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SUSTAINABLE FISHERIES MANAGEMENT PROJECT (SFMP)

Results Of Field Survey For The Small Pelagic Fisheries

THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY | CRC COASTAL RESOURCES CENTER

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Cover photo: Small pelagic fish: top-right: anchovy; top-left: Chub Mackerel; bottom-left: flat sardinella and bottom-right: round sardinella (Credit: Hen Mpoano)

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ACRONYMS

FC	Fisheries Commission
HM	Hen Mpoano
SFMP	Sustainable Fisheries Management Project
USAID	United States Agency for International Development

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INTRODUCTION

This report summarizes the preliminary results of a field survey of fishermen and women in order to provide inputs for a small pelagic fisheries profile to be prepared under the USAID-funded Sustainable Fisheries Management Project (SFMP) in Ghana.

The activity was initiated in May 2015 to September of 2015 in 12 target communities across 64 landing sites (see overview map on page 3 for list of communities and landing sites). These communities are representative of the wide geographical spread of the project as well as record high landings of small pelagic fish as captured by Fisheries Commission (FC) in 2013 canoe frame survey.

The survey aimed at providing inputs to the under listed objectives of the small pelagic fisheries profile:

- To guide fishery management strategies, potential fisheries capacity control and reduction plans, economic development initiatives (post-harvest), infrastructure investments and community and marine fisheries spatial planning.
- Support FC with updated information on both fishermen and fish processors.

SAMPLING STRATEGY

The sampling strategy was based on the countrywide catch data and the 2013 canoe frame survey from the FC. These were used to select communities with high small pelagic landings across the four coastal regions; Volta Region was considered as a single 'community' for the purpose of the profile due to the predominance of beach seine fishery in this region. Canoes and fish processors in the selected communities were enumerated and the outcome of the enumeration was used to develop sample size proportional to both the canoe harvesting the small pelagic fish and number of fish processors in each of the selected communities using the "Probability Proportional to Landings" approach. The sample size was weighted by landings of 2012 for each region.

Table 1, 2 and 3 shows an overview of the sample size.

Table 1: Number of purse seine and beach seine canoes and sample size

Region	Estimated no. of purse seine and beach seine Canoes	Sample size	proportion
Volta	562	31	06%*
Greater Accra	809	178	22%
Central	370	65	18%
Western	486	136	28%
Total	**2227**	**410**	**18%**

A total sample of 410 fishermen was then interviewed. This included 328 canoe owners and 82 crew members.

Table 2: Number of processors and sample size

Region	Numbers of fish processors			Sample size	Proportion
	Female	Male	Total		
Volta	1282	15	1297	130	10%
Greater Accra	859	11	870	87	10%
Western	1349	0	1349	136	10%
Central	725	0	725	73	10%
Total	**4215**	**26**	**4241**	**426**	**10%**

A total of 426 fish processors were selected and interviewed from the same landing sites where fishermen survey was carried out. It should be noted that respondents, both fishermen and fish processors, were not selected randomly and an opportunistic sampling strategy was used based on availability and willingness of individuals to participate in the survey. Hence, caution must be used in interpreting the results as it may not be representative of the communities or regions sampled or of all fishermen and women involved in the small pelagic fishery nationally.

Table 3: Number of landing sites sampled per region

Regions	Number of landing sites
Volta	20
Greater Accra	10
Central	12
Western	16
Total	**58**

DEFINITION OF TERMS

Fisherman: A fisherman or fisher is someone who captures fish and other animals from a body of water, or gathers shellfish for food and/or employment.

Fish processor: A fish processor is someone who buys fish from a fisherman or fishmonger and either smoke, fry, salt and dry for commercial purposes.

Artisanal fisheries: Refer to the relative level of technology and capital used to operate fishing gear to capture and land marine or inland fisheries resources.

Small scale fisheries: Refer to the size of the fishing unit relative to the overall fleet.

Overview map

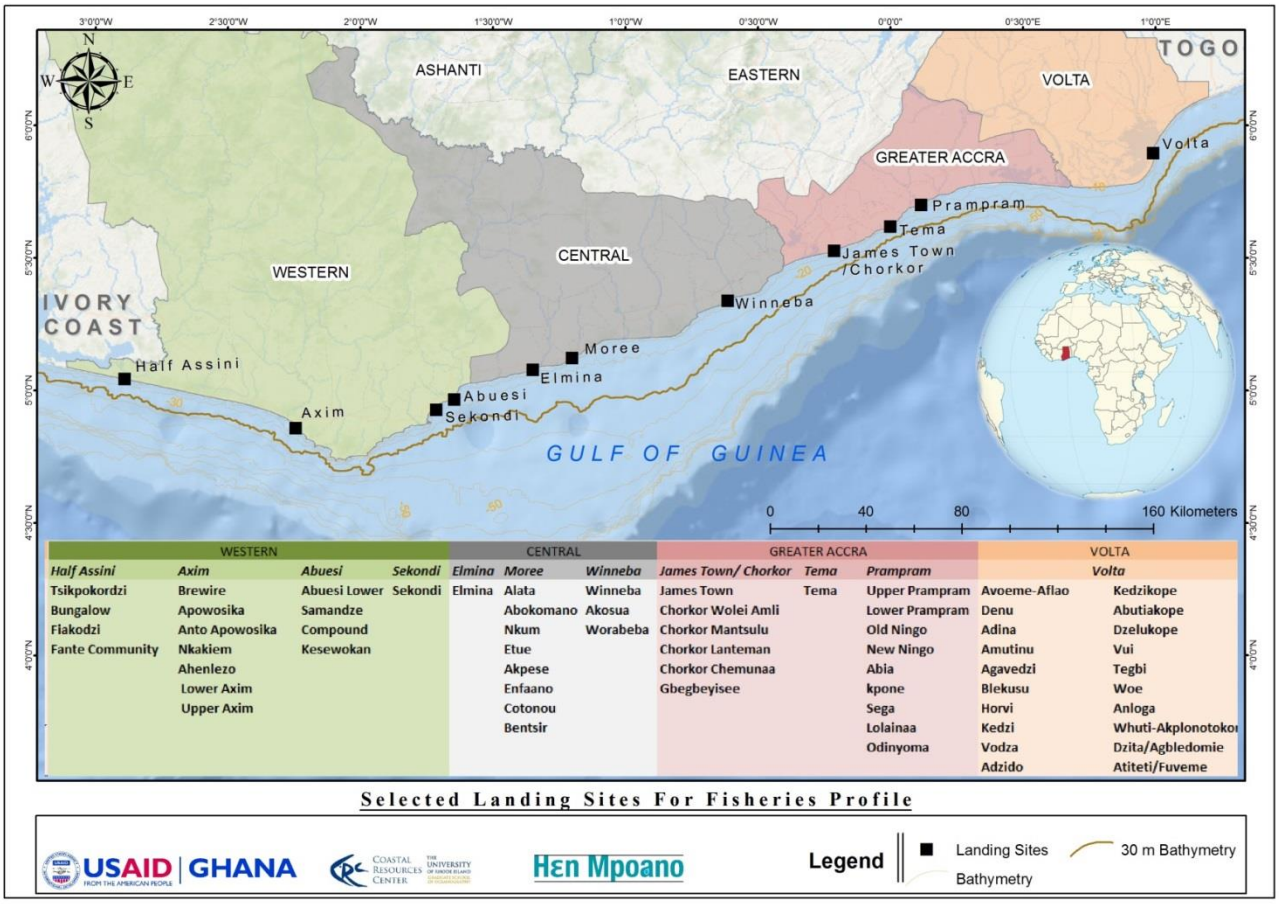


Figure 1: Overview map of selected communities for the small pelagic fisheries profile

RESULTS

AGE DISTRIBUTION

The analysis of fishermen surveyed from the selected communities in the four coastal regions indicated that older generation dominated the fisheries in the traditional fishing communities, i.e., 51+ years along the coast. However the reverse is true in the cosmopolitan fishing communities like Tema, Elmina, Sekondi and communities with lots of migrant fishers like Half Assini.

National

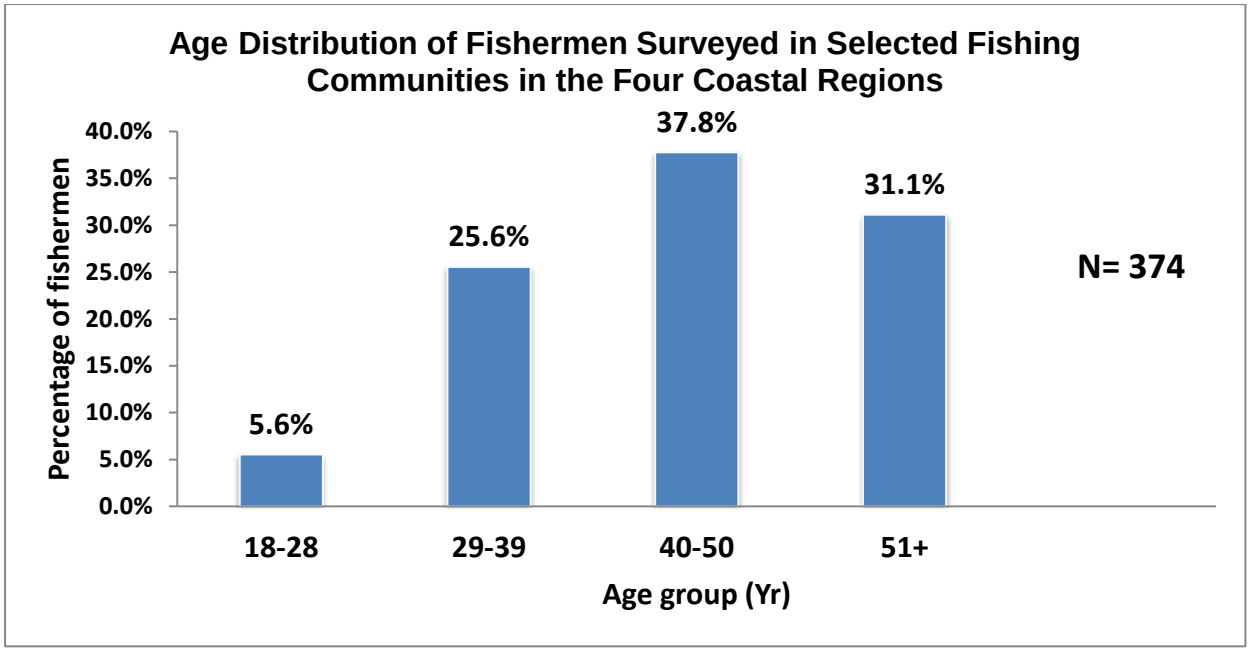


Figure 2: Age distribution of fishermen surveyed from all selected communities in the four coastal regions

Volta Region:

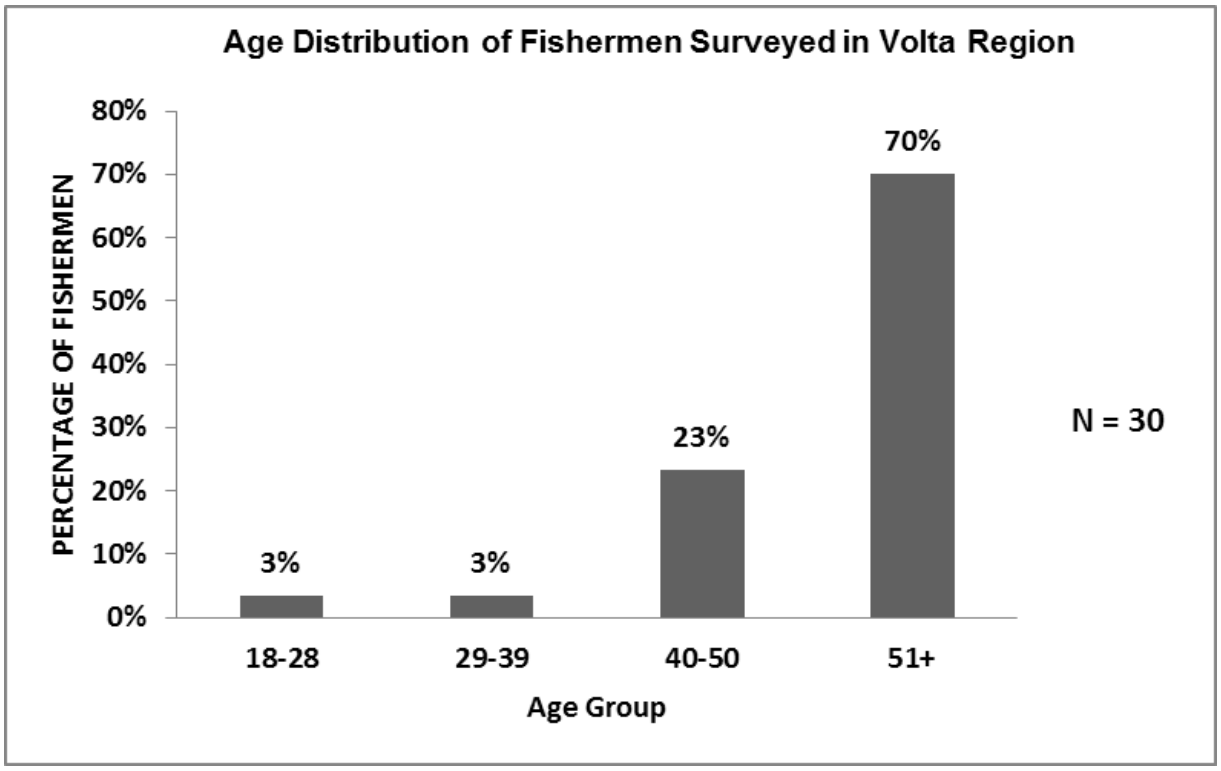


Figure 3: Age distribution of fishermen surveyed in the Volta Region

Greater Accra Region:

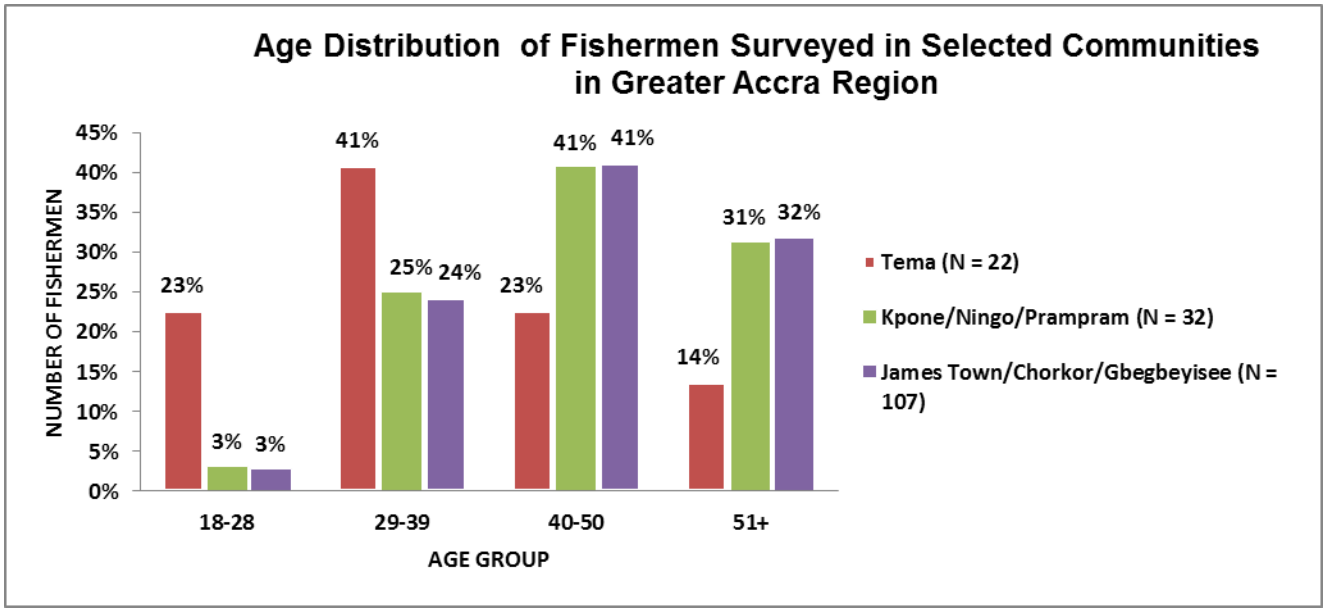


Figure 4: Age distribution of fishermen surveyed in selected communities in Greater Accra Region

Central Region

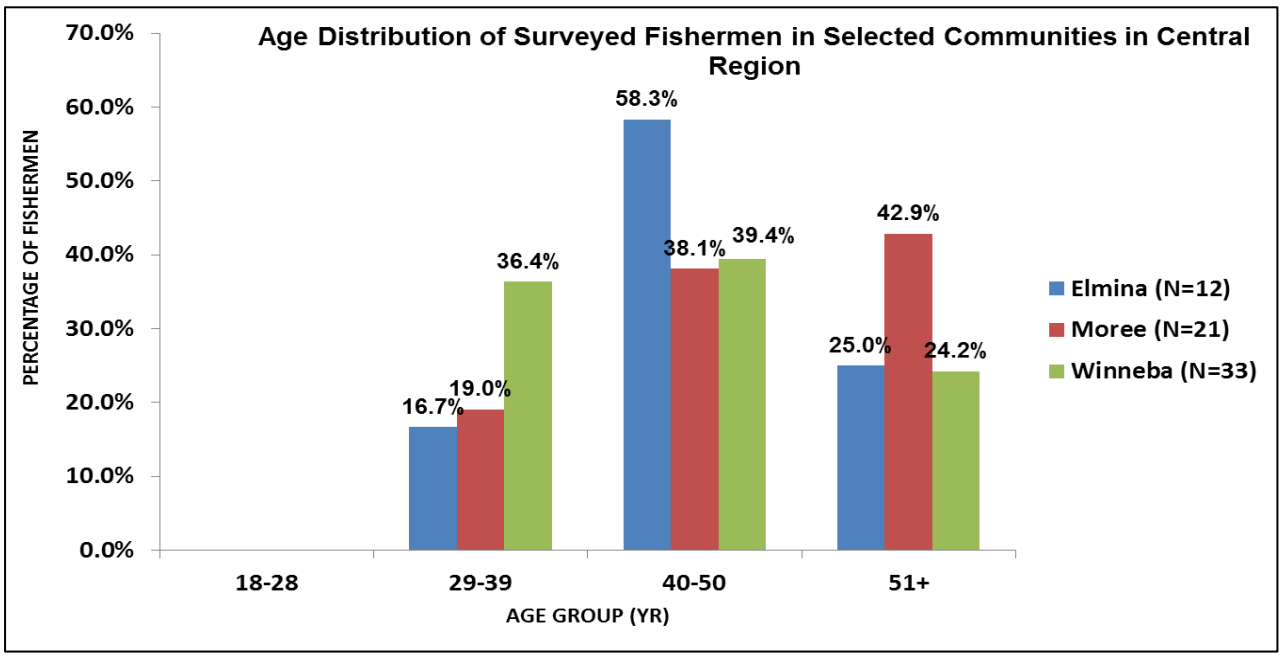


Figure 5: Age distribution of fishermen surveyed in selected communities in Central Region

Western Region

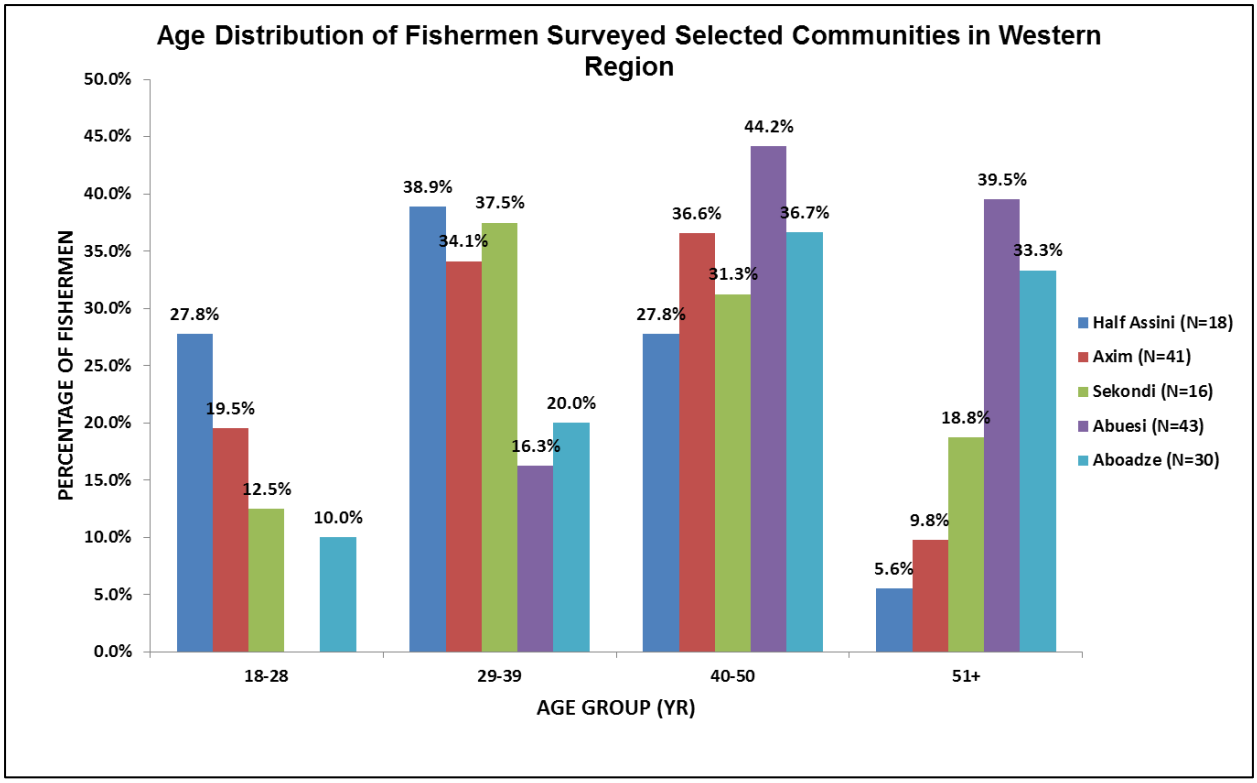


Figure 6: Age distribution of fishermen surveyed in selected communities in Western Region

EDUCATION LEVEL

At the national level, the education level among fishermen interviewed is relatively low. About 50% of fishermen have no formal education. Those who attended school have up to the basic education level, that is, Primary school up to Junior High School level.

National

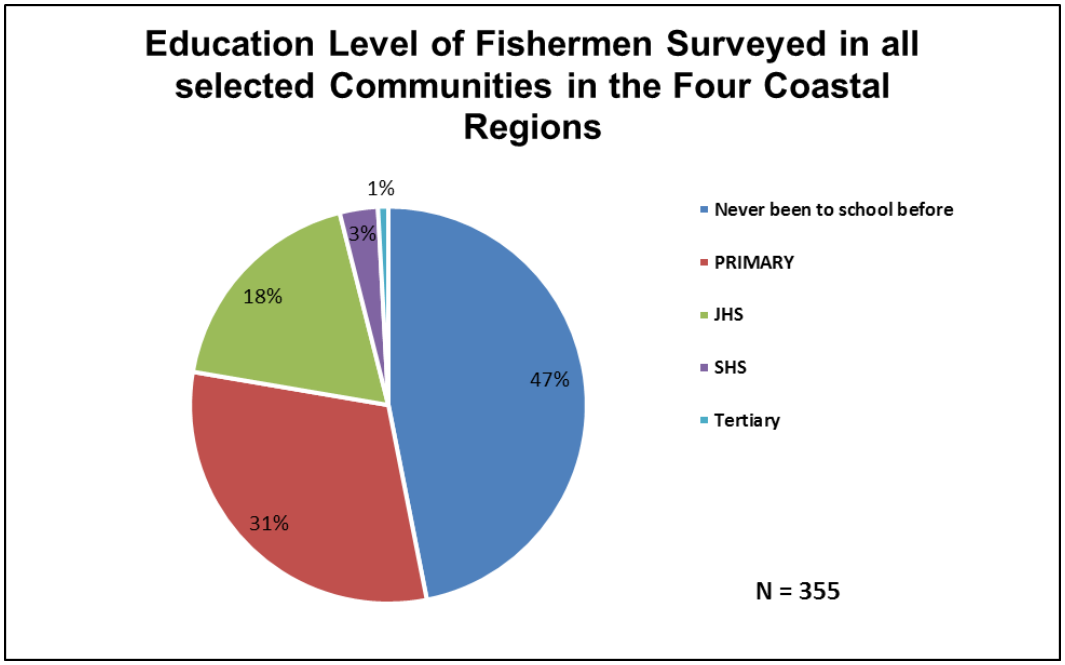


Figure 7: Education level of fishermen surveyed from all selected communities in the four coastal regions

Volta Region

In the Volta, the education level of fishermen sampled was relatively high compared to other regions. The majority of small fishermen in the Volta region operate from beaches using beach seines. Although the majority of fishermen sampled are in the older generation they have basic formal education.

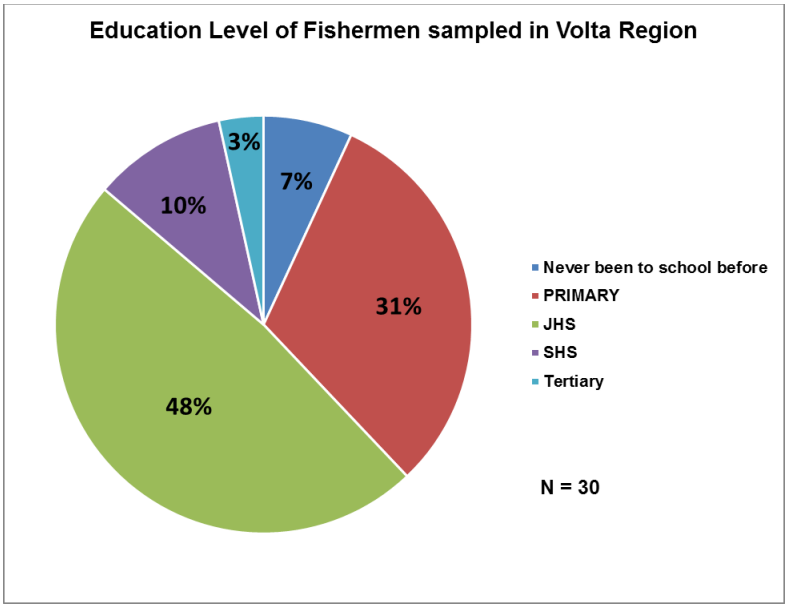


Figure 8: Education level of fishermen surveyed from the Volta RegionGreater Accra Region

The level of education of fishermen sampled in this region is relatively low compared to Volta and Western Regions. About 50% of fishermen cannot read nor write. However a

significant proportion (17%) said they had some form of formal high school education, particularly in Tema and Prampram.

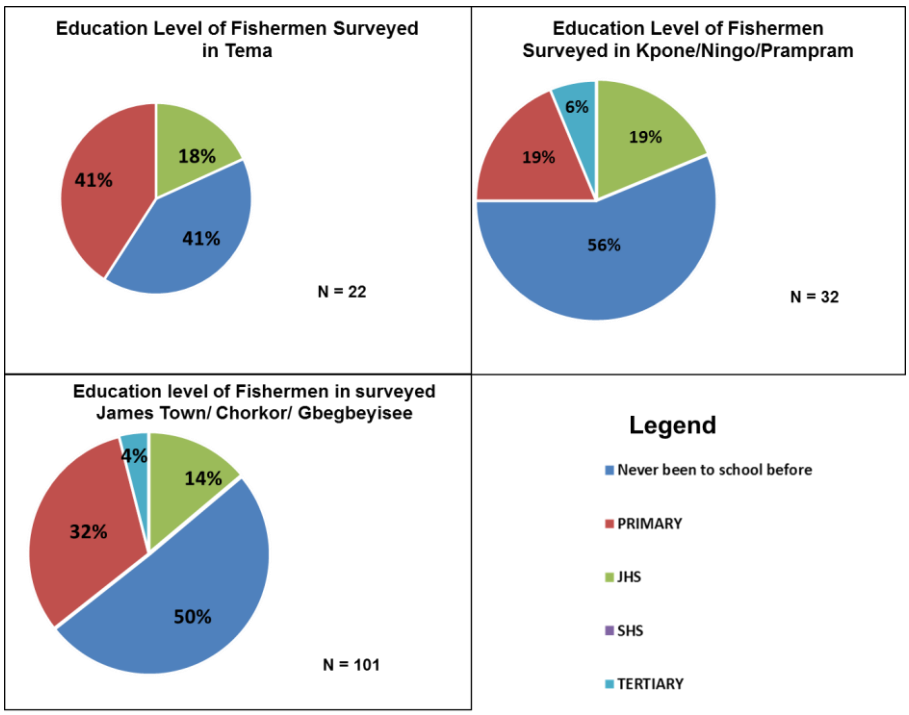


Figure 9: Education level of fishermen surveyed from selected communities in Greater Accra Region

Central Region

Fishermen sampled in the Central Region had the lowest level of education from the entire four coastal regions. Over 60% never had any formal education. Only a small portion of the population of fishermen attended high school.

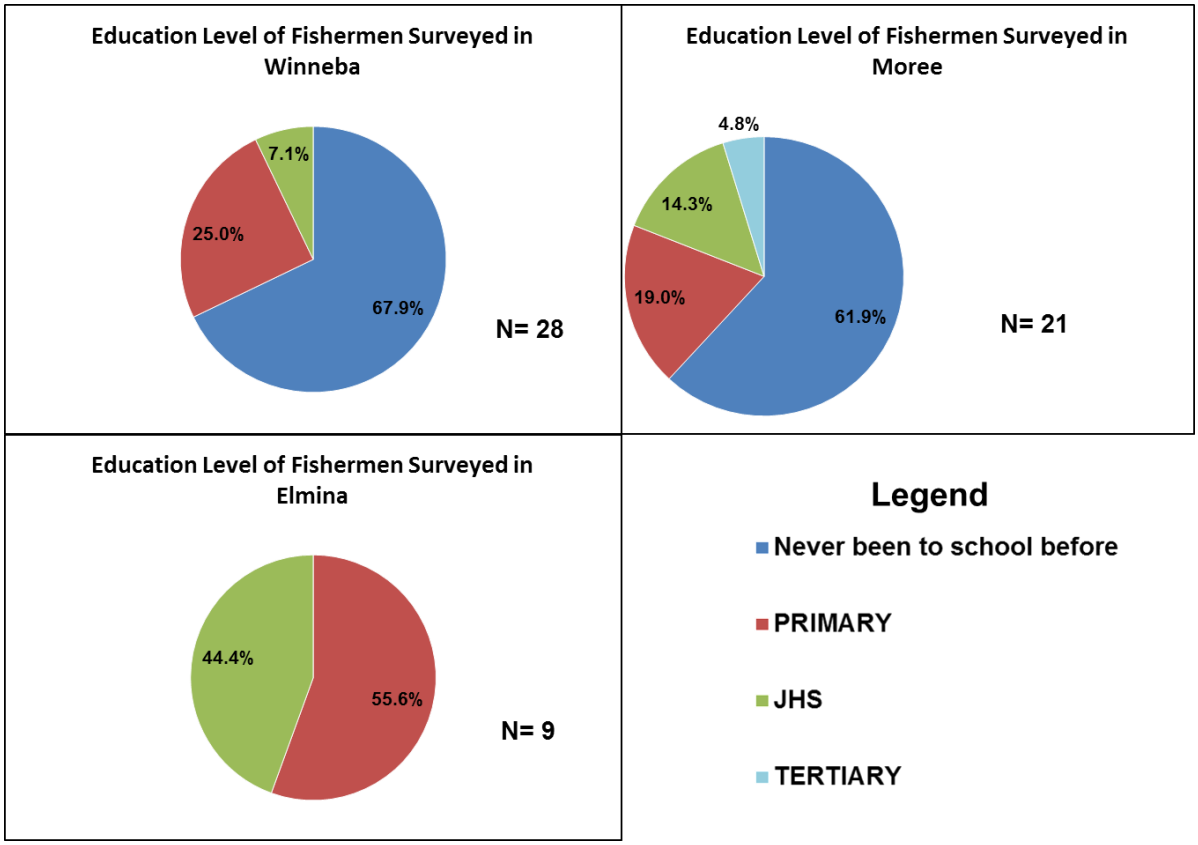


Figure 10: Education of fishermen surveyed from selected communities in Central Region

Western Region

Fishermen sampled in the western region had the highest level of education. 25% of the sampled population was illiterate. A significant level of high education was observed among the fishermen sampled in Sekondi harbor and Abuesi.

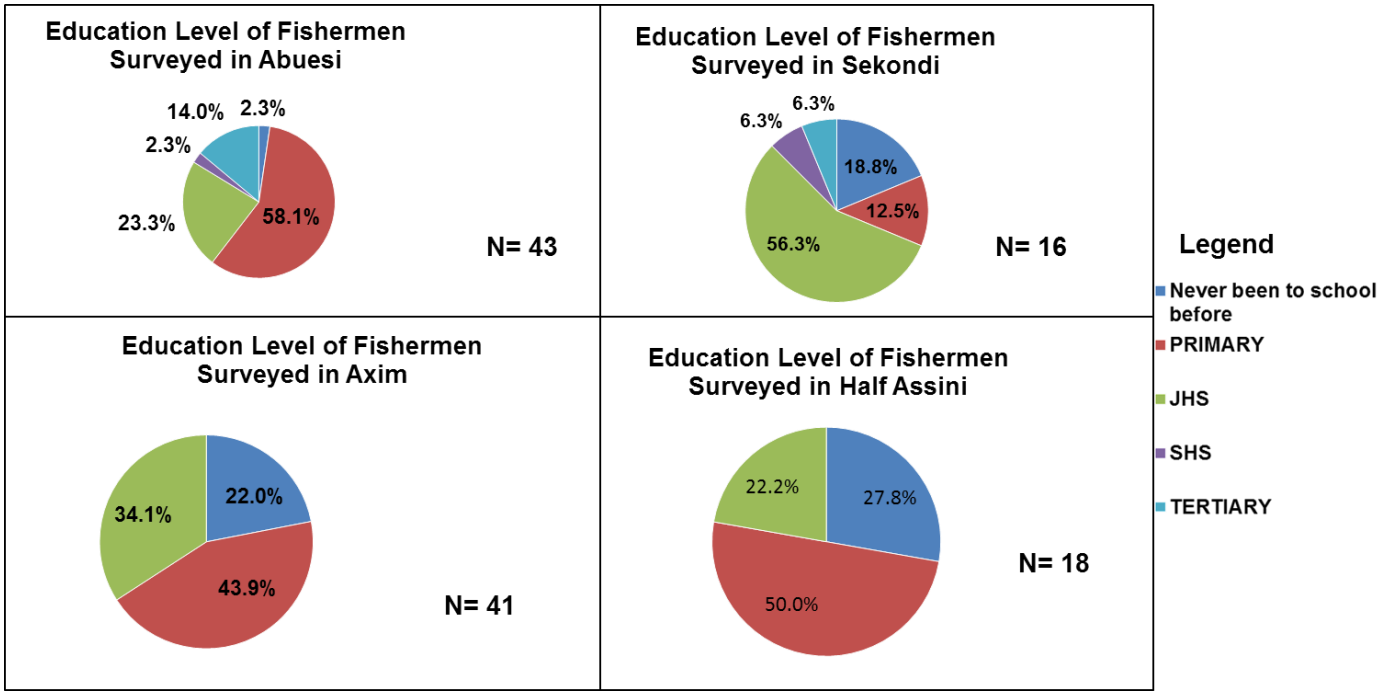


Figure 11: Education level of fishermen surveyed from selected communities in Western Region

MIGRATION PATTERN

Ghanaian fishermen migrate from communities to communities in search of fish and other socio-economic drivers as explained by the interviewees. This migration take many forms, from short term movements over modest distances within the country to long distances across borders to Benin, Togo, Cote d'Ivoire, Liberia and as far north as Senegal. Their migration pattern hinges heavily on location of fish especially the small pelagics such as sardinella and anchovies. There seasonal pattern of movement of fishermen from their home landing site varies by region. Some migrate with their families to play an important role in marketing and fish processing but the majority migrate alone. The majority of fishermen move between July and December when small pelagics are migrating inshore and eastward. The migrants are organized and establish a code of behavior with the host communities or host country, respecting their rules and local etiquette.

National

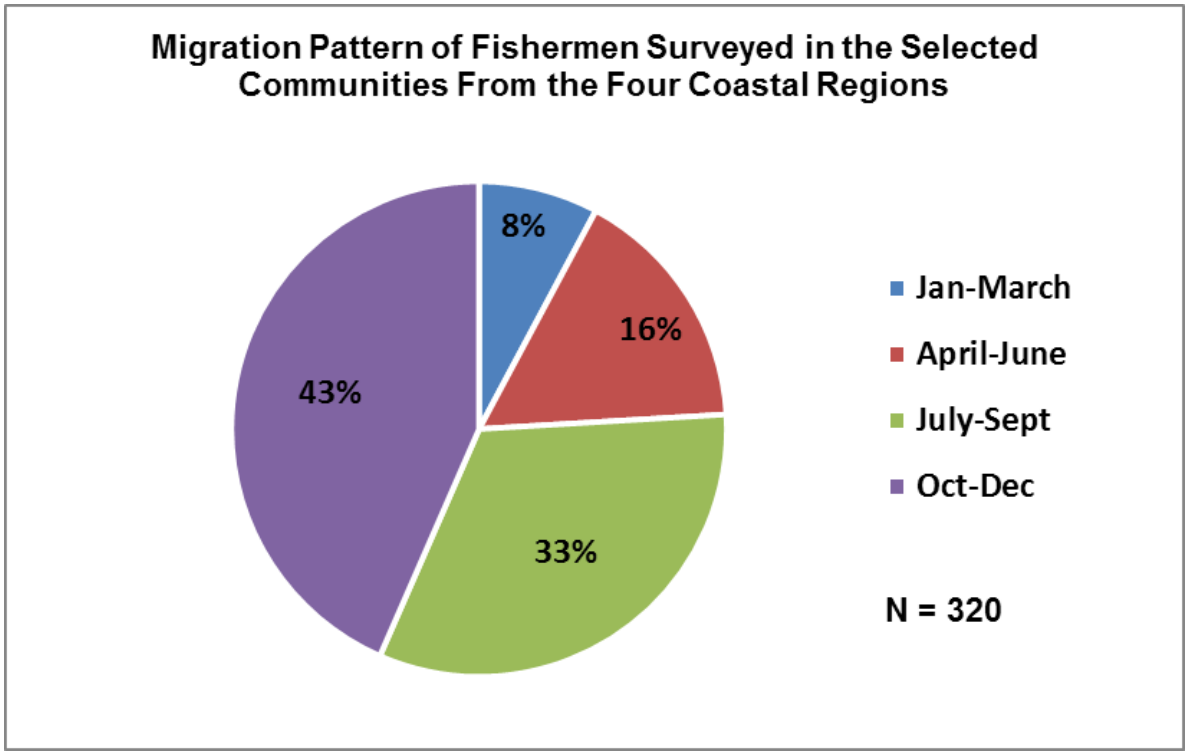


Figure 12: Migration pattern of fishermen surveyed from selected communities in the four coastal regions

Volta Region

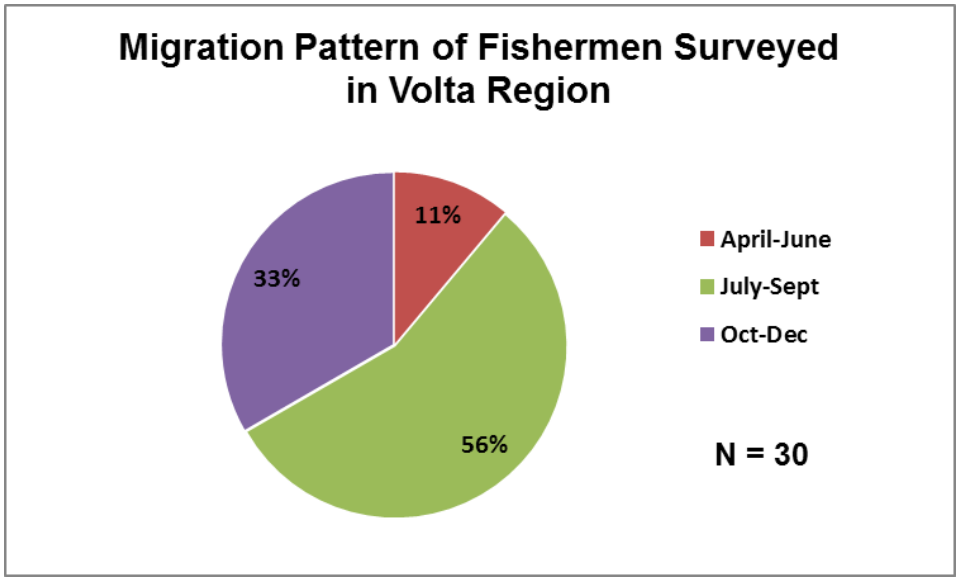


Figure 13: Migration pattern of fishermen surveyed in Volta Region

Greater Accra Region

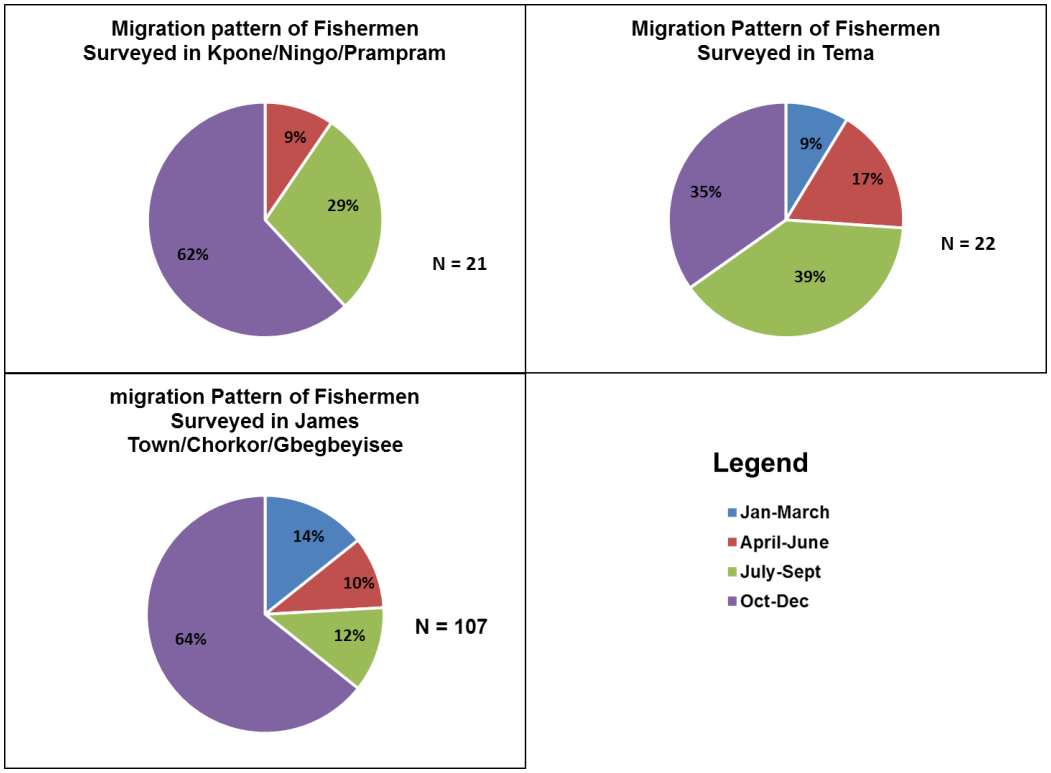


Figure 14: Migration pattern of fishermen surveyed from selected communities in Greater Accra Region

Central Region

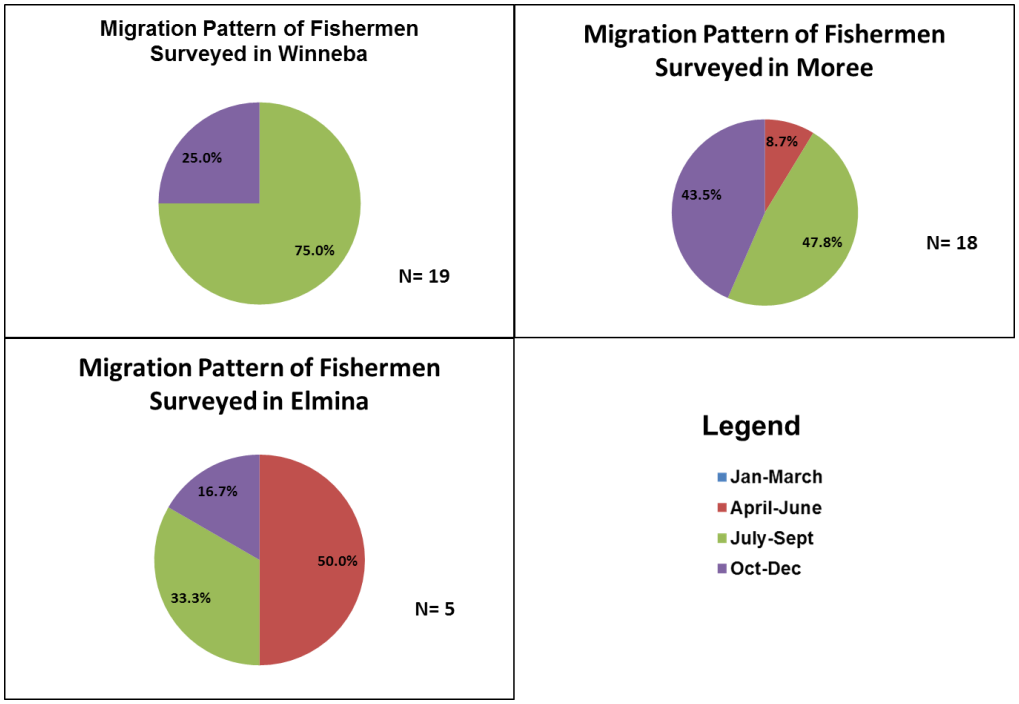


Figure 15: Migration pattern of fishermen surveyed from selected communities in Central Region

Western Region

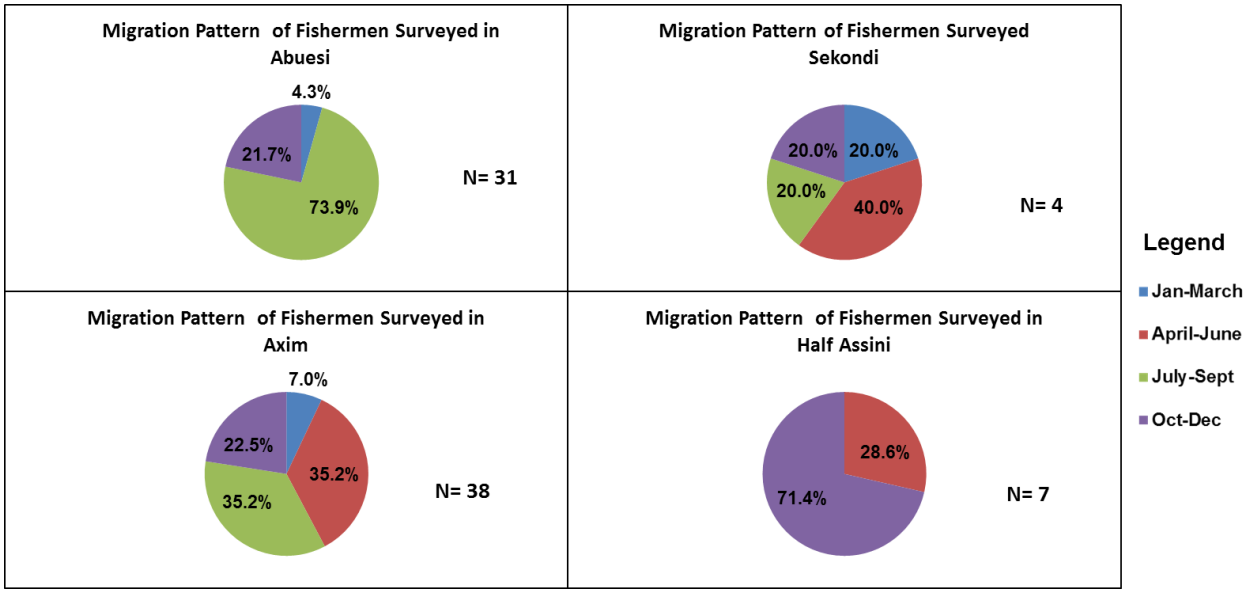


Figure 16: Migration pattern of fishermen surveyed from selected communities in Western Region

NUMBER OF DEPENDENTS

As indicated by the fishermen sampled large family sizes are not uncommon among fishermen with some marrying as much as 5 wives and some having as many as 15 children. However majority of those interviewed were married to one wife. The wives retail the fish and the children sometimes help in fishing expedition.

National

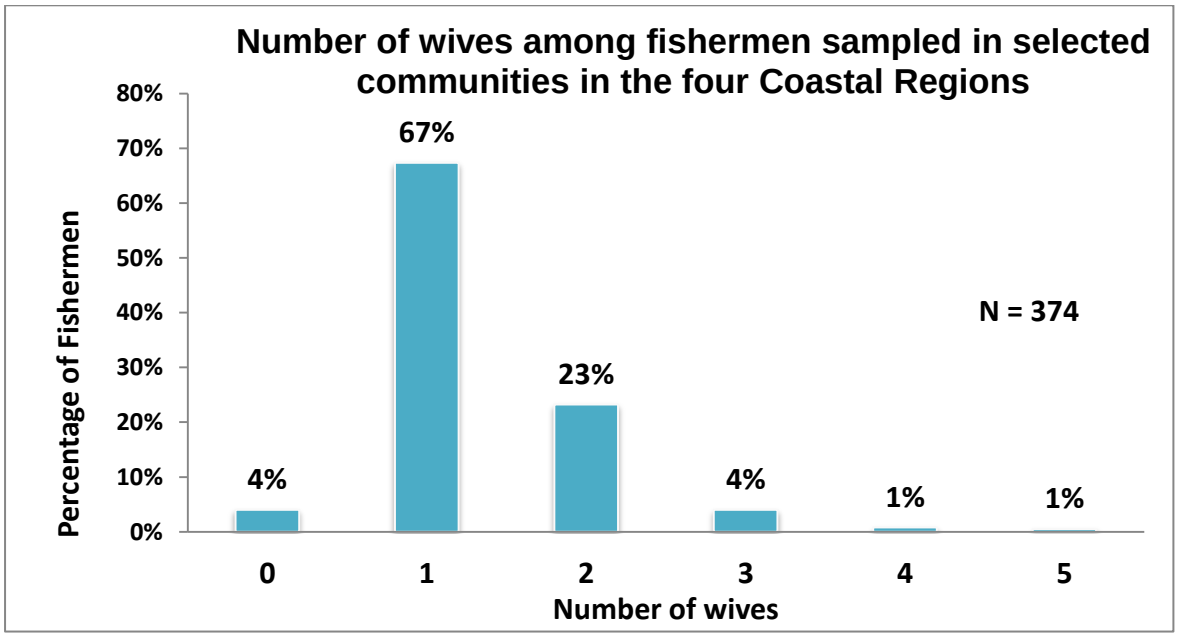


Figure 17: Number of wives of fishermen surveyed from the selected communities in the four coastal regions

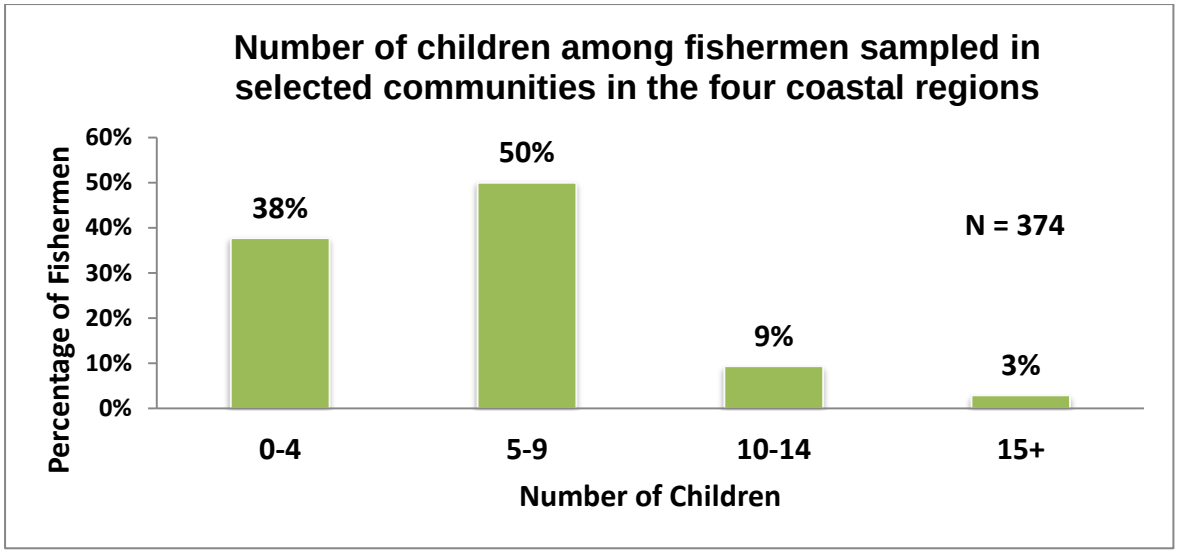


Figure 18: Number of children of fishermen surveyed from all the selected communities in the four coastal regions

Volta Region

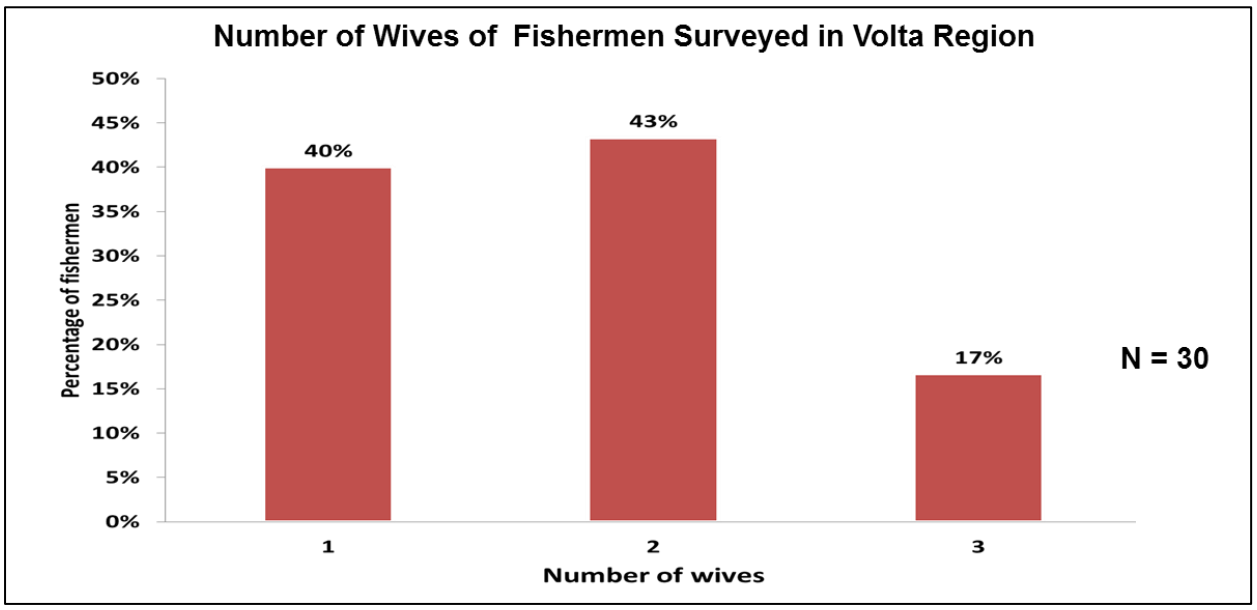


Figure 19: Number of wives of fishermen surveyed in Volta Region

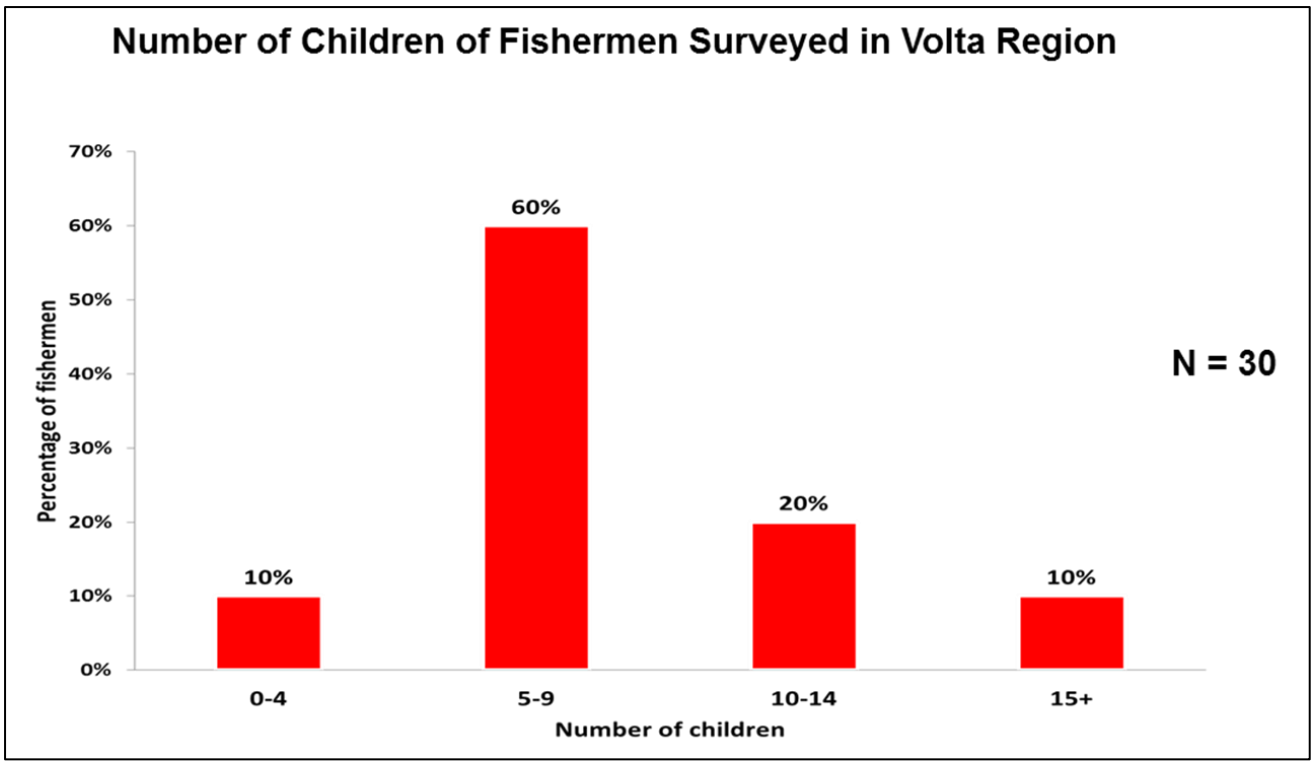


Figure 20: Number of children of fishermen surveyed in the Volta Region

Greater Accra Region

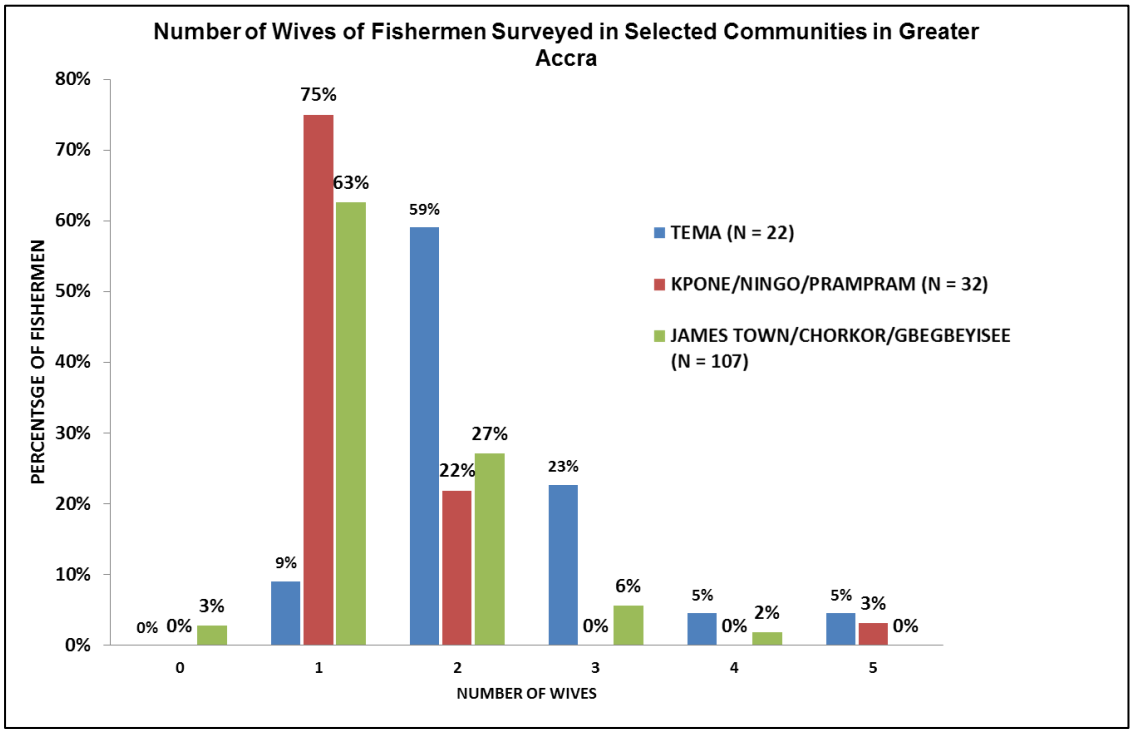


Figure 21: Number of wives of fishermen surveyed from the selected communities in Greater Accra Region

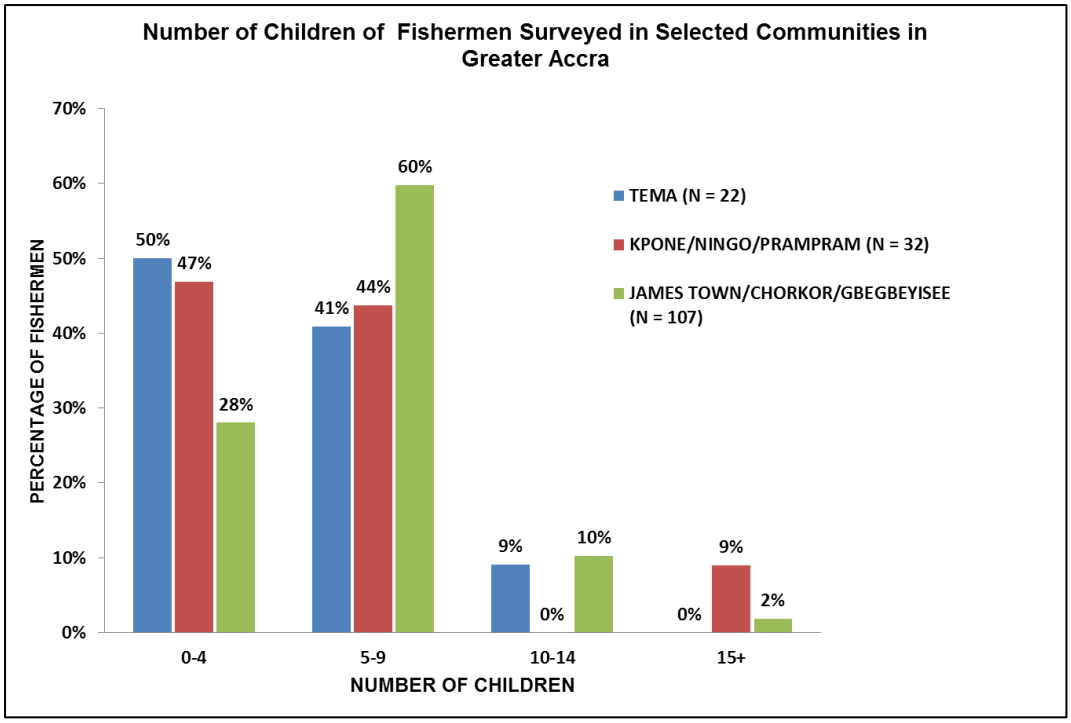


Figure 22: Number of children of fishermen surveyed from the selected communities in Greater Accra Region

Central Region

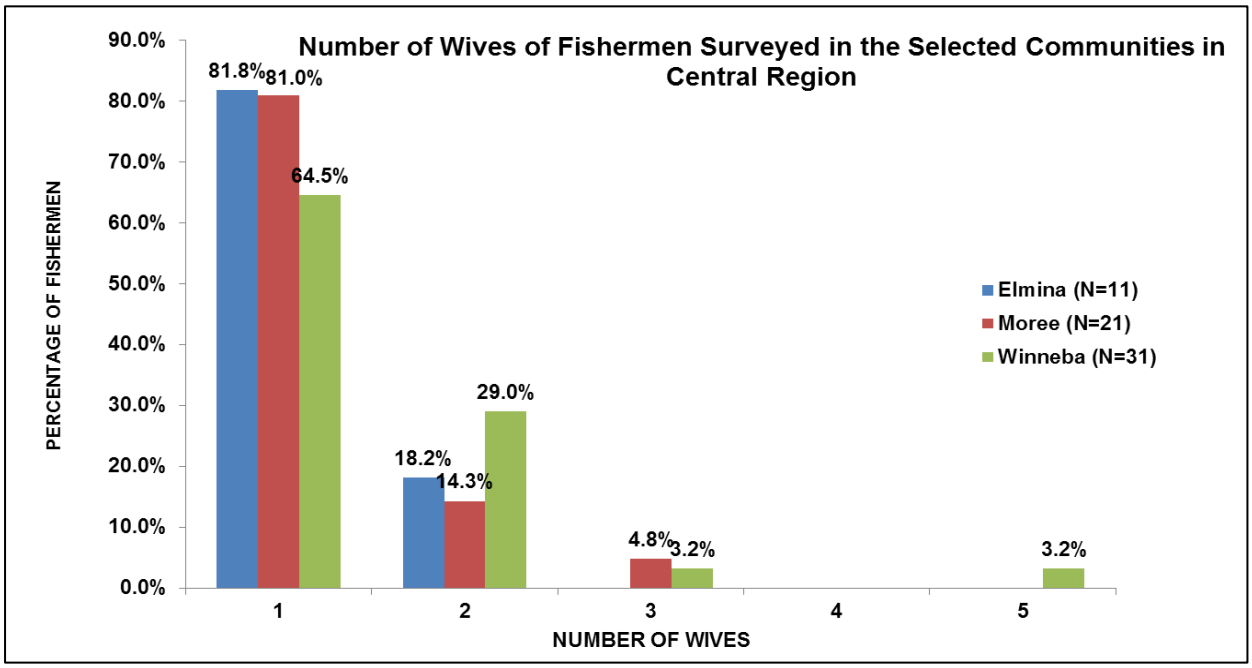


Figure 23: Number of wives of fishermen surveyed from the selected communities in Central Region

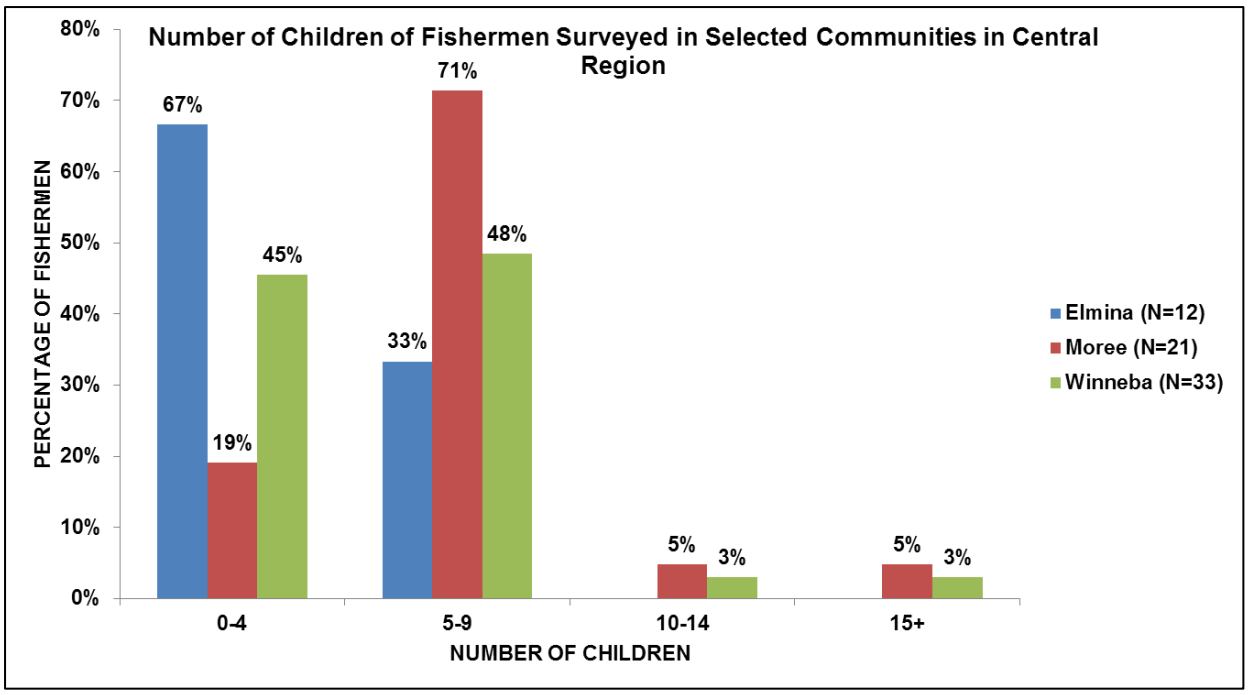


Figure 24: Number of children of fishermen surveyed from the selected communities in Central Region

Western Region

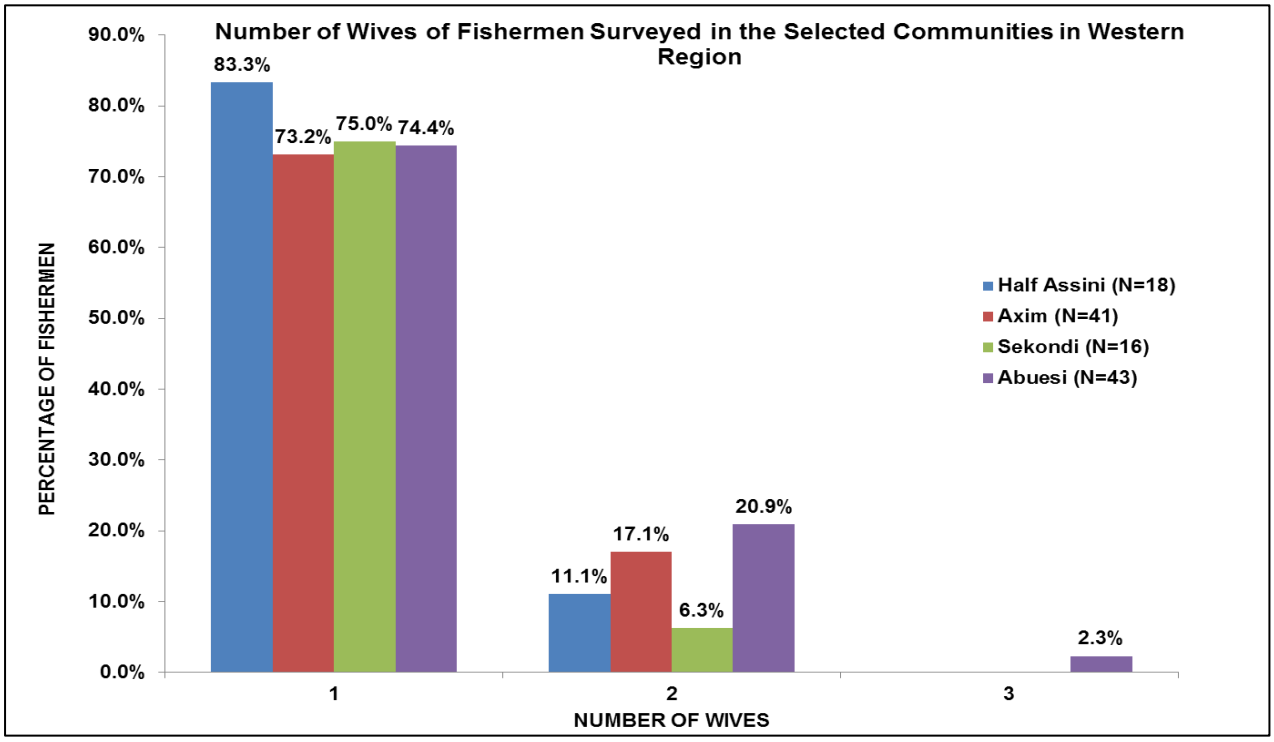


Figure 25: Number of wives of fishermen surveyed from the selected communities in Western Region

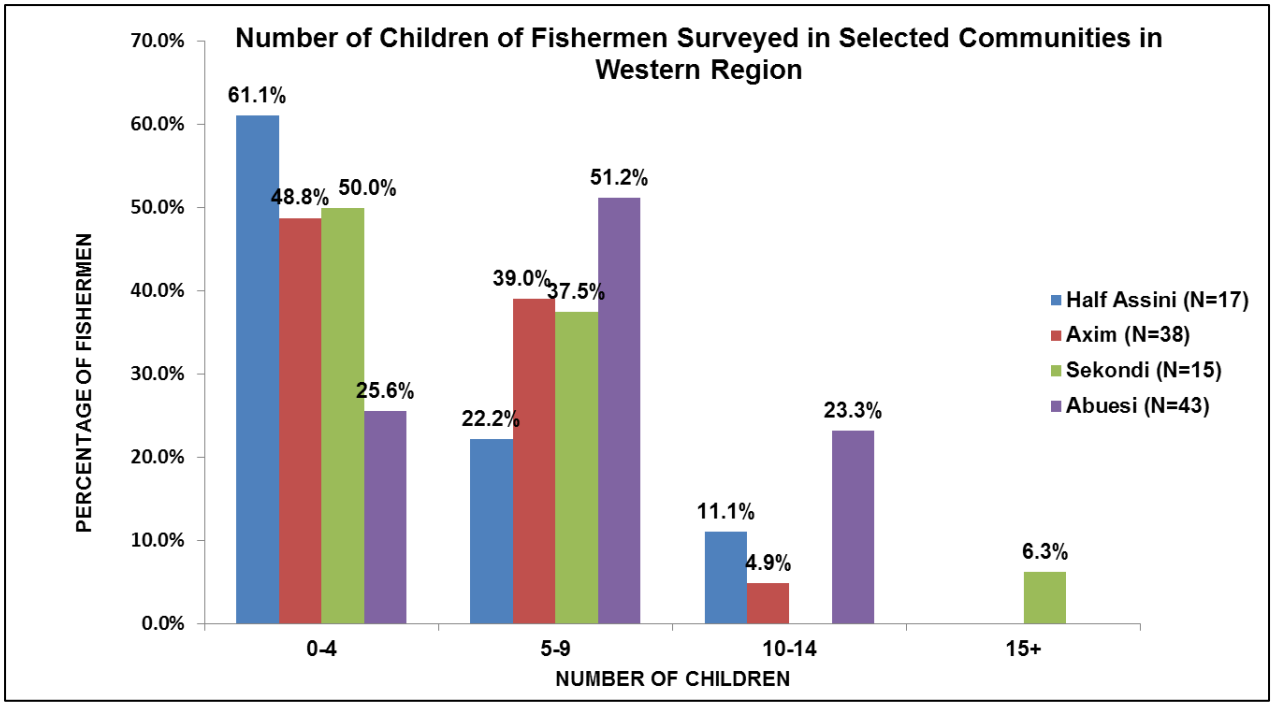


Figure 26: Number of children of fishermen surveyed from the selected communities in Western Region

YEARS IN FISHING

Among the fishermen sampled in the selected communities along the four coastal regions, majority of them had more than 20 years of fishing experience. This confirms the long history and traditional ties of coastal communities with fishing. It is not just a livelihood but a way of life as expressed by some of the interviewees.

National

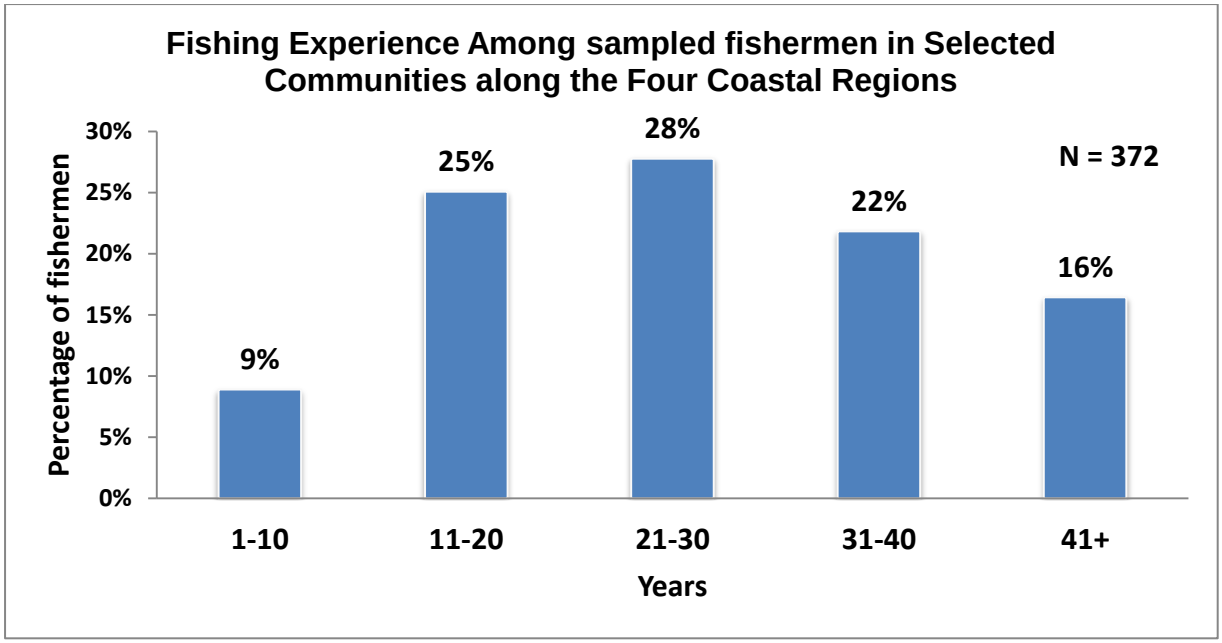


Figure 27: Fishing experience of fishermen surveyed from the selected communities in the four coastal regions

Volta region

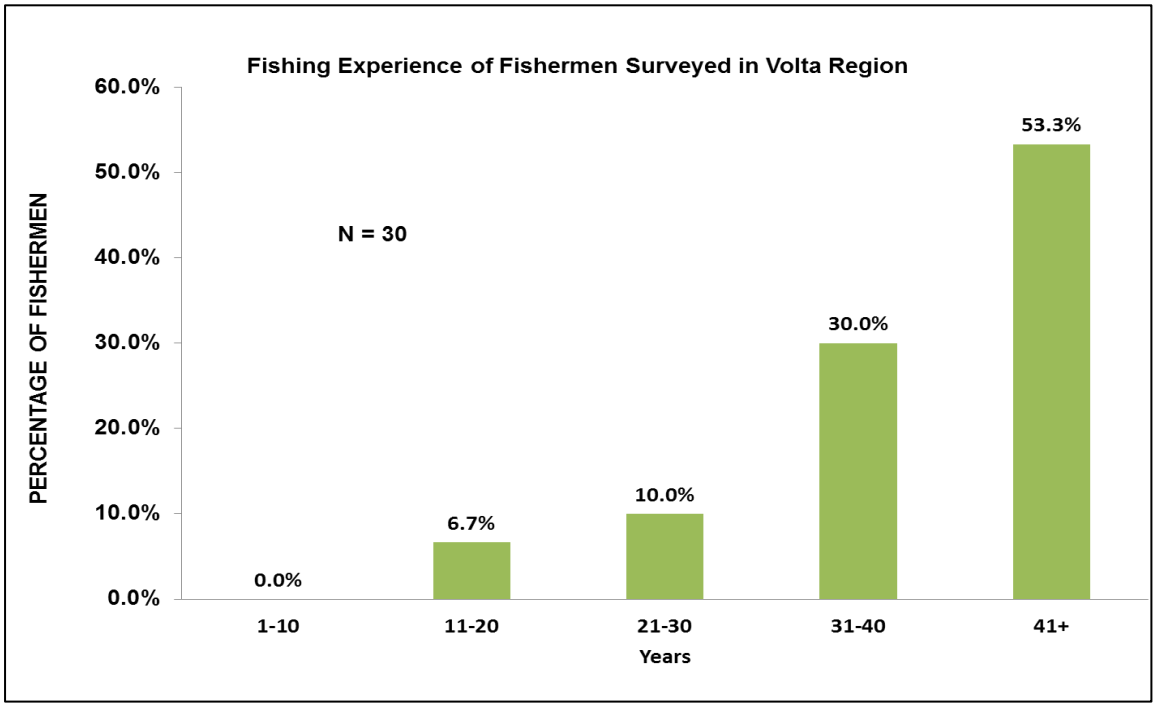


Figure 28: Fishing experience of fishermen surveyed in Volta Region

Greater Accra Region

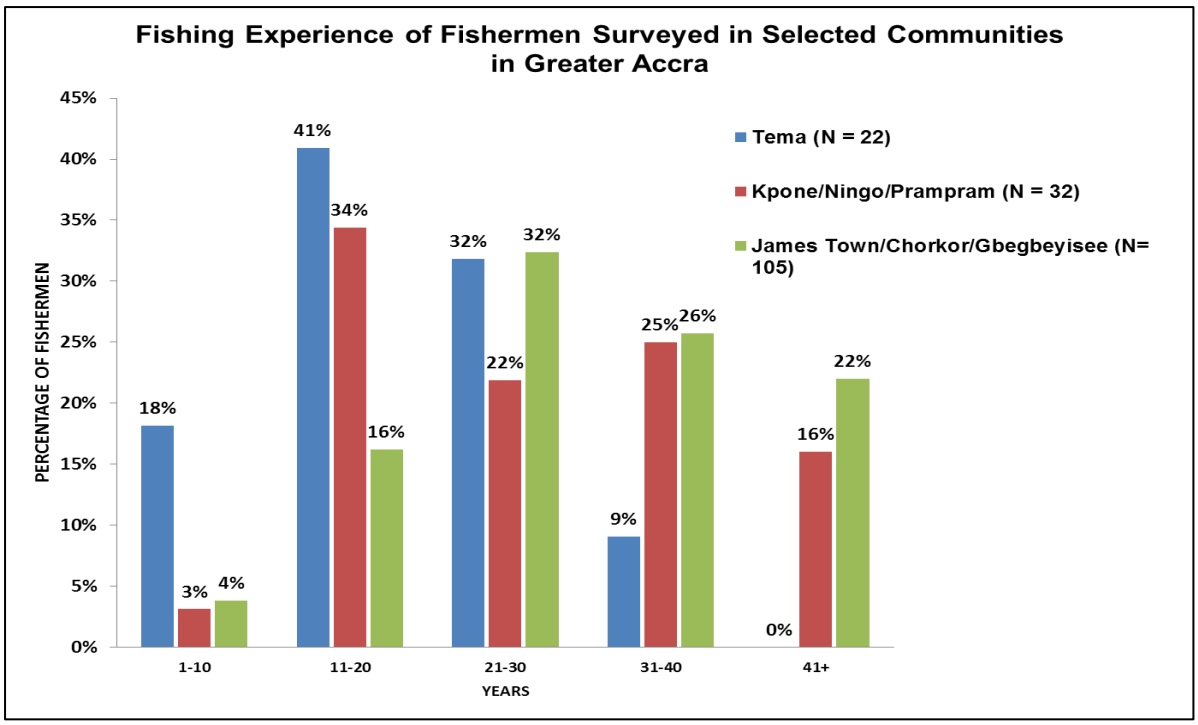


Figure 29: Fishing experience of fishermen surveyed from the selected communities in Greater Accra Region

Central Region

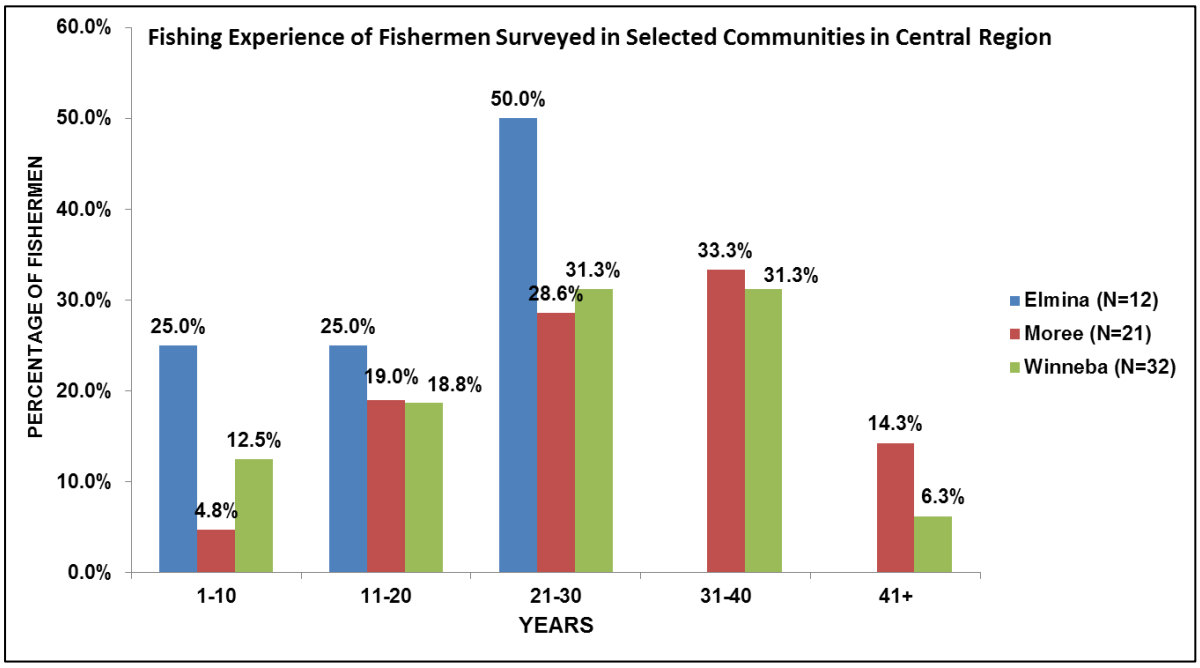


Figure 30: Fishing experience of fishermen surveyed from the selected communities in Central Region

Western Region

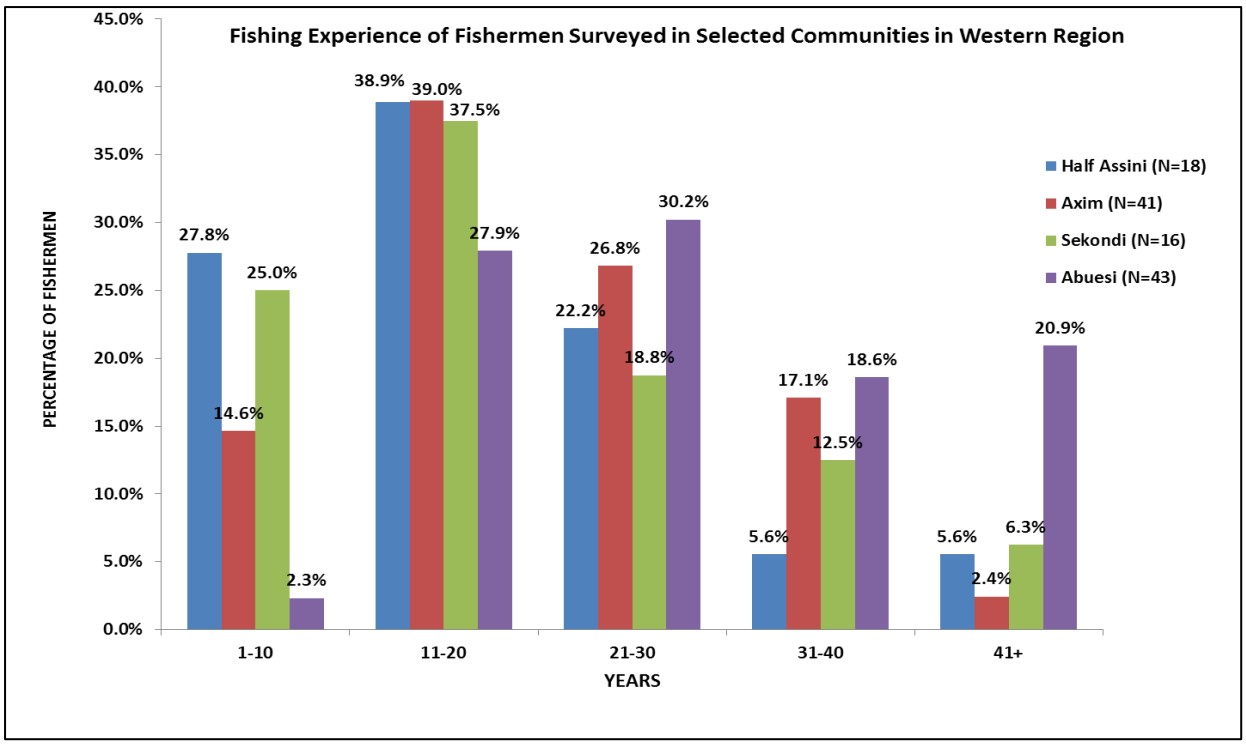


Figure 31: Fishing experience of fishermen surveyed from the selected communities in Western Region

SIZE OF CANOE

From the sample of fishermen in this survey, canoe size harvesting small pelagic in the artisanal fisheries sector are dominated by the 12-16 meters canoes. There are some extreme cases where sizes as large as 20 meters to 22 meters are recorded in places like Prampram and Half Assini. Smaller size canoes are used inshore close to lagoons and estuaries.

National

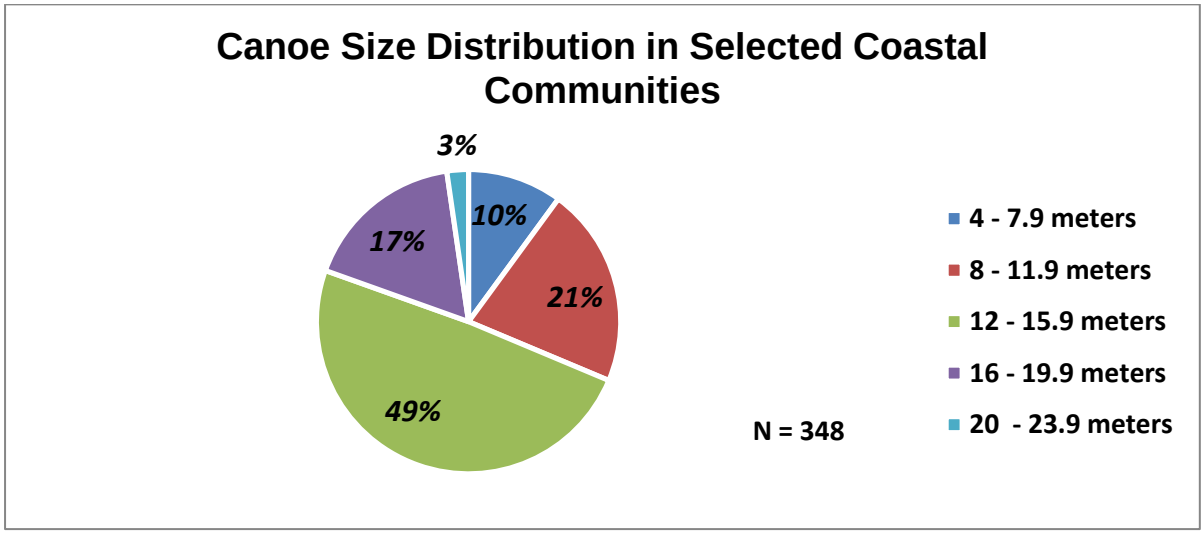


Figure 32: Canoe size distribution from fishermen surveyed in the selected communities in the four coastal regions

Volta Region

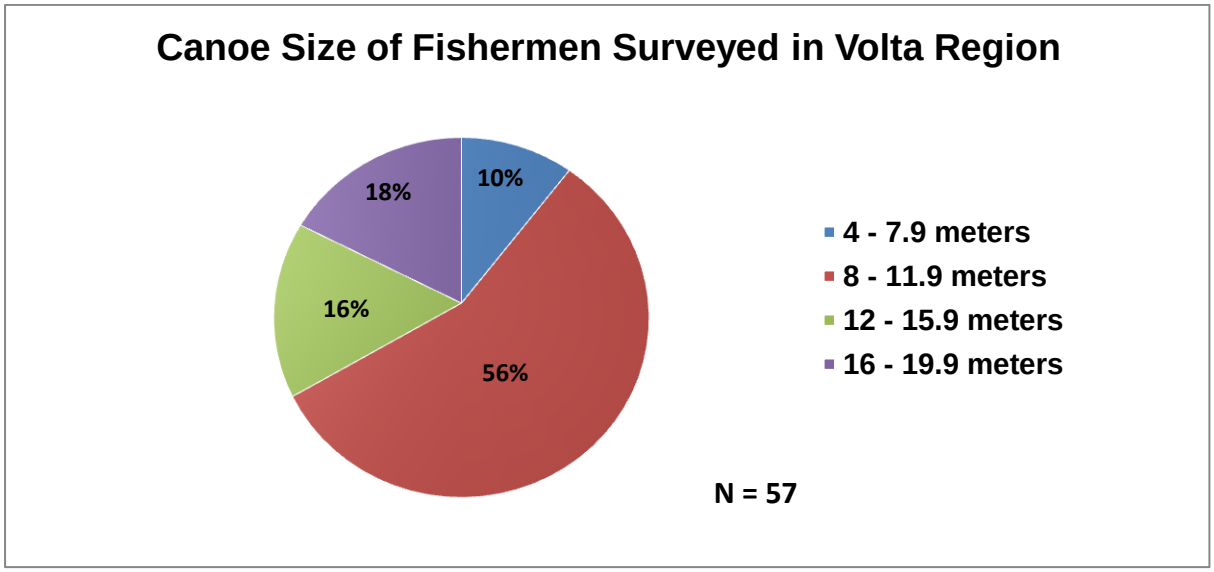


Figure 33: Canoe size distribution from fishermen surveyed in Volta Region

Greater Accra Region

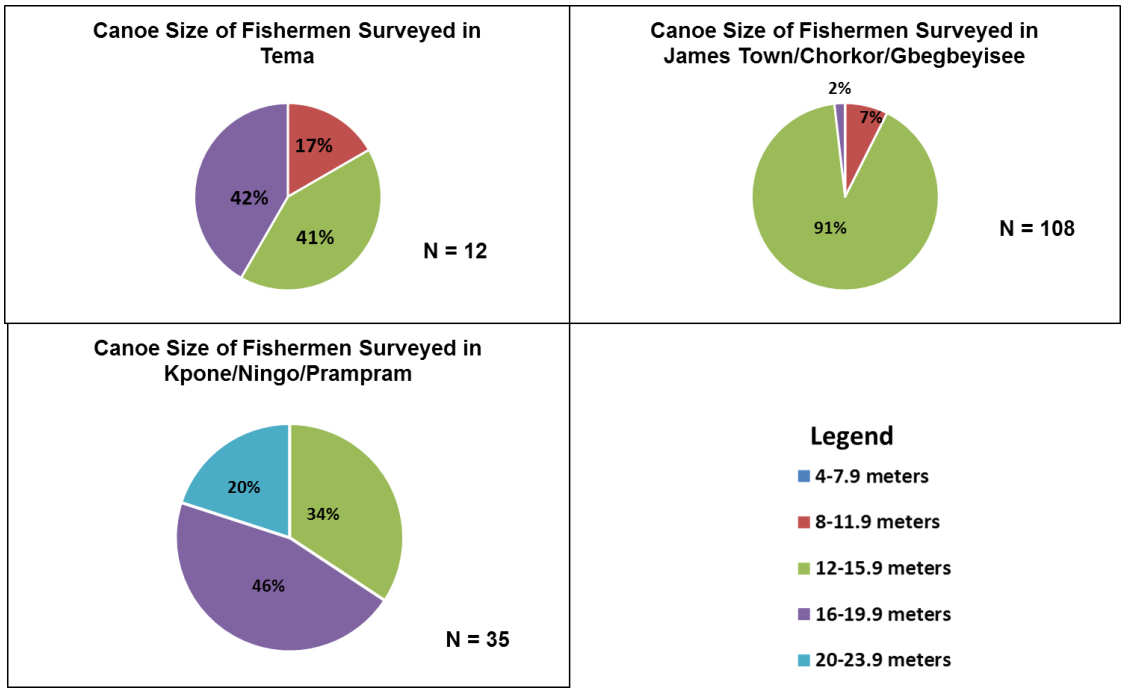


Figure 34: Canoe size distribution from fishermen surveyed in the selected communities in Greater Accra Region

Central region

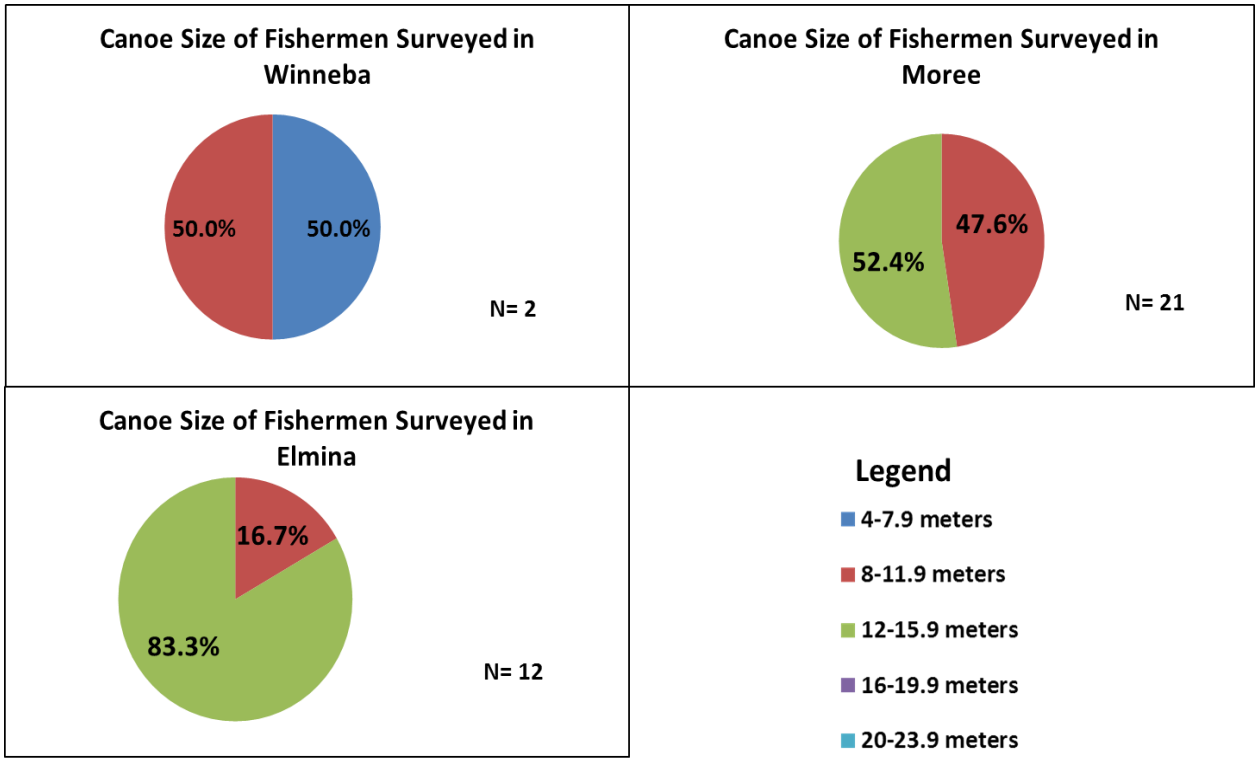


Figure 35: Canoe size distribution from fishermen surveyed in the selected communities in Central Region

Western Region

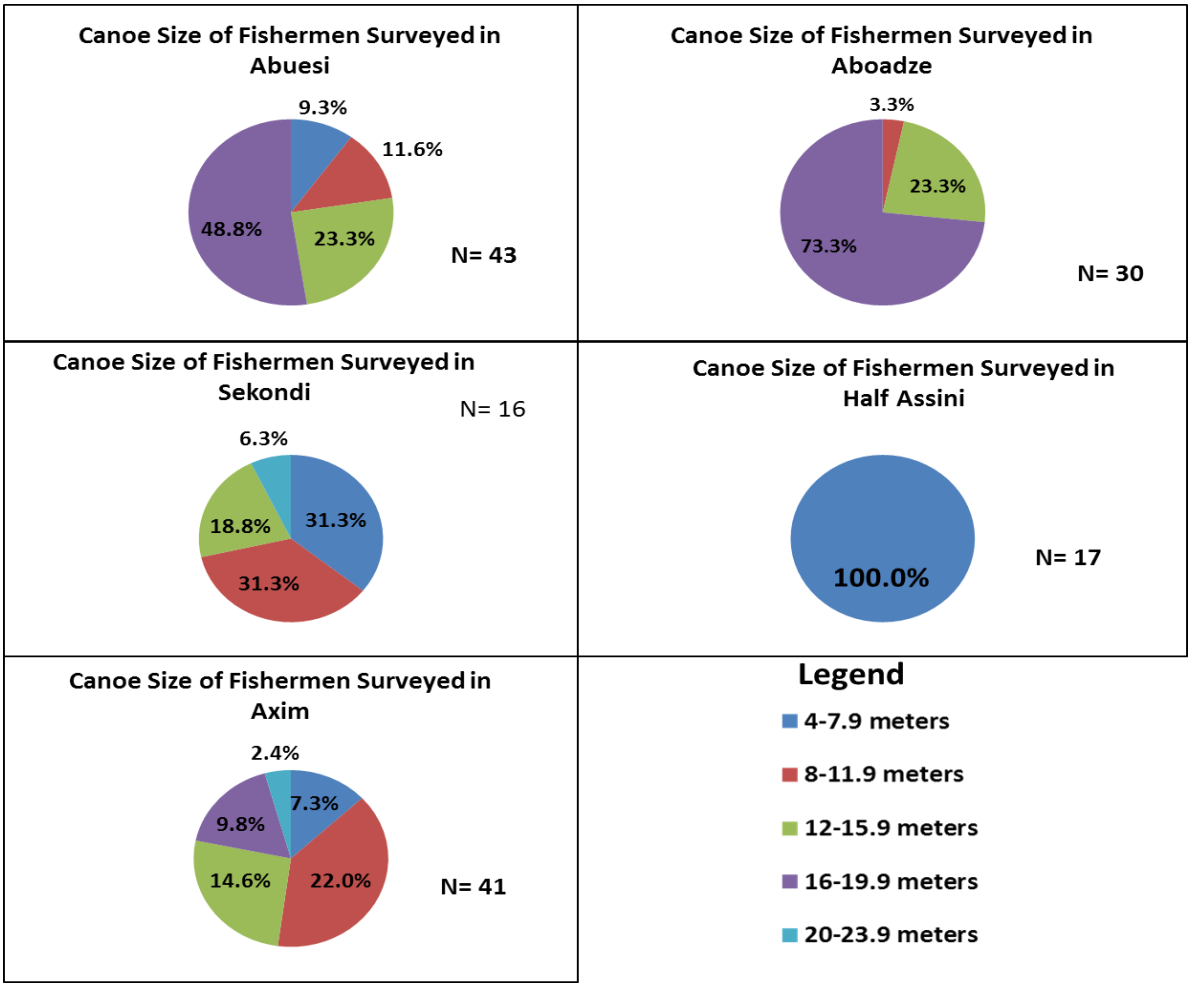


Figure 36: Canoe size distribution from fishermen surveyed in the selected communities in Western Region

TYPE OF GEARS

Fishing gears in the artisanal fisheries is constantly evolving; fishermen are always finding or inventing more efficient fishing gears to target shoal of fish. Based on fishermen sampled in our survey it suggest that the Volta Region, which hitherto was considered to be dominated by a single fishing gear, the beach seine, has seen massive adoption of other fishing gear over the years. They have moved from the traditional beach seine fisheries to adopt hook and line, Purse seine net or *Ali Poli Watsa* (APW), Drift Gill Net (DGN) and others in their fishery.

National

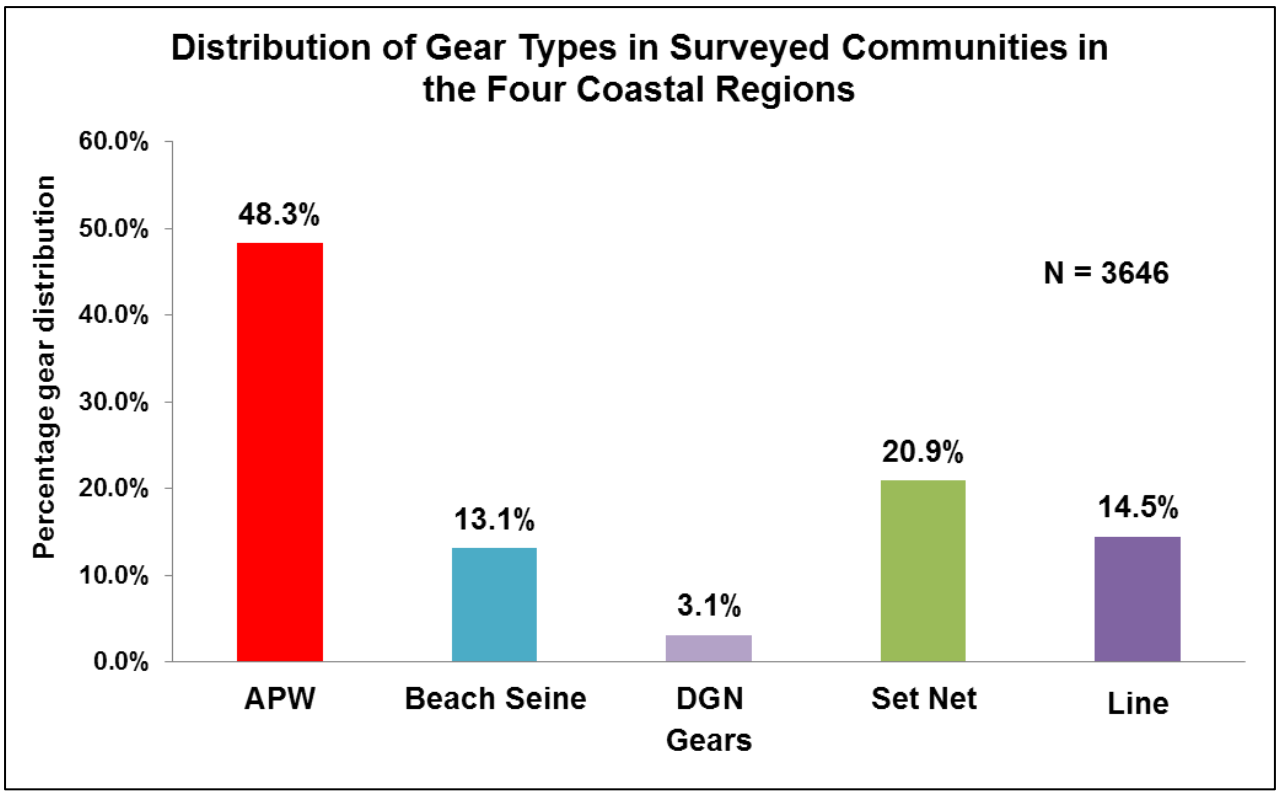


Figure 37: Distribution of fishing gear types in the selected communities from the four coastal regions

Volta region

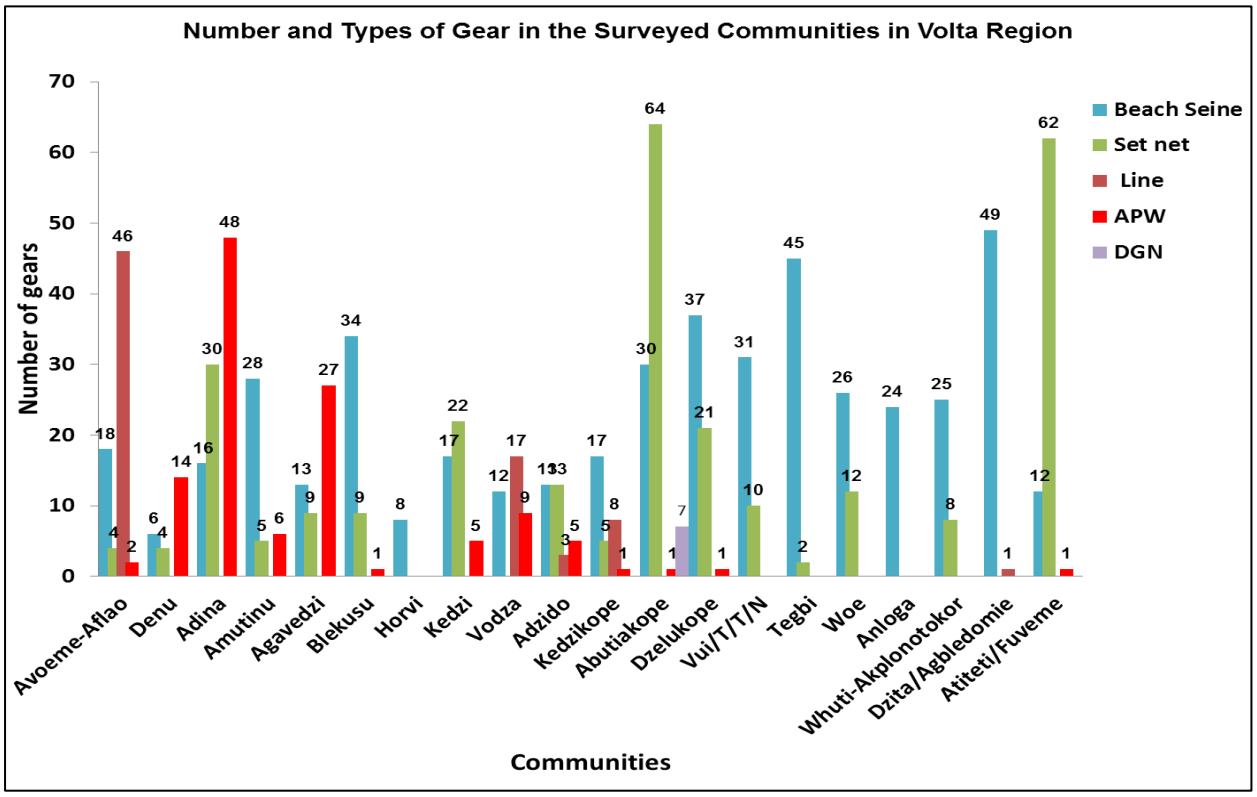


Figure 38: Types of gears in selected communities in Volta Region

Greater Accra Region

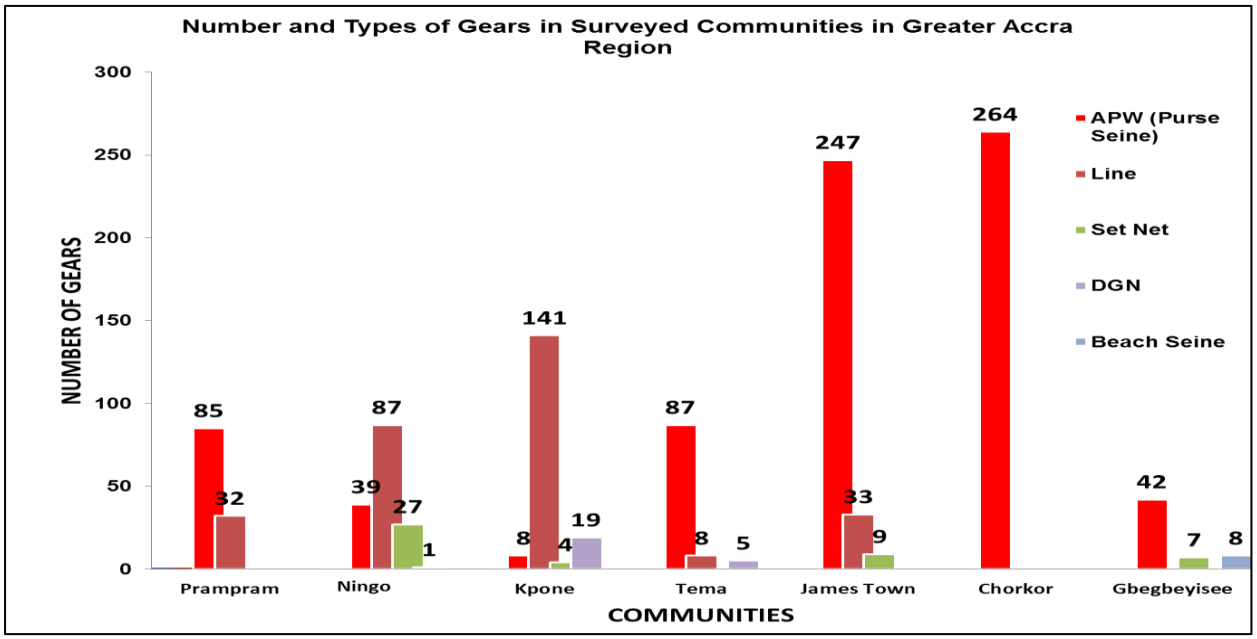


Figure 39: Types of fishing gears in the selected communities in Greater Accra Region

Central Region

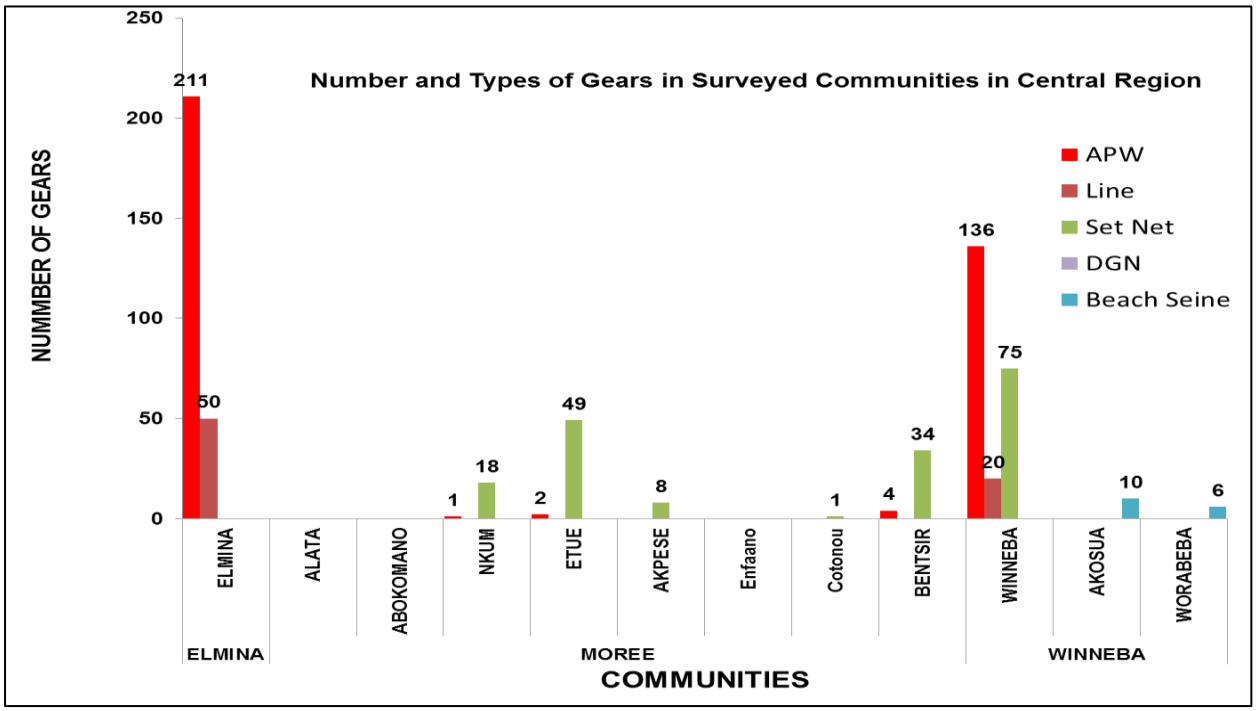


Figure 40: Types of fishing gears in the selected communities in Central Region

Western Region

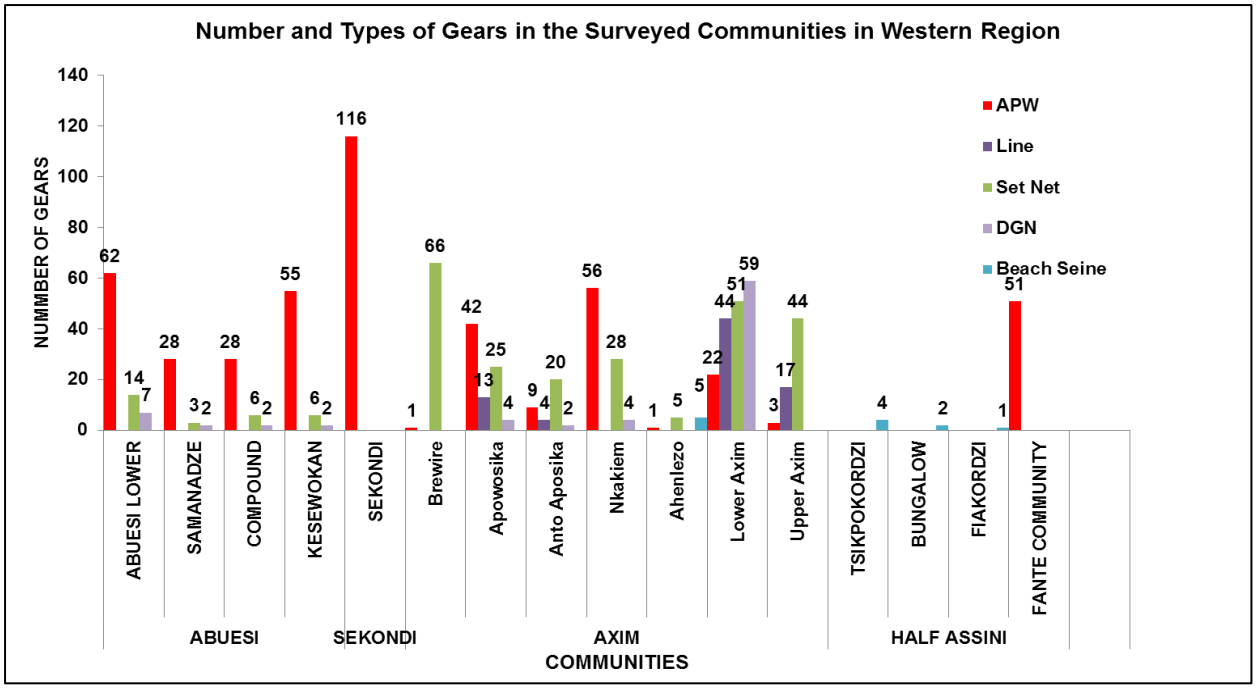


Figure 41: Types of fishing gears in the selected communities in Western Region

NUMBER OF FISHERMEN AND CANOES

The coast remains the most densely populated area in Ghana. The majority of people living in the coast are directly or indirectly involved in fishing activities. More work force are moving into fishing and more canoes enter into the fishery. According to census of fishermen and canoes in surveyed communities, fishermen in the selected communities outnumber the canoes by an average of 10 to 1 (i.e., for every one canoe constructed, there are 10 times the number of fishermen available). Everyone of this fishermen look forward to owning a canoe in a fishery faced with overcapacity and overfishing problem.

Volta Region

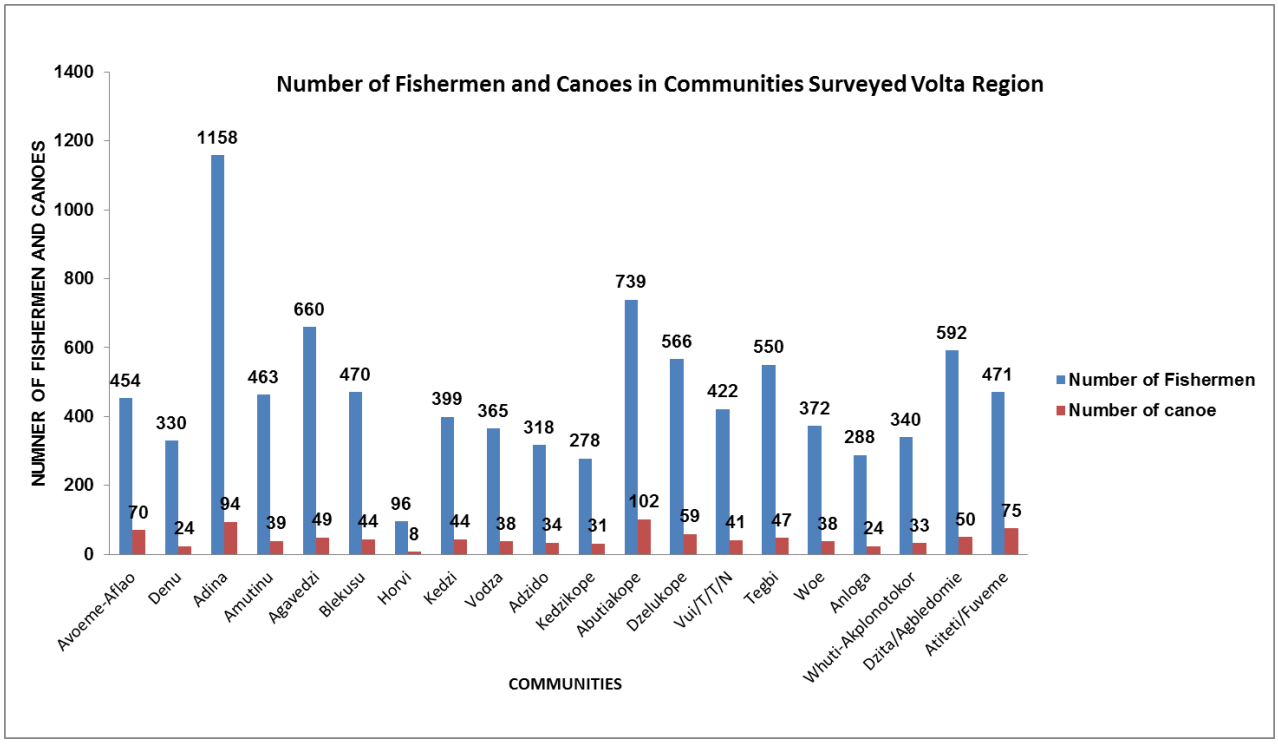


Figure 42: Number of fishermen and canoes harvesting small pelagic fish in Volta Region

Greater Accra Region

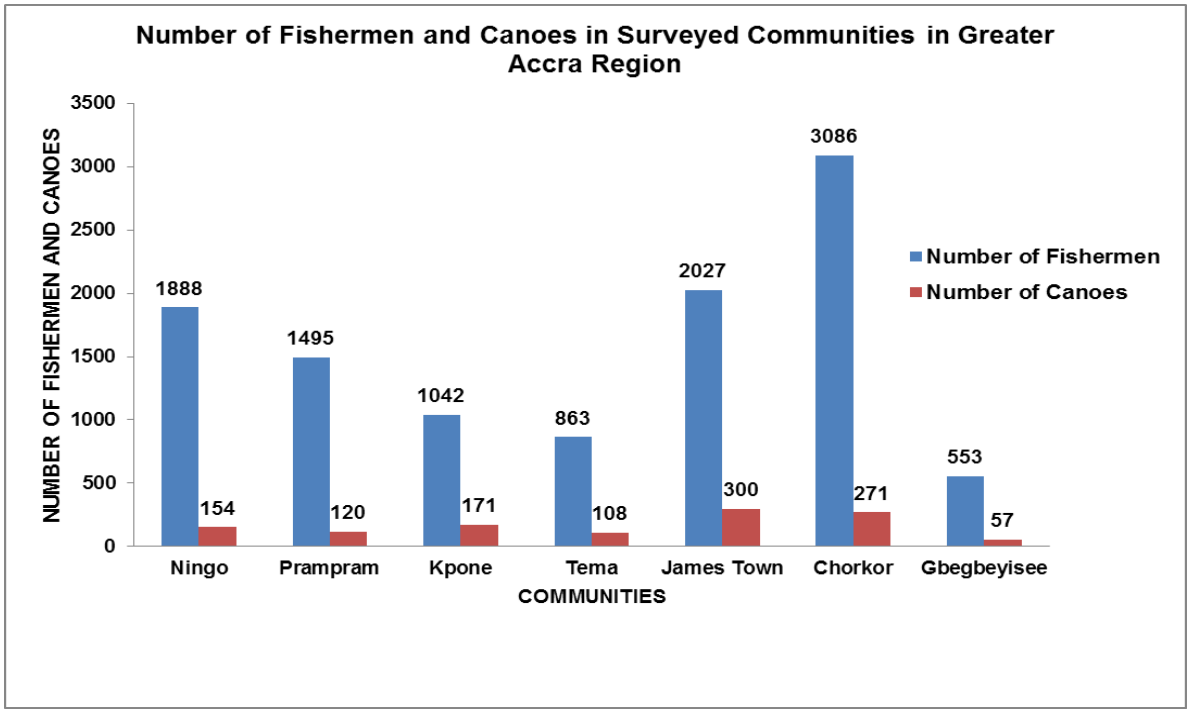


Figure 43: Number of fishermen and canoes harvesting small pelagic fish in selected communities in Greater Accra Region

Central Region

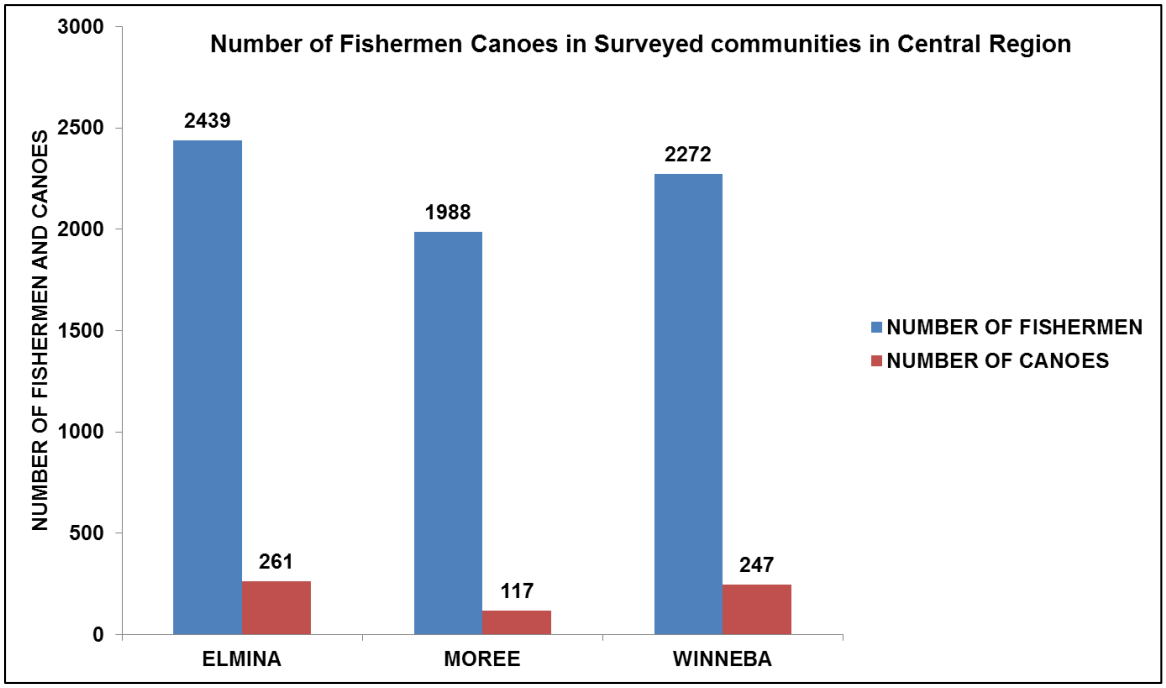


Figure 44: Number of fishermen and canoes harvesting small pelagic fish in selected communities in Central Region

Western Region

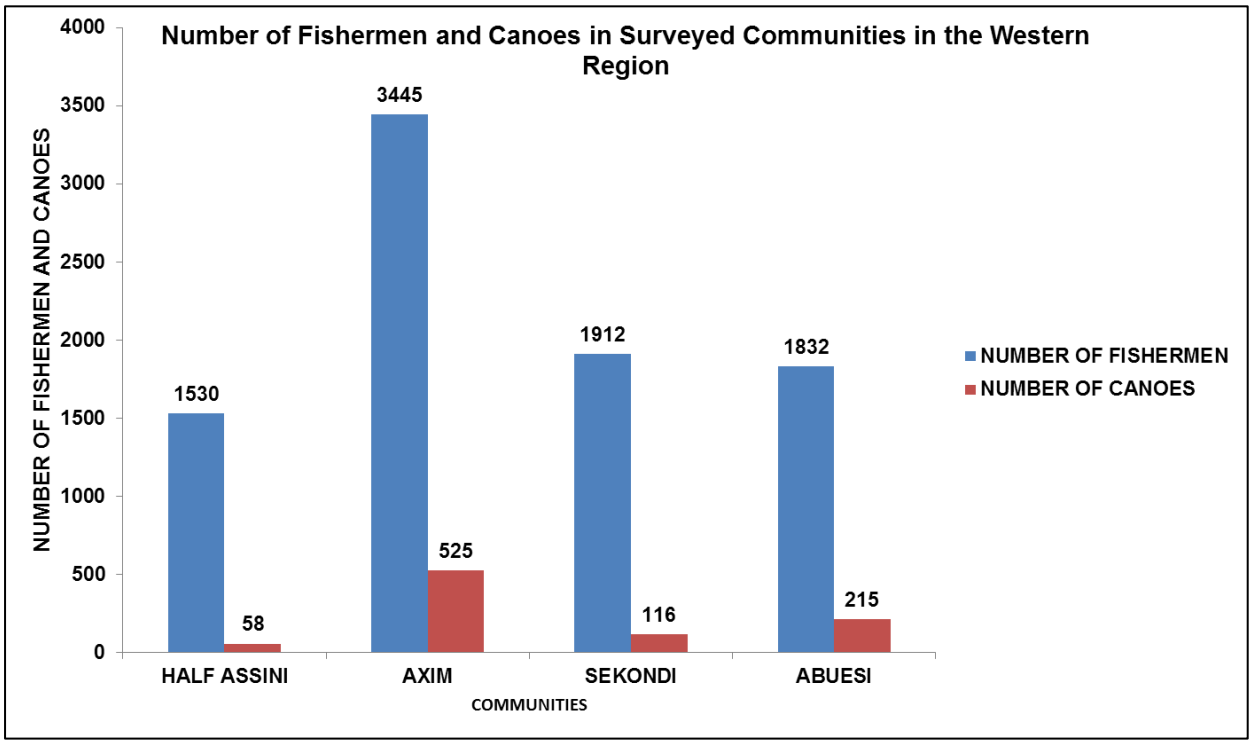


Figure 45: Number of fishermen and canoes harvesting small pelagic fish in selected communities in Western Region

TYPES SMOKING UNITS

Based on census of smoking unit conducted in 58 landing sites selected from the 4 coastal regions about three-fourth comprised of the traditional clay type (chorkor stove). There were a few improved stoves that were identified, they are the Morrison stove at New Takoradi and the Kosmos stove at Abuasi both in the Western Region.

National

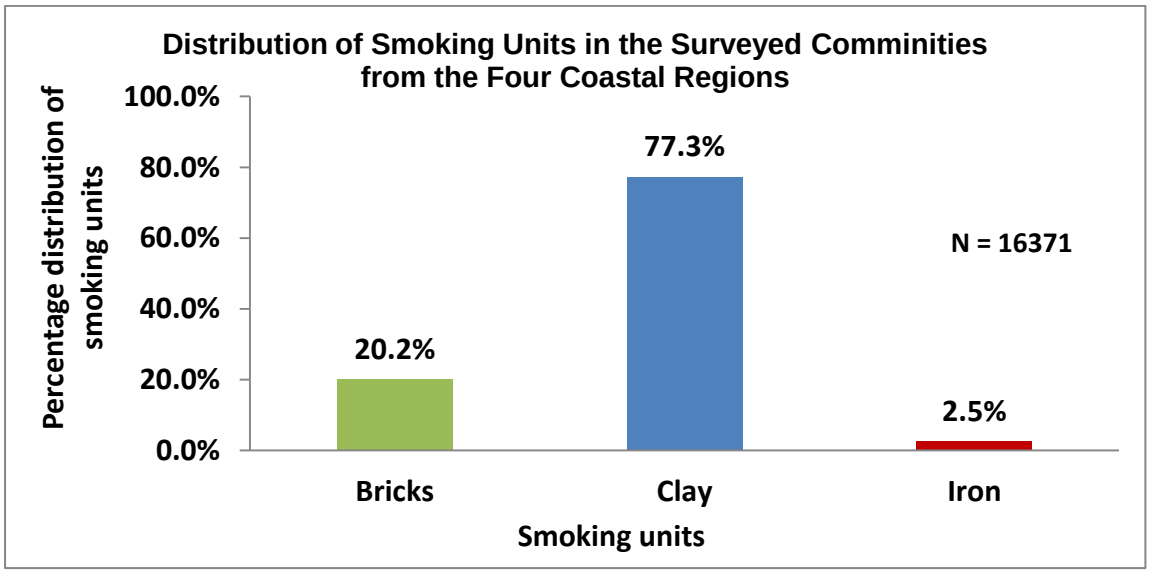


Figure 46: Distribution of smoking units in the selected communities from the four coastal regions

Volta Region

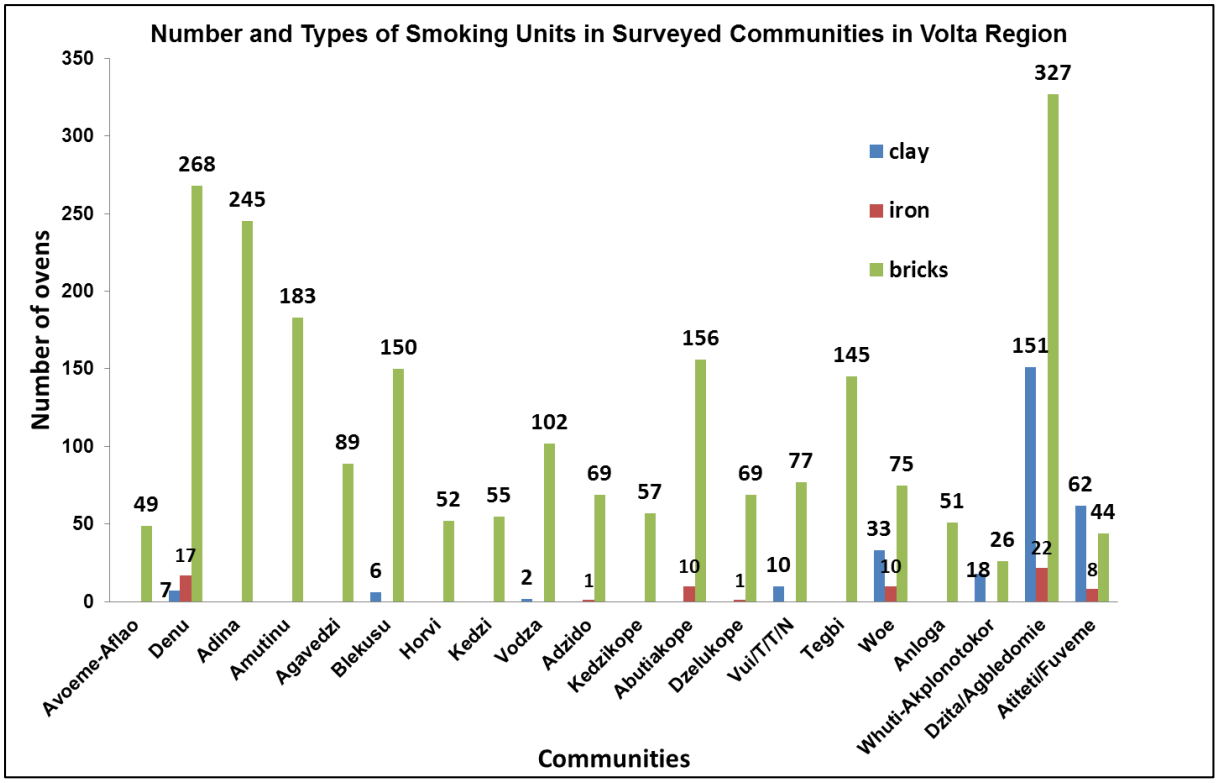


Figure 47: Types of smoking units in selected communities in Volta Region

Greater Accra Region

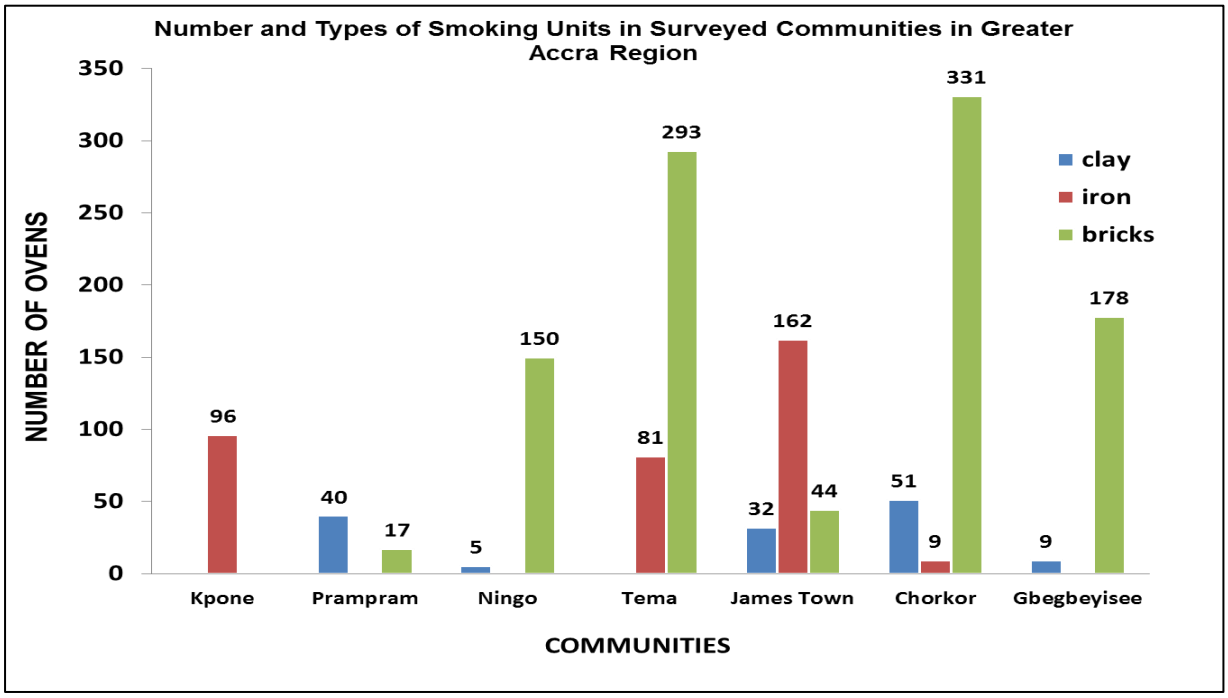


Figure 48: Types of smoking units in selected communities in Greater Accra Region

Central Region

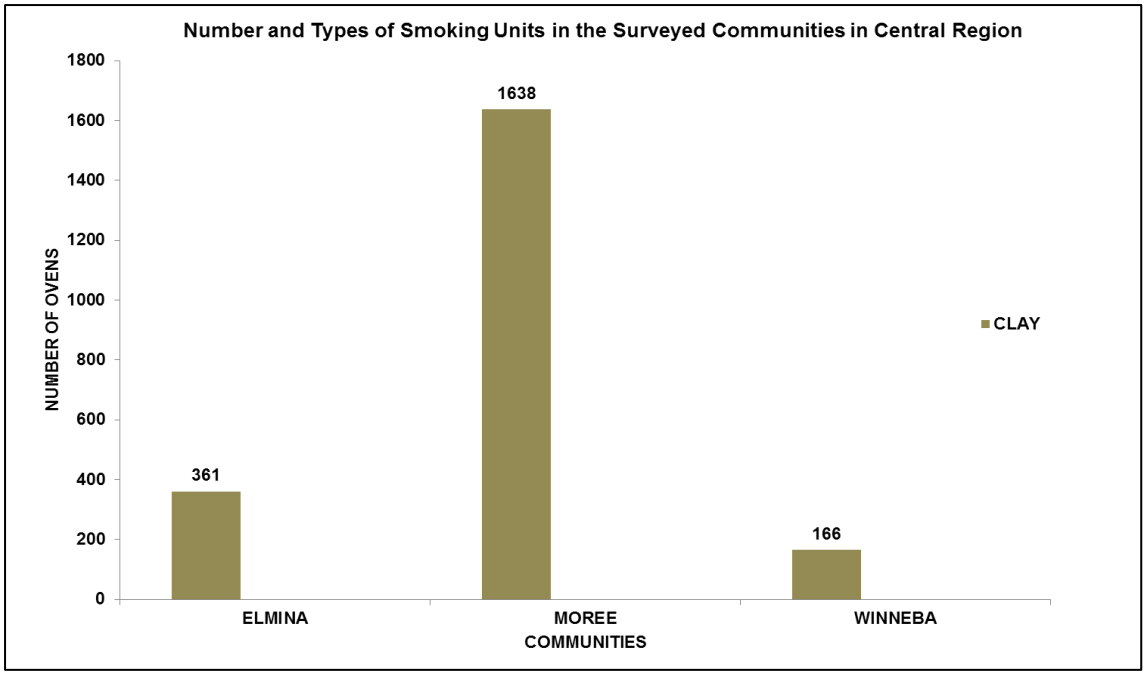


Figure 49: Types of smoking units in selected communities in Central Region

Western Region

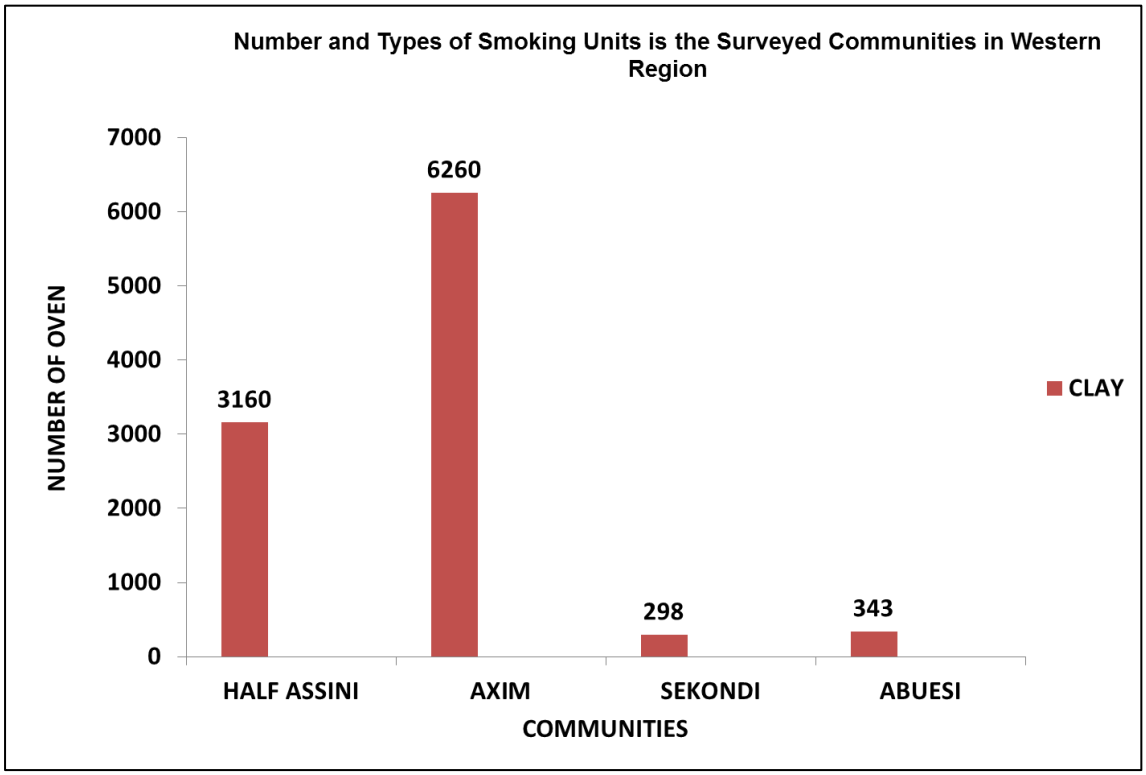


Figure 50: Types of smoking units in selected communities in Western Region

HISTORICAL PERSPECTIVE OF FISHERIES

General perception among fishermen sampled indicated that there is a general decline in the fishery starting from the late 90s. The fishery at this same time recorded a general increase in

the number of canoe and fishermen. Although the fishermen are aware of the decline, more canoes and fishermen continue to enter the fishery as indicated in the graphs below.

National

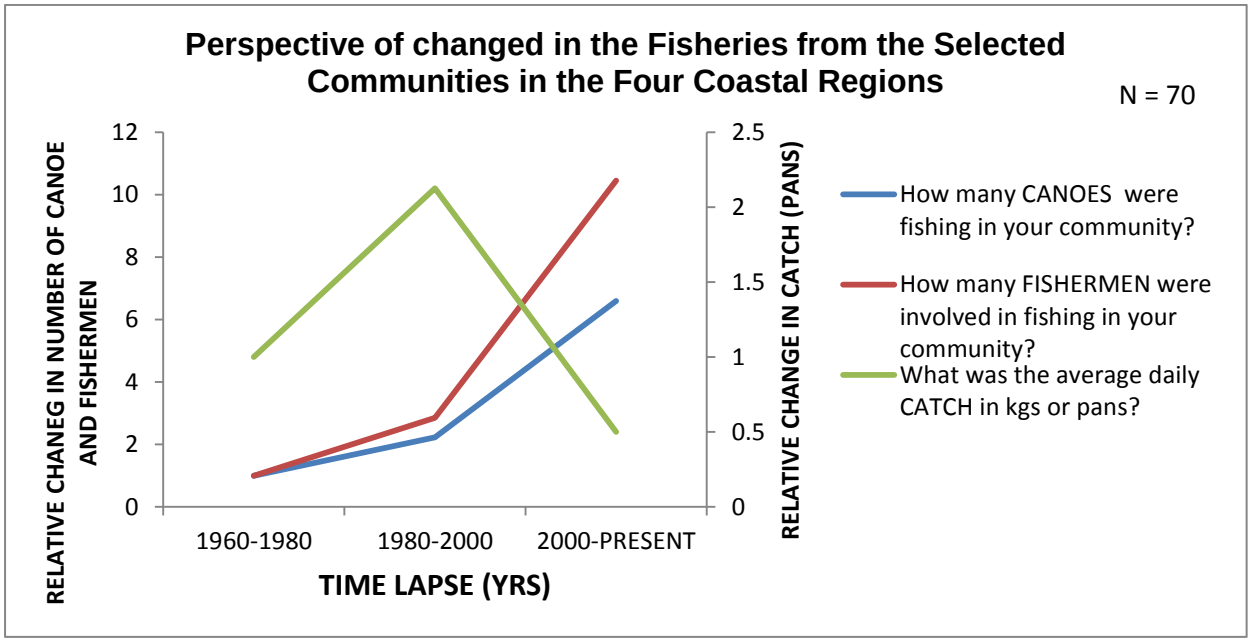


Figure 51: Perspective of change in the fisheries among fishermen surveyed in the selected communities from the four coastal regions

Volta Region

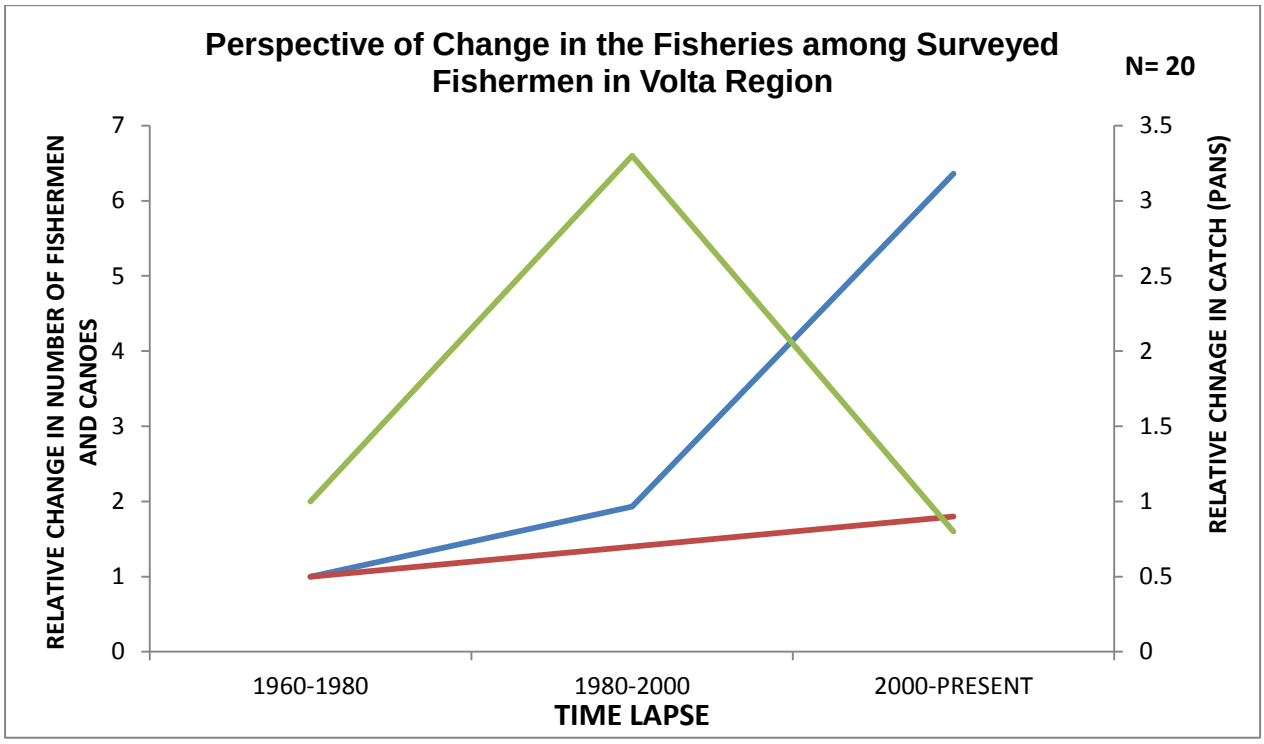


Figure 52: Perspective of change in the fisheries among fishermen surveyed in Volta Region

Greater Accra Region

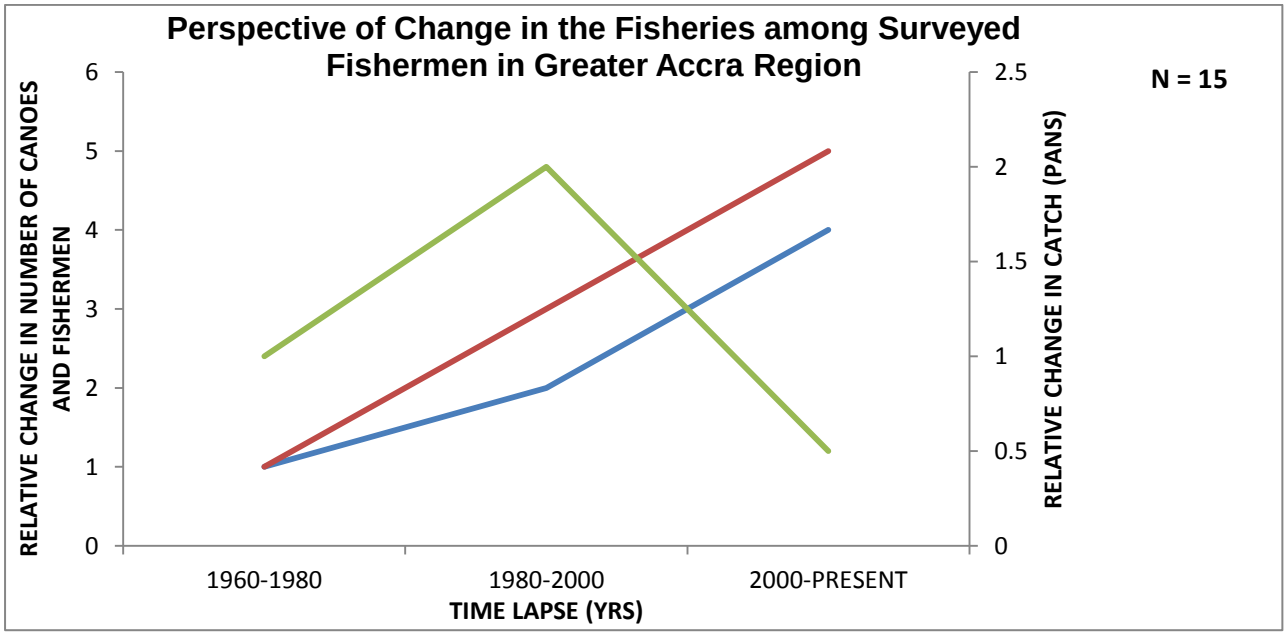


Figure 53: Perspective of change in the fisheries among fishermen surveyed in the selected communities in Greater Accra Region

Central Region

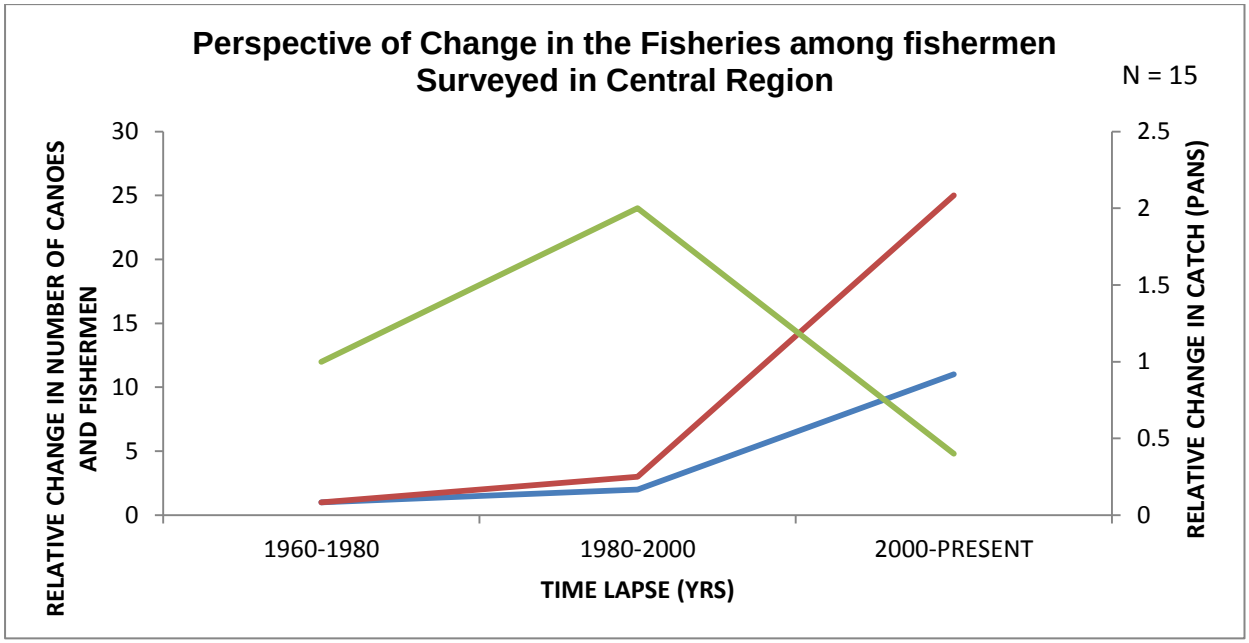


Figure 54: Perspective of change in the fisheries among fishermen surveyed in the selected communities in Central Region

Western Region

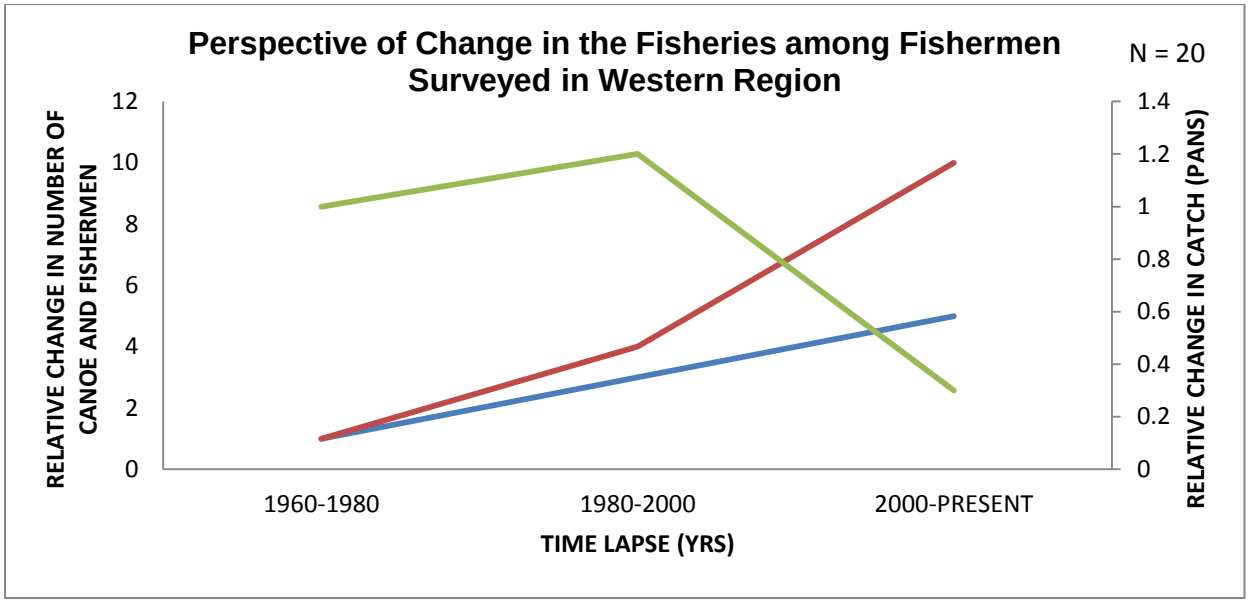


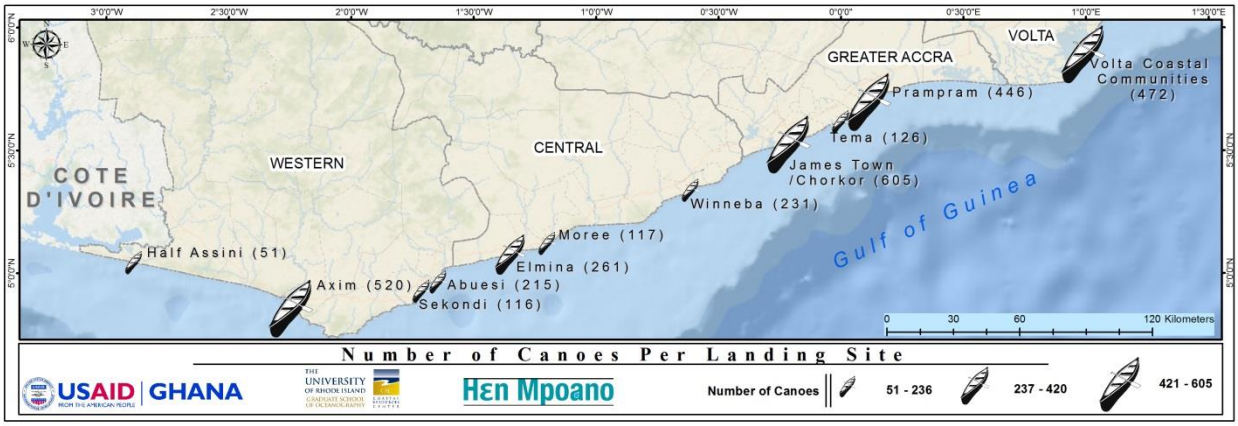
Figure 55: Perspective of change in the fisheries among fishermen surveyed in the selected communities in Western Region

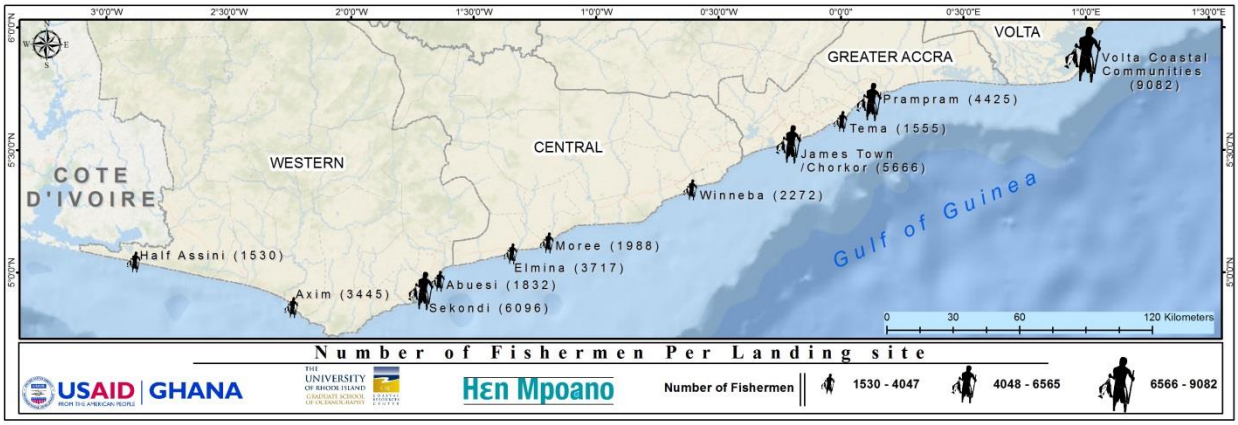
CONCLUDING NOTES

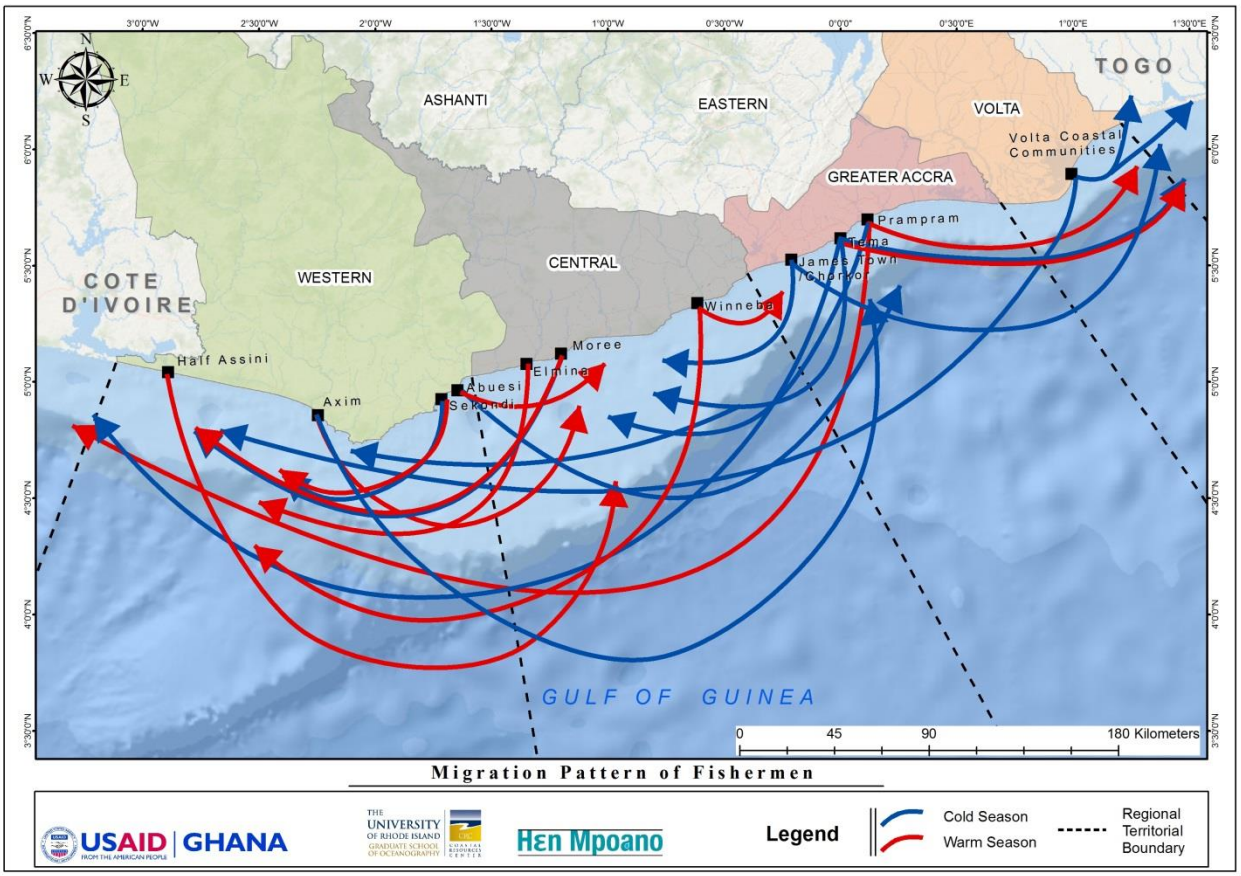
- **Livelihood interventions:** this should not be a one-size-fits-all approach. Interventions should focus on the younger age brackets that are already looking for a way out of the fisheries.
- **Smoking units:** space and available material should be considered in smoking unit improvement. These factors influence smoking unit choice in fishing communities along the coast.
- **Communication strategy:** a more practical communication options should be considered when developing communication strategy for fisher folks. Dramas, sketches should be used for effective communication.
- **Migration:** it takes many forms, from short term – short distance movement in-country to long term – long distance movement to countries far away from home port. This should be considered in formulating policy for the sector
- Older generation (40 years and above) forms a higher proportion of the population of fishermen in the small pelagic fishery surveyed.
- General level of education among fishermen is low as a higher percentage of fishermen surveyed in the selected communities were educated up to the basic level.
- Large family size is not uncommon among fishermen surveyed in the selected fishing communities

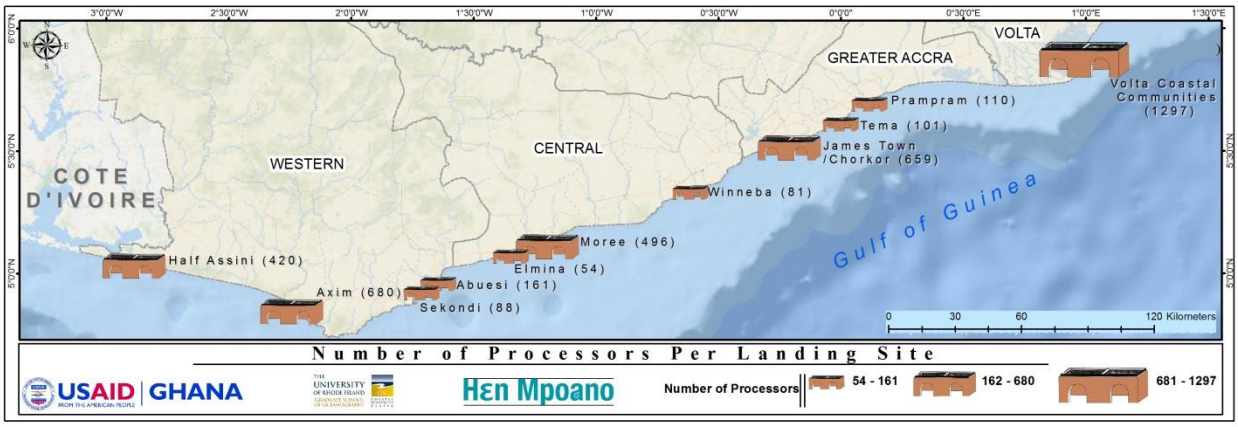
ANNEX

Maps


VOLTA
GREATER ACCRA
Volta Coastal Communities (472)
Prampram (446)
Tema (126)
CENTRAL
WESTERN
James Town /Chorkor (605)
COTE D'IVOIRE
Winneba (231)
Gulf of Guinea
Moree (117)
Half Assini (51)
Elmina (261)
Axim (520)
Abuesi (215)
Sekondi (116)
0 30 60 120 Kilometers
Number of Canoes Per Landing Site
USAID | GHANA
Hɛn Mpoano
Number of Canoes
51 - 236
237 - 420
421 - 605


VOLTA
GREATER ACCRA
Volta Coastal Communities (9082)
Prampram (4425)
Tema (1555)
CENTRAL
WESTERN
James Town /Chorkor (5666)
COTE D'IVOIRE
Winneba (2272)
Gulf of Guinea
Moree (1988)
Half Assini (1530)
Elmina (3717)
Abuesi (1832)
Axim (3445)
Sekondi (6096)
0 30 60 120 Kilometers
Number of Fishermen Per Landing site
USAID | GHANA
Hɛn Mpoano
Number of Fishermen
1530 - 4047
4048 - 6565
6566 - 9082


TOGO
ASHANTI
EASTERN
VOLTA
Volta Coastal Communities
GREATER ACCRA
Prampram
Tema
James Town /Chorkor
CENTRAL
WESTERN
COTE D'IVOIRE
Winneba
Moree
Elmina
Abuesi
Sekondi
Half Assini
Axim
GULF OF GUINEA
0 45 90 180 Kilometers
Migration Pattern of Fishermen
USAID | GHANA
THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY
Hεn Mpoano
Legend
Cold Season
Warm Season
Regional Territorial Boundary


VOLTA
GREATER ACCRA
Volta Coastal Communities (1297)
Prampram (110)
Tema (101)
James Town /Chorkor (659)
CENTRAL
WESTERN
COTE D'IVOIRE
Winneba (81)
Gulf of Guinea
Moree (496)
Elmina (54)
Abuesi (161)
Sekondi (88)
Axim (680)
Half Assini (420)
0 30 60 120 Kilometers
Number of Processors Per Landing Site
USAID | GHANA
THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY
Hεn Mpoano
Number of Processors
54 - 161
162 - 680
681 - 1297

Survey Questionnaires

DATA COLLECTION PROTOCOL

INTRODUCING THE PROJECT

The Sustainable Fisheries Management Project (*USAID/SFMP*) is a five-year initiative (October 1, 2014 – September 30, 2019) supported by the U.S. Agency for International Development (USAID-Ghana). It is implemented through a cooperative agreement with the University of Rhode Island (URI).

Implementing partners include Hen Mpoano, FON, SSG, CEWEFIA, DAA, DASGIFT and other key government, private sector and Non-Governmental Organizations (NGO) stakeholders along the coast and in the fisheries sector.

The main goal of the *USAID/SFMP* Project is to support the Government of Ghana's efforts to achieve reform of its fisheries sector by strengthening many of the enabling conditions necessary to end overfishing and rebuild small pelagic fisheries and to improve post-harvest processing conditions through effective tools and approaches in a participatory fisheries management process.

The annual sardinella catch from the canoe fishery has plummeted from just over 17,000 metric tons in 2012 from a high of 120,000 metric tons just a dozen years earlier.

Overfishing due to an increasing number of boats and fishers in an open access fishery and weak governance all contribute to the crisis. At risk are not only the livelihoods of more than 25,000 Ghanaians engaged in the fishery sector but also the food security of the nation and region.

Immediate action is needed to reverse this decline. The menu of potential management measures that can reverse this decline and rebuild the fishery are known and have proven effective elsewhere in the world. Needed are the applications of some combination of several of the following options:

- Freeze on new canoes and licenses
- Closed seasons
- Closed areas
- Reduction on number of industrial vessels
- Promote best fishing practices
- Promote new processing techniques
- Involve fishermen in direct management

These actions will only work if all the stakeholders including fishermen (canoe, semi-industrial and trawlers) fishmongers, processors and government agree to work together to ensure everyone follows the rules agreed to and are applied.

The SFMP strategy is to engage with you (stakeholders) to identify the problem, study it together, and then search for solutions together so as to reverse the trends of the collapse!

This questionnaire is designed to seek information on Small pelagic fisheries to improve management and inform policy decisions on the resource. Any information given will be used solely for such purposes. Your cooperation in answering these questions below shall be very much appreciated. You are assured that answers will be handled with strict confidentiality.

Please tick [√] or fill in the blank spaces where appropriate and provide additional information or comment where necessary

TAXONOMY

What fish species do you harvest? *Provide local names:*

a. Pelagic fish species

Scientific names	**Local names**
Round Sardine (*Sardinella aurita*)	
Flat Sardine (*Sardinella maderensis*)	
Anchovy (*Engraulis encrasicolus*)	
Chub Mackerel (*Scomber japonicas*)	
Ribbon Fish (*Trachurus sp*)	

b. Demersal fish species

Scientific names	**Local names**

Canoe Fishermen Survey

1. Name: …….Cell No…….

2. Community: ……

3. Age: ……

4. Level of education

   □ never been to school □ primary school □ JHS □ SHS □ Tertiary □ others

5. Are you married? □Yes □No If yes how many wives? :……..

6. How many children do you have? :……..

7. How many years have you been a fisherman? :…….

8. What is your principal fishery? □ Pelagic □ Demersal

9. Which type of gear(s) do you use?

   □ APW □ Beach seine □ Set net □ Drift Gill Net (DGN □Hook & line

10. What other type of fishing are you engaged in? (Target species): ……
11. Do you own a canoe? □Yes □No
12. If yes, fill the table below:

How many?	
Which year was the canoe built?	
What is the size of the canoe?	
What is the horse power of the motor?	
Construction material of the canoe	

13. How many crewmen work on the canoe(s)?
    :……..

14. How do you describe your fish catch from 2000-present? □Decreased □ Increased

15. How many days is your fishing trip?
    :……..

16. How do you finance your fishing trip? □ Banks □ Self □ Fish mammies □ Family □ other (Please specify): ……..

17. What percentage of your personal/household income is derived from fishing income? :…

18. Where is your primary landing site? :……

19. Do you migrate to fish? □Yes □No

    a. If yes, where? :……

    b. Which month of the year? :……

20. Do you belong to any type of fishermen's organization? □Yes □No

21. If yes, name the organization(s): ……

22. Is your canoe(s) registered? □Yes □No

23. Do you have health insurance? □Yes □No

24. Do you have insurance for the canoe? □Yes □No

25. Any other comment/questions? :……..

Historical perspective

	1960-1980	1980-2000	2000-PRESENT
How many **CANOES** where fishing in your community?			
How many **FISHERMEN** were involved in fishing in your community?			
What type of **FISHING GEAR** existed in your community?			
How long was your fishing **TRIP**?			
What was the average daily **CATCH** in kgs or boxes?			
What was the **PRICE** per Kgs or box?			
What was the average **LENGTH of CANOE/GEAR** in your community?			

a. Beach seine			
b. Watsa			
What was the average size of the **PURSE SEINE** used in your community?			
What was the **MESH SIZE** of the **PURSE SEINE** used in your community?			
What was the average **LENGTH** of the **BEACH SEINE** used in your community?			
What was the **MESH SIZE** of the **BEACH SEINE** used in your community?			
What was the size of **CREW MEMBERS** per one canoe?			
What was the **SIZE of CREW** hauling **BEACH SEINE**?			
What was the average **HORSE POWER** of the engine used for Canoe?			
How far did you **TRAVEL** (distance in nautical miles) to catch fish?			

Fish Processors Survey

1. Name: …….. Cell No……
2. Community: …….
3. Age: ……
4. Marital status: □ Single □ Married □ Separated □ Divorced
5. How many children do you have? :.....
6. Level of education
   □ never been to school □ primary school □ JHS □ SHS □ Tertiary
7. Do you come from this community?
   □Yes □No (Migrant)
8. How many years have you been processing fish? :.....
9. How do you process your fish? □ Smoking □ Frying □ Sun-Drying □ Salting
   □ Others-Please specify: …….

	Peak season	Lean season
10. How many days in a week do you engage in fish processing?		
11. How many hours per day did you process fish		
12. How many pans/crate of fish (quantity) do you process per day		
13. How many pans/crate of fish are kept on average per day for household consumption?		

14. Which fish species do you process? Please explain
    □ Pelagic: ……
    □ Demersal: ……
    □ Both: ……
15. Where do you get fish to process? □ Local fishermen □ Cold stores □ others (Please specify): …….

		1960-1980	1980-2000	2000-PRESENT
18	What is the average price (GH¢) per pan/crate of fish processed			
19	Operating Costs (GH¢) for Processed fish			
	a. Wood			
	b. Labour			
	c. Fish purchased			
	d. Paper for packaging			
	e. Others (Please specify): ……			

20. Where do you market processed fish?

□ Community
□ Within Ghana (specify)……
□ Outside Ghana (specify)……

21. Number of dependents in households engaged in fish processing: …….

22. Number of processing and storage facilities owned

□ Oven……
□ Stove……
□ Freezer…….
□ Others (Please specify)…….

23. Are you a vessel/canoe owner? □Yes □No

24. If yes, how many vessel/canoe do you own? .....

26. Do you finance fishing expeditions? □Yes □No

26. If yes, how frequent do you finance expeditions? : .....

27. Are you ever asked for special favors (e.g. sex for fish) to buy fish from a fishermen? □Yes □No

28. Any other comment/questions?
:…….....