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Ministry of Fisheries and Aquaculture Development

FISHERIES COMMISSION

Fisheries Scientific Survey Division

REPORT ON THE 2016

GHANA MARINE CANOE FRAME SURVEY

BY

Dovlo E, Amador K, Nkrumah B et al

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1.0 INTRODUCTION

1.1 BACKGROUND

The Ministry of Fisheries and Aquaculture Development (MOFAD) has the primary responsibility of ensuring the availability and affordability of fish and fisheries products within the country. Fish is the preferred source of protein and it accounts for about 60% of animal protein in most Ghanaian diets. About 75% of the total domestic production of fish is consumed locally with an average per capita consumption of 23.7 kg per annum (Anon; 2011). Through scientific research, MOFAD ensures the promotion of sustainable and thriving fisheries enterprises as well as providing extension and other support services to fishers.

Fishery products constitute the most important non-traditional export of Ghana, contributing 254.4 million dollars in 2011 (Ghana Export Promotion Authority). The sector contributes about 5 percent to Agricultural Gross Do mestic Product (GDP) and employs about 10% of the nation's economically active population. According to FAO (1991) assessment, out of 1.9 million people engaged in either full time, part time and seasonal fishing about 98% belongs to the artisanal sector. The artisanal fisheries is the most important fisheries sector in Ghana in terms of its great contribution to production and local fish supply. The sector contributes about 70 to 80% of the total marine fish production (Anon; 2011). It represents the main types of fishing carried out in all the twenty six coastal districts in Ghana.

The multiplicity and high numbers of gears and fishing crafts employed in the artisanal sector and the diversity and higher number of fish caught makes this sector quite complex. Fisheries Scientific Survey Division (FSSD) of the Ministry of Fisheries and Aquaculture Development has the mandate for conducting frame surveys of canoes and artisanal gears. The major use of the frame survey results is as basis for catch assessment surveys. The frame survey also collect socio-economic information from the landing sites which is important for determing the efficiency of the fisheries sector. and the results used as basis for catch assessment surveys and also to determine the strength of the sector and its needs.

A frame survey of canoes and fishing gears as well as the collection of socio-economic information on the artisanal fisheries was conducted in April 2016 to update the existing data on the sector. The last survey was conducted in 2013.

1.2 AIM OF SURVEY

- To assess the size, structure and distribution of artisanal marine canoes
- To collect basic data and information necessary for processing annual artisanal marine catch data
- To collect socio-economic information from the artisanal marine sector.
- To collect other information on the canoe fleet.

The frame survey focused on detailed count and measurement of canoes and fishing gears, number of outboard motors, number of fishing villages and landing beaches, number of fishermen. Other parameters that were also considered included the cost of fishing inputs, fish sharing system, migration patterns and other socio-economic information for the month of April 2016. The data and information collected on the fishing effort inventory covered all landing sites. Full enumeration was however not employed for the socio-economic data. The data was collected during period where there was less migration of canoe and fishermen between landing centers.

2.0 PROFILES OF MMDAs IN THE REGIONS

There are a total of 26 coastal metroplolitan, municipal and district assemblies (MMDAs) in the four regions along the coastline of Ghana: Two (2) in the Volta Region; Nine (9) in the Greater Accra Region; Nine (9) in the Central Region; and Six (6) in the Western Region.

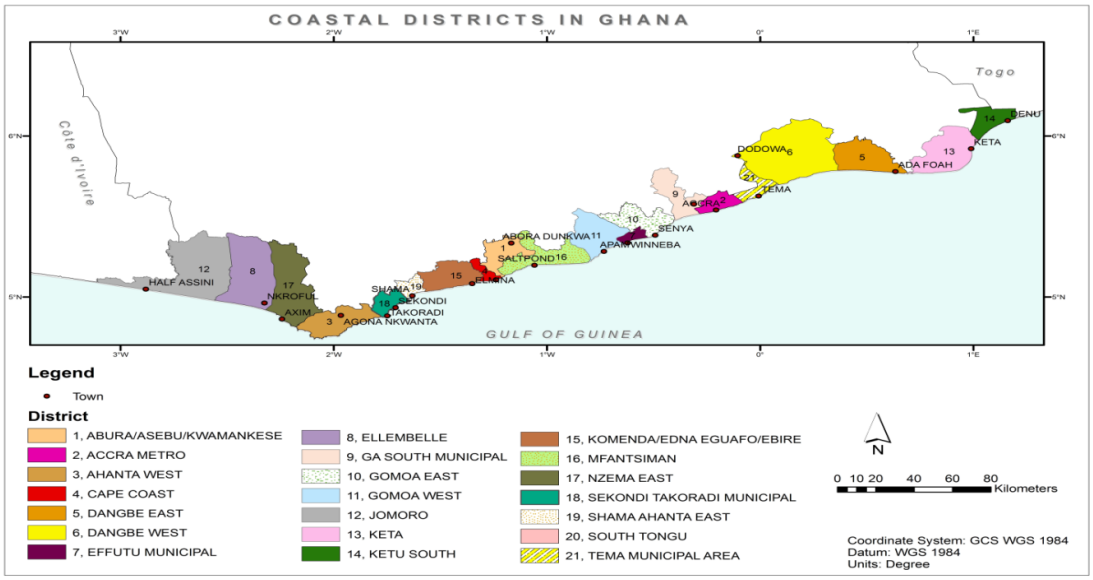


Fig.1: Map of coastline of Ghana showing majority of districts (2011)

2.1 VOLTA REGION

Volta Region is at the eastern border of Ghana with Togo and has two (2) coastal MMDAs; Ketu South Municipal Assembly and Keta Municipal Assembly.

2.1.1 *KETU SOUTH MUNICIPAL ASSEMBLY*

The Ketu South Municipality has its capital at Denu and it is bordered to the North by the Akatsi District, to the South by the Gulf of Guinea and to the East by the Republic of Togo, and to the West by the Keta Municipality. The district shares a border with the Republic of Togo where continuous cross-border trading activities occur. The main occupation of the people in this district is salt mining and fishing although some people engage in subsistence agriculture. Fish production in the district over the past five years has averaged 6,300 mt over the period. The main fish species caught are; Anchovy (*Engraulis encrasicolus*), Burrito (*Brachydeuterus auritus)*, Bumper (*Chloroscombrus chyrsurus*), Flat sardinella, (*Sardinella maderensis*), Round sardinella (*Sardinella aurita*) and Horse Mackerel (*Caranx hippos*).

2.1.2 *KETA MUNICIPAL ASSEMBLY*

The Keta Municipality was carved out of the former Anlo District and it is located east of the Volta estuary with Keta as its capital. It has a total land area of 1,086 km^2, with approximately 362km^2 (about 30 per cent) covered by water bodies, the largest of which is Keta Lagoon. Fishing and water transportation potentials exist in the district. The main occupation of the people in this municipality is salt mining and fishing. Fish production in the municipality over the past five years has averaged around 4,800 mt. However declining trends have been observed in recent years. The main fish species caught are Anchovy (*Engraulis encrasicolus*), Burrito (*Brachydeuterus auritus)*, Bumper (*Chloroscombrus chyrsurus*), Flat sardinella, (*Sardinella maderensis*), Round sardinella (*Sardinella aurita*) and Horse Mackerel (*Caranx hippos*).

2.2 GREATER ACCRA REGION

Greater Accra Region has nine (9) coastal MMDAs and they are Ada East District, Ada West District, Ningo–Prampram District, Kpone-Katamanso District, Tema Metropolitan Assembly, Ledzokuku-Krowor Municipal Assembly, La- Dadekotopon Municipal Assembly, Accra Metropolitan Assembly and Ga South Municipal Assembly.

2.2.1 ADA EAST DISTRICT

The Ada East District is carved out the defunct Dangme East District and has a land area of about 909 km . It is located at the estuary where the Volta River meets the sea with Ada Foah as the district capital. The main occupation of the local people is fishing. There are a significant number of people working in the salt mining industry. Fish production in the district over the past 5 years has averaged aroind 54,500 mt. Anchovy (*Engraulis encrasicolus*), Round Sardinella (*Sardinella aurita*), Frigate Mackerel (*Caranx hippos*) and Chub Mackerel (*Scomber colias*) are the main fish species caught in the district.

2.2.2 ADA WEST DISTRICT

The Ada West District is carved out the defunct Dangme East District and is one of the new 46 districts created in 2012 with Sege as its capital**.** It was carved from Dangme East District.

Majority of the populace engage in fish farming and agriculture as a source of income for their families. The main occupation of the people in this district is salt mining and fishing.

2.2.3 NINGO -PRAMPRAM DISTRICT

This new district was carved out of defunct Dangme West District. The Ningo Prampram District is the largest in the Greater Accra Region with a coastline stretching over 37 kilometers and a total land area of 1,442 square kilometers. The main occupation of the people in the district is salt mining and fishing. Fish production in the district over the past five years has averaged around 1,000 mt. Anchovy (*Engraulis encrasicolus)*, Sardinellas (*Sardinella spp*) and mackerels (*Caranx spp*) are the major fish species caught in this district.

2.2.4 KPONE-KATAMANSO DISTRICT

This new district was carved out of the Tema Municipal Assembly. Majority of the populace are mainly fishermen specialising in the hook and line method of harvesting large demersal species. Others are farmers on subsistence levels.

2.2.5 TEMA METROPOLITAN ASSEMBLY

Tema serves as the administrative capital of the Tema Metropolitan Assembly and is situated 25 kilometres east of Accra, the national capital. The metropolis shares common boundaries with the Accra Metropolis on the west, the Ga Municipality on the North West and the Dangme West District on the northern and eastern borders respectively. The main occupation of inhabitants varies from commerce, tourism, hoteliers and fishing. Within the metropolis, Tema fishing port lands annually over 4,000 mt in the past 5 years. This includes catches from the artisanal canoe fishermen. Over 40 fish species of fish belonging to various families such as the Anchovy (*Engraulis encrasicolus*), Sardinellas (*Sardinella spp)*, Bumper (*Chloroscombrus chrysurus*), Frigate Mackerel (*Caranx hippos)*, and Chub Mackerel (*Scomber colias*) are landed in Tema due to its major infrastructure and proximity to the capital.

2.2.6 LEDZOKUKU-KROWOR MUNICIPAL ASSEMBLY

Nungua is the capital with an estimated population of 261,571 people in the municipality. Fishing is one of the major occupations of the people in the district. Fish production in the district over the past five years has averaged aroud 2,500 mt. The main fish species caught are the Round Sardinella (*Sardinella aurita*), Bumper (*Chloroscombrus chrysurus*) and Frigate Mackerel (*Caranx hippos).*

2.2.7 LA DADEKOTOPON MUNICIPAL ASSEMBLY

This new municipalty was carved out of the Accra Metroplitan Assembly in 2011 with a large majority of its inhabitants into commercial ventures and tourism. Fishing is not a major economic activity in the municipality.

2.2.8 ACCRA METROPOLITAN ASSEMBLY

AMA has a total land size of 200 square kilometres and is made up of six sub metros namely Okaikoi, Ashiedu Keteke, Ayawaso, Kpeshie, Osu Klotey and Ablekuma. The total population of AMA is about 1,695,136 people (2000 National Population Census). Commerce, tourism, hoteliers and fishing are the main occupation of inhabitants in the district. The metropolis has quite a number of landing sites producing over 5,2902 mt in the past 5 years. Round Sardinella (*Sardinella aurita*), Bumper (*Chloroscombrus chrysurus*), Frigate Mackerel (*Caranx hippos)* and Flat Sardine (*Sardinella maderensis*) are the major species landed in the metropolis.

2.2.9 GA SOUTH MUNICIPAL ASSEMBLY

The Ga South Municipality has a number of fishing villages including Bortianor, Oshie, Kokrobite, Faana and Lanma. Fishing is one of the occupations of the people residing in the municipality. Mean fish production in the district in the past five years is around 6,600mt. Some of the most important fish species caught are Moon Fish (*Selene dorsalis*), Cassava fish (*Pseudotolithus senegalensis*), Burrito (*Brachydeuterus auritus*), Sea breams (*Sparus and Dentex spp*) and Round Sardinella (*Sardinella aurita)*.

2.3 CENTRAL REGION

Central Region has nine (9) coastal MMDAs and these are Awutu-Senya District, Effutu Municipality, Gomoa East District, Gomoa West District, Ekumfi District, Mfantseman Municipal Assembly, Cape Coast Metroplitan Assembly, Abura-Asebu-Kwamankese District and Komenda-Edina-Eguafo-Abrem Municipal Assemly.

2.3.1 AWUTU SENYA DISTRICT

The district capital is Senya-Beraku and the main occupation of the people in this district is agriculture and fishing. Fish production in the district over the past five years has averaged 3,500 mt over the period. Main species caught are the Sardinella (*Sardinella spp)*, Threadfin (*Galeoides decadactylus*), and Burrito (*Brachydeuterus auritus)* among others.

2.3.2 GOMOA EAST DISTRICT

This district was carved from the Gomoa West district with Afransi as its district capital in 2012. The Districts is bounded by Gomoa West to the South, to the North by Agona West

Municipal, Asikuma-Odoben-Brakwa District to the West and to the East by Awutu-Senya East District. The population of the district is 102,449. The main occupation of the people in this district is subsistence agriculture and fishing. The sardinellas are the major fish species landed.

2.3.3 GOMOA WEST DISTRICT

Gomoa West District has Apam as its administrative capital and covers a land area of 1,022 km^2 with a total population of 194,792. The main occupations of the people in the district are subsistence agriculture and fishing. Mean fish production in the district over the past five years was 6,300mt. A lot of fish species of commercial importance are caught in the district with the sardinellas being the dominant pelagic species. The rest includes Threadfin (*Galeoides decadactylus*) and Burrito (*Brachydeuterus auritus).*

2.3.4 EFFUTU MUNICIPAL ASSEMBLY

The Municipality covers an area of 417.3 km^2 with Winneba as its administrative capital. It is bordered to the north by Agona Municipal, east by Gomoa District, on the west by the Gomoa West District and the south by the Gulf of Guinea. The municipal has a population of 169,972 with 168 settlements. The main occupation of the people in this district is agriculture and fishing. The small pelagics (*Sardinella spp.*) are dominantly caught and landed but occasionally the billfishes are also landed by the drift gill operators.

2.3.5 EKUMFI DISTRICT

This new district was carved out of the Mfantseman Municipality from Otuam to Srafa with a population of less than 50,000 people with fishing as their predominant occupation. Sardinellas are the dominant pelagic species landed. This ocurrs during the peak fishing season.

2.3.6 MFANTSEMAN MUNICIPAL ASSEMBLY

Mfantseman Municipality occupies a total land area of approximately 612 km^2 stretching for about 21 km along the coastline and for about 13 kilometers inland. It has Saltpond as its capital. The municipality has a total population of 152,264 (2000 population and housing census) constituting almost 7% of the Central Region population. The main occupation of the people in the municipality is subsistence agriculture and fishing. Mean fish production in the district over the past five years averaged 10,000mt over the period. Major fish species caught are the Anchovy (*Engraulis encrasicolus*), Atlantic little tuna (*Euthynnus alleratus*), and, Scad Mackerel (*Caranx rhoncus*), Threadfin (*Galeoides decadactylus*), Chub Mackerel (*Scomber colias*) and Burrito (*Brachydeuterus auritus*)

2.3.7 ABURA ASEBU KWAMANKESE DISTRICT

Abura-Dunkwa is the administrative capital of the Abura-Asebu-Kwamankese District. The distict has a population size of 90,093 representing 5.6% share of the Regional Population and 0.47% of the National Population figure (2000 population census). The population density is consequently 277.2 per sq. km. The main occupation of the people in this district is agriculture and fishing. Fish production in the district over the past five years has been 74,200mt over the period. The main fish species caught are: Anchovy (*Engraulis encrasicolus)*, Atlantic little tuna (*Euthynnus alleratus*, Scad Mackerel (*Caranx rhoncus)*, Threadfin (*Galeoides decadactylus*), Chub Mackerel (*Scomber japonicus*) and Burrito (*Brachydeuterus auritus*).

2.3.8 CAPE COAST METROPOLITAN ASSEMBLY

Cape Coast is the administrative capital of Cape Coast Metropolitan Assembly and also the regional capital of the Central Region. The metropolis occupies an area of 122km^2. It's boundary to the West is Komenda-Edina-Eguafo-Abrem Municipality, to the East is Abura-Asebu-Kwamankese District and to the North, the Twifo-Hemang-Lower Denkyira District. The main occupation of the people in this metropolis is fishing. Fish production in the district over the past five years has on the average been 6,200mt over the period. The main fish species caught are the Threadfin (*Galeoides decadactylus*), Chub Mackerel (*Scomber colias*) and Burrito (*Brachydeuterus auritus*).

2.3.9 KOMENDA-EDINA EGUAFO-ABREM MUNICIPAL ASSEMBLY

Elmina is its administrative capital. It is situated between longitude 1° 20' West and 1° 40' West and latitude 5° 05' North and 5° North 15' North. The district covers an area of 1,372.45 km^2 The estimated population for the district is 112,435 people which is 7.1% of the regional population. The main occupation of the people in this municipality is subsistence agriculture and fishing. Fish production in the district over the past five years accounted for 10,571mt annually over the period. The main fish species caught are: Atlantic little tuna (*Euthynnus alleteratus)*Frigate mackerel (*Auxis thazard*) and Burrito (*Brachydeuterus auritus*).

2.4 WESTERN REGION

Western region is located in the south western part of Ghana and has six (6) coastal MMDAs.

2.4.1 SHAMA DISTRICT

The Shama District was carved out of the former Shama Ahanta East Metropolitan Assembly. It is bordered to the North by the Mpohor Wassa East District, to the South by the Gulf of Guinea, Sekondi-Takoradi Metropolitan Assembly to the West (all in the Western Region) and Komenda-Edina-Eguafo-Abirem District to the East in the Central Region. The District Capital is Shama. The District covers a land area of 215 km^2 and has a total of sixty seven (67) settlements with 366,579 population size. The predominant occupation of the people in the District is mainly farming, commerce and fishing. Fish production in the district over the past five years has averaged 43,500mt over the period. The main fish species caught are the Sardinellas, Frigate Mackerel (*Auxis thazard*) and Long-finned Herring (*Ilisha africana*).

2.4.2 SEKONDI TAKORADI METROPOLITAN ASSEMBLY

Sekondi is the administrative capital of the twin city comprising Sekondi and Takoradi. It lies within longitudes 4.92°N, and latitude 1.77°W. Sekondi-Takoradi is the Western Region's largest city and an industrial and commercial center, with a population of 445,205 people (2012). The chief industries in Sekondi-Takoradi are timber, plywood, shipbuilding and railroad repair and fishing. The main fish species caught are: Sardines (*Sardinella aurita and Sardinella maderensis*), frigate Mackerel, (*Auxis thazard*) and long-finned Herring (*Ilisha africana*).

2.4.3 AHANTA WEST DISTRICT

The Ahanta West District has a total land area of 591km^2 and according to the 2010 Population and Housing Census report it is occupied by 106,215 people. Agona Nkwanta is the district capital. The District lies between latitude 4°.45"N and longitude 1°.58"W and it is located at the southern most part of the country. The district is bounded on the East by the Sekondi Takoradi Metropolitan, on the West by the Nzema East Municipal, and the North by Mpohor Wassa East and Wassa Amenfi West Districts. The main occupation of the people in this district includes subsistence agriculture, rubber plantation which employs about 60% of the total population, the remaining engage in fishing, trading and the formal sectors. Mean annual fish production in the district over the past five years has been is 17,000mt. The main fish species caught are the Sardines (*Sardinella aurita and Sardinella maderensis*).

2.4.4 NZEMA EAST MUNICIPAL ASSEMBLY

The Nzema East Municipality is located on the southern end of the western region between longitude 2^{0}05" and 2^{0}35" West and latitude 4^{0}40 and 5^{0}20 North. The Nzema East Municipal covers 9.8 % (2,194km^2) of the total area of the Western Region It is bordered to the west by Ellembelle, north by Wassa Amenfi East District, and the east by Wassa Amenfi West and Ahanta West districts. On the south, it is bordered by the Gulf of Guinea with 70km stretch of sandy beaches. It is estimated that over 65% of the economically active population are engaged in fishing and farming. Mean annual fish production in the district over the past five years has been 6,200mt over the period. The main species caught are the sardinellas.

2.4.5 ELLEMBELLE DISTRICT

The Elembelle District was carved out of the Nzema East District in 2007 with Nkroful as its administrative capital. The Ellembelle District is located on the southern end of the region between longitudes 2º 05' and 2º 35' W and latitude 4º 40' and 5º 20' N. It covers a total area of about 1,468 km^2 which constitute about 6.8% (Percent) of the total land mass of the Western Region with a total population of 107,673 for the district (Ghana Statistical Service, 2010). Fishing and Cocoa growing is the main occupation of the people in the district. However, small scale mining, and trading is carried out in the middle and the northern zones. Processing and sale of copra oil is also carried out in certain parts of the district. Major fish species caught are Sardinellas.

2.4.6 JOMORO DISTRICT

Created by a Legislative Instrument 1394 in 1988, the Jomoro District used to be part of the then Nzema East Municipal. The size of the district is 1,344 km^2 and Half Assini is the District Capital. It lies between Latitudes 04° 55' – 05° 15' N and Longitudes 02° 15' – 02° 45' W and is bordered on the North by Wassa Amenfi West and Aowin Suaman districts, Ellembelle District on the East, La Cote d'Ivoire to the West and the Gulf of Guinea to the South. It is located in the Southwestern corner of the Western Region of Ghana. The population of the district is 150,107 with a density of 83 persons per km2 and an annual growth rate of 3%. (2000 PHC Census/2010). The population of the district is 5.8% of that of the region. The main occupation of the people in this district is subsistence agriculture and fishing. Mean Fish production in the district annually has been approximately 825mt over the period. Main species caught are the Atlantic little tuna (*Euthynnus alleteratus*) and the Round and Flat Sardinellas (*Sardinella aurita* and *S. madernsis*).

3.0 METHODOLOGY

3.1 STUDY AREA

The survey covered the entire marine coastline with approximately 550 km from Aflao in the Eastern border in the Republic of Togo side to Half-Assini (Newtown) in the western border with Cote d'Ivoire.

3.2 METHODS

The method of full coverage was used (Banerji, 1974) with the entire coastline of Ghana divided into four sectors corresponding to the four administrative regions bordering the sea (Fig.1). These are Volta, Greater-Accra, Central and Western regions. The Regions were subdivided into districts numbering 26 in total. These were Ketu South and Keta districts in the Volta Region; Ada East, Ada West, Ningo-Prampram, Kpone-Katamanso, Tema, Ledzokuku-Krowor, La-Dadekotopon, Accra and Ga South districts in the Greater Accra Region; Awutu-Senya, Effutu, Gomoa East, Gomoa West, Ekumfi, Mfantseman, Cape Coast, Abura-Asebu-Kwamankese, Komenda-Edina-Eguafo-Abrem districts in the Central Region; and Shama, Sekondi-Takoradi, Ahanta West, Nzema East, Ellembelle, Jomoro districts in the Western Region. Within each district, enumerators covered the full length of the coastline listing all fishing villages and associated landing beaches.

For the purpose of this survey, a fishing village is a village (town or city) where fishermen reside and have a chief fisherman. The chief fisherman is generally the head of the fishing

community. A landing beach on the other hand, is the stretch of coastline on which fish is typically landed and canoes are beached. Similarly, a number of villages that are governed by one chief fisherman are considered as landing beaches under the fishing village where the chief fisherman resides. Thus villages or beaches as used here may have been reassigned under newly created administrative areas/districts recently but however cover the sites and areas along the coastline.

The Survey team consisted of Fisheries Officers, Technical Officers, and Technical Assistants from the coastal regions/districts who all acted as enumerators during the period under review. The team numbering approximately 80 (grouped according to districts) went through a three day pre-survey training in April 2016 highlighting on the methodology to be used, identification of types of fishing gears, fishing crafts as well as administering of questionnaires.

At the fishing village, the enumerators enquired and established the number of landing beaches. The number and type of canoes at each landing beach were physically counted. A sample of each type of canoe was measured with a tape measure. The type of canoe is determined, generally by the kind of fishing method (prominent gear) carried out on it. The canoes were also examined for motorisation. A canoe is considered motorized if it carries a bracket or cradle on which an Canoes in estuaries, rivers and lagoons no matter how close they were to the open sea, were excluded in the count. outboard motor can be mounted.

All other information requested are indicated in the questionnaires (Appendices A & B). The findings of most questionnaire have not been put in this report but only summaries because they were put in to help design and monitor catch assessment surveys. However these results can be incorporated in a detailed register with detailed information on ownership, names of canoes, symbols, crew size per individual canoes etc.

New canoes which were being prepared to go to sea and old ones undergoing repairs were all counted and included in the database. Canoes that were seen broken beyond repairs or abandoned were not counted. In each canoe, the number of fishermen were also not sought.

The chief fisherman in each village was the first point of contact before the enumeration was done and they often delegated some trustworthy and experienced subordinates to help the enumerators do their job.

The rest of the survey was conducted by interviewing either the chief fisherman or other fishermen in the village. Some of the information demanded from them are on non-fishing

days, range of fishing operations, main species fished or sought, migration of fishermen within and out of the country etc.

All the information obtained were crosschecked and later entered into a database for further scrutiny.

The entire programme lasted for a month starting on the 9th April and ending on the 29th April 2016. A few retired officers were recruited to join the existing numbers of enumerators. A post census check was organized in the second week of May 2016 to visit some landing sites to ascertain the true numbers of canoes in some landing sites. Besides counting the numbers and types of canoes and gears associated, some aspects of the livelihoods (socio-economics) of fisher folks were sought such as their family size, educational backgrounds, and livelihoods among others. The respondents were mainly fishermen and fishmongers in the various fishing were interviewed in the communities. A sample size of 200 of fishers/fishmongers (respondents) were used. The results however should be taken as tentative and used with much caution.

Results using the Statistical Package for Social Sciences (SPSS v-16) was conducted to give us a fair idea of the social importance of fishers within our coastal communities.

4.0 RESULTS

4.1 Number anf Types of Canoes

Classification of canoes in the artisanal sector is based on the type of gear the canoes operate. The major gears operated by the canoes during the survey were Purse seine (Poli/Watsa), Hook & Line, Drift Gill Net, Beach Seine, Ali, Set Net and One Man Canoe. As one canoe can be used to operate more than one type of fishing gear, each canoe was put in the category of gear for which it is most often used. Doyi (1984) describes the various gears used in the artisanal fishery in Ghana.

Triplochiton scleroxylon and *Ceiba petandra* locally called Wawa and Onyina respectively are the main materials used for the manufacture of these canoes.

4.1.1 Ali and Poli/Watsa

A total of 3,346 pursing nets (Poli/Watsa) and 1,052 Ali net canoes were counted. These are large wooden canoes in the size range of 12.0 – 19.5m long x 1.2 – 2.4m wide that are used to operate the ali/poli/watsa nets. They are mainly propelled by 25 – 40 hp Outboard Motors with some also using electronic devices like the fish finders and echo sounders.

4.1.2 Beach Seine

During the survey, 1,084 beach seines canoes were recorded. In this category, some old "Ali/Poli/Watsa" canoes are converted for beach seining. Normally, the bow is raised to avoid taking water when crossing through the surf. Beach seine canoes are mostly propelled by paddles nevertheless outboard motors may be used as well. Their sizes range between 8.5-11.5m.

4.1.3 Set Net

During the survey, 3,729 Setnet canoes were counted. Setnet canoes are those that are used to operate small nets rigged to fish at bottoms or in midwaters depending on the strength of the floats and leadlines. They are used mainly on daily basis using paddles and sails or outboard motors. Their size ranges from about 7.0 – 9.5m long. Some Set nets are used to trap lobsters.

4.1.4 Line

The number of line canoes recorded were 1,344. Line canoes in Ghana also termed "Lagas" canoes (French word for ice, "la glace"), are canoes that specialize in hook and line fishing. Ice is used to preserve high value demersal fish at sea in insulated containers. They stay out at sea for 2 to 4 days targeting large demersals such as sparids, snappers and groupers within rocky bottoms. The size range is approximately 12.0 – 18.5m long.

4.1.5 Drift Gill Net

During the count, a total of 836 drift gill net canoes were recorded. Their size range is the same as that of "Ali/Poli/Watsa" and can only be identified with the gear on board. These are used to operate a drift gill net for large pelagic species such as the skipjack tuna, swordfish and sailfishes.

4.1.6 One Man Canoes

192 One Man canoes were counted. These are small canoes measuring up to 6 m. They are operated by one person either using a set net or small handline. They are usually too small to be operated by outboard engines.

4.1.7 Service canoes

Service canoes measure about 6.0 – 18m long and do not operate any fishing gear. They are mainly used to transport fish often termed as discards from industrial trawlers (system known as 'seiko') at Apam, Mumford, Elmina and Sekondi. There are over 50 of such canoes currently operating from mainly the Central rgion.

During the survey, a total of 11,583 canoes were recorded of which 3,346 of the number was pursing net canoes, 1,084 beach seine canoes, 1344 line canoes, 3,729 set nets canoes, 1,052 ali net canoes, 836 drifting net canoes and 192 one man canoes. The number of canoes for the different categories of gears operated at the landing beaches in each district is presented in Tables 1.1(a) - (z).

Table 4.2 contains the summary of the various numbers of canoes for each district and region.

4.2 Number and Type of Fishing Gears

The six different gears widely in use during the survey were the Pursing Nets, Beach Seines, Line, Set Net, Ali and Drift Gill Net.

Except for canoes that operated line, and set net gears, every other canoe operated one unit of fishing gear.

4.3 Number and Types of Outboard Motors

A total of 9,122 outboard engines of various brands and capacity were recorded. Seven (7) brands of various capacities ranging from 4hp to 40hp were identified during the survey. The Yamaha brand of 40hp dominated the motor types by 64.4%. Other brands were Johnson, Suzuki, Marina and Tohatsu which had capacities between 4 and 9hp .

Engines with such small capacities were common in the Central and Western regions, where they are used to propel small set net canoes which are common in these areas.

The regional distribution of outboard motors is presented in Tables 4.2 and 4.6. The level of motorization for each region is also presented in Table 4.3.

4.4 Number of Fishing Villages and Landing Beaches

A total of 186 fishing villages and 292 landing beaches were recorded during the survey. Names of the various fishing villages and landing beaches are in Tables 1.1(a) - (z).

At the regional level, there were 28, 44, 42 and 72 fishing villages in the Volta, Greater Accra, Central and Western regions respectively. The highest number of landing beaches (97) was recorded in the Central Region with the lowest number (47) in the Volta Region. Table 4.2 shows the breakdown of numbers of fishing villages and landing beaches by districts and regions.

4.5 Number of Fishermen

The number of fishermen recorded during the survey was 107,518 (Table 4.3). The total number for each landing beach is presented in Tables 1.1(a) – (z). Presented also in Table 4.2 are the number of fishermen in each district and region.

4.6 Cost of Fishing Inputs

It was observed that a 40hp Yamaha outboard engine was the most popular and sold between Gh¢11,000 and Gh¢15,000. Engines of lower capacities (15hp, 20hp, 25hp, 30hp) sold between GH¢4,500 and GH¢8,000. The very small motors (4 hp and 9 hp) also cost between GH¢2,000 and Gh¢3,500.

The large size nets for Watsa, Drift Gill nets and Beach Seines sold between Gh¢15,000 and Gh¢40,000. Medium size set nets cost GH¢1,000 and Gh¢3,000 and small set nets for One Man canoes also sold between Gh¢500 and Gh¢1,500.

Canoes for large heavy gears such as the big Beach Seines, Watsa and Drift Gill nets cost between Gh¢10,000 and Gh¢28,000 whilst canoes for lighter gears like the Set nets sold between Gh¢750 and Gh¢8,000. One Man Canoes were also sold between GH¢750 and GH¢1,500.

Table 4.4 shows mean ranges of price of canoes, fishing gears and outboard motors.

4.7 Fish Sharing Systems

In the marine artisanal fisheries in Ghana, the daily catches by each fishing unit are usually shared according to laid down ratios. A percentage of the catch goes to the crew on one side and the owner of the craft, gear (net) and outboard motor. The sharing system from village to village is more or less similar within the regions and does not differ much from year to year. Table 4.8 shows the various sharing systems within the regions.

4.8 Fishing Holidays

Along the coast of Ghana, at least one day in a week is observed as a fishing holiday by the various fishing communities. The day usually varies in the various communities along the coast. However, a few communities in the Volta Region were noted of not having any fishing holiday. A summary of the various days observed as fishing holidays by different regions are presented below:

Region	Fishing Holiday
Volta Region	Tuesday, Wednesday, Thursday and Sunday

Greater Accra Region	Tuesday
Central Region	Tuesday
Western Region	Tuesday, Thursday and Sunday

4.9 Migration Patterns

Based on information collected during the survey, two types of migration patterns were observed. These were migrations within or outside the country.

Often, the Ghanaian fisherman migrates beyond Ghana's territorial waters and can be found as far as Mauritania to the north and Angola to the south. They are known to stay away for a few months to several years.

4.10 Comparison of Results with Previous Surveys

4.10.1 Canoes

Table 4.5 shows comparison of the 2016 survey with the 3 previous surveys conducted in 2001, 2004 and 2013. There is seen an increase in the number of canoes from the 2001 survey to 2013 survey. A decrease of 9.0 % is however seen from the 2013 numbers of 12,728 to the current 11,583 canoes counted in 2016.

4.10.2 Outboard Motors

With regards to outboard motors since 1981 there has been increasing trends in the numbers until in 1992 when there was an 8 percent decrease. The current survey registered 9,122 motors which represented a decrease of 2.0 % from the 2013. The level of motorization was however higher from a level of 73.2 percent in 2013 to 78.8 percent in 2016.

4.10.3 Fishermen

Historically the number of fishermen population have increased over the years except between 1986 and 1989 when there was a 12.7 percent decrease. However in 2016 survey, 107,518 fishermen were recorded giving a 22.7 percent decrease from the previous survey.

5.0 DISCUSSIONS

5.1 Number and Type of Canoes

Total enumeration of canoes, gears and fishing inputs in all the fishing districts along the coast to evaluate the status of the marine artisanal fisheries sector has been a periodic exercise. The previous and present surveys incorporated some socio-economic aspects of the artisanal fishery

to ascertain changing livelihoods in the communities as a result of varying factors such as access to the resources and changes in socio-economic trends within the environment.

The total number of active canoes in comparison to that of 2013 recorded a decrease of 9.0% nationally. The general pattern has been an increase in the number of canes as shown by the results from Koranteng *et al* (1987; 1992) who recorded an increase in the number of canoes during those surveys. However, there were surveys with recorded decrease in the number of canoes (for example, Quaatey *et al* , 1997). Despite the recorded decreased number of canoes in the current survey, a trend line shows the general pattern of increasing number of canoes form 1969.

The decrease in the number of canoes from the current survey is not equally distributed among the three regions (Volta, Greater Accra and Western) with recorded decrease in the number of canoes. The greatest decrease in the number of canoes (19.3%) occurred in the Western Region. Volta Region, however, showed a remarkably increase of 15.6%.

5.2 Number of Types of Fishing Gear

In the canoe categories, of the four types of canoes that decreased in numbers (Set net, Ali, DGN and One Man canoe), Set net and Ali showed 9.0 percent and 43.8 percent down on 2013 respectively. The dramatic decrease in Ali is due to the fact that catches of the major species (*Sardinella aurita*) that the gea exploits have gone down significantly and the gear is becoming less prominent in operation. The use of One Man canoes is also becoming less significant.

5.3 Number of Types of Outboard Motors

9,122 outboard engines were recorded in the survey depicting a high percentage of 78.8 percent level of motorization. There has been an increment of 7.7 percent level of motorization over the 2013 survey. Over 85 percent of these motors were of the Yamaha brand because it is a dominant brand in the market and mostly preferred by fisher folks. Other brands encountered were of lower capacities of Yamaha, Johnson, and Suzuki etc.

On regional basis, Western Region had the highest number of outboard motors of 3,305 which constitutes 36.2 percent of the national total. This could possibly be due to the increase of Purse seine net canoes in the region.

Number of motors recorded in the Central, Greater Accra and Volta regions were 2,994, 2,234 and 589 respectively. The highest percentage of canoes with motors comes from the Greater

Accra Region with a level of motorization of 84.8 percent of crafts followed by Western Region (81.7 percent), Central Region (77.7 percent) and Volta Region (56.0 percent) respectively. In norminal terms, the number of canoes in the Western Region are far more than that of the Greater Accra Region but the number of canoes with motors in Greater Accra by gear type are more than that in the Western Region. This accounted for the higher level of motorization in Greatter Accra Region.

There have been increases in sizes of canoes in recent times. Pursing nets and Drifting Gill nets canoes were planked up to increase height and width to carry more fish. Powerful outboard motors are used to propel these planked up heavy canoes.

5.4 Number of Fishing Villages and Landing Beaches

Compared with the previous survey in 2013, the number of fishing villages throughout the four regions decreased by 4 during the current survey. The lost of landing beaches can be attributed to coastal erosion taking place in some coastal areas of the country. Migrations of canoes within the fishing villages as well to nearby fishing countries have led to some fishing villages and landing beaches in the Central Region and the Western Region to be inactive.

5.5 Number of Fishermen

The total number of fishermen enumerated in the current survey was 107,518. This showed a 22.7 percent decrease from the 2013 survey which recorded 139,115 fishermen. From the regional breakdown, 13.7 percent of all the fishermen were in the Volta Region, 24.0 percent in the Greater Accra Region, 31.0 percent in the Central Region and 31.3 percent of fishermen were recorded in the Western Region.

5.6 Cost of Fishing Input

The cost of fishing inputs depends on location, sizes and ages of equipment. The most expensive artisanal fishing nets is the Poli/Watsa net which costs between Gh¢15,000 and Gh¢40,000 This was followed by large beach seine nets between Gh¢10,000 and Gh¢32,000. The Drift Gill Net is also sold between Gh¢15,000 and Gh¢20,000. The gear for line fishing was the cheapest and they cost between Gh¢850 and Gh¢1,800. With respect to canoes, those for Drift Gill nets, Pursing nets and Beach Seine operations were the most expensive; costing between Gh¢10, 000 and Gh¢40, 000.

The cost of inputs has gone up in recent years since the last survey due to inflationary trend and high cost of borrowing.

5.7 Fishing Sharing System

The sharing system from village to village are more or less similar within the regions and according to laid down rations. These do not differ from year to year (Koranteng and Nmashie, 1987).

5.8 Fishing Holidays

Fishing holidays or non-fishing days are usually on Tuesdays however in some villages especially in the Volta and Western regions they differ due to traditional and customary norms. These days are usually used to repair nets.

5.9 Migration Patterns

Fishermen still migrate to other villages or out of the country for several reasons. Usually within the country its mainly due to rough beaches and chasing fish which are more abundant in a particular locality. Others migrate to seek greener pastures all along the western African coast and beyond.

6.0 SOCIO-ECONOMIC STUDIES

Fisheries development aims at improving the socio-economic conditions of the fisher folks and the nation as a whole. Their social systems can play an important role in the local ecosystem hence these systems must be studied and understood clearly to help policy makers to bring to the fishers acceptable and beneficial innovations to improve their living standards.

In order to have an idea of the socio economic conditions of the fisher folks along the coastal districts of Ghana, a primary data was collected as part of the canoe frame survey. Socio-economic parameters such as family size, age structure, education etc. were collected from various sample centres in the coastal regions of the Volta, Greater Accra, Central and the Western regions.

This study is aimed at presenting the socio-economic situation of the Ghanaian fisher folk. In all two hundred (200) fishers were interviewed; 100 fishermen and 100 fish mongers using the semi-structured interview method.

6.1 The Fishing Workforce

In fishing communities, family sizes are large, ranging from 6-20 per household. This is largely determined by the high demands for labour force for the key stages of pre- and post-harvest activities. A typical fishing unit comprises a canoe owner and his immediate family members made up of one or several wives and children. This core family is in turn supported by external relations such as nieces, nephews and cousins, who may constitute the crew members of a canoe, or help in fish processing. Such an arrangement has provided the needed workforce and employment in the artisanal fishery industry over the years.

Children are not left out of the fishing business as they form an integral part of the community structure. They learn on the job and through that gain experience and knowledge in fishing and fish processing.

6.2 Gender in Marine Artisanal Fisheries

Gender roles in the artisanal marine fishery sector have been clearly defined for years. The marine canoe fishery involves intensive labour. Fishermen can be as young as 7 years or as old as 70 years. The male youths perform the hard tasks ranging from pushing the canoe to and from the beach, casting, setting, dragging nets and often carrying fish. The elderly are usually involved in the management and supervisory roles, providing logistics for crew members, net mending and facilitating arrangements for fishing expeditions.

The essential role played by women is well defined. Women contribute significantly in activities such as processing and distribution of landed fish. Most women depend on individuals, financial and non-financial institutions with high interest rates for their fish mongering business.

6.3 Socioeconomic Issues Concerning Fishers

Fishermen

Hundred fishermen were interviewed on various issues and the results are presented below.

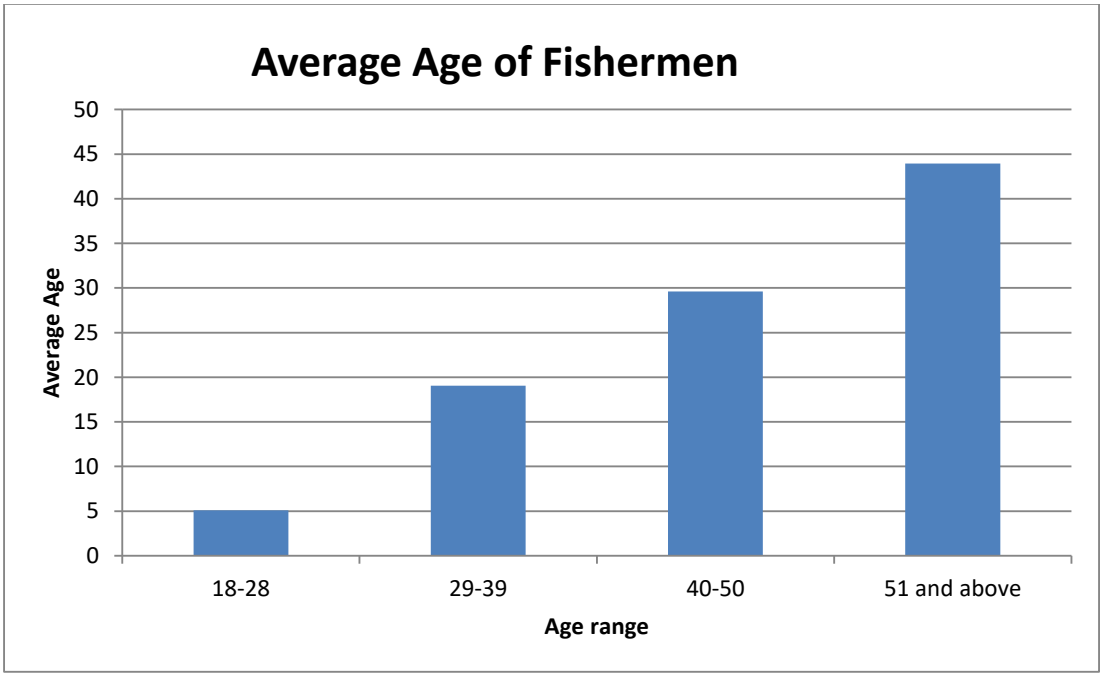
6.3.1 Age distribution

Results revealed that, the age group 51 and above constituted the majority of fishermen. Where 50% of this age group were obtained in the Volta Region. 43.3%, 42.4% and 40%were obtained

in Central, Western and Greater Accra regions respectively. Age-group 18 - 28 was the least among the fishermen across the regions. This suggests a gradual reduction in the entry of the youth into fishing activities. Perhaps they are more interested in other professions, and have varied aspirations other than to labour as fishermen in this era of declining fish catches and exorbitantly high input costs.

Table 1. Age range of fishermen

	PERCENTAGE				
Age range of fishermen	Greater Accra	Volta region	Central region	Western region	Average age
18-28	5	9	3.3	3	5
29-39	25	9	30	12	19
40-50	30	32	23	33	30
51 and above	40	50	43	42	44
Total	100	100	100	100	100



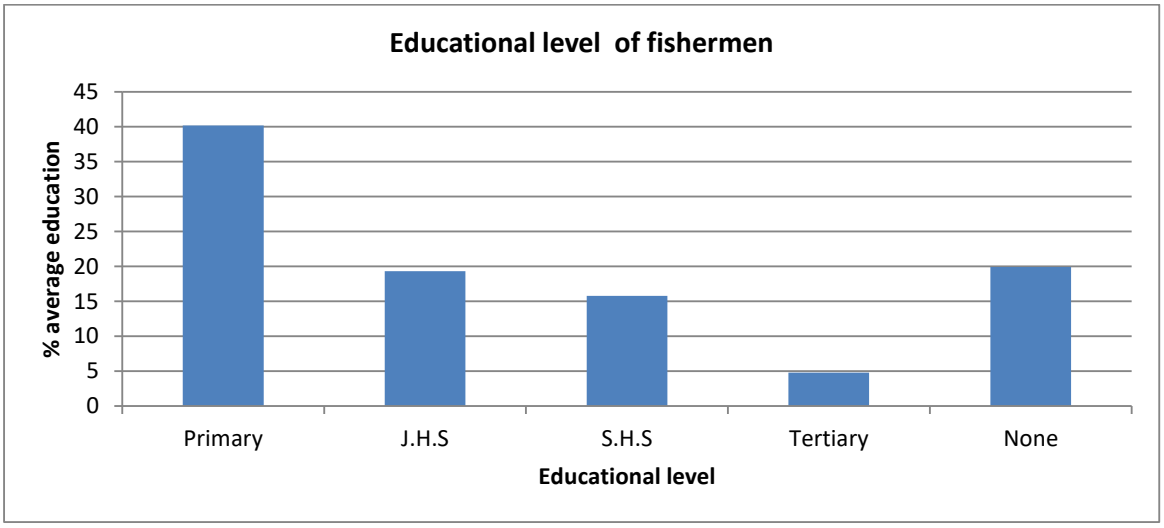
6.3.2 Education

The educational background of fishers was ascertained during the interview. Table 2 shows that 55% of the fishermen in the Greater Accra region, 36.4% in Volta region, 39.4% in Western

region and 30% in Central region had attained primary level education. The Greater Accra Region had the highest (30%) number of fishermen attaining J.H.S level of education. With respect to fishermen who had attained S.H.S level of education, Volta Region recorded the highest (22.7%). In terms of tertiary education, Central Region recorded the highest (10%) number of fishermen.

Table 2. Educational level of fishermen

	PERCENTAGE				
Educational background of fishermen	Greater Accra	Volta region	Central region	Western region	Average Education
Primary	55	36	30	39	40
J.H.S	30	9	20	18	19
S.H.S	15	22	13	12	16
Tertiary	0	9	10	0	5
None	0	22	26	30	20
Total	100	100	100	100	100

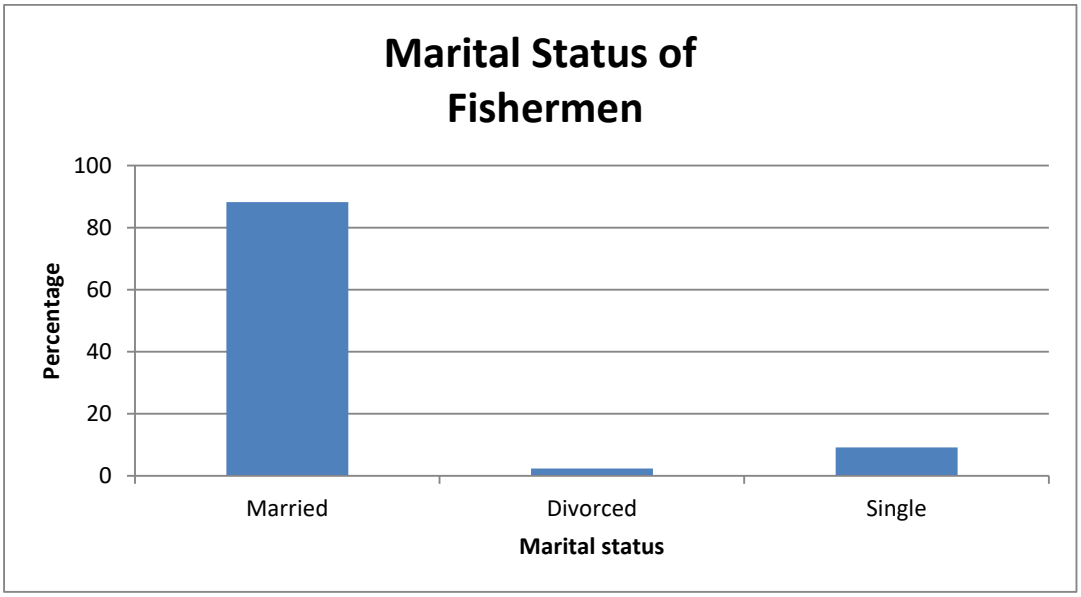


6.3.3 Marital status

In response to their marital status, 95% of the fishermen in Greater Accra Region, 86% in the Volta Region, 90% in the Central Region and 82% in the Western Region said they are married, as shown in Table 3.

Table 3. Marital status of fishermen

	PERCENTAGE				
Marital status of fishermen	Greater Accra	Volta region	Central region	Western region	Average marital status
Married	95	86	90	82	88
Divorced	0	0	3	6	2
Single	5	13	7	12	9
Total	100	100	100	100	100



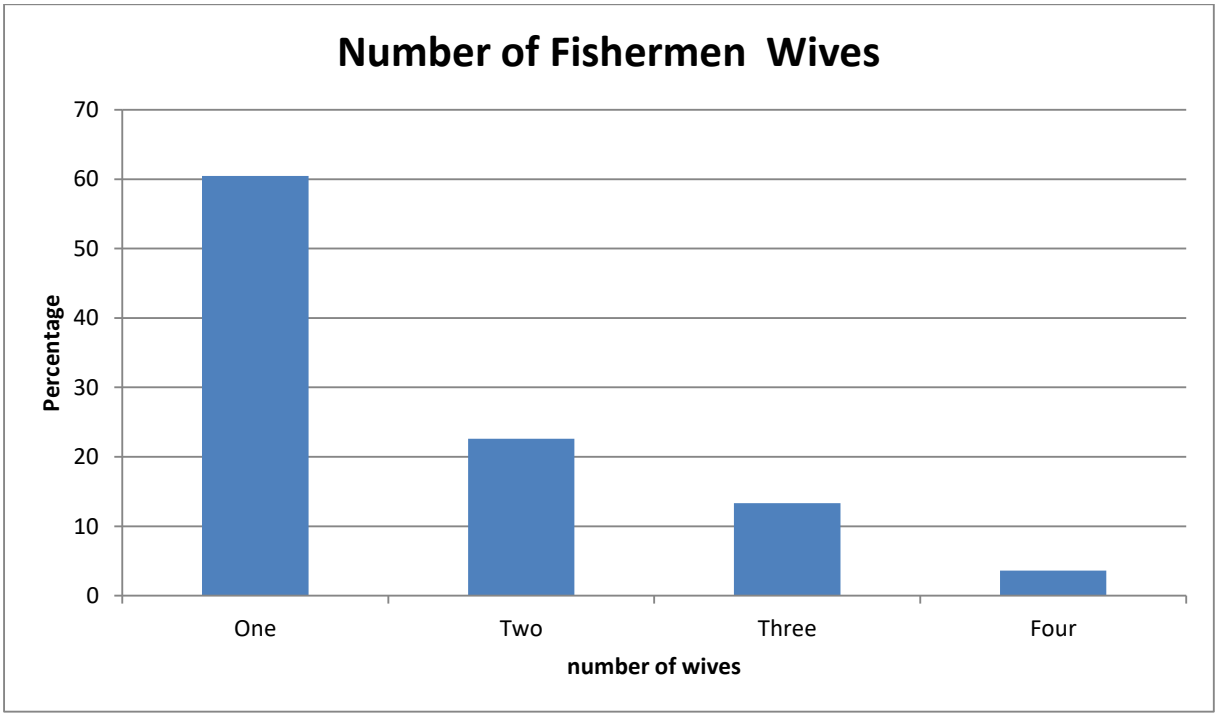
6.3.4 Wives of fishermen

Out of the married fishermen, 69.7% of them in Western Region had one wife. 66.7% in Central region, 60% in the Greater Accra Region and 45.5% in Volta Region had also one wife each as shown in table 4. In terms of multiple wives, 31.9% of fishermen in the Volta Region had two wives, 18.1% had three wives and 4.5% had four wives. In the Greater Region 20% had two,

10% three wives and 10% had four wives. However, in the Western and Central Region there were no fishermen who had four wives.

Table 4. No. of wives of fishermen

	PERCENTAGE				
Number of wives	Greater Accra	Volta region	Central region	Western region	Average
One	60	46	67	70	60
Two	20	32	23	15	23
Three	10	18	10	15	13
Four	10	6	0	0	4
Total	100	100	100	100	100

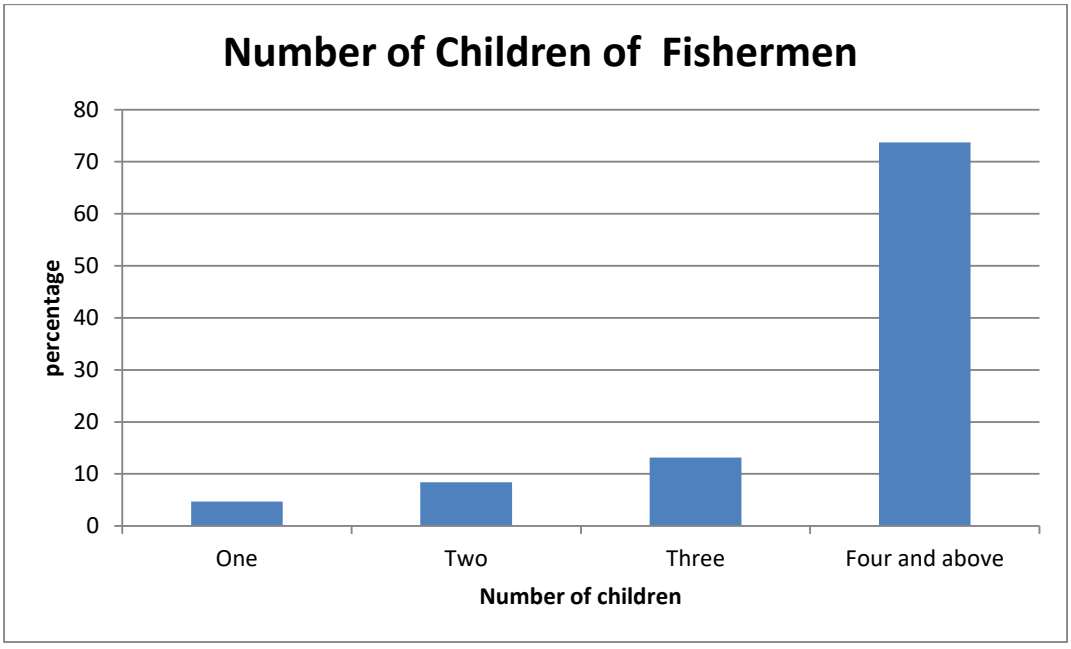


6.3.5 Children of fishermen

In relation to the number of children of fishermen, between 65% and 81% had more than four children as shown table 5. This confirms the notion that fishermen have plenty children.

Table 5.Number of Children of fishermen

	PERCENTAGE				
Number of children of fishermen	Greater Accra	Volta region	Central region	Western region	Average Children
One	5	5	3	6	5
Two	10	5	10	9	8
Three	20	23	8	3	13
Four and above	65	68	80	82	74
Total	100	100	100	100	100



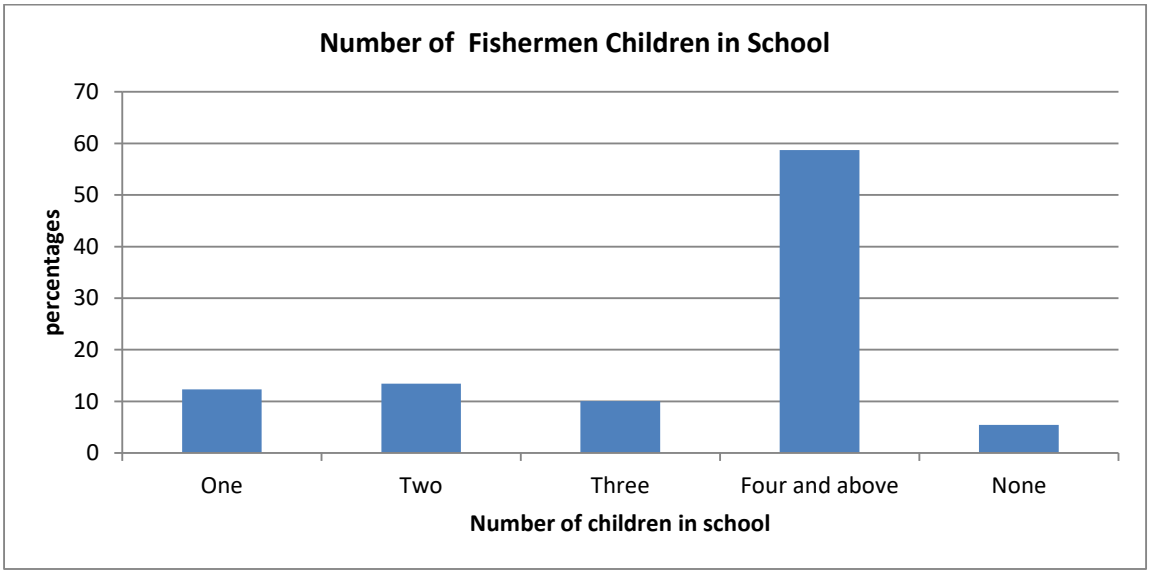
6.3.6 Number of children in School

Table 6 shows that, majority of fishermen across the region has seen the importance of formal education. 55% in Greater Accra region, 59% in Volta region, 60% in Central region and 61% in Western region of fishermen had more than four of their children in school. Very few had no children in the Volta, Central and Western regions,

Table 6. Number of fishermen children in school

	PERCENTAGE

Number of children in School	Greater Accra	Volta region	Central region	Western region	Average Children
One	20	14	7	9	12
Two	15	14	10	15	13
Three	10	6	17	9	10
Four and above	55	59	60	61	59
None	0	9	7	6	5
Total	100	100	100	100	100



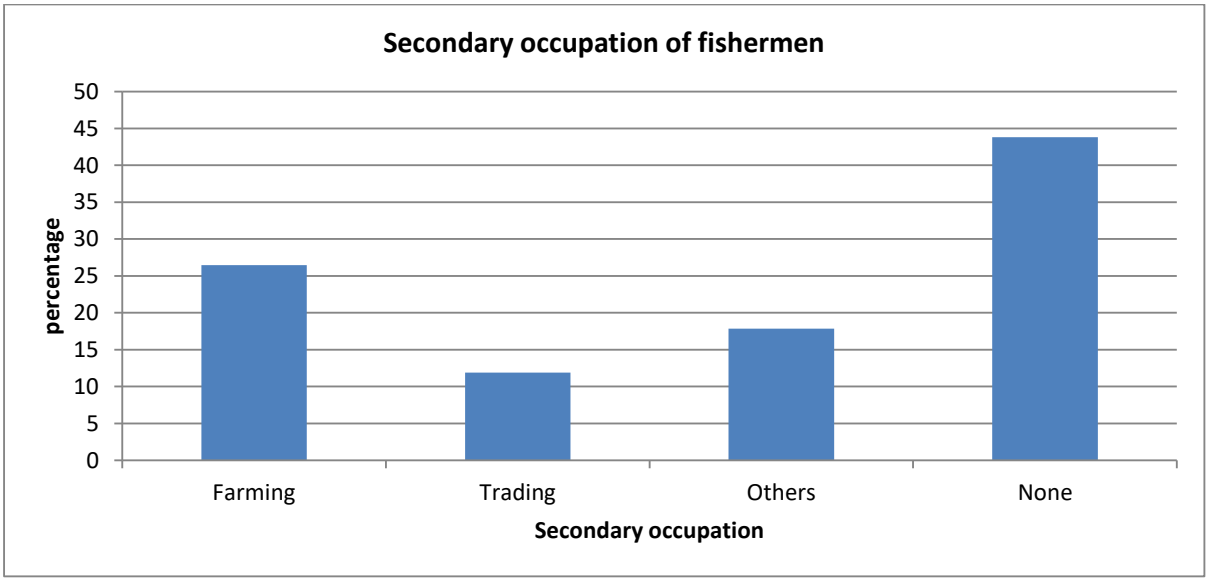
6.3.7 Other Occupation

Fishermen were engaged in other income generating activities apart from fishing. Some of these activities are farming, trading, masonry, carpentry, driving and basket weaving. 35% of fishermen in the Greater Accra Region, 29.5% in the Volta Region, 21.3% in the Western Region and 20% in Central Region were engaged in farming. However, 56.7% and 54.5% from the Central and the Western Region respectively depended solely fishing as shown in table 7.

Table 7. Other economic activities of fishermen

	PERCENTAGE

Secondary occupation	Greater Accra	Volta region	Central region	Western region	Average Occupation
Farming	35	30	20	21	26
Trading	15	14	7	12	12
Others	20	23	17	12	18
None	30	34	57	55	44
Total	100	100	100	100	100



6.3.8 Concerns of fishermen

During the interview, fishermen express their concerns on subsidy from Government, financial support and loans and implementation of fisheries laws. Table 8 shows the response of fishermen on the above issues. 65% of fishermen in Greater Accra Region were of the notion that MOFAD (Ministry of Fisheries and Aquaculture Development) laws and regulations should be implemented. 46.6% from the Central Region and 27.3% each from the Volta and Western region were also of the same view. In the Volta Region 50% of the fishermen were of the view that, the Government should subsidise fishing inputs such as premix fuel, outboard motor, nets etc. whereas in the Western region 39.4% of the fishermen suggested that the Government should support them with loans.

Table 8. Suggestions of fishermen

	PERCENTAGE				
Suggestions of fishermen	Greater Accra	Volta region	Central region	Western region	Average
Gov't Subsidy On Fishing Inputs(Premix Fuel, Outboard Motor and Net)	30	50	40	33	38
Financial support/Loans	5	23	13	39	2
Implementation Of Fisheries Laws and regulations	65	27	47	27	42
Total	100	100	100	100	100

6.3.9 FISH PROCESSORS AND TRADERS

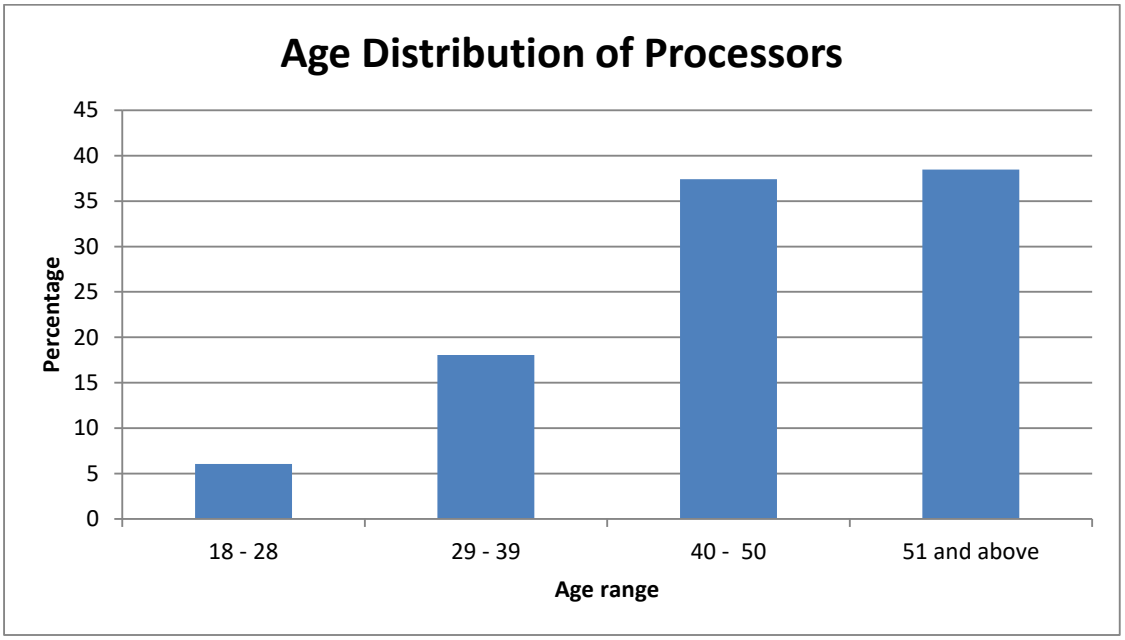
All processors and traders interviewed were women. Hundred (100) fish processors and traders were interviewed through questionnaire across the coastal regions on parameters such as age, marital status, number of children, processing and preservation methods, other post-harvest issues and avenues they perceive as sources for enhancing their business etc.

6.3.10 Age distribution of fish processors and traders

With regard to the age of fish processors and traders majority were forty years old and above (60%).

Table 9. Age distribution of fish processors and traders

	PERCENTAGE				
Age of fish processors and traders	Greater Accra	Volta region	Central region	Western region	Average Age
18 – 28	10	6	7	3	6
29 – 39	5	14	23	30	18
40 - 50	30	50	33	36	37
51 and above	55	32	37	30	38
Total	100	100	100	100	100

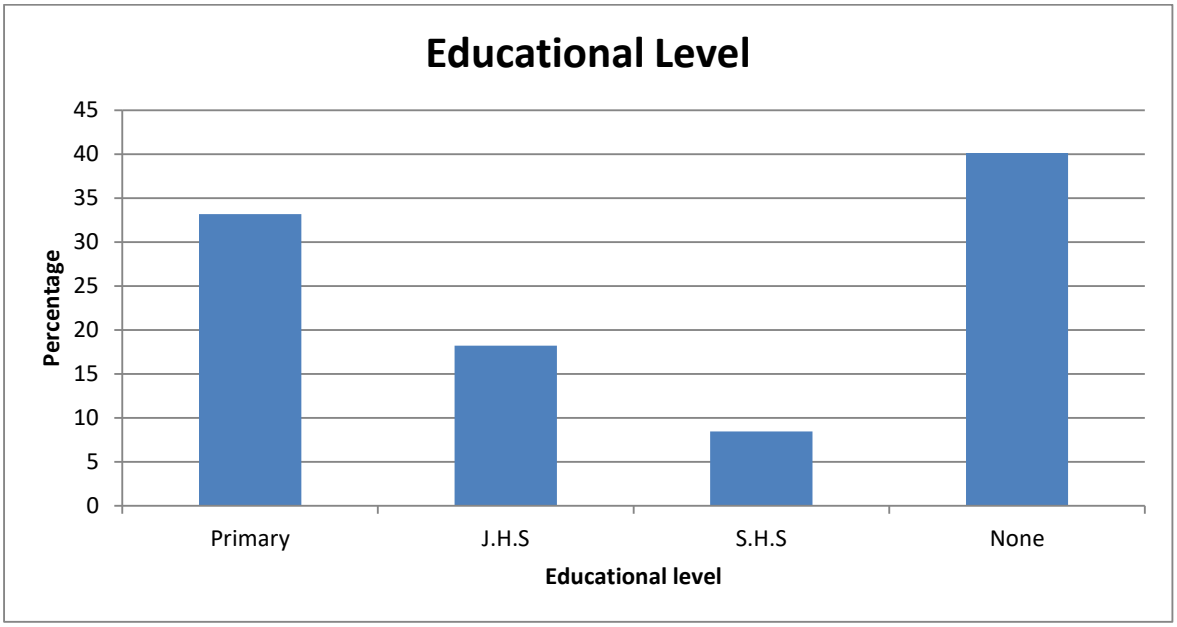


6.3.11 Formal Education

From table 10, it was realised that generally women in the Central region had little or no formal education. Very few women attained the SHS level of education as compared to the rest of the regions.

Table 10. Educational background of fishmongers

	PERCENTAGE				
Educational background	Greater Accra	Volta region	Central region	Western region	Average
Primary	45	32	17	39	33
J.H.S	15	27	3	27	18
S.H.S	15	9	7	3	8
None	25	32	73	30	40
Total	100	100	100	100	100

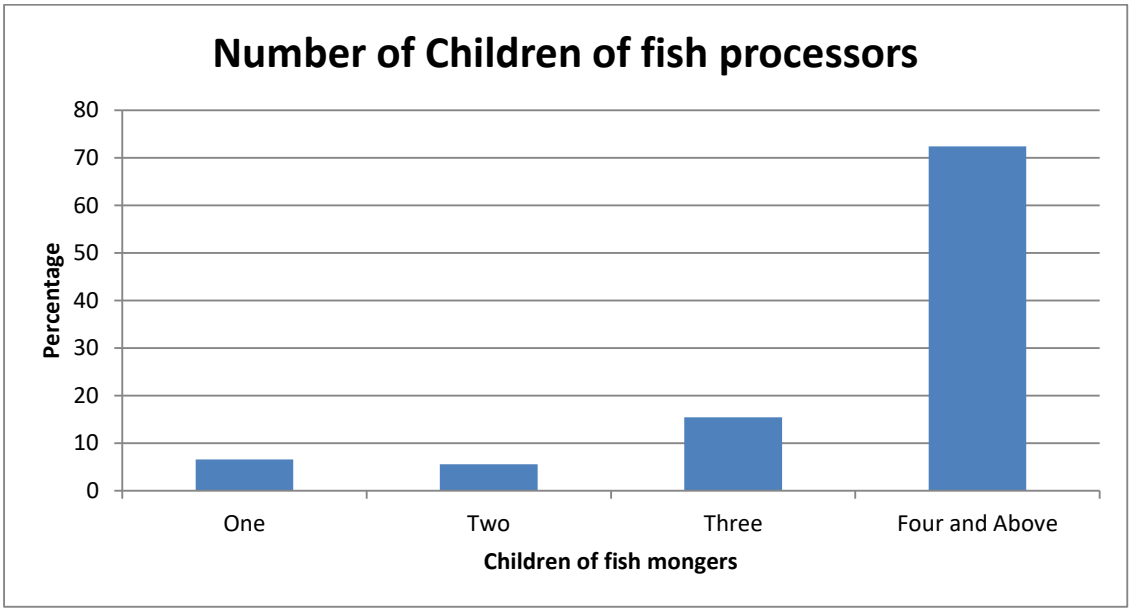


6.3.12 Number of children

Table 11 shows that between 68.2% and 76.7% of the women processors and traders had four or more children across the regions.

Table 11. Number of children of fish processors and traders

	PERCENTAGE				
Number of children	Greater Accra	Volta region	Central region	Western region	Average
One	5	9	3	9	7
Two	5	5	7	6	6
Three	15	18	13	15	15
Four and Above	75	68	76	70	72
Total	100	100	100	100	100



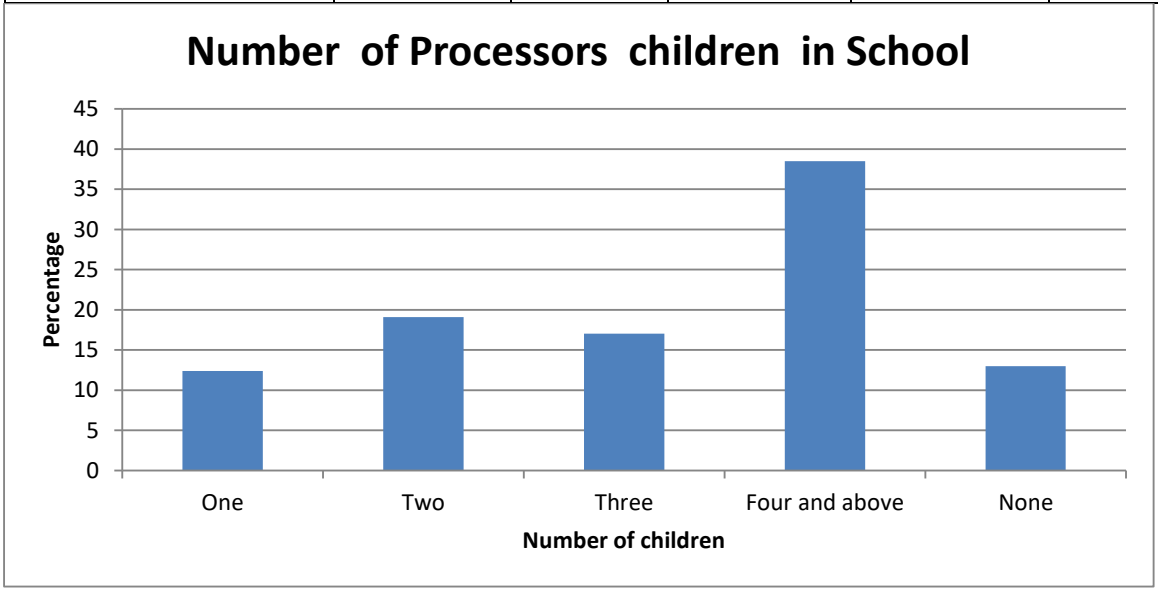
6.3.13 Number of children in school

When asked to indicate the number of their children in school, it was realised thst over 365 of the women had up to 4 children in school. 13 % did not have any of their children in school with the highest from the Volta region, followed by the Greater-Accra and Western regions.

Table 12. Number of children in school

PERCENTAGE					
Number of children in school	Greater Accra	Volta region	Central region	Western region	Average
One	15	18	13	3	12
Two	30	18	10	18	19
Three	5	18	27	18	17

Four and above	35	27	43	47	36
None	15	18	7	12	13
Total	100	100	100	100	100



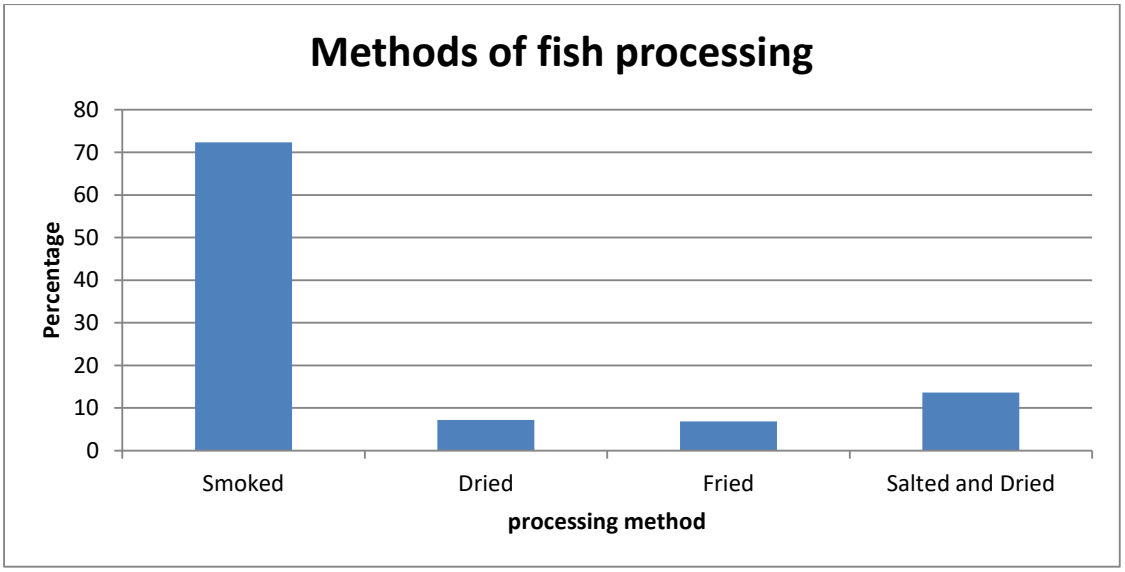
6.3.14 Fish processing methods

The main method of processing fish in Ghana is smoking (Kegan, 2001). As presented in table 24, it is confirmed that most of the fishmongers smoke their fish before selling. 87.9% and 83.3% of processors from the Western and Central regions respectively smoked their fish. In the Volta Region 68.1% and in the Greater Accra Region 60% of processors of smoked fish. 10% or less of processors across the regions dried or fried fish. In the Greater Accra 30% of processors and in the Volta region 18.2% of processors salted and dried fish. In the Central and the Western regions 3.4% or less of processors salted and dried fish

Table 13. Processing methods

	PERCENTAGE				
Processing methods	Greater Accra	Volta region	Central region	Western region	Average
Smoked	60	68	83	78	72
Dried	5	5	10	9	7
Fried	5	9	3	10	7

Salted and Dried	30	18	3	3	14
Total	100	100	100	100	100



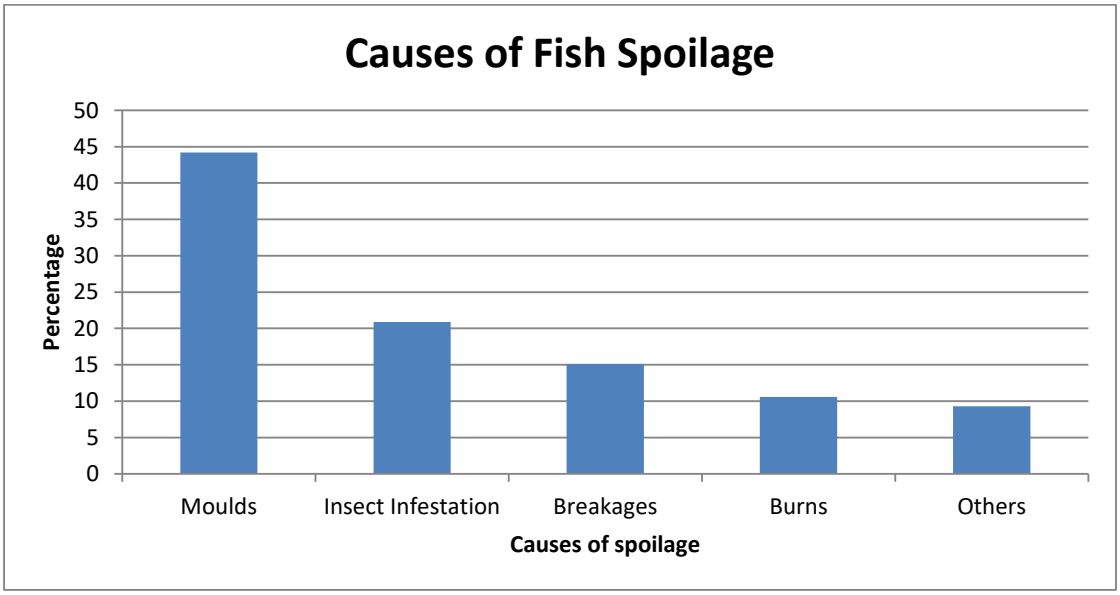
6.3.15 Causes of fish spoilage

Majority of the fish processors interviewed in the various regions acknowledged that they experience fish spoilage at times. Such situations are a source of income loss to them. Table 25 shows that33.8% to 54.6% of fish processors reported of fish spoilage through moulds. 39% of processors in the Volta Region indicated that insect infestation reduce fish quality. In the Central Region 36.6% of processors claimed that fish is lost or reduce quality as a result of breakages in transit. In the Greater Accra Region 25% of processors said that fish is lost through other means such as improper storage facilities, poor ventilation and high humidity resulted in fish spoilage. In the rest of the regions 9.1% or less of processors lost fish through aforementioned means.

Table 14. Causes of fish spoilage

	PERCENTAGE				
Causes of fish spoilage	Greater Accra	Volta region	Central region	Western region	Average

Moulds	45	34	43	55	44
Insect Infestation	10	39	13	21	21
Breakages	10	5	37	9	15
Burns	10	14	7	12	11
Others	25	9	0	3	9
Total	100	100	100	100	100

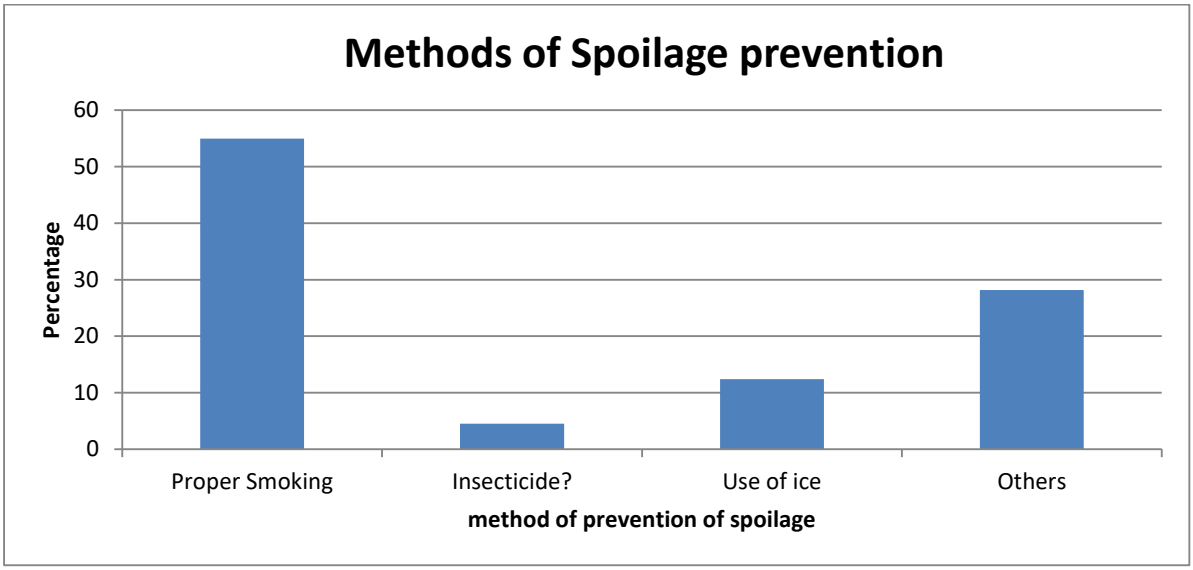


6.3.15 Prevention of fish spoilage

Table 15 indicates how fish processors prevent or reduce spoilage. Between 50% and 60.6% of respondents claimed that with very good smoking practices to prevent or reduce fish spoilage in smoked fish. In the Greeter Accra, Volta and Central regions between 12.5% 17.3% of processors use ice to prevent of spoilage in fresh fish. However only 3% of processors in the Western Region preserve fish with ice. Between 3.3% and 6.1% of processors claimed they use insecticides to prolong the shelf life of processed fish. Between 25% and 30% of fish processors use other means to prevent fish spoilage. Some of these other methods are neem tree *Azadirachta indica* extracts, powder pepper, alum (Aluminium sulphate) etc.

Table 15. Prevention of fish spoilage

	PERCENTAGE				
Prevention of fish spoilage	Greater Accra	Volta region	Central region	Western region	Average
Proper Smoking	58	52	50	60	55
Insecticide	5	3.6	3	6	6
Use of ice	13	17	2	3	12
Others	25	27	30	30	28
Total	100	100	100	100	100

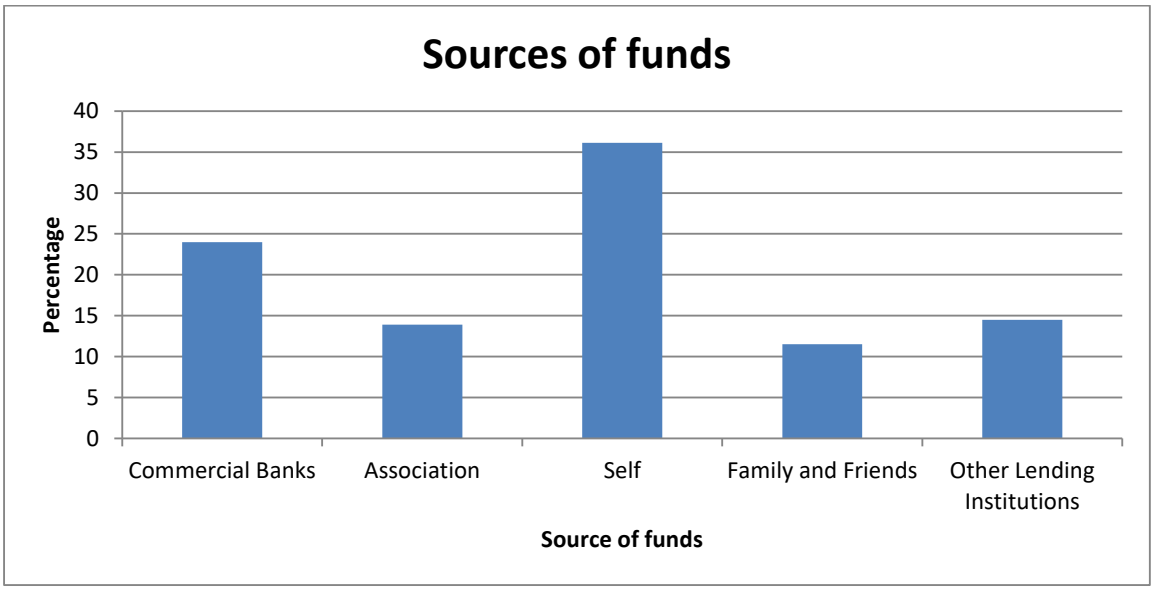


6.3.16 Source funds

Table 16 summarizes sources of funding of fish processors and traders.22.7% and 48.5% of respondents indicated that they self-sponsored their business. In the Greater Accra and Western Region, 40% and 21.2% respectively borrow money from the commercial banks to support their business. In the Volta Region 18.2% of processors borrow from the banks whilst 16.6% from the Central Region took credit from the banks for their business activities. In the Volta region 31.8% of processors are supported by association they belong to whereas in the Greater Accra, Central and Western regions 5%, 6.7% and 12% respectively had credits from associations for their business. Processor also borrow from other institutions. In the Central and Volta regions, 26.7% and 18.2% respectively borrow from other lending institutions. In the Greater Accra and Western region between 3% and 10% respectively procure credit from other institutions.

Table 16. Sources of funds

	PERCENTAGE				
Source of funds	Greater Accra	Volta region	Central region	Western region	Average
Commercial Banks	40	18	17	21	24
Association	5	32	7	12	14
Self –financed	30	23	43	49	36
Family and Friends	15	9	7	15	12
Other Lending Institutions	10	18	27	3	14
Total	100	100	100	100	100



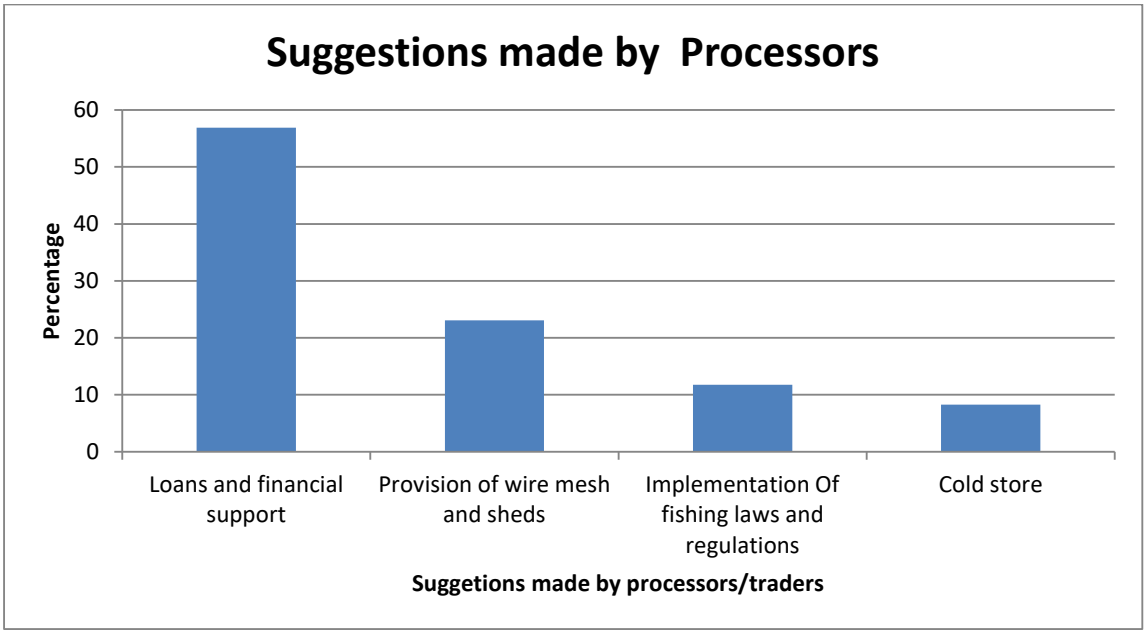
6.3.17 Concerns of fish processors and traders

Majority of the fish processor and traders across the regions wanted loans and financial assistance from Government to improve their business as shown in table 17. Between 40% and 69.3% of processors across the regions wanted loans and financial support from Government. 31.8%, 25% and 23.3% of processor from Volta, Greater Accra and Central regions respectively wanted Government to provide them with wire mesh and sheds to enhance their processing

activities. However, only 12.1% of processors in the Western Region wanted this support. With regards to the implementation of the fisheries laws, 30% of processors wanted these laws to be rigidly implemented. Whilst 9.1% and less of processors from the other regions, showed concerns in implementation of the fisheries laws. 5% to 10% of processors across the regions wanted provision of cold stores by Government.

Table 17. Suggestions of fish processors

	PERCENTAGE				
Suggestions of fish processors	Greater Accra	Volta region	Central region	Western region	Average
Loans and financial support	40	55	63	70	57
Provision of wire mesh and sheds	25	32	23	12	23
Implementation Of fishing laws and regulations	30	5	3	9	12
Cold store	5	9	10	9	8
Total	100	100	100	100	100



7.0 CONCLUSION AND RECOMMENDATIONS

Overall, the results of the survey indicate that the number of canoes decreased by 9.0 % from the previous survey in 2013. Over 78.8 % of canoes were motorized about 7.7 % up from the 2013 survey. Number of fishermen in the sector has decreased by 31,637 people from 139,155 in 2013 to 107,518 in 2016. Decrease in the number of gears was in mainly the Ali (43.8%) and Drift Gill Nets (14.3%) and Set Nets (9.0%). Pursing Nets and Line increased by 8.5% and 17.7% respectively. Four fishing villages were lost in the period between the current and the last survey in 2013.

Given the changes observed in the numbers of canoes, gears, motors and fishermen, and also of the socio-economic status of the fisher folks over period during the survey, it is necessary to monitor the effect these changes have on the status of the artisanal marine sector by updating the canoe frame surveys periodically.

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We also thank all the retired technical officers who even out of retirement came to train the young and upcoming officers and also for their assistance.

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Appendices

Tables 4.1 – 4.8

Figures 1- 16

Questionaires Form A and Form B

TABLES AND FIGURES

Table 1.1(a -z): Results of 2016 Canoe Frame Survey showing number of Fishing units by Gear for all Districts

TABLES 4.1(a) FISHING UNIT BY GEAR - KETU SOUTH MUNICIPAL ASSEMBLY (VOLTA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
AFLAO	ABELIAKOPE		5	40	0				45	26	130
AFLAO	AKLIGOKOPE	1	4		0				5	5	55
AVOEME	ATORKUKOPE	1	6		0				7	7	75
VIEPE	VIEPE	1	11		2				14	13	194
DENU	DENU	14	4		4				22	22	418
HEDZRANAWO	HEDZRANAWO	30	9		0				39	37	670
ADAFIENU	DZEGAKOPE	4	6		0				10	7	190
ADAFIENU	DAVORKOPE	1	3		0				4	3	70
AGORKO	DAVIDKOPE	3	7		1				11	10	182
AGORKO	AGORKO	4	13		1				18	18	297
ADINA	ADINA	51	16		16	14			97	91	1493
AMUTINU	AMUTINU	5	21		1				27	19	344
SALAKOPE	SALAKOPE	3			1	2			6	5	47
AGAVEDZI	AGAVEDZI	24	14		6	10			54	36	744
BLEKUSU	BLEKUSU	5	31		0				36	20	388
	TOTAL	**147**	**150**	**40**	**32**	**26**	**0**	**0**	**395**	**319**	**5297**

TABLES 4.1(b) FISHING UNIT BY GEAR - KETA MUNICIPAL ASSEMBLY (VOLTA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
KEDZI	AGORTA	2	15	2	16				35	34	523
KEDZI	HORVI		12		4				16	4	424
VODZA	VODZA	15	11	21	0				47	17	800
ADZIDO	ADZIDO	8	8	6	11		1		34	2	329
KEDZIKOPE	KEDZIKOPE	1	17	8	1				27	11	442
ABUTIAKOPE	ABUTIAKOPE	2	26	1	104		8		141	25	689
DZELUKPE	DZELUKOPE	1	36		30				67	19	572
VUI	NUKPESEKOPE		6		2				8	3	132
VUI	TETEVIKOPE		16		8				24	9	400
TEGBI	HEKPA		20		0				20	9	25
TEGBI	ADZIAKPOR		6		0				6	6	120
TEGBI	DEKPEKOPE		4		0				4	2	80
TEGBI	AMERIKOPE		4		0				4	2	115
TEGBI	KLAMATSI		4		0				4	2	100
TEGBI	HELOGLOKOPE		2		0				2	1	44
TEGBI	WORGANA		4		1				5	2	85
TEGBI	ASHIATA		3		1				4	1	80
WOE	LIGHTHOUSE		11		0				11	8	224
WOE	DEKPEKOPE		3		0				3	3	105
WOE	AKLUBORORDZI		4		18				22	17	211
ANLOGA	ATIEFE		18		0				18	18	500
ANLOGA	CAPE COAST		8		0				8	8	500
SROGBE	WHUTI		10		0				10	3	250
WHUTI	WHUTI		10		0				10	3	250
SROGBE	SROGBE		4		3				7	6	130
ATORKOR	ATORKOR		5		5				10	6	130
ATORKOR	DAKORDZI		8		0				8	2	200
ATORKOR	AKPLOWOTORKOR		11		0				11		198
DZITA	DZITA		17		0				17		425
DZITA	AGBLEDOME		27		0				27	2	756
ATITETI	ATITETI		8		12				20	20	220
ATITETI	FUVEME		5		20	1			26	25	343
	TOTAL	**29**	**343**	**38**	**236**	**1**	**9**	**0**	**656**	**270**	**9402**

TABLE 4.1(c) FISHING UNIT BY GEAR - ADA EAST DISTRICT (GREATER ACCRA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
AZIZANYA	MATAHEKO	34	1		2		5		42	41	808
AZIZANYA	ADJIVONPANYA	8	2		0		1		11	11	225
KEWUNOR	KEWUNOR	5	6		0				11	7	360
LOLONYAKOPE	LOLONYAKOPE	3	3		1				7	5	170
OTROKPE	KPONKPO	7			0		2		9	9	128
OTROKPE	MANKPETI	7	1		1				9	8	153
OTROKPE	DOEMEKOPE	3	4		0				7	7	188
OCANSEYKOPE	OCANSEYKOPE		6		0				6	5	240
ANYAKPOR	ANYAKPOR	21	3		8				32	30	240
SONGNTSOKPA	SONGNTSOKPA	2			0				2	2	30
PATUKOPE	PATUKOPE	3	1		0				4	4	80
ELAVANYO	ELAVANYO	3	10		0				13	13	410
PUTE	PUTE	9	4		0				13	12	320
TOTOPE	TOTOPE	8	1		6				15	13	209
	TOTAL	**113**	**42**	**0**	**18**	**0**	**8**	**0**	**181**	**167**	**3561**

TABLE 4.1(d) FISHING UNIT BY GEAR - ADA WEST DISTRICT (GREATER ACCRA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
KABLEVU	KABLEVU	1	6		0				7	7	162
KABLEVU	KPOTITSEKOPE		4		0				4	4	160
LOLONYA	LOLONYA	5	3		9				17	17	276
GOI	GOI	9	5		11		1		26	23	406
ANYAMAM	ANYAMAM	35	5	2	4		2		48	48	859
AKPLABANYA	AKPLABANYA	109			1				110	109	1422
WEKUMAGBE	WEKUMAGBE	16	5		0				21	20	390
	TOTAL	**175**	**28**	**2**	**25**	**0**	**3**	**0**	**233**	**228**	**3675**

TABLE 4.1(e) FISHING UNIT BY GEAR - NINGO-PRAMPRAM DISTRICT (GREATER ACCRA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
LEKPONGUNOR	ZONGO/ANASI	30			2				32	32	610
LEKPONGUNOR	NMETSOKOPE	8	4	4	6			1	23	17	190
LEWEM	LEWEM	15		14	16				45	36	358
KPONGUNOR	KPONGUNOR		7	7	0				14	1	84
AYETEPAH	AYETEPAH		1		5				6	3	37
MANGOTOSNYA	MANGOTSOPANYA				4				4	3	16
AHWIAM	AHWIAM	32		52	5		35		124	124	894
OLD NINGO	OLD NINGO	15		14	16				45	36	358
NEW NINGO	TOZAH	30		34	0				64	64	898
ABIA	ABIA			11	1			8	20		54
KPONKPO	KPONKPO	12			2				14	14	162
U/PRAMPRAM	FUKUDORNYA	5		24	0				29	29	264
L/PRAMPRAM	LIGHTHOUSE	109		19	7				135	120	1514
	TOTAL	**256**	**12**	**179**	**64**	**0**	**35**	**9**	**555**	**479**	**5439**

TABLE 4.1(f) FISHING UNIT BY GEAR - KPONE-KATAMANSO DISTRICT (GREATER ACCRA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
KPONE	LAA LOI NAA	7		6	8		8	1	30	25	202
KPONE	ODUNYAONMA	4		40	24		7	7	82	66	341
KPONE	SEGA	4		77	5		10	38	134	65	470
	TOTAL	**15**	**0**	**123**	**37**	**0**	**25**	**46**	**246**	**156**	**1013**

TABLE 1.1(g) FISHING UNIT BY GEAR - TEMA METROPOLITAN ASSEMBLY (GREATER ACCRA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
TEMA	ASHAMANG	64		41	29	11	71	2	218	198	1186
TEMA	AWUDUN	295		26	6	4		7	338	316	3981
SAKUMONO	SAKUMONO		5	7	6				18	17	173
	TOTAL	**359**	**5**	**74**	**41**	**15**	**71**	**9**	**574**	**531**	**5340**

TABLE 4.1(h) FISHING UNIT BY GEAR - LEDZOKUKU-KROWOR MUNICIPAL ASSEMBLY (GREATER ACCRA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
NUNGUA	TSIENAA	22		1	26	9			58	51	529
TESHIE	SANGONAA	65	1		6				72	111	1044
	TOTAL	**87**	**1**	**1**	**32**	**9**	**0**	**0**	**130**	**162**	**1573**

TABLE 4.1(i) FISHING UNIT BY GEAR - LA - DADE KOTOPON MUNICIPAL ASSEMBLY (GREATER ACCRA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
LA	PLEASURE BEACH		4		0				4		26
LA	ABESE		3	2	10				15	6	56
	TOTAL		**7**	**2**	**10**				**19**	**6**	**82**

TABLE 4.1(j) FISHING UNIT BY GEAR - ACCRA METROPOLITAN ASSEMBLY (GREATER ACCRA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
OSU	ALATA			35	1				36	29	177
ACCRA	GA MASHIE	116		32	97		34		279	208	1515
ACCRA	KORLEY NAA	31	6		0				37	32	334
ACCRA	MENSAH GUINEA		4		0				4		32
CHORKOR	WOLEI AMLI	35	3		0	1			39	36	302
CHORKOR	MANTSURU	14			0				14	14	126
CHORKOR	LANTEMAN	10			0				10	10	100
CHORKOR	CHEMU NAA	22			0				22	22	220
GBEGBEYISEE	GBEGBEYISEE	10	6		13				29	19	175
	TOTAL	**238**	**19**	**67**	**111**	**1**	**34**	**0**	**470**	**370**	**2981**

TABLE 4.1(k) FISHING UNIT BY GEAR - GA SOUTH MUNICIPAL ASSEMBLY (GREATER ACCRA REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
BORTIANOR	TSOKOME	6	2		0				8	6	156
BORTIANOR	BORTIANOR	52	7	62	0	1			122	57	1240
OSHIE	OSHIE	3	2		30				35	28	181
KOKROBITE	KOKROBITE	10	2		31				43	34	314
LANMA	LANMA	1	8		1				10	3	79
FAANAA	FAANAA		7		0				7	7	210
	TOTAL	**72**	**28**	**62**	**62**	**1**	**0**	**0**	**225**	**135**	**2180**

TABLE 4.1(l) FISHING UNIT BY GEAR - AWUTU SENYA DISTRICT (CENTRAL REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
SENYA BERAKU	MBANYINMPOANO	52	13	77	26	2			170	136	1952
	TOTAL	**52**	**13**	**77**	**26**	**2**	**0**	**0**	**170**	**136**	**1952**

TABLE 4.1(m) FISHING UNIT BY GEAR - EFFUTU MUNICIPAL ASSEMBLY (CENTRAL REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
WINNEBA	AYIPEY	68		41	104	27			240	240	2205
WINNEBA	ABOADZE	26		20	33	1			80	80	678
WINNEBA	PENKYI	22		7	56	3			88	88	755
WINNEBA	AKOSUA VILLAGE		19		0				19	15	380
WINNEBA	WARABEBA		9		0				9	9	252
	TOTAL	**116**	**28**	**68**	**193**	**31**	**0**	**0**	**436**	**432**	**4270**

TABLE 4.1(n) FISHING UNIT BY GEAR - GOMOA EAST DISTRICT (CENTRAL REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
NYANYANO	NYANYANO	105		7	48	25	5		190	189	1920
FETTEH	MBANYINMPOANO	1	2		71	26			100	86	476
FETTEH	MBAA MPOANO		1	5	22	4			32	16	167
FETTEH	AKYIRESUADZE				15	2			17	14	59
DAMPAASE	DAMPAASE	1	4		0				5	1	105
	TOTAL	**107**	**7**	**12**	**156**	**57**	**5**	**0**	**344**	**306**	**2727**

TABLE 4.1(o) FISHING UNIT BY GEAR - GOMOA WEST DISTRICT (CENTRAL REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
ABREKUM	ABREKUM	1	6		48				55	5	164
APAM	APAM MAIN	38		21	18	3	12		92	73	741
APAM	ALATA	30		47	4	2	15	1	99	79	694
APAM	ABURA			2	0				2	1	2
MUMFORD	AYESEWANO		20		2				22	3	240
MUMFORD	AKYENFOMPOANO	1		71	10				82	14	246
MUMFORD	MUMFORD MAIN			29	1				30	1	91
DAGO	AKOBERIAM	3		6	21	18		1	49	36	299
DAGO	DAGO MAIN	5		2	20	53		1	81	63	1399

MANKOADZE	MANKOADZE	8		1	37			2	48	23	186
	TOTAL	**86**	**26**	**179**	**161**	**76**	**27**	**5**	**560**	**298**	**4062**

TABLE 4.1(p) FISHING UNIT BY GEAR - EKUMFI DISTIRCT (CENTRAL REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
OTUAM	ASESEM	3			18	3			24	19	150
OTUAM	OBOM/ETUEI				23				23	19	92
OTUAM	KROWEKTIR		7		0				7	4	189
OTUAM	NTETREMU	1	5		7	3			16	16	162
KOTANKORE	KOTANKORE		10		0				10	6	270
SRAFA	SRAFA MPOANO		4		0				4	4	148
SRAFA	ABO ANO		1		1				2	2	34
	TOTAL	**4**	**27**	**0**	**49**	**6**	**0**	**0**	**86**	**70**	**1045**

TABLE 4.1(q) FISHING UNIT BY GEAR - MFANTSIMAN MUNICIPAL ASSEMBLY (CENTRAL REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
IMMUNA	IMMUNA		3		8				11	11	128
AKRA	AKRA MPOANO		7		12	1			20	18	312
EKUMPOANO	EKUMPOANO	4	5		8				17	8	245
NARKWA	BRUMASSE	16			2	9			27	27	434
NARKWA	ESIKADO	12			1	1			14	15	274
NARKWA	ADUKROM				18				18	16	72
EDUMAFA	ADOEGYIR				8				8	1	32
EDUMAFA	SOMA		2		19				21	6	120
EDUMAFA	SAMENANA				20				20	3	60
ASAAFA	OHIABA		2		13				15	3	109
ASAAFA	OBROMUA		5		23	3			31	5	188
AMISSANO	AMISSANO				1				1	1	3
HINYI	HINIYI	11			6			11	28	12	288
KUNTU	PEBI		4		0				4	4	84
ANKAFUL	HASOWODZE	1		3	22				26	3	117
ANKAFUL	ASSIM	35		3	9	1			48	38	833
ANKAFUL	NANKESIDO-ANWONA	3		2	0	2			7	5	109
ANKAFUL	ABOANYIM	27	2	9	26				64	37	739
NANKESEDO	NANKESEDO	16			0	1			17	17	324
SALTPOND	SALTPOND		4		0				4	4	84
KROMANTSE 1	KROMANTSE 1	10			2				12	12	258
KROMANTSE 1	YARD	11			0				11	11	242
KROMANTSE 1	ABRESIRENNU	5			0				5	5	110
KROMANTSE 1	EKURABADZE	7			0				7	7	175
KROMANTSE 2	HASOWODZE	7	4		0				11	11	226
ABANDZE	ABANDZE	37		2	114	8			161	161	586
EGYA	EGYA NO. 1 BEACH				44	1	1	1	47	44	150
EGYA	EGYA NO. 2 BEACH			1	21	2			24	29	82
EGYA	EGYA NO. 3 BEACH				14			1	15	4	43
ANOMABO	KROM MPOANO	7			39	7			53	48	352
ANOMABO	ATSIWA	3			37	5			45	47	211
ANOMABO	ABAN EKYIR	6			37	5			48	4	278
ANOMABO	AFARI KUMAWU	2			24	2			28	21	122
ANOMABO	AHWEANO	25			20	1			46	47	559

ANOMABO	BAKA ANO	25	7		9				41	41	611
BIRIWA	SAMAN BREANYIM				7				7	0	14
BIRIWA	ABREANYIM	22			60	4		2	88	58	642
BIRIWA	ABAKA EKYIR	36			55	1			92	92	836
	TOTAL	**328**	**45**	**20**	**679**	**54**	**1**	**15**	**1142**	**876**	**10052**

TABLE 4.1(r) FISHING UNIT BY GEAR - CAPE COAST METROPOLITAN ASSEMBLY (CENTRAL REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
EKON	MPOANOKESEM/BOEMIS			2	26				28	12	82
EKON	ANAFO/AKUBUREM				11	4			15	12	120
EKON	AHWIADO		2		1	1			4	2	27
CAPE COAST	ASEKAM	2		3	30	1			36	34	144
CAPE COAST	ABROFO MPOANO	4		4	15	48			71	67	284
CAPE COAST	VICTORIA PARK		8		0	1			9	9	144
CAPE COAST	BAKA ANO	2	6		0				8	8	122
CAPE COAST	OLA		16		0				16	16	256
CAPE COAST	DUAKOR		16		0				16	16	272
	TOTAL	**8**	**48**	**9**	**83**	**55**	**0**	**0**	**203**	**176**	**1451**

TABLE 4.1(s) FISHING UNIT BY GEAR - ABURA-ASEBU-KWAMANKESE DISTRICT (CENTRAL REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
MOREE	ASEKYEREBEDZI		12		1				13	13	187
MOREE	APESA MPOANO	1			4	7			12	12	155
MOREE	ENFA ANO	1			7	65			73	73	846
MOREE	BENTSIN	2			1	26			29	29	366
MOREE	NKUM ABROFO	1			0	45			46	46	563
MOREE	COTONOU				1	16			17	17	200
MOREE	ETUEI	3			4	76			83	83	997
MOREE	ABOKUM ANO				2	39			41	41	490
	TOTAL	**8**	**12**	**0**	**20**	**274**	**0**	**0**	**314**	**314**	**3804**

TABLE 4.1(t) FISHING UNIT BY GEAR - KOMENDA-EDINA-EGUAFO-ABREM DISTRICT (CENTRAL REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
ELMINA	ASAMANPOWMU	16	1	13	30				60	56	494
ELMINA	ELMINA MAIN	81		9	13	3			106	101	1512
ANKWANDA	ANKWANDA MPON				29	3		2	34	3	116
BREMU AKYINMU	DOGOFOMU				19	1			20	18	65
BREMU AKYINMU	MOWUREFOM		1		44	3		1	49	35	115
BREMU AKYINMU	BROFO MPOANO		1		19			1	21	15	73
AMPENYIN	ANAFO				30	3			33	3	114
AMPENYIN	ABAKAM				15				15	0	30
AMPENYIN	BENTSIR				14				14	0	42
AMPENYIN	BEREKESEMU				16	1			17	0	56
ABROBEANO	ABROBEANO				35				35	14	105
KAFODZIDZI	KAFODZIDZI				58	11			69	22	350
BRI. KOMENDA	BRI. KOMENDA	42			31	4			77	71	760
DUT. KOMENDA	DUT. KOMENDA	5			43	2			50	48	178
	TOTAL	**144**	**3**	**22**	**396**	**31**	**0**	**4**	**600**	**386**	**4010**

TABLE 4.1(u) FISHING UNIT BY GEAR - SHAMA DISTRICT (WESTERN REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
SHAMA	AWUNAKROM		32		0				32	0	320
SHAMA	APO	7			45	8	135		195	191	948
SHAMA	BENTSIR			2	20	6	135		163	155	769
SHAMA	AMENA-ANO	13		1	14	1	13		42	39	295
ABUESI	ABUESI	66			19	12			97	97	1041
ABUESI	SAMAN-ADZE	40			5	3			48	48	590
ABUESI	COMPOUND	18		1	4	2			25	24	275
ABUESI	KESEWOKAN	49			12	12			73	72	782
ABOADZE	BRONYI-BOMA	87			93	99			279	279	1992
ABOADZE	EKROABEM	27			46	59			132	132	698
	TOTAL	**307**	**32**	**4**	**258**	**202**	**283**	**0**	**1086**	**1037**	**7710**

TABLE 4.1(v) FISHING UNIT BY GEAR - SEKONDI-TAKORADI METROPLITAN ASSEMBLY (WESTERN REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
NGYIRESIA	NGYIRESIA	13			133	26			172	161	776
SEKONDI	SEKONDI	138		134	0		5		277	277	3038
ESSAMAN	EGYINAMBOA BAKAM		2		1				3	2	27
NKONTOMPO	NKONTOMPO	1			32	1			34	31	119
POASE	POASE				53				53	50	159
NEW TAKORADI	NEW TAKORADI	3			120	2			125	125	423
	TOTAL	**155**	**2**	**134**	**339**	**29**	**5**	**0**	**664**	**646**	**4542**

TABLE 4.1(w) FISHING UNIT BY GEAR - AHANTA WEST DISTRICT (WESTERN REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
NEW AMANFUL	AMANFU-KUMAN		2		20	3			25	20	98
FUNKO	BENTIN BEACH	33			78	4			115	96	712
ADJOA	UPPER BEACH		4		22	23	9		58	44	292
ENYIMA EHU	ENYIMA EHU				13	6			19	10	63
PUNPUNI	PUNPUNI BEACH				27				27	3	84
AMPATANO	AMPATANO		1		59				60	14	182
ASEMKOW	ASEMKOW	2	1		48				51	19	251
BUTRE	BUTRE ETROM	20	1	1	37	15	3		77	70	585
BUSUA	BUSUA BEACH	2	1		34		14		51	44	239
UPPER DIXCOVE	UPPER DIXCOVE			3	1		82		86	85	179
LOWER DIXCOVE	LOWER DIXCOVE	3			4	1	112		120	110	712
DIXCOVE	TUROM				0		38		38	38	190
ACHOWA	ACHOWA				0			22	22	1	22
AKWADAE	AKWADAE	45	1	15	18		4	11	94	82	527
KETAKOR	KETAKOR			15	0				15	6	60
CAPE-3-POINTS	ATENKYEN	4		30	3	16	1	30	84	54	176
AKITAKYI	AKITAYI MPOANO	25	9	15	10				59	31	743
PRINCESS TOWN	PRINCESS TOWN	1	6	12	6				25	8	186
MIEMIA	MIEMIA	39		4	19		1		63	59	710
AGYAMBRA	ELAZULEYNU			17	1				18	0	20
	TOTAL	**174**	**26**	**112**	**400**	**68**	**264**	**63**	**1107**	**794**	**6031**

TABLE 4.1(x) FISHING UNIT BY GEAR - NZEMA EAST DISTRICT (WESTERN REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
EGHAN	EGHAN			70	11	1			82	7	133
DOMULI	AKONU			8	0				8	1	8
DOMULI	DOMULI/TAHELAH		2	11	2				15	0	45
LOWER AXIM	NKAKEMU	76			24	3	3		106	106	1472
LOWER AXIM	SIKA SANTEWASE	10			15				25	25	255
LOWER AXIM	SIKA ABWIADO	27			21				48	35	561
LOWER AXIM	ANTOAPEWUSIKA	8			26	5	1		40	40	348
LOWER AXIM	FANTI-LINE	22			10	9	45	11	97	84	853
LOWER AXIM	BOAT-ASE	12			20	2	16		50	30	404
LOWER AXIM	SUKPOM	4		27	3				34	6	130
UPPER AXIM	SOWLO	9	2	3	35	2		22	73	51	391
UPPER AXIM	ANTO BREWERE	8	1		57		1	4	71	66	485
UPPER AXIM	AKYINIM		8		0				8	1	320
	TOTAL	**176**	**13**	**119**	**224**	**22**	**66**	**37**	**657**	**452**	**5405**

TABLE 4.1(y) FISHING UNIT BY GEAR - ELLEMBELLE DISTRICT (WESTERN REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
ANKOBRA	ANKOBRA		7		0				7	0	347
ASANTA	ASANTA		12		0				12	0	420
KIKAM	KIKAM		4		0			4	8	0	148
ESSIAMA	ESSIAMA		15		11				26	12	546
AMPAIN	AMPAIN		3		0				3	0	111
BAKANTA	BAKANTA		7		0				7	0	287
SANZULE	SANZULE	1	8		2				11	3	334
KRISTIAN	KRISTIAN		3		12				15	6	171
EIKWE	EIKWE		3		0				3	0	120
NGALEKPOLE	NGALEKPOLE		3		0				3	0	120
NGALEKYI	NGALEKYI		4		0				4	0	180
BAKU	BAKU		3		11				14	1	156
ANOKYI	ANOKYI		6		0				6	0	150
ATUABO	ATUABO		6		0				6	1	210
	TOTAL	**1**	**84**	**0**	**36**	**0**	**0**	**4**	**125**	**23**	**3300**

TABLE 4.1(z) FISHING UNIT BY GEAR - JOMORO DISTRICT (WESTERN REGION)

FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
AKABAKU	AKABAKU		2		0				2	0	20
BENYIN	BENYIN		3		4				7	4	50
ELLOYIN	ELLOYIN		10		0				10	0	100
KANGEN	KANGEN		9		0				9	2	100
TWENE	TWENE		2		0				2	0	20
AGYEZA	AGYEZA	2	5		12				19	14	140
EZINLEBO	EZINLEBO	1	6		1	5			13	13	120
BONYERE	BONYERE		4		0	3			7	0	58
EGBAZO	EGBAZO		4		0				4	0	40
NEW AHOBRE	AHOBRE KAKRABA	4	2		7	7			20	14	145
OLD AHOBRE	AHOBRE KESE	30			2				32	32	640
OLD EDOBO	OLD EDOBO		2		0				2	2	60
NEW EDOBO	NEW EDOBO		2		0				2	2	40
ANTWEBANSO	ANTWEBANSO		3		0				3	2	120
EKPU	EKPU	32	2		2	15			51	51	765
HALF ASSINI	FANTI-LINE	47			0				47	47	1222
HALF ASSINI	EWE-LINE		8		0				8	8	80
METIKA	METIKA	7			0	3			10	10	102
ANOMATUAPE-EWE	ANOMATUAPE-EWE		5		0				5	0	50
ANOMATUAPE-FANTI	ANOMATUAPE-FANTI	11			2	15			28	28	577
BUAKWA	BUAKWA		7		0				7	7	105
MPAASEM	MPAASEM	2	3		0	2			7	7	68
NZIMITIAN	NZIMITIAN		4		0				4	4	56
MANGYEA	MANGYEA	24			0	10			34	34	738
EFFASU	EFFASU	22			3	7			32	32	569
NEW TOWN	NEW TOWN	7			8	25			40	40	629
	TOTAL	**189**	**83**	**0**	**41**	**92**	**0**	**0**	**405**	**353**	**6614**

Table 4.2: Districts and Regions Summaries of 2016 Canoe Frame Survey

DISTRICT	FISHING VILLAGE	LANDING BEACH	PURSING NETS	BEACH SEINE	LINE	SET NETS	ALI NET	DRIFTING NET	ONE MAN CANOE	CANOES	TOTAL MOTORS	FISHERMEN
KETU SOUTH	12	15	147	150	40	32	26	0	0	395	319	5297
KETA	16	32	29	343	38	236	1	9	0	656	270	9402
SUB-TOTAL V/R	**28**	**47**	**176**	**493**	**78**	**268**	**27**	**9**	**0**	**1051**	**589**	**14699**
ADA EAST	11	14	113	42	0	18	0	8	0	181	167	3561
ADA WEST	6	7	175	28	2	25	0	3	0	233	228	3675
NINGO PRAMPRAM	12	13	256	12	179	64	0	35	9	555	479	5439
KPONE KATAMANSO	1	3	15	0	123	37	0	25	46	246	156	1013
TMA	2	3	359	5	74	41	15	71	9	574	531	5340
LEDZOKUKU-KROWOR	2	2	87	1	1	32	9	0	0	130	162	1573
LA DADEKOTOPON	1	2		7	2	10				19	6	82
AMA	4	9	238	19	67	111	1	34	0	470	370	2981
GA SOUTH	5	6	72	28	62	62	1	0	0	225	135	2180
SUB-TOTAL G/R	**44**	**59**	**1315**	**142**	**510**	**400**	**26**	**176**	**64**	**2633**	**2234**	**25844**
AWUTA SENYA	1	1	52	13	77	26	2	0	0	170	136	1952
EFUTU MUNICIPAL	1	5	116	28	68	193	31	0	0	436	432	4270
GOMOA EAST	3	5	107	7	12	156	57	5	0	344	306	2727
GOMOA WEST	5	10	86	26	179	161	76	27	5	560	298	4062
EKUMFI	3	7	4	27	0	49	6	0	0	86	70	1045
MFANTSEMAN	18	38	328	45	20	679	54	1	15	1142	876	10052
CAPE COAST	2	9	8	48	9	83	55	0	0	203	176	1451
ABURA-ASEBU-KWAMANKESE	1	8	8	12	0	20	274	0	0	314	314	3804
KOMENDA-EDINA-EGUAFO-ABREM	8	14	144	3	22	396	31	0	4	600	386	4010
SUB-TOTAL C/R	**42**	**97**	**853**	**209**	**387**	**1763**	**586**	**33**	**24**	**3855**	**2994**	**33373**
SHAMA	3	10	307	32	4	258	202	283	0	1086	1037	7710
SEKONDI-TAKORADI	6	6	155	2	134	339	29	5	0	664	646	4542
AHANTA WEST	20	20	174	26	112	400	68	264	63	1107	794	6031
NZEMA EAST	4	13	176	13	119	224	22	66	37	657	452	5405
ELLEMBELLE	14	14	1	84	0	36	0	0	4	125	23	3300
JOMORO	25	26	189	83	0	41	92	0	0	405	353	6614
SUB-TOTAL W/R	**72**	**89**	**1002**	**240**	**369**	**1298**	**413**	**618**	**104**	**4044**	**3305**	**33602**
GRAND TOTAL	**186**	**292**	**3346**	**1084**	**1344**	**3729**	**1052**	**836**	**192**	**11583**	**9122**	**107518**

Table 4.3: Summary of 2016 Canoe Frame Survey on Regional Level

NUMBERS OF	VOLTA	G/ACCRA	CENTRAL	WESTERN	NATIONAL
Fishing Villages	28	44	42	72	186
Landing Beaches	47	59	97	89	292
Canoes	1051	2633	3855	4044	11583
Outboard Motors	589	2234	2994	3305	9122
Levels of Motorization (%)	56	85	78	82	79
Fishermen	14699	25844	33373	33602	107518

Table 2.4: Mean Range of Price (Cost) of Fishing Gears, Canoes and Outboard motors in the Regions - 2016

PRICES/COST (GH Cedis)				
	VOLTA	GREATER ACCRA	CENTRAL	WESTERN
GEAR				
Ali	8,000 - 11,000	10,000 - 17,000	8,000 - 12,000	9,000 - 14,000
Poli/Watsa	14,000 - 41,000	14,00 - 41,000	14,000 - 40,000	15,000 - 40,000
Beach Seine (big)	17,000 - 25,000	16,000 - 22,000	11,000 -32,000	10,000 - 32,000
Beach Seine (small)	13,000 - 15,000	6,000 - 11,000	7,500 - 12,000	7,000 - 18,000
Set Net	3,000 - 5,000	2,000 - 4,000	1,000 - 4,0000	1,000 - 4,000
Line	1,000 - 2,000	900 - 2,000	850 - 1,800	1,200 - 1,800
Drift Gill Net	20,000 - 25,000	17,000 - 26,000	15,000 - 23,000	15,000 - 22,000
Lobster	750 - 2,000	750 - 2,000	1,200 - 2,800	600 - 1,800
CANOES				
Ali	15,000 - 21,000	15,000 - 22,000	12,000 - 22,000	9,000 - 12,000
Poli/Watsa	21,000 - 26,000	22,000 - 28,000	22,000 - 28,000	15,000 - 25,000
One-man canoe	1,000 - 1,500	1,200 - 1,700	800 - 1,000	700 - 1,000
MOTORS				
YAMAHA 40hp	11,000 - 15,000	12,000 - 14,000	13,000 - 15,000	12,500 - 15,000
YAMAHA 30hp	7,000 - 8,000	7,000 - 8,000	7,000 - 8,000	7,500 - 8,000
YAMAHA 25hp	6,000 -6,500	6,000 -6,500	6,000 -6,500	6,500 -7,000
YAMAHA 15hp	5,500 - 6,000	5,000 - 6,000	5,500 - 6,000	5,500 - 6,000
YAMAHA 9hp	4,500 - 5,000	4,500 - 5,000	4,500 - 5,000	4,500 - 5,000
YAMAHA 8hp	2,500 - 3,000	2,000 - 3,000	2,500 - 3,500	2,500 - 3,500

Table 4.5: Regional Summaries of 2001, 2004, 2013 and 2016 Canoe Frame Surveys.

Numbers of	Volta Region				Greater Accra Region				Central Region				Western Region				Total			
	2001	2004	2013	2016	2001	2004	2013	2016	2001	2004	2013	2016	2001	2004	2013	2016	2001	2004	2013	2016
Fishing Villages	23	29	26	28	48	48	44	44	42	43	44	42	72	75	76	72	185	195	190	186
Landing Beaches	42	63	49	47	67	68	59	59	101	103	106	97	94	100	100	89	304	334	314	292
Motors	242	323	394	589	1921	2144	2449	2234	1547	2097	3016	2994	1546	1841	3454	3305	5256	6405	9313	9122
Fishermen	11863	17382	18150	14699	41026	35168	39737	25844	45909	44303	40563	33373	24358	27366	40705	33602	123156	124219	139155	107518
Pursing Nets	62	99	123	176	1164	1185	1410	1315	848	931	975	853	365	382	577	1002	2439	2597	3085	3346
Beach Seines	294	384	423	493	184	158	194	142	195	198	221	209	140	163	236	240	813	903	1074	1084
Line	23	0	30	78	790	586	600	510	235	280	349	387	86	67	163	369	1134	933	1142	1344
Set Nets	88	230	274	268	384	386	372	400	1544	2084	1768	1763	857	1175	1683	1298	2873	3875	4097	3729
Ali	48	20	18	27	351	364	244	26	657	710	527	586	562	761	1084	413	1618	1855	1873	1052
Drifting Nets	3	3	13	9	53	81	112	176	274	63	32	33	444	373	819	618	774	520	976	836
One Man Canoe	0	0	6	0	31	21	0	64	22	184	23	24	277	325	452	104	330	530	481	192
Total Canoes	518	736	887	1051	2957	2781	2932	2633	3775	4450	3895	3855	2731	3264	5014	4044	9981	11231	12728	11583

Table 4.6: Distribution of Brands and Sizes of Outboard Motors in the Regions in 2016 Canoe Frame Survey

	YAMAHA											JOHNSON	SUZUKI				MARINA		TOHATSUA
	4HP	5HP	6HP	8HP	9HP	10HP	15HP	20HP	25HP	30HP	40HP	25HP	4HP	5HP	8HP	9HP	15HP	4HP	8HP
VOLTA REGION				5	2	5	23	1	33	9	350	110		11			40		
GREATER ACCRA						15	46	4	51	7	1951	131	1	2	3		7	1	4
CENTRAL REGION					428		337	9	170	40	1541	284		52	37			92	
WESTERN REGION	21	0	0	160	414	4	312	1	127	39	2037	181			5			4	
TOTAL	**21**	**0**	**0**	**165**	**844**	**24**	**718**	**15**	**381**	**95**	**5879**	**706**	**1**	**65**	**45**	**0**	**47**	**97**	**4**

Table 4.7: Mean Dimensions/Ranges of Canoes along the Coast in Ghana

CANOES	LENGTH (M)	WIDTH (M)
Ali/Poli/watsa	13.0 - 20.5	1.6 - 2.8
Line	15.0	2.0
Beach Seine (Large)	11.5	1.2
Beach Seine (Small)	8.6	1.3
Set Net	7.1 -9.2	1.2 - 2.0
One Man Canoe	4.5 - 4.8	0.5 - 0.6
DGN	12.0 - 19.0	1.6 - 2.9

Table 4.8: Fish Sharing System within the Regions

	VOLTA					GREATER ACCRA			
	NET	**CANOE**	**OUTBOARD MOTOR**	**CREW**		**NET**	**CANOE**	**OUTBOARD MOTOR**	**CREW**
Ali	50%			50%		50%			50%
Poli	50%			50%		50%			50%
Watsa	50%			50%		50%			50%
Beach Seine	20%	30%		50%		50%			50%
Set Net (Toga)	50%			50%		50%			50%
Set Net (Lobster)	50%			50%		50%			50%
Drift Gill Net	50%			50%		50%			50%
Line	50%			50%		50%			50%
CENTRAL						**WESTERN**			
	NET	**CANOE**	**OUTBOARD MOTOR**	**CREW**		**NET**	**CANOE**	**OUTBOARD MOTOR**	**CREW**
Ali	50%			50%		50%			50%
Poli	50%			50%		50%			50%
Watsa	50%			50%		50%			50%
Beach Seine	50%			50%		50%			50%
Set Net (Toga)	50%			50%		50%			50%
Set Net (Lobster)	50%			50%		50%			50%
Drift Gill Net	50%			50%		50%			50%
Line	50%			50%		50%			50%

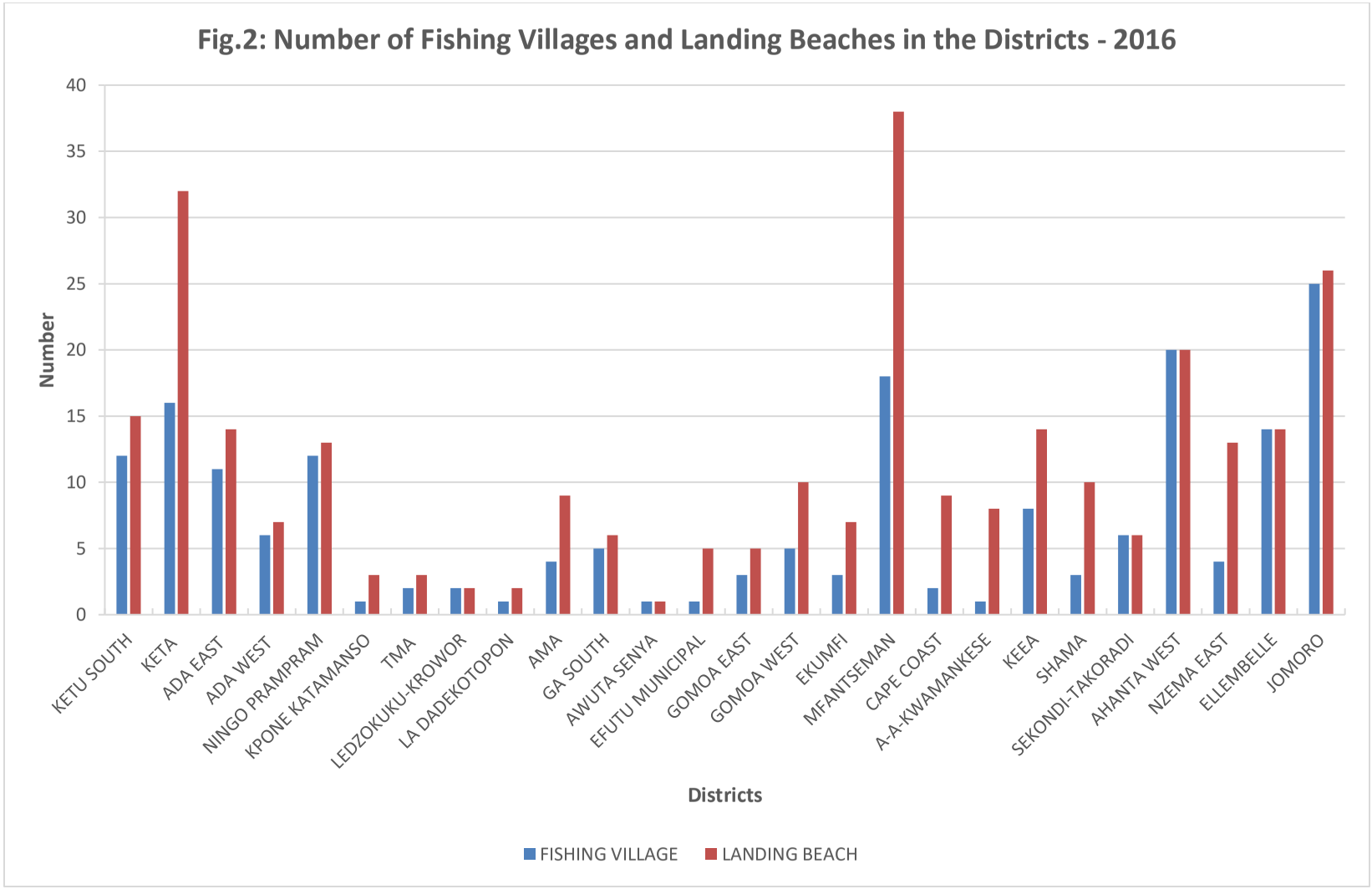


Fig.2: Number of Fishing Villages and Landing Beaches in the Districts - 2016
Number
40
35
30
25
20
15
10
5
0
KETU SOUTH
KETA
ADA EAST
ADA WEST
NINGO PRAMPRAM
KPONE KATAMANSO
TMA
LEDZOKUKU-KROWOR
LA DADEKOTOPON
AMA
GA SOUTH
AWUTA SENYA
EFUTU MUNICIPAL
GOMOA EAST
GOMOA WEST
EKUMFI
MFANTSEMAN
CAPE COAST
A-A-KWAMANKESE
KEEA
SHAMA
SEKONDI-TAKORADI
AHANTA WEST
NZEMA EAST
ELLEMBELLE
JOMORO
Districts
FISHING VILLAGE
LANDING BEACH

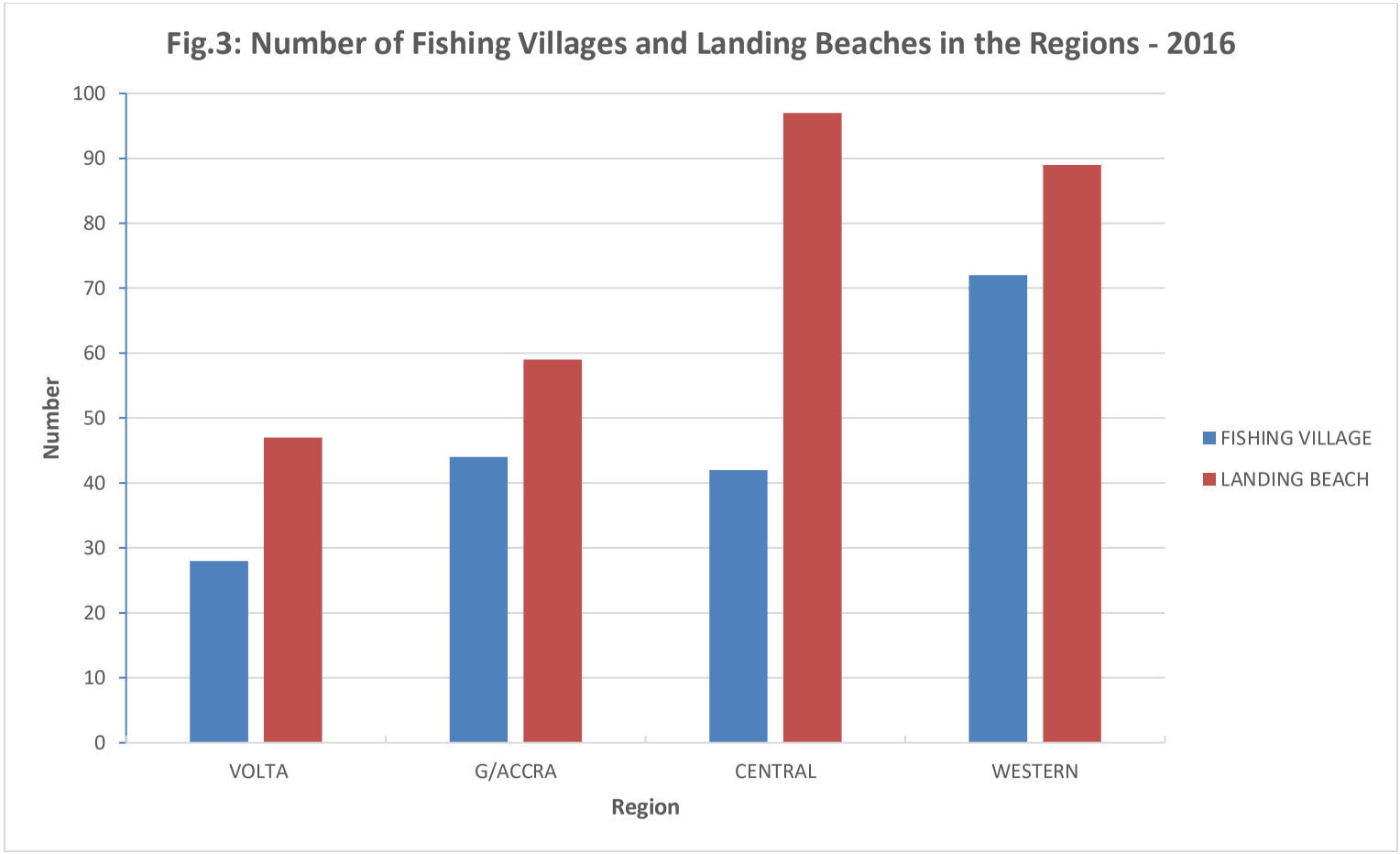


Fig.3: Number of Fishing Villages and Landing Beaches in the Regions - 2016
100
90
80
70
60
50
40
30
20
10
0
Number
VOLTA
G/ACCRA
CENTRAL
WESTERN
Region
FISHING VILLAGE
LANDING BEACH

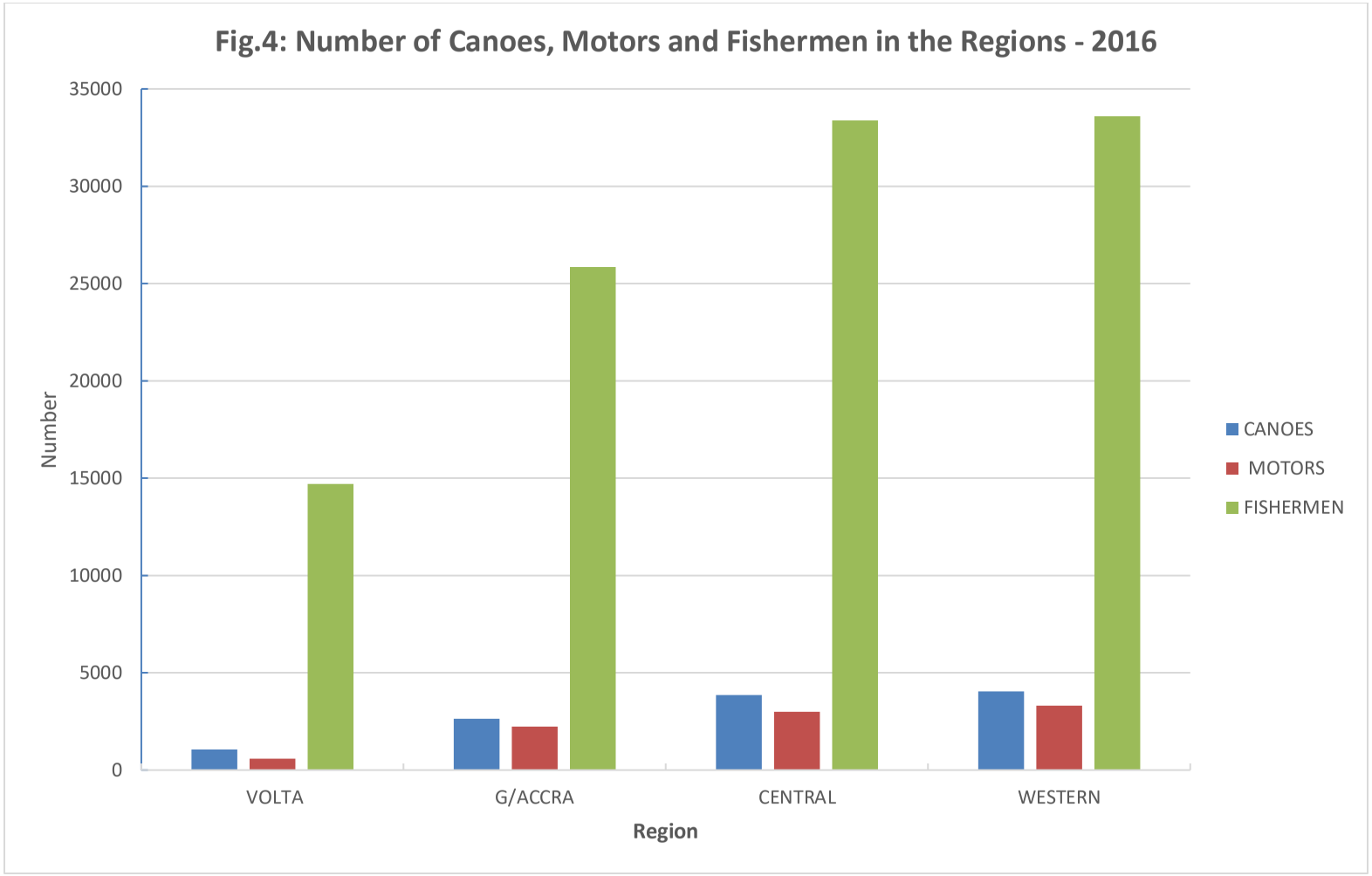


Fig.4: Number of Canoes, Motors and Fishermen in the Regions - 2016
35000
30000
25000
20000
15000
10000
5000
0
Number
VOLTA
G/ACCRA
CENTRAL
WESTERN
Region
CANOES
MOTORS
FISHERMEN

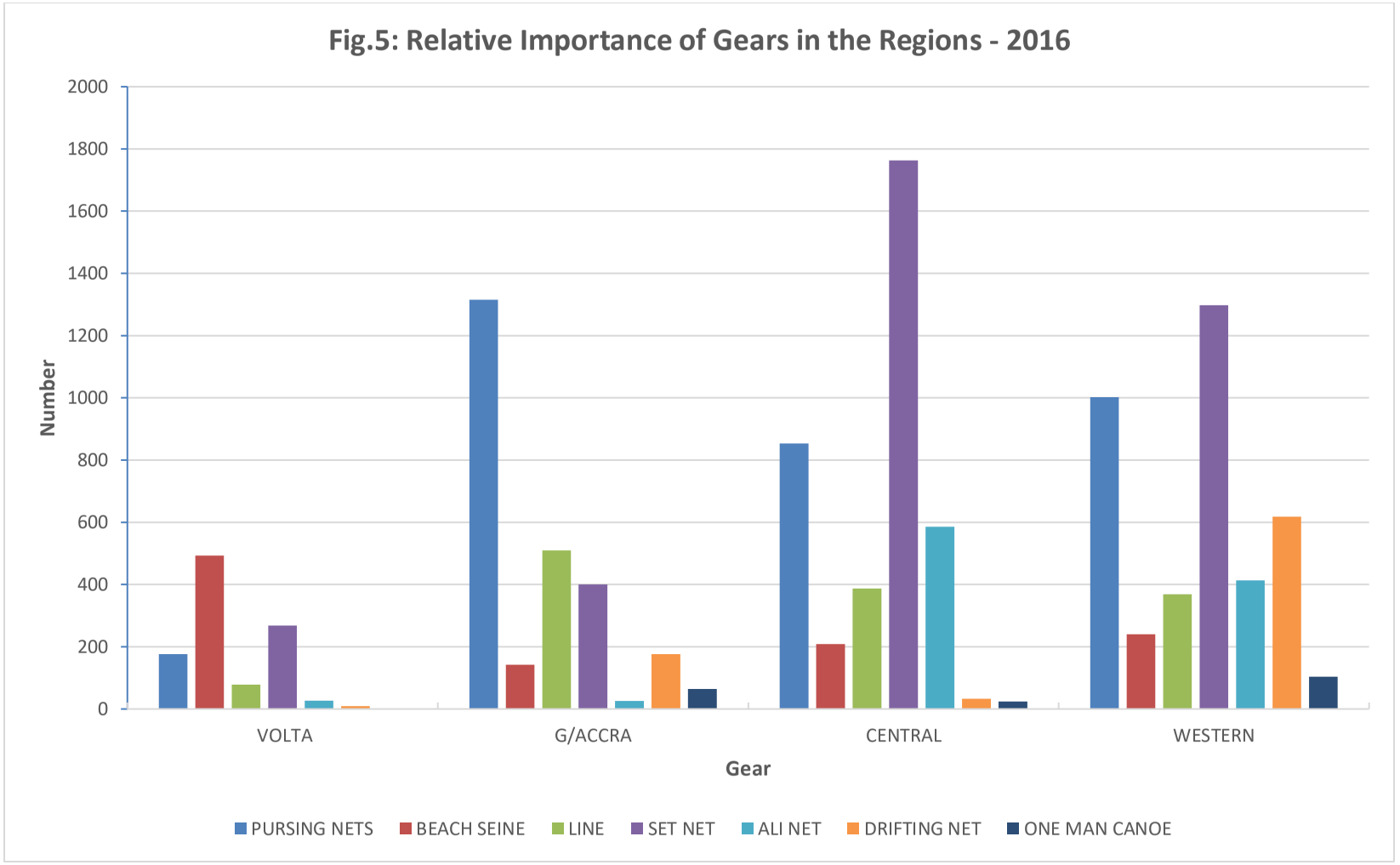


Fig.5: Relative Importance of Gears in the Regions - 2016
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Number
VOLTA
G/ACCRA
CENTRAL
WESTERN
Gear
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET
ONE MAN CANOE

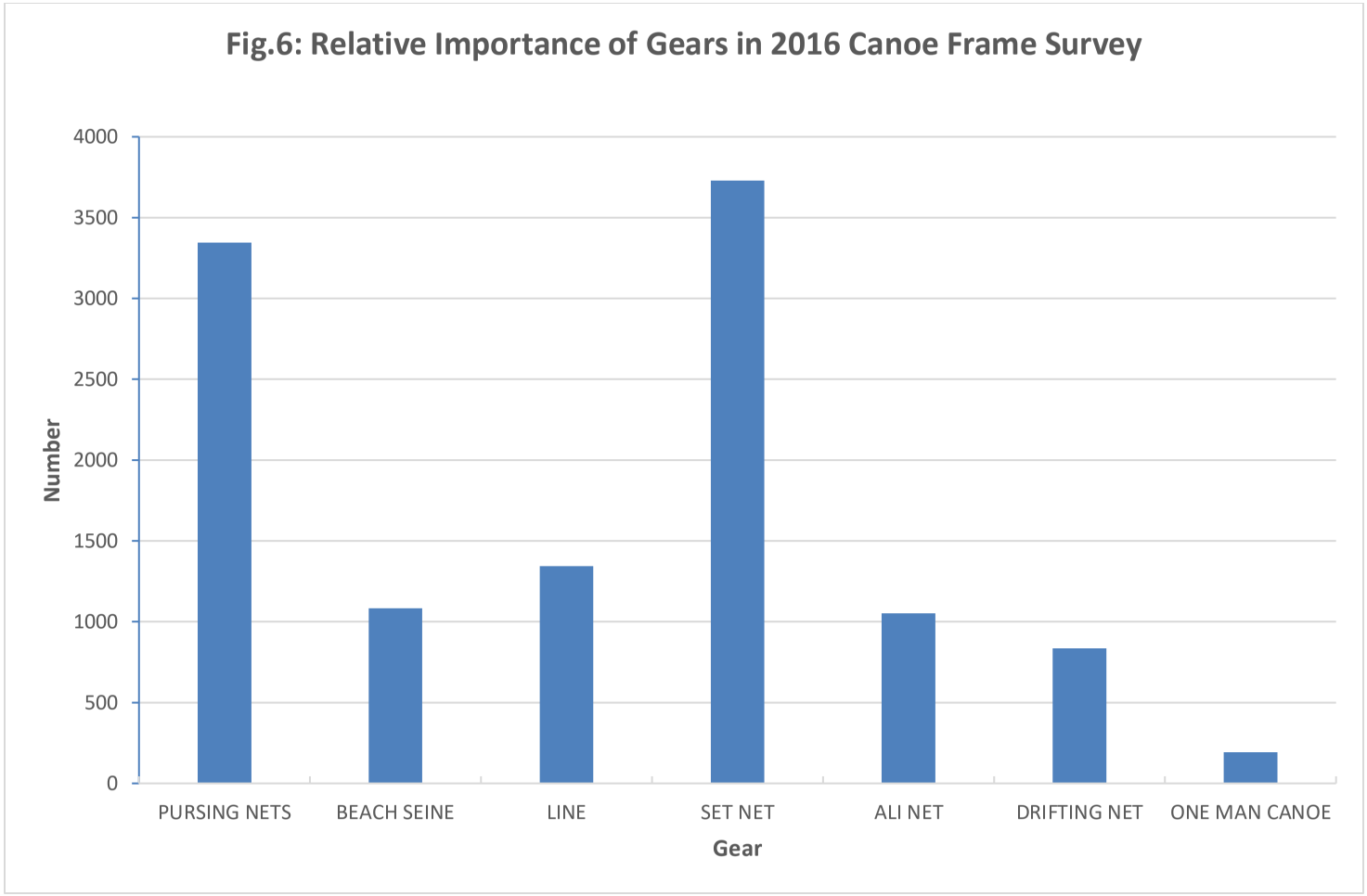


Fig.6: Relative Importance of Gears in 2016 Canoe Frame Survey
4000
3500
3000
2500
2000
1500
1000
500
0
Number
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET
ONE MAN CANOE
Gear

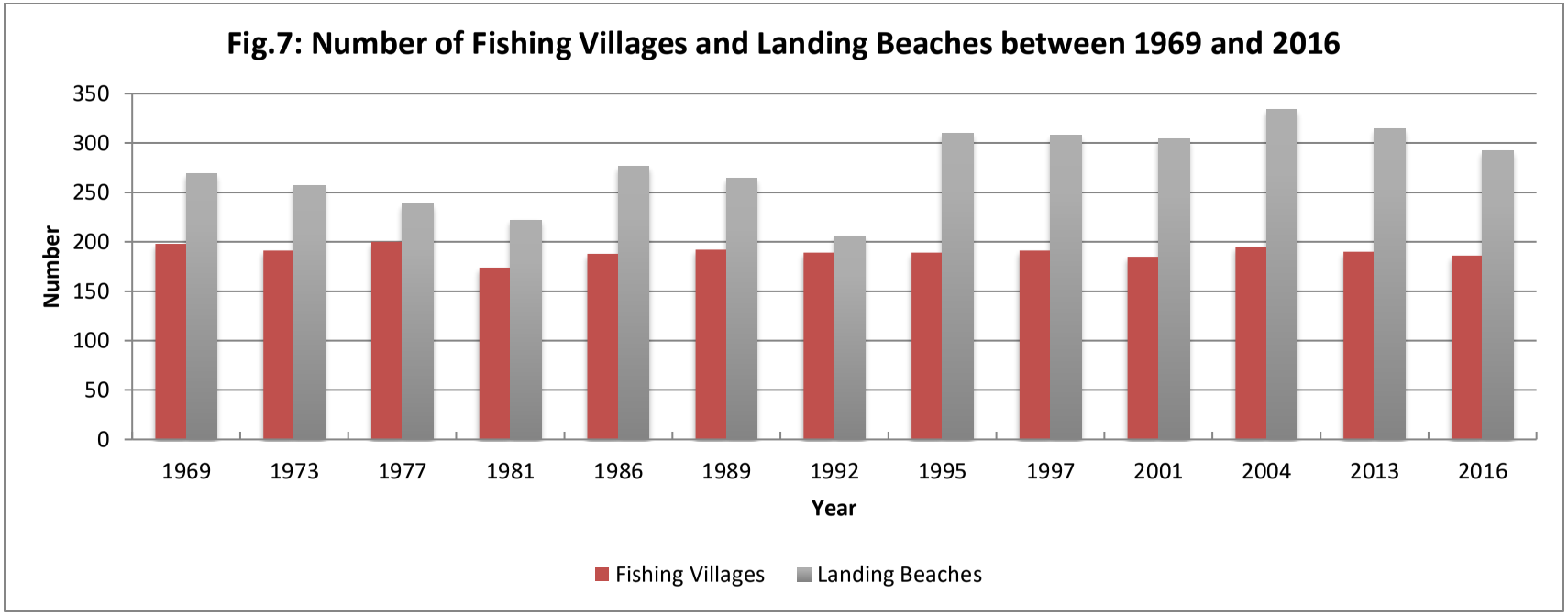


Fig.7: Number of Fishing Villages and Landing Beaches between 1969 and 2016
350
300
250
200
150
100
50
0
Number
1969
1973
1977
1981
1986
1989
1992
1995
1997
2001
2004
2013
2016
Year
Fishing Villages
Landing Beaches

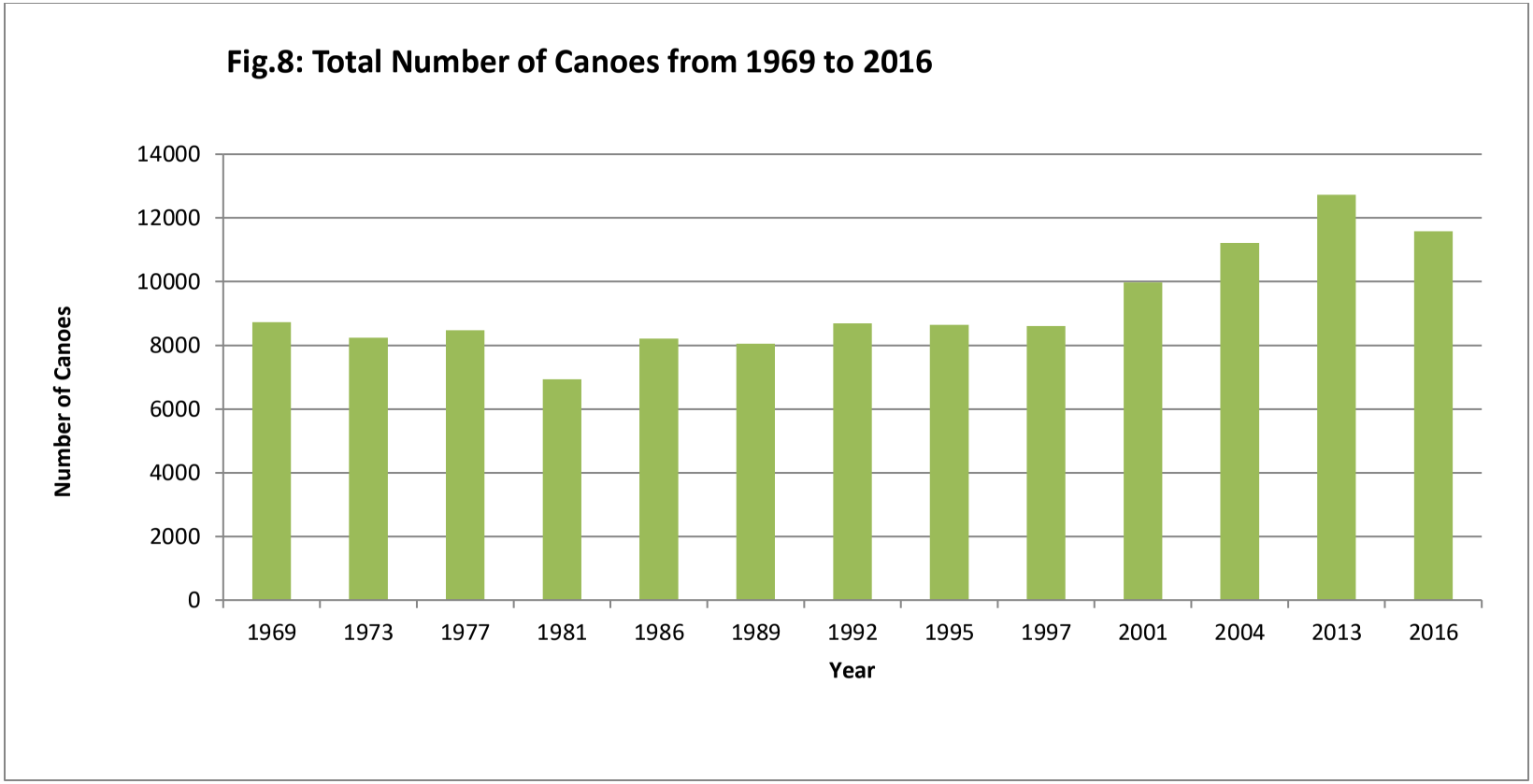


Fig.8: Total Number of Canoes from 1969 to 2016
Number of Canoes
14000
12000
10000
8000
6000
4000
2000
0
1969
1973
1977
1981
1986
1989
1992
1995
1997
2001
2004
2013
2016
Year

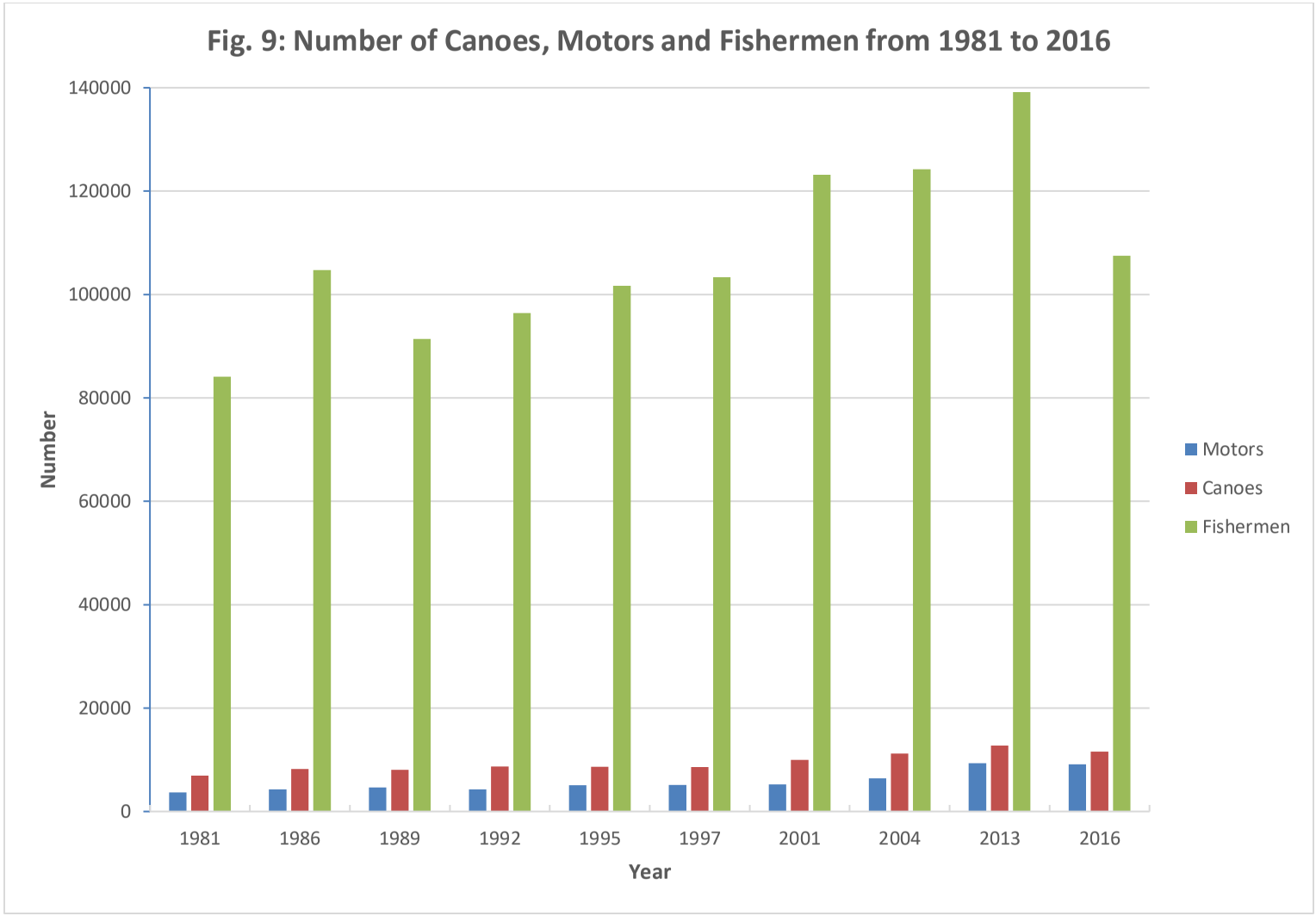


Fig. 9: Number of Canoes, Motors and Fishermen from 1981 to 2016
140000
120000
100000
80000
60000
40000
20000
0
Number
1981
1986
1989
1992
1995
1997
2001
2004
2013
2016
Year
Motors
Canoes
Fishermen

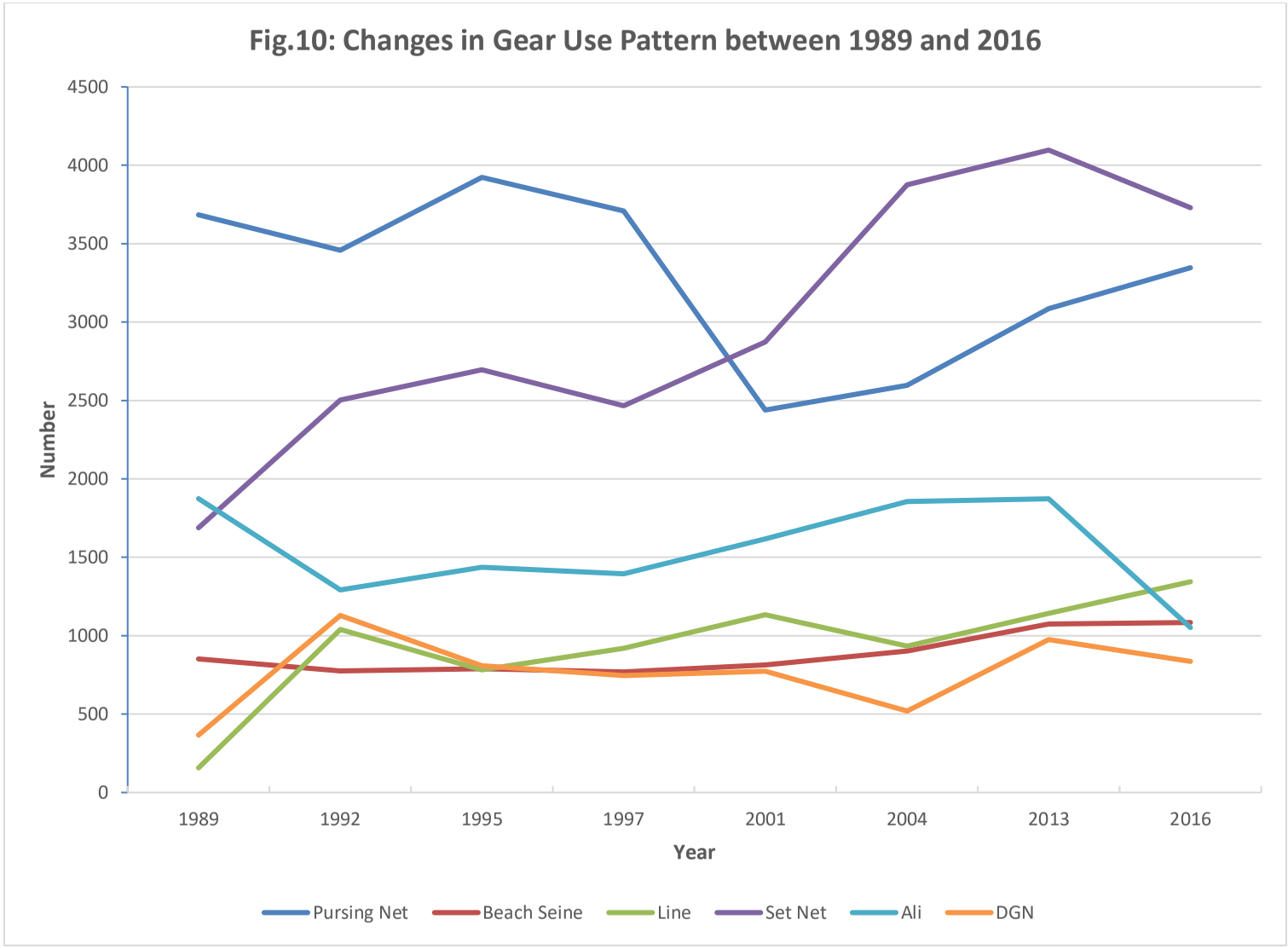


Fig.10: Changes in Gear Use Pattern between 1989 and 2016
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Number
1989
1992
1995
1997
2001
2004
2013
2016
Year
Pursing Net
Beach Seine
Line
Set Net
Ali
DGN

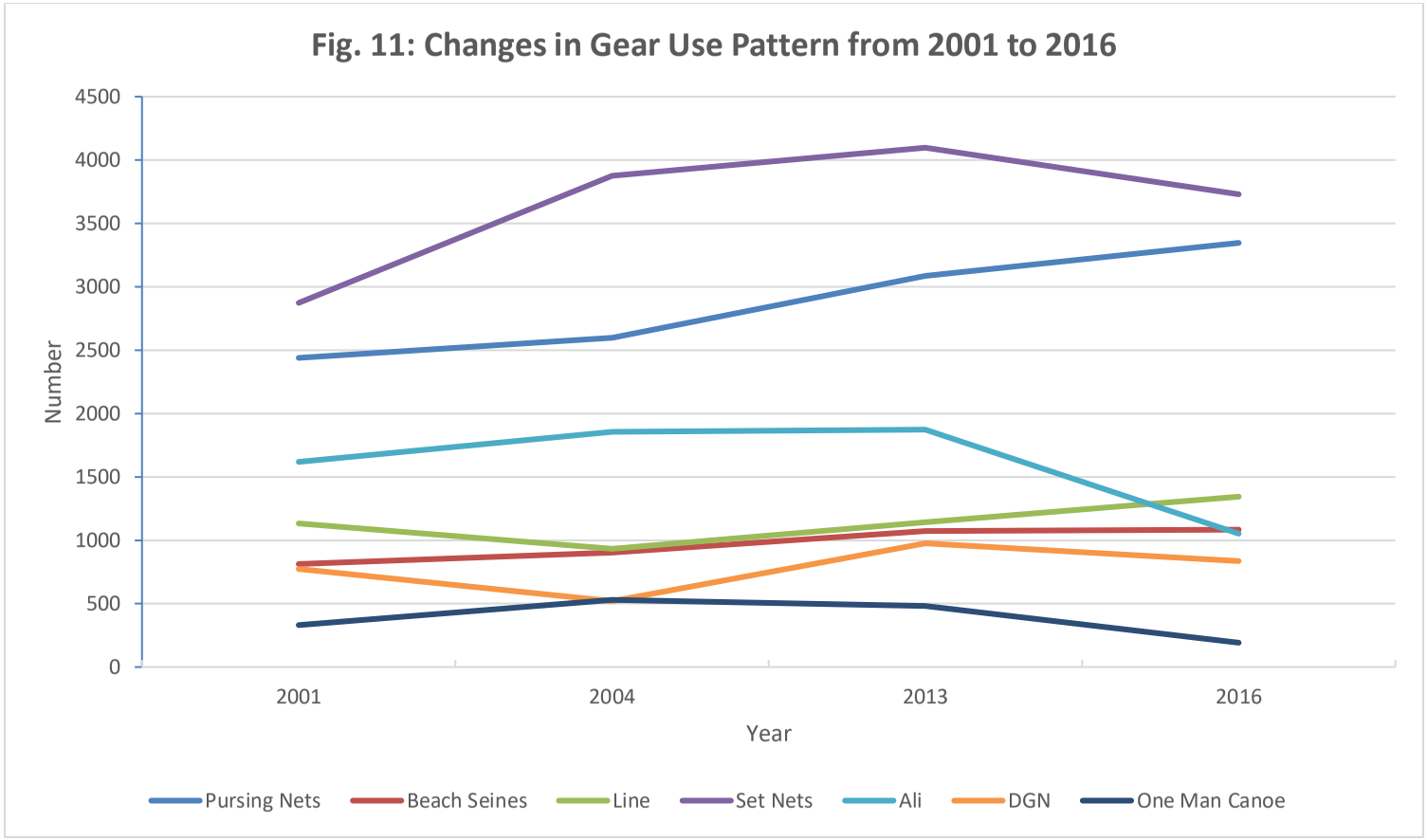


Fig. 11: Changes in Gear Use Pattern from 2001 to 2016
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Number
2001
2004
2013
2016
Year
Pursing Nets
Beach Seines
Line
Set Nets
Ali
DGN
One Man Canoe

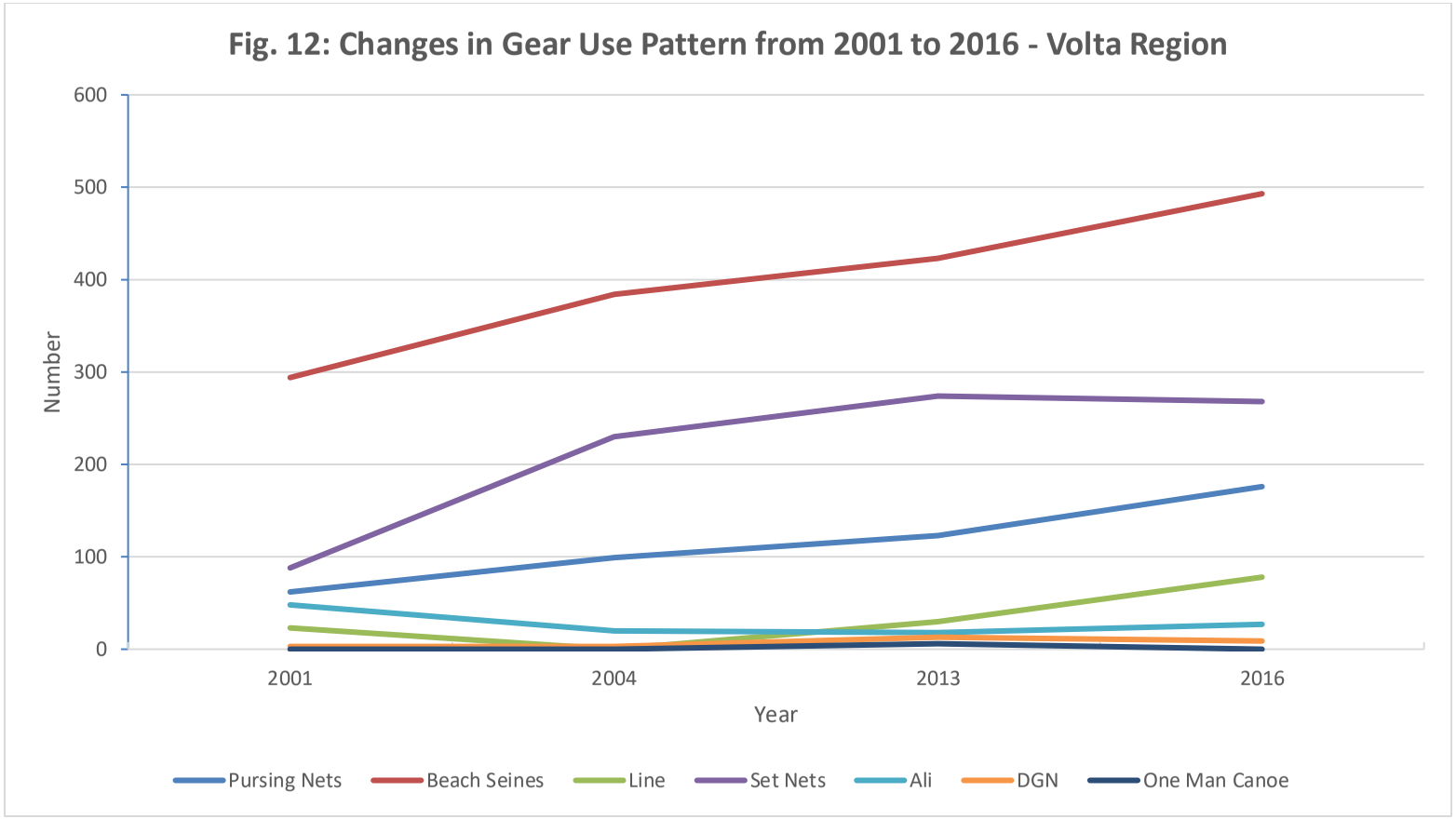


Fig. 12: Changes in Gear Use Pattern from 2001 to 2016 - Volta Region
600
500
400
300
200
100
0
Number
2001
2004
2013
2016
Year
Pursing Nets
Beach Seines
Line
Set Nets
Ali
DGN
One Man Canoe

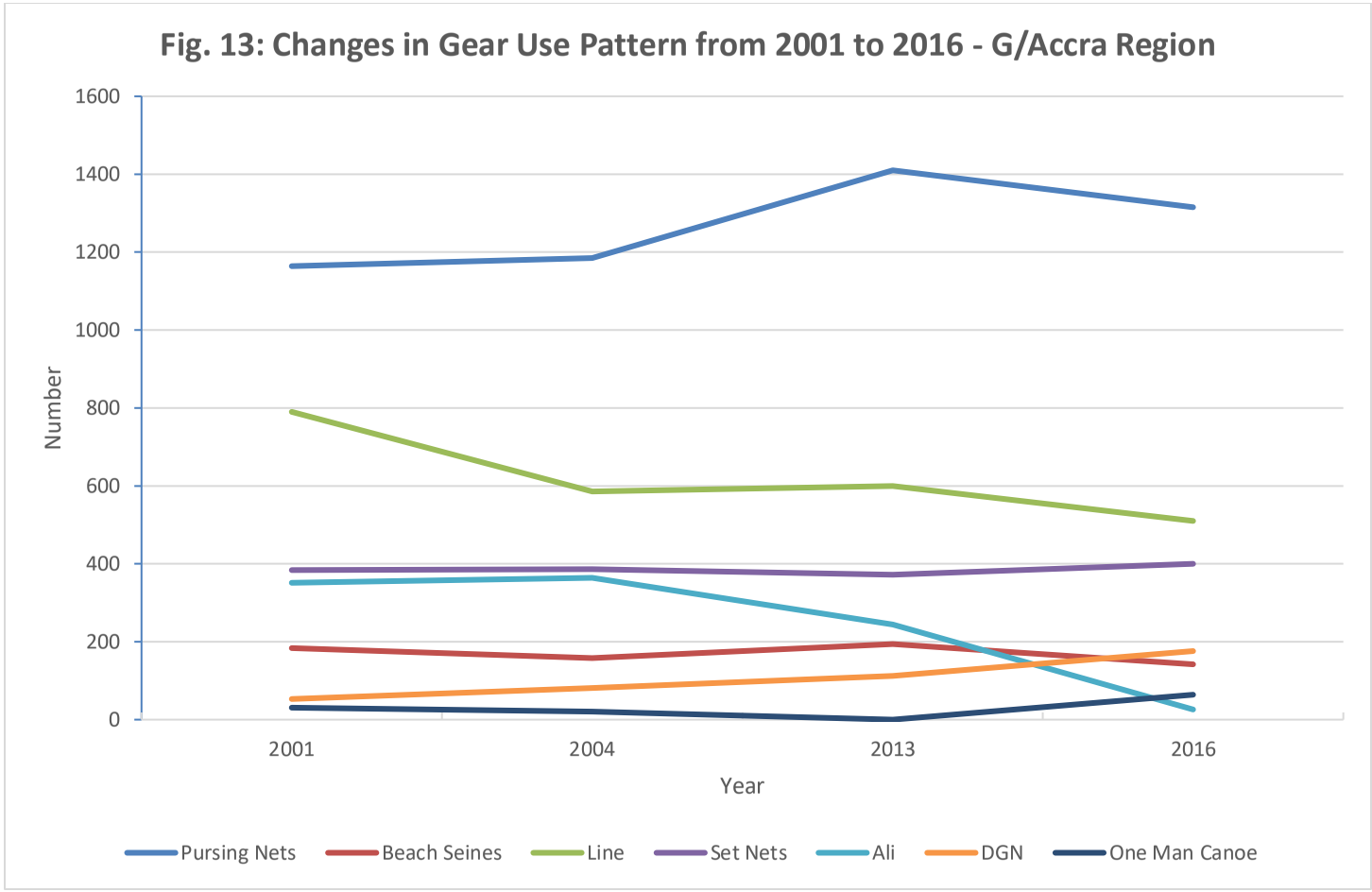


Fig. 13: Changes in Gear Use Pattern from 2001 to 2016 - G/Accra Region
1600
1400
1200
1000
800
600
400
200
0
Number
2001
2004
2013
2016
Year
Pursing Nets
Beach Seines
Line
Set Nets
Ali
DGN
One Man Canoe

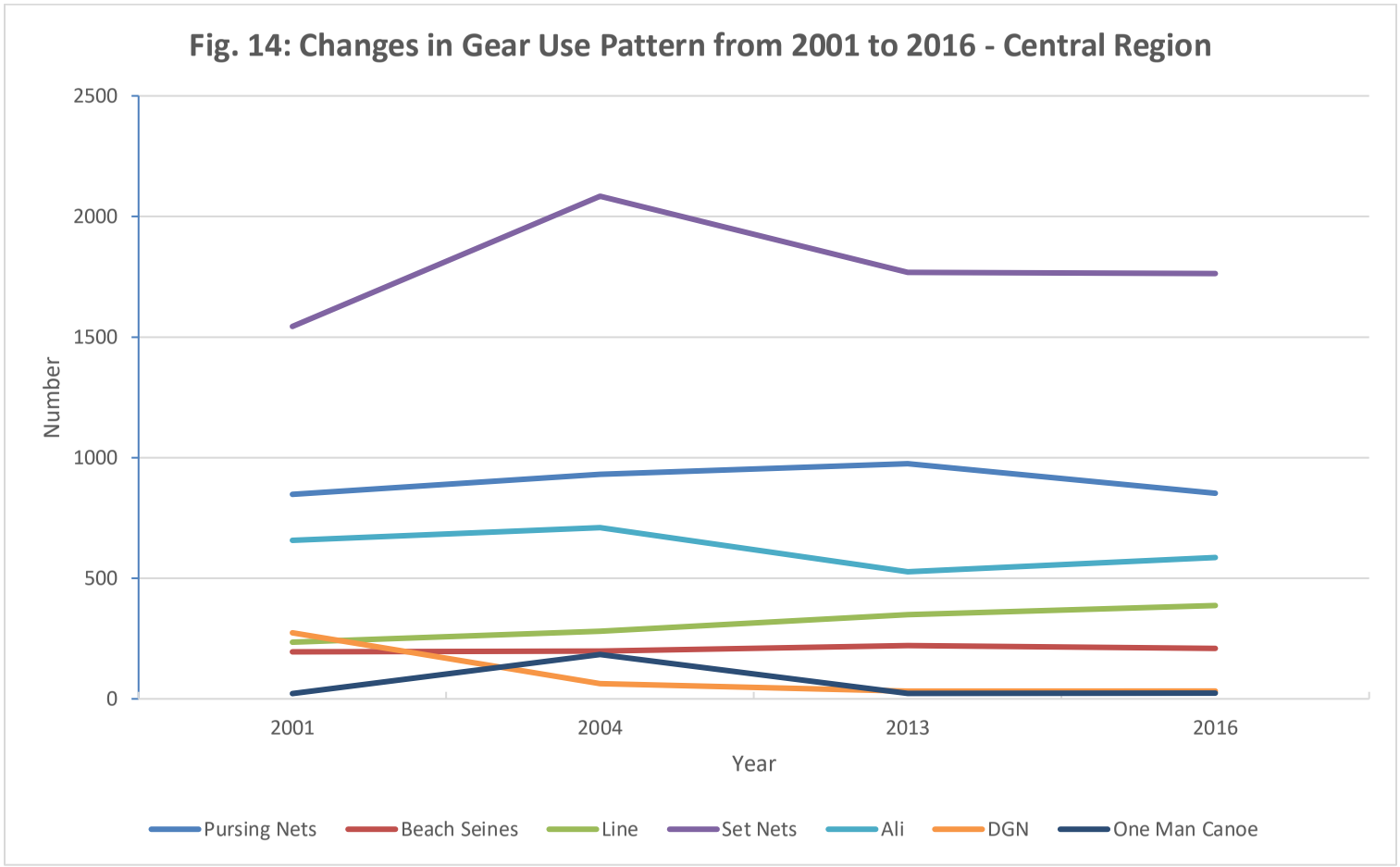


Fig. 14: Changes in Gear Use Pattern from 2001 to 2016 - Central Region
2500
2000
1500
1000
500
0
Number
2001
2004
2013
2016
Year
Pursing Nets
Beach Seines
Line
Set Nets
Ali
DGN
One Man Canoe

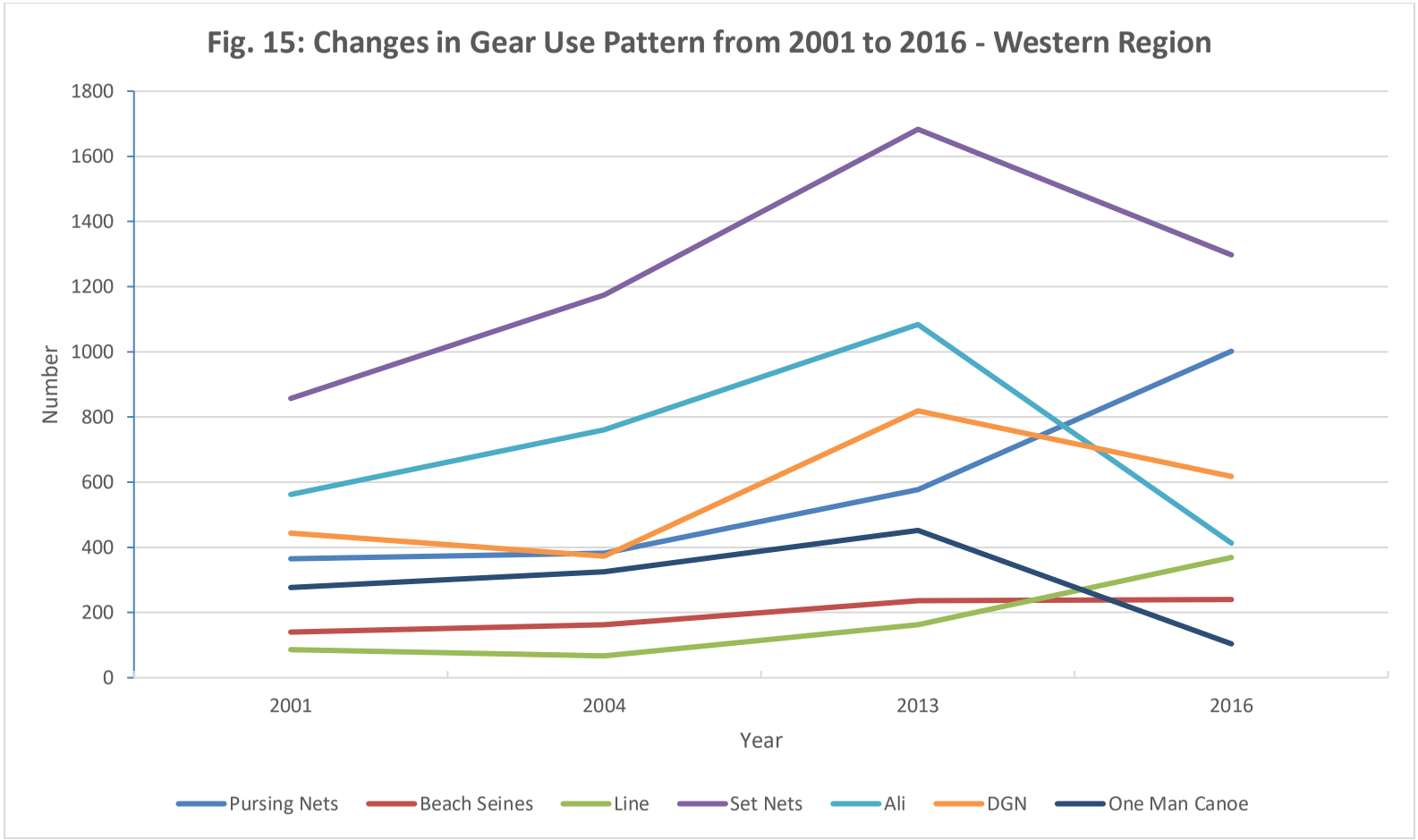
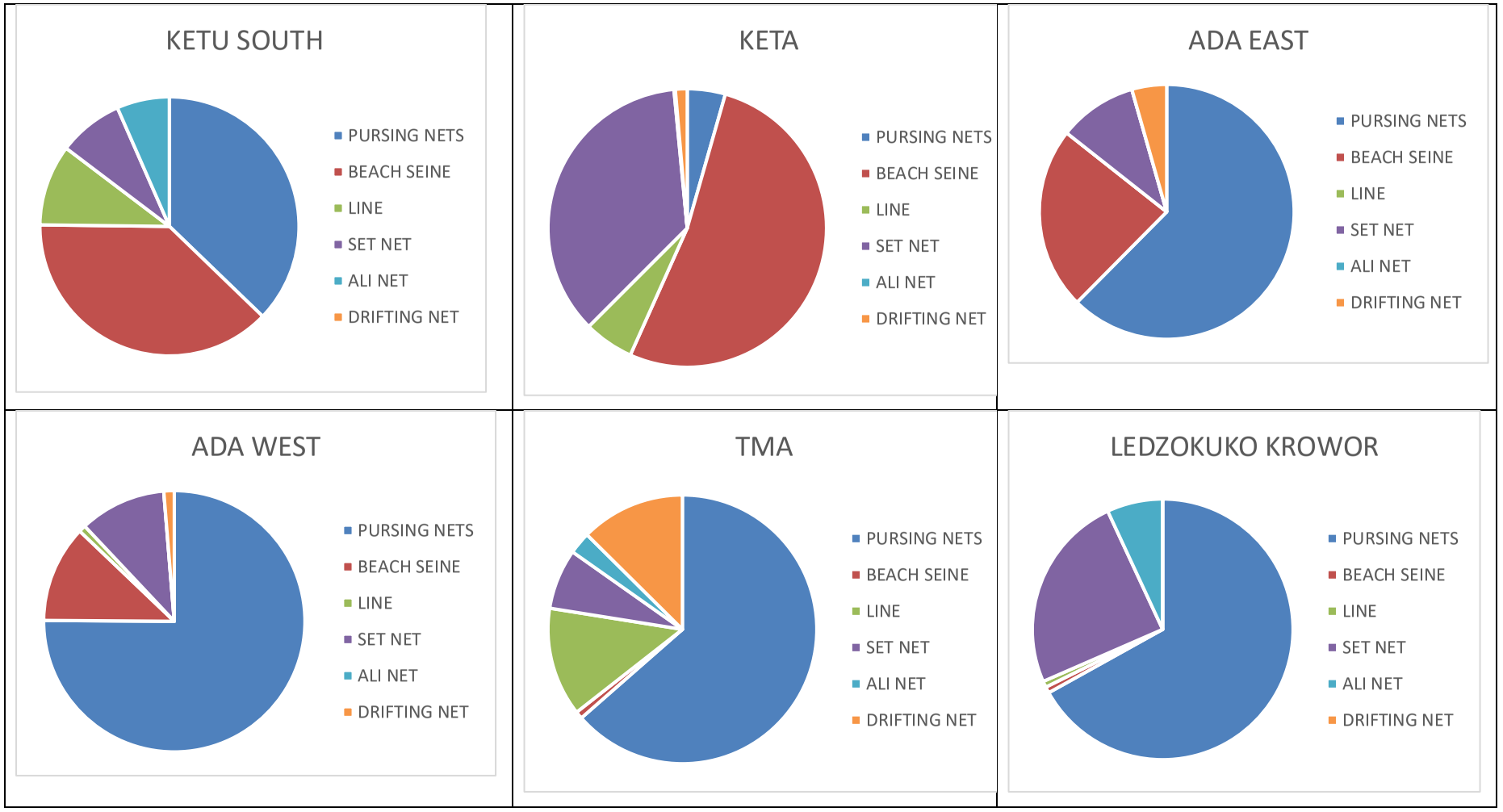
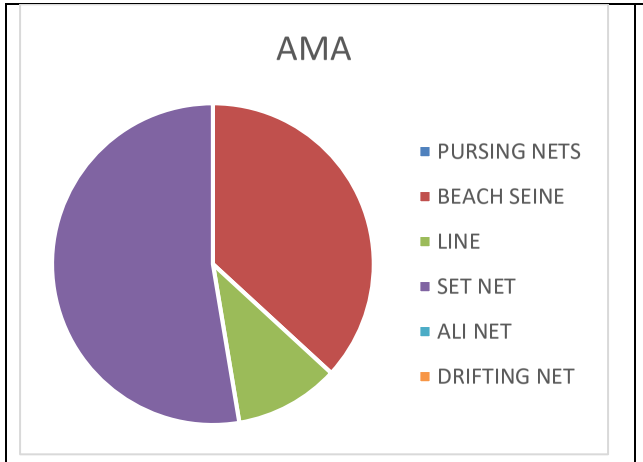
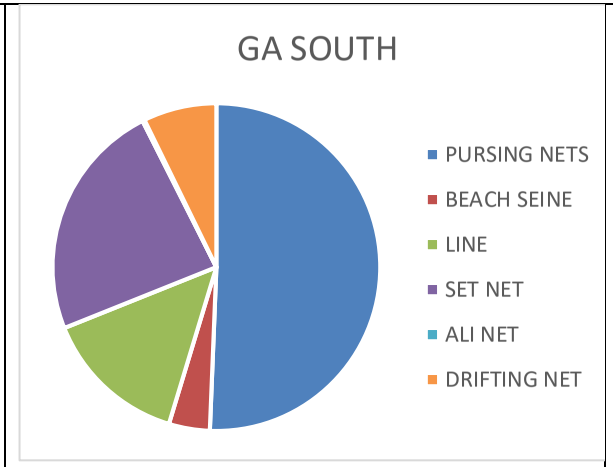


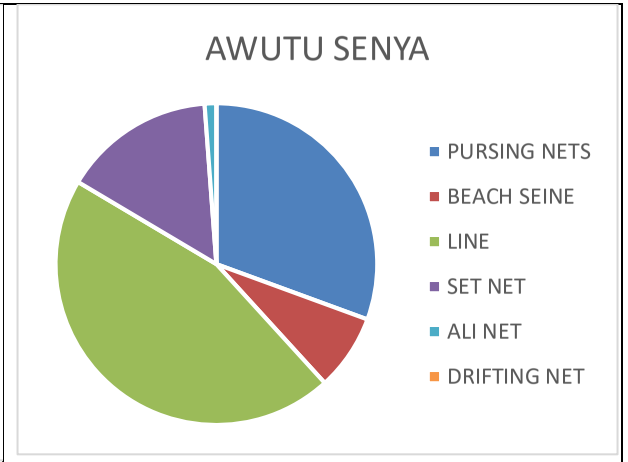
Fig. 15: Changes in Gear Use Pattern from 2001 to 2016 - Western Region
1800
1600
1400
1200
1000
800
600
400
200
0
Number
2001
2004
2013
2016
Year
Pursing Nets
Beach Seines
Line
Set Nets
Ali
DGN
One Man Canoe

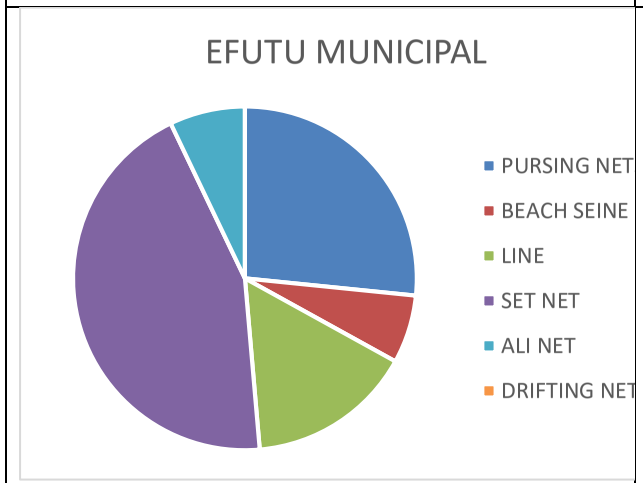
Fig.16: Relative Importance of Fishing gear in some Coastal districts

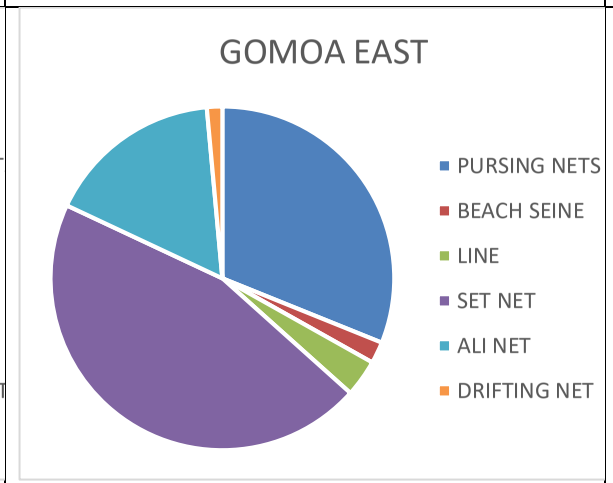


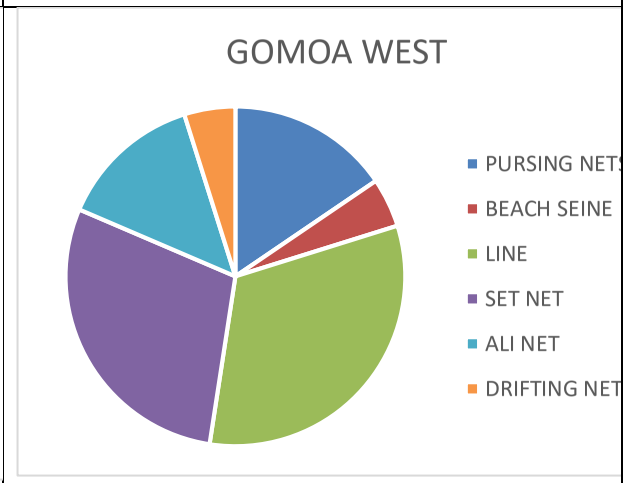

AMA
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET

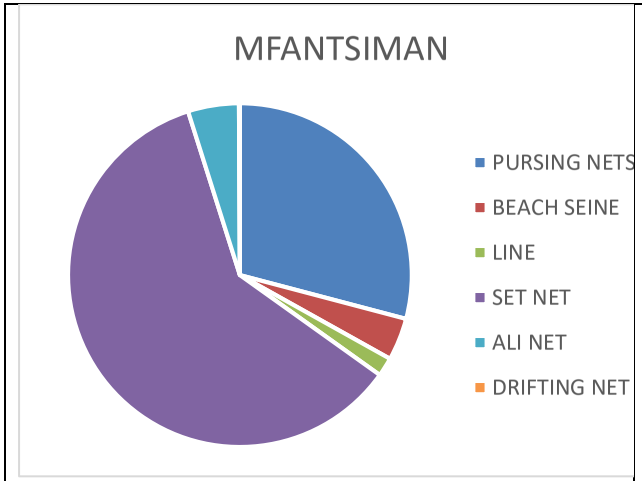

GA SOUTH
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET

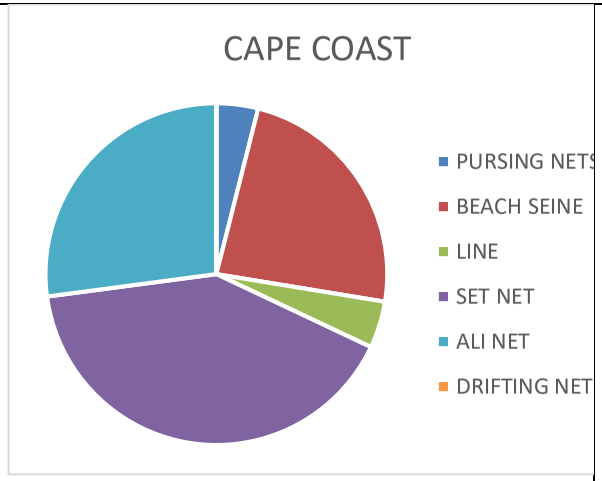

AWUTU SENYA
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET

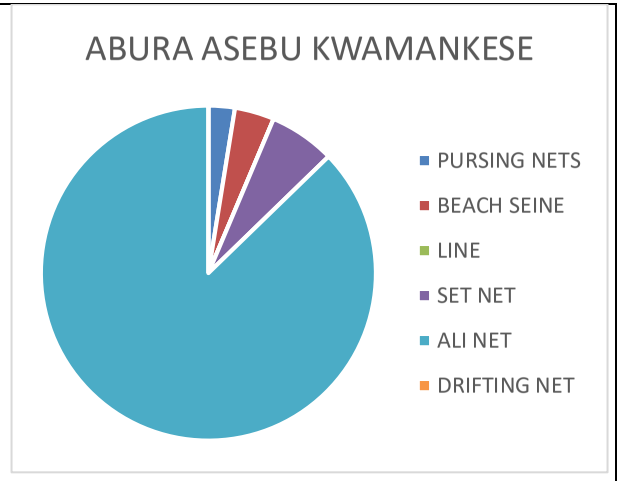

EFUTU MUNICIPAL
PURSING NET
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET

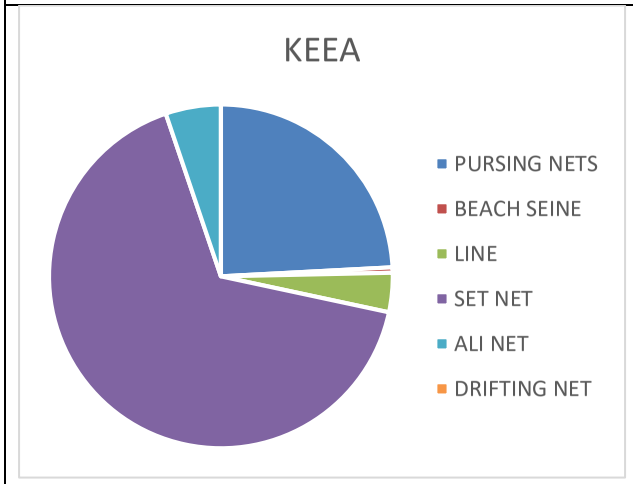

GOMOA EAST
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET

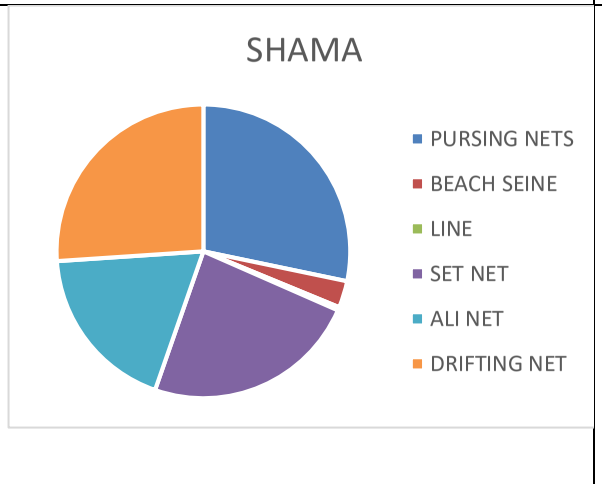

GOMOA WEST
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET


MFANTSIMAN
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET


CAPE COAST
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET


ABURA ASEBU KWAMANKESE
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET


KEEA
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET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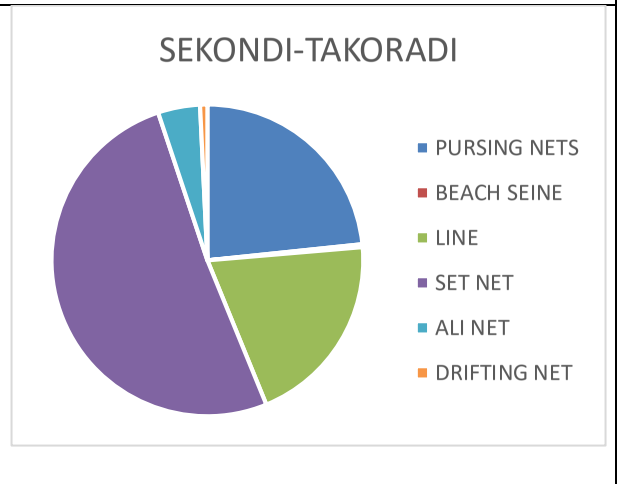
LINE
SET NET
ALI NET
DRIFTING NET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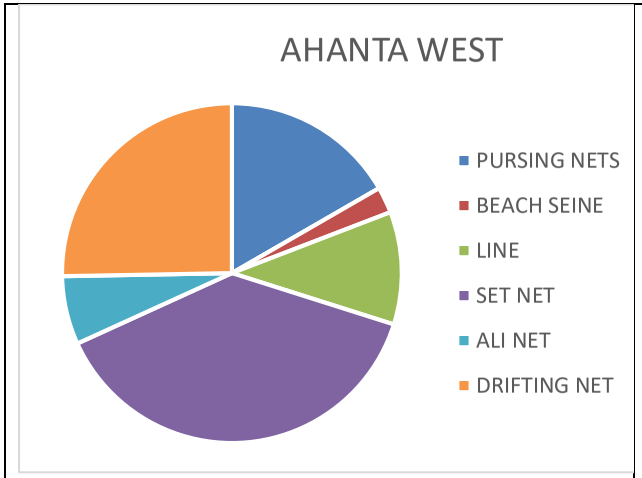
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET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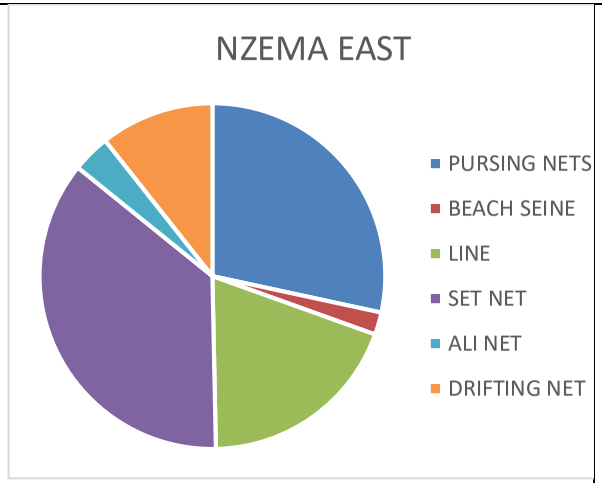
LINE
SET NET
ALI NET
DRIFTING NET


NZEMA EAST
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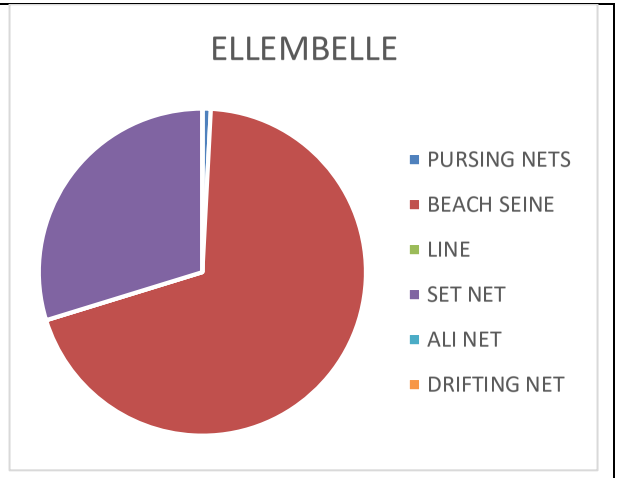
LINE
SET NET
ALI NET
DRIFTING NET


ELLEMBELLE
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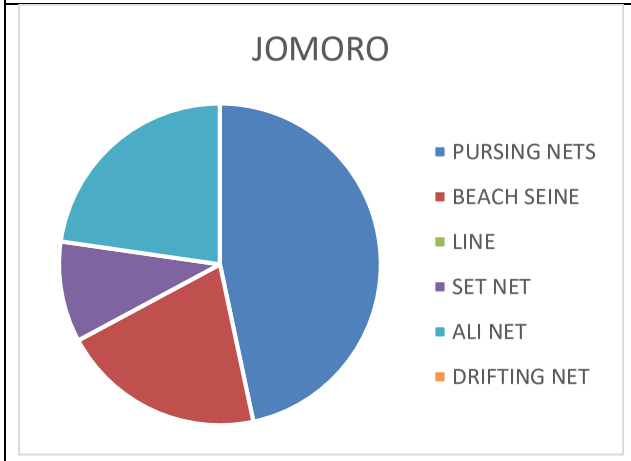
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET


JOMORO
PURSING NETS
BEACH SEINE
LINE
SET NET
ALI NET
DRIFTING NET

Pic 1. Officers interviewing fishermen

Pic 2. Landing Beach

Pic 3.Officers measuring canoes

Pic 4. Officers en-route to a fishing village

APPENDIX 1 FORM A FRAME SURVEY (CANOE REGISTRATION)

REGION…… DATE…… ENUMERATOR……

FISHING VILLAGE…….. LANDING BEACH…….. CHIEF FISHERMAN……..

SERIAL NO.	REGISTRATION NO.	NAME OF CANOE SYMBOL	NAME OF OWNER	NO. OF CREW	TYPES OF GEAR	OUTBOARD MOTOR					REMARKS
						DO YOU HAVE		IF YES			
1						YES	NO	NO	TYPE	HP	
2											
3											
4											
5											
6											
7											
8											
9											
0											
1											
2											

APPENDIX 2

FORM B FRAME SURVEY CANOE FISHERY STATISTICS

REGION…… …….. DATE……

DISTRICT ……

FISHING VILLAGE…….. ENUMERATOR……

LANDING BEACH……

WHERE DOES THE CHIEF FISHERMAN LIVE (VILLAGE):……

GEAR		CANOE			AVERAGE NO. OF FISHERMEN		
NAME	NO.	TOTAL	MOTORS	ACTIVE	AVE. NO. OF CREW ON CANOE	FULL TIME	TOTAL
ALI							
POLI							
WASTA							
BEACH SEINE							
S/N LOBSTER							
LINE							
DGN/NIFA-NIFA							
ONE MAN CANOE							
TOTAL							

2. For one man canoe, what gears are usually used?

……

3. Does fishing go on all the year around? Yes/No

4. If “No” state the period of operation……

5. Range of fishing grounds……

6. Do the canoes here migrate to other centers within Ghana? Yes/No

(i) If “Yes”, where do they go mainly to:……..

(ii) State the usual period that they migrate from the center?……

(iii) What type of gear do they mainly migrate to operate?……

8. Do canoes at other centers migrate into this center? Yes/No

(i) If “Yes” where do they mainly come from?……

(ii) State the usual period that they migrate from this center:……

(iii) The canoes that migrate into this center operate what main gear……

9. Do canoes at this center migrate outside the country? Yes/No

If “Yes

(i) Where do they usually migrate to?……

(ii) How long do they stay?……

(iii) State the usual period they migrate from this center……

(iv) Do they register with Ghana Embassy Abroad?……

(v) What do they usually migrate with?……

10. Do non-Ghanaians canoes migrate to this center? Yes/No If yes

(i) Where do they usually migrate to this center from……

(ii) How long do they stay?.....

(iii) What period do they usually migrate from this center……..

11. Are there conflicts between Ghanaian and Fisherman at this center? Yes/No

(i) If yes, what is the nature of the conflicts……

12. Are there conflicts between Ghanaian and Non Ghanaian Fishermen at this center? Yes/No

(i) If Yes, what is the nature of the conflicts…….

13. What condition does migrant fisherman have to satisfy at this center?

(a) Ghanaian

(b) Non-Ghanaian

14. Does this fishing village observe non-fishing days? (Fishing holiday) Yes/No If Yes, State the Day(s) ……..

15. How are the proceeds from Fishing shared? Give the percentage/Fractions for the input

GEAR	NET	CANOE	OUTBOARD MOTOR	CREW
ALI				
POLI				
WASTA				
BEACH SEINE				
S/N TOGA				
S/N LOBSTER				
LINE				
D.G.N/NIFA-NIFA				
O.M.C				