21,205	2,635	230	108,232		79,538	133,884	669,121
Captain Fish		3,439					-				3,439
Tilapia				979	21,723		82,466				105,168
Trippo	32,245						-				32,245

Contd.....

TABLE 7. TOTAL CATCHES BY SPECIES AND LANDING SITES FOR THE ATLANTIC COAST OF GAMBIA (2008)

Species	Total Catches by Landing Sites (Kilogram)										
	Brufut	Kartong	New/Old Jeshwang	anyang	Bakau	Tanji	Banjul	Barra	T/batokunku	Gunjur	Total
Ribon Fish						31,926	-				31,926
Doctor Fish	3,842				35		-				3,876
Spinous spider					2,137		-				2,137
Swim crabs	112,479			676			157			300	113,613
Total	4,991,776	512,991	2,803,174	1,678,212	3,078,562	7,466,895	2,972,728	187,872	293,450	9,589,588	33,575,249
Mormyrus						4,849	-				4,849
Sayewo						1,831	-				1,831
Ribon Fish						31,926	-				31,926
Doctor Fish	3,842				35		-				3,876
Spinous spider					2,137		-				2,137
Swim crabs	112,479			676			157			300	113,613
Others	69,734					7,876					77,610
Total	4,991,776	512,991	2,803,174	1,678,212	3,078,562	7,466,895	2,972,728	187,872	293,450	9,589,588	33,575,249

The Atlantic coast is the most productive fishery stratum in the Gambia. In the case of the inland fisheries, the South Bank of the river was the most productive in 2008. Total catch for the Upper River South Bank and Lower River South Bank were estimated at 4 500 tonnes (mainly fresh water species) and 4 000 tonnes respectively (Table 8).

Table 8 : Total Catches by Species and Landing Sites for the Inland Stratum (2008)

Species	Total Catches by Fishery Regions (Kilogram)				
	Lower R. North Bank	Upper R. North Bank	Lower R. South Bank	Upper R. South Bank	Total
Shad/Bonga	133,202		1,960	3,604	138,766
Round Sardinella	49				49
Long Neck Croaker	3,079		916		3,995
Madeiran Sardinella	29,169				29,169
Cassava Croaker	57,572		139,254		196,826
Bobo Croaker	68,665	69,080	73,133	28,522	239,420
Meagre	323				323
Rubberlip Grunt	2,470			119	2,589
Sompat Grunt	10,855				10,855
African Red Snapper	727				727
African brown Snapper		6,447			6,447
Royal Threadfin	26,927		740,433		767,360
Giant African threadfins	60,600		390,882	17,122	468,604
Lesser African Threadfins	16,906		293		17,199
Rough head sea catfish	89,821	149,546	767,899	475,131	1,482,396
Smooth mouth sea catfish			370		370
Atlantic Horse Mackerel	229				229
Blue runner	3,331		91	346	3,767
Craville jack	896				896
Guinean Barracuda	805				805
Great Barracuda	2,945		109,557	2,534	115,036

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Table 8 : Total Catches by Species and Landing Sites for the Inland Stratum (2008)

Species	Total Catches by Fishery Regions (Kilogram)				
	Lower R. North Bank	Upper R. North Bank	Lower R. South Bank	Upper R. South Bank	Total
Guachancho Barracuda	519		31,083		31,602
Banana mullet	274				274
Leaping African mullet	32,070		31,416	398	63,883
Wahoo	53				53
Africana sicklefish	5,450		24,793		31,243
Butterfish	3,300		4,128		7,428
West African ladyfish	25,054		28,243		53,296
Wedge sole	268		270	2,773	3,311
Thickback sole			349		349
Senegalese sole	9,391		7,546	14,189	31,126
Bonefish	1,556				1,556
Smooth puffer	157				157
Pink shrimp (Southern)	114,877		1,341,198		1,456,076
Caramote Brown	902				902
Striped shrimp	13,771				13,771
Common cuttlefish	17,836				17,836
Elegant Cuttlefish				23,474	23,474
Blacktip shark	485		30,690		31,175
Milk shark	822				822
Brown ray	178				178
Whitespotted guitarfish	196				196

Contd.....

Table 8 : Total Catches by Species and Landing Sites for the Inland Stratum (2008)

Species	Total Catches by Fishery Regions (Kilogram)				
	Lower R. North Bank	Upper R. North Bank	Lower R. South Bank	Upper R. South Bank	Total
Blackchin guitarfish	503				503
Lsitanian cownose ray	8,905		1,929		10,833
Sea Snail	875		8,997	5,659	15,531
Captain Fish	529			160	688
Tilapia	16,165	6,278	83,307	508,315	614,065
Kono Kono	102			276,719	276,821
Trippe				10,564	10,564
Lamba Coesay				689	689
Mormyrus				74,805	74,805
Kosso	214			533,904	534,118
Sanko	341			14,588	14,929
Kokriko		43,974		922	44,896
Taro				1,051,808	1,051,808
Kuludomo				1,534	1,534
Sokoro				15,980	15,980
Sayewo				230,209	230,209
Walinyaba				405,030	405,030
Tingo				857,448	857,448
Fantango		1,974		9,641	11,615
Swim crabs			5,265		5,265
Red swim crabs			269		269
Total	764,383	277,299	3,824,270	4,566,185	9,432,137

2.8 Industrial Fisheries

The industrial fisheries operates in the coastal and offshore waters and is normally capital intensive. There is almost no national industrial fleet, all fishing or fish processing establishments in the Gambia have no sea-going fishing vessels. Most of fishing vessels operating in our waters came through joint venture or through fishing agreements such as the Reciprocal Maritime Fishing Agreement between the Gambia and Senegal or compensatory agreement. These foreign operated vessels do not land their catches in the country but in foreign ports. Fish production by the sub-sector was recorded by the Fisheries Observer Programme (each vessels carries an observer). Annual industrial productions were on the decline in recent years, slightly increasing in 2007 then decreasing to nearly the same level in 2006 (Figure 6). Annex 1a and 1c gives time series production figures for the industrial fisheries.

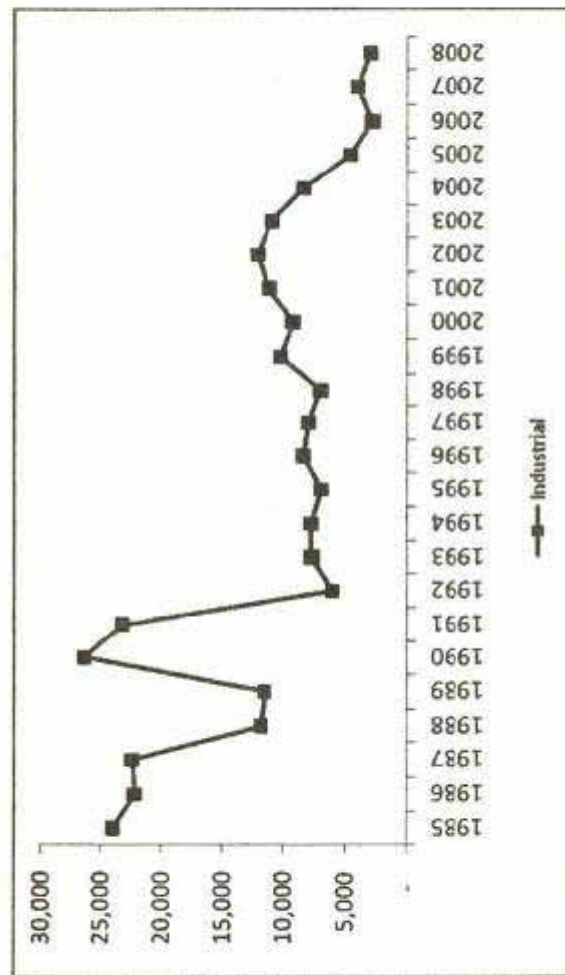


Figure 6: Total annual industrial fisheries production in metric tonnes

In 2008, industrial fisheries production was estimated at about 3 000 tonnes with the bulk of nearly 2 000 tonnes attributed to the demersal fishery including crustaceans, table 9 below. The most productive period was during the raining season (between June and September). January was the least productive and this may be due to licensing as all fishing licenses in the year issued expire in December.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Shrimp	788	3,818	2,267	2,256	9,727	11,347	18,819	34,557	50,008	35,775	330	1,489	171,181
Sole Fish	5,770	16,141	17,455	5,940	4,112	2,975	28,042	24,199	26,272	15,929	1,391	19,966	168,192
Demersal	26,590	153,259	142,051	142,705	126,978	260,966	223,021	233,108	267,374	162,679	81,504	104,290	1,924,525
Cuttlefish	4,490	26,660	11,663	5,879	11,029	18,658	26,529	35,972	7,303	4,948	2,304	7,093	162,528
Octopus	360	6,738	2,580	41,411	73,154	32,835	34,978	34,161	2,203	785	410	100	229,715
Squid								24					24
Pelagics		5,807	10,404	11,157	14,062	5,835	3,773	9,539	18,393	16,156	8,499	8,667	112,292
Tuna													
Others	9,446	23,463	22,094	14,643	9,889	16,005	13,355	18,449	22,218	39,312	7,411	9,165	205,450
Total	47,444	235,886	208,514	223,991	248,951	348,621	348,517	390,009	393,771	275,584	101,849	150,770	2,973,907

Industrial fishing effort is captured as fishing days or vessel days. Table 10 below gives a summary of industrial fisheries effort and catches in 2007 and 2008. This is to show changes in fishing effort over the 12 months period. In 2008, the annual average catch per unit effort was estimated at 1 698 Kg/day, slightly higher than in 2007 (1 630 Kg/day). The period with the highest catch rates was between June and September which was the most productive fishing period.

Table 10: Industrial Catches, Efforts and Catch Per Unit

Months	2007			2008			% change		
	Total Catches Kg	Effort Days	CPUE Kg/Day	Total Catches Kg	Effort Days	CPUE Kg/Day	Total Catches Kg	Effort Days	CPUE Kg/Day
January	253,266	115	2,202	47,444	30	1,581	-81	-74	-28
February	326,564	157	2,080	235,886	134	1,760	-28	-15	-15
March	197,471	140	1,411	208,514	98	2,128	6	-30	51
April	193,293	111	1,741	223,991	129	1,736	16	16	0
May	211,846	119	1,780	248,951	159	1,566	18	34	-12
June	348,094	149	2,336	348,621	218	1,599	0	46	-32
July	308,328	174	1,772	348,517	213	1,636	13	22	-8
August	449,290	281	1,599	390,009	259	1,506	-13	-8	-8
September	373,313	315	1,185	393,771	208	1,893	5	-34	60
October	570,802	463	1,233	275,584	187	1,474	-52	-60	20
November	189,353	142	1,333	101,849	51	1,997	-46	-64	50
December	469,739	222	2,116	150,770	65	2,320	-68	-71	10
Total	3,891,361	2,388	1,630	2,973,907	1,751	1,698	-24	-27	4

2.9 Exports of Fish and Fishery Products

Exports of fish and fishery products are not stable and they constitute a small percentage of total production (artisanal plus industrial). The main supplier of export fish raw material is the artisanal fisheries. Although industrial catches are landed in foreign ports and sold as exported fish they are not reflected in trade figures as exports from the Gambia. Exports rose from 625 tonnes in 2006 to 1 480 tonnes in 2007 and 1 102 tonnes in 2008. Only 2.4 percent of total fish production was exported in 2008. Exports has been

erratic and showed irregular fluctuations punctuated by nose-dived trend after 1987 in terms of volume with the tendency to stabilizing around 2000 metric tonnes over a 12 year period, Table 11.

Table 11: Exports of Fish and Fishery Products (1984 - 2008)

Year	Production (MT)	Quantity Exported (MT)	Ratio of Export to total Production Percent	Val. (GMD)
1984	8,170	4,775	58.4*	3,525,848
1985	31,411	4,352	13.9	5,040,848
1986	32,134	5,563	17.3	6,695,965
1987	27,560	5,452	19.8	11,363,179
1988	19,088	1,068	5.6	16,028,437
1989	22,476	1,069	4.8	17,154,146
1990	37,975	1,449	3.8	31,117,402
1991	43,445	1,544	3.6	32,470,440
1992	20,094	1,061	5.3	17,602,622
1993	25,296	1,598	6.3	24,625,442
1994	27,668	1,950	7.0	30,621,122
1995	27,736	1,817	6.6	27,149,996
1996	38,882	1,543	4.0	27,271,831
1997	38,231	2,063	5.4	44,427,355
1998	33,545	1,666	5.0	33,293,225
1999	30,093	1,877	4.2	36,563,649
2000	36,104	901	2.5	32,779,477
2001	43,214	949	2.2	35,726,199
2002	44,496	932	2.1	21,334,062
2003	45,370	445	1.0	11,629,895
2004	37,692	405	1.1	7,694,241
2005	36,845	751	2.0	9,956,837
2006	39,728	625	1.6	22,837,330
2007	47,000	1,480	3.2	67,432,811
2008	45,814	1,102	2.4	46,892,582.39

CHAPTER 3 APPENDIX TABLES

Annex 1a Total Fish Catches by Artisanal and Industrial Sub-Sectors (1981-2008)

Production (MT)			
Year	Industrial	Artisanal	Total
1981	-	14,579	14,579
1982	-	6,209	6,209
1983	-	8,333	8,333
1984	-	8,170	8,170
1985	23,985	7,426	31,411
1986	22,225	9,909	32,134
1987	22,421	5,139	27,560
1988	11,864	7,224	19,088
1989	11,534	10,942	22,476
1990	26,401	11,573	37,975
1991	23,175	20,273	43,445
1992	6,060	14,035	20,094
1993	7,736	17,560	25,296
1994	7,752	19,917	27,668
1995	6,937	20,799	27,736
1996	8,372	30,510	38,882
1997	7,988	30,243	38,231
1998	7,012	26,533	33,545
1999	10,249	29,743	39,993
2000	9,237	26,867	36,104
2001	11,198	32,016	43,214
2002	12,160	32,336	44,496
2003	11,005	34,365	45,370
2004	8,375	29,317	37,692
2005	4,600	30,169	36,845
2006*	2,830	36,898	39,728
2007	3,891	43,007	46,898
2008	2,973	42,841	45,814

- *Note: From 2006 the Artisanal Sector include both Marine and Inland Fishing*
- *Industrial Fishing exclude 15 percent Discard.*

