STATUS OF ARTISANAL FISHING TRAPS USED BY FISHERFOLKS IN SELECTED FISHING COMMUNITIES IN EPE LAGOON, NIGERIA

AKINNIGBAGBE, R. O
Nigerian Institute for Oceanography and Marine Research (NIOMR), Victoria Island, Lagos, Nigeria.
Tel: +234 8038 216 520. E-mail: **toyinorims@yahoo.com**

ABSTRACT
The study evaluates the status of artisanal fishing traps and its operational techniques employed by fisherfolks in four fishing communities in Epe Lagoon. The objective is to have an in-depth understanding of trap fishing within the communities, so as to know the challenges faced by the fisherfolks and recommend (if possible) more efficient fishing traps to enhance their fishing activities and increase productivity. The big and small cylindrical basket traps were preferred by the fisherfolks because of the catches obtained from these traps. Traps are mostly used in the shallow depth of water between 1-2 meters as indicated by 69% of the respondents and 78% of the respondents prefer operating the fishing traps at either between 4-6am or 4-6pm at all the selected fishing communities. Despite the various methods of trap managements in Epe Lagoon, most of the traps used are not durable and the availability of the materials for constructing these traps are not easily accessible by the artisanal fisherfolks. There is a need to modify the traditional fishing traps with more durable and available materials for better performances.
Keywords: Fishing gears, durability, challenges, respondents, Epe.

INTRODUCTION

Epe Lagoon is located in Lagos State and experiences the same hydroclimatic conditions as the rest of South-western Nigeria such that there are two main seasons (wet and dry). Soyinka and Ebigbo (2012), confirmed that Epe Lagoon is relatively fresh and stable water system from season to season and this could be due to the closer connection of two fresh water bodies (Lekki Lagoon and River Oshun), which over-ride the effect of further distant brackish water. Epe Lagoon is one of the four major Lagoons in Lagos state, Nigeria. Others are Lagos Lagoon, Lekki Lagoon and Ologe Lagoon (Kumolu-Johnson, *et al*., 2010). It is situated between two lagoons; the Lagos Lagoon (brackish water) to the west and Lekki Lagoon (fresh water) to the east (Oyebisi*et al*., 2012). The surface area of Epe Lagoon is about 225km ^{2} with a depth of about 6m; however, a large area of the lagoon is relatively shallow with minimum depth of about 1m (Balogun, 1987).

Traps are contrivances of different shapes and sizes with or without non return valve(s) to allow and hold fish during their daily or annual migrations within natural or artificial water bodies (Emmanuel, 2009). Traps are passive fishing gears that are used instead of barriers which are still used today among some artisanal fishers (Slack-Smith, 2001). Trap and pot means different words to people in different parts of the world; in general, pots are smaller movable traps (Slack-Smith, 2001). Furthermore, pot is a trap type which has been reported as one of the traditional traps in Lagos Lagoon by Akinnigbagbe and Osibona (2017).

Fishing trap technique has been confirmed to work effectively in areas of hard bottom which the trawl fishery cannot stand because of its technique (dragging) (Moran and Jenke, 1989) and also with the advantage of catching fishes alive (Emmanuel and Awojide, 2016). Various research works have been carried out on various traditional trap; Udolisa, *et al*, (1994), reported that basket trap is the commonest type of traps used in Rivers, Lagoons, Lakes and Estuaries and may be set with or without baits. The basket trap is conical in shape and it is made of palm cane strips. It is made in various sizes, shapes and dimensions (Emmanuel, 2009). The galvanized wire guaze trap was highly selective for the crab, *Callinectes amnicola* in Abule Eledu Creek and the effectiveness of the trap to catch different species in the two creeks made it a good small-scale fishing gear (Emmanuel and Olojede, 2010). Ipinjolu, *et al*. (2005) reported that Malian and Nduturu traps are most widely used in combination with other traditional and modern fishing gears in the northern part of Nigeria.

Fishing activities has been reported to be profitable among fisherfolks in Epe Lagoon (Okeowo *et al.,* 2015) yet evidence has shown that fish supply has not been able to cope with its demand most especially on the artisanal sector (Fakoya and Oloruntoba, 2002). There is therefore the need to have a detailed understanding of fishing trap (one of the major artisanal fishing gears) operations among fisherfolks in Epe to enhance the production of fish in the environs. There is also a need to know the challenges facing the artisanal trap users at the different fishing communities so as to recommend (if possible) more efficient fishing traps to enhance their fishing and increase productivity. This study therefore made use of questionnaire to evaluate the status of artisanal fishing traps and challenges faced by trap users in Epe Lagoon.

MATERIALS AND METHODS

Recognisance survey for trap gears was made by engaging the fisherfolks at Okorisan fishing community (Epe). This was to ensure that methods and instruments (questionnaires) are well prepared (validation of questionnaire). Four fishing sites

of the Epe Lagoon were selected: Ebute-Afuye (N06° 34.922' and E003° 59.691'), Igbonla (N06° 38.014' and E004° 03.452'), Erepoto (N06° 34.588' and E003° 58.238') and Ejirin (N06° 36.69' and E003° 54.198') (Fig. I).

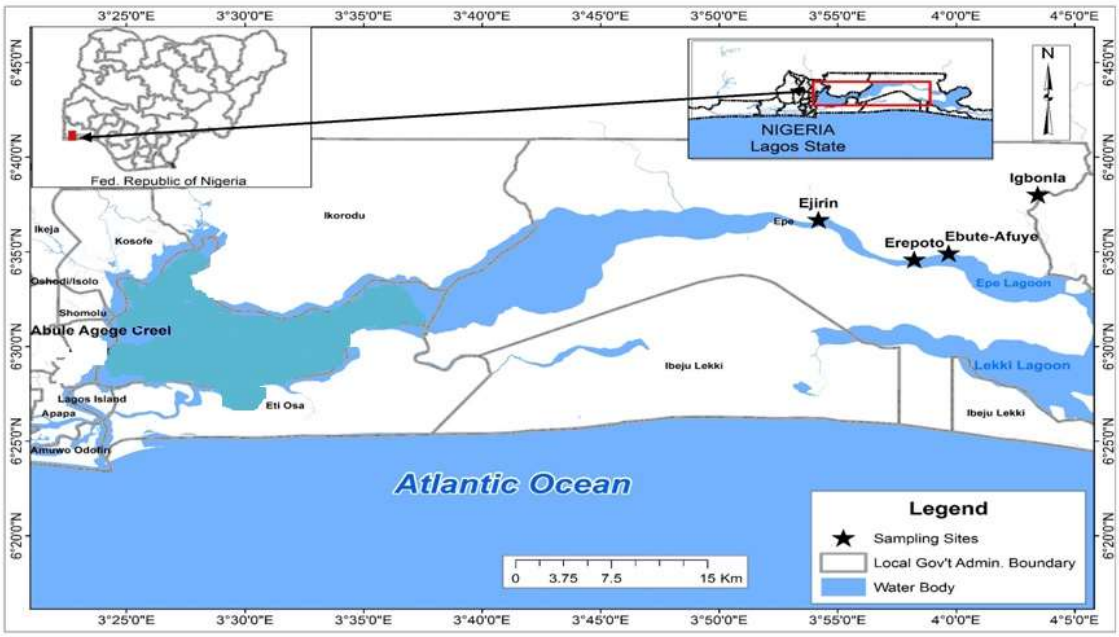

Fig. I: Map of the Epe Lagoon and the study areas.

Data Collection

The questionnaire covered the different types of fishing traps used (Plate 1 - 8), size of the trap, types of other artisanal fishing gears used with traps, such as gill nets, stow nets, hooks and lines, seine nets and cast nets, depth of fishing with traps and other fishing gears in water, durability and handling of trap and other questions relating to fishing practices as reported by the respondents. Eighty (80) questionnaires were administered in each sampling station making 320 participants in all, using simple random sampling technique. The survey lasted for one year (March, 2013 to February, 2014) to have an in-depth understanding of trap fishing operations in Epe lagoon.

Plate 1: Big cylindrical basket trap

Plate 2: Small cylindrical basket trap

Plate 3: Drum trap

Plate 4: Wire guaze trap

Plate 5: Pot trap

Plate 6:Gura trap

Plate 7: PVC trap

Plate 8: Bamboo trap

RESULTS

Fishing Traps Used by Fisherfolks in Epe Lagoon

Eight (8) types of fishing traps are used in the study areas (Plate 1 – 8). Analysis revealed that 20.3%, 17.7%, 16.4%, 15.6%, 12%, 7.5%, 7.2% and 3.3% of the respondents use big cylindrical basket, small cylindrical basket, drum, pot, wire gauze, bamboo, gura and pvc trap respectively (Fig. II) and most fisherfolks use more than one type of trap. Trap specification of each trap is analysed in Table I & II.

Depth of Fishing with Traps Compared with Other Fishing Gears in Epe Lagoon

The depth of water at which fishing traps and other gears were set or operated in Epe lagoon are shown in Fig. III&IV. Fisherfolks regarded depth of 1 – 2 meters as shallow and 2 meters and above as deep water. The depth is measured with a stick which was further read with a meter rule. Type of traps used at the selected fishing communities are used most in shallow water as reported by 69% of the respondents (Fig. III) while 24% of the respondents indicated that some traps can also be used in deep waters (Fig. IV); however, other fishing gears will do better in deep water than in shallow water (Fig. IV).

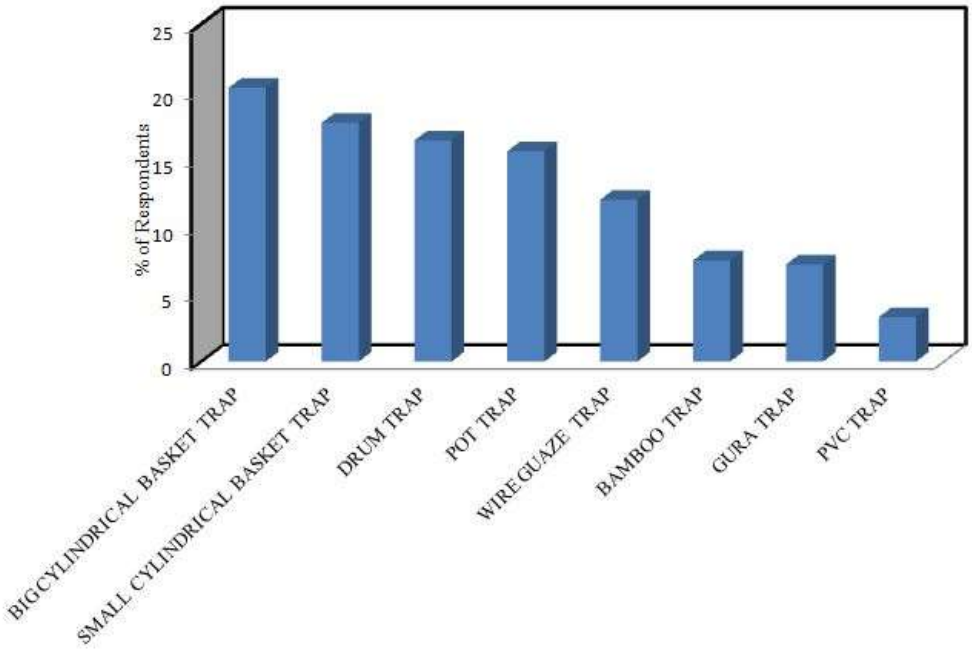

Fig. II: Types of Fishing Traps used among Fisherfolks in Epe Lagoon

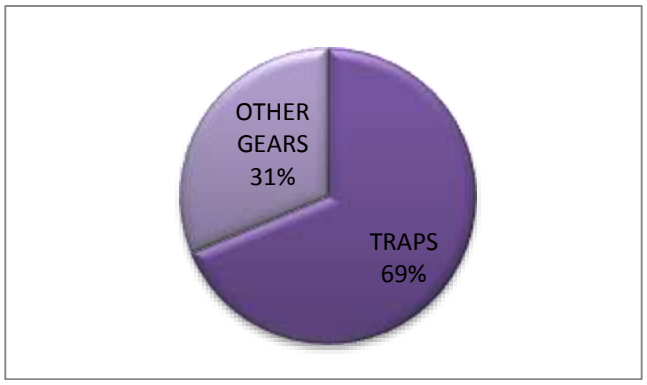

Fig. III: Percentage distribution of respondents operating traps and other gears in shallow water (1-2meters) in Epe Lagoon.

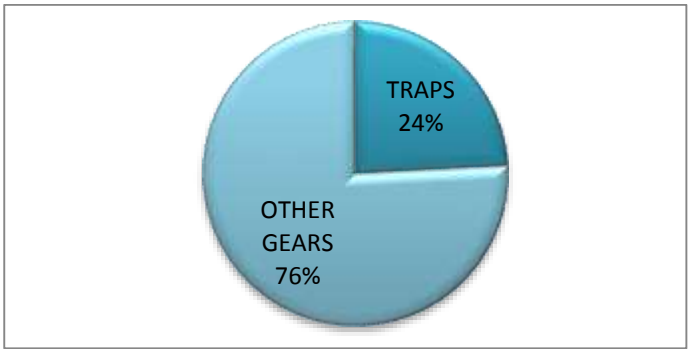

Fig. IV: Percentage distribution of respondents operating traps and other gears in deep water (2meters and above) in Epe Lagoon.

Table I: Specification of the traditional fishing traps used among fishers in Epe Lagoon

DESIGN CHARACTERISTICS	TYPES OF TRAP AND ITS MEASUREMENTS			
	BIG CYLINDRICAL TRAP	SMALL CYLINDRICAL TRAP	DRUM TRAP	POT TRAP
GEAR COLOUR	Brown	Brown	Brown or Black	Brown or Black
GEAR MATERIAL	Raffia palm	Raffia palm	Metal	Clay
VALVE MATERIAL	Raffia palm	Raffia palm	Polyethylene	Raffia palm
VALVE FRAME MATERIAL	Raffia palm	Raffia palm	-	Raffia palm
NUMBER OF VALVE	Two	One	One	One
LENGTH OF FIRST VALVE	20-30cm	15-20cm	20-25cm	15-20cm
LENGTH OF SECOND VALVE	20-30cm	-		-
VALVE WIDTH/OPENING	35-40cm	20-30cm	15-25cm	15-20cm
DISTANCE BETWEEN VALVES	10-15cm	-	-	-
TYING ROPE MATERIAL	Polyethylene rope	Polyethylene rope	Polyethylene rope	Polyethylene rope
MESH SIZE	0.5/0.8mm	0.2/0.5mm	20-25mm	-
MESH SHAPE	Rectangular	Rectangular	-	-
NUMBER OF MESHES			-	-
HEIGHT	60-90cm	40-60cm	80cm-1m	35-45cm
BASE LENGTH	Apex form	Apex form		-
CIRCMFERENCE			80-95cm	70-95cm
TYPE OF SET	Anchored bottom		Anchored bottom	Anchored bottom

Table II: Specification of the traditional fishing traps used among fishers in Epe Lagoon

DESIGN CHARACTERISTICS	TYPES OF TRAP AND ITS MEASUREMENTS			
	WIRE GAUZE TRAP	BAMBOO TRAP	GURA TRAP	PVC TRAP
GEAR COLOUR	Ash	Brown	White	Ash
GEAR MATERIAL	Wire	Bamboo	Polyethylene and cane	PVC
VALVE MATERIAL	Wire	Coconut husk	Polyethylene and cane	Coconut husk
VALVE FRAME MATERIAL	Wire	Coconut husk	Polyethylene and cane	Coconut husk
NUMBER OF VALVE	One	One	Two	One
LENGTH OF FIRST VALVE	35-45cm	15cm	25cm	15cm
LENGTH OF SECOND VALVE	-	-	25cm	-
VALVE WIDTH/OPENING	70-80cm	8cm	26cm	10.7
DISTANCE BETWEEN VALVES	-	-	-	-
TYING ROPE MATERIAL	Polyethylene material	Polyethylene material	Polyethylene material	Polyethylene material
MESH SIZE	10-15mm	8-11mm	-	-
MESH SHAPE	Square	Diagonal	-	-
NUMBER OF MESHES	-	-	-	-
HEIGHT	75-90cm	100-115cm	65-70cm	115- 135cm
BASE LENGTH	80-90cm	25-30cm	-	-
CIRCMFERENCE	-	15- 25cm	175-185cm	20-35cm
TYPE OF SET	Anchored bottom	Anchored bottom	Anchored bottom	Anchored bottom

Table III: Setting and Retrieving Time of Traps in Epe Lagoon

		SETTING TIME (%)					RETRIEVING TIME (%)						
Stations		4-6am	7-9am	1-3pm	4-6pm	7pm	4-6am	7-9am	1-3pm	4-6pm	6am (Three days later)	6am (Four days later)	6am (A week later
Ebute-Afuye	F	38	0	8	34	0	34	4	4	30	3	5	0
	%	23.8	0	5	21.2	0	21.2	2.6	2.6	18.6	1.8	3.2	0
Ejirin	F	21	0	15	41	3	20	1	15	35	3	2	4
	%	13.2	0	9.4	25.6	1.8	12.6	0.6	9.4	21.8	1.8	1.2	2.6
Igbonla	F	24	3	5	47	3	29	2	5	30	8	14	2
	%	15	1.8	3.2	28.2	1.8	15	1.2	3.2	15.6	5	8.8	1.2
Erepoto	F	50	0	4	25	1	42	1	2	23	5	7	0
	%	31.2	0	2.6	15.6	0.6	26.2	0.6	1.2	14.4	3.2	4.4	0

Table IV: Average Durability of Traps in months in Epe Lagoon

STATIONS		BIG CYLINDRICAL BASKET TRAP	SMALL CYLINDRICAL BASKET TRAP	WIRE GUAZE TRAP	BAMBOO TRAP	POT TRAP	DRUM TRAP	GURA TRAP	PVC TRAP
Ebute-Afuye	Percentage of fishers (N=80)	19.73	18.37	10.2	10.2	15.65	16.33	6.8	2.72
	Range (Months)	5 – 12	4 - 12	5 – 12	4 - 9	8 - 24	8 – 24	5 – 12	6 - 12
	Standard Deviation	3.19	3.8	1.95	1.89	4	4.4	1.27	0.52
Ejirin	Percentage of fishers (N=80)	20.36	18.56	8.38	4.19	16.77	17.96	9.58	4.19
	Range (Months)	6 – 12	5 - 12	7 – 12	4 - 12	8 - 24	8 – 24	6 - 12	6 - 12
	Standard Deviation	6.28	3.78	2.31	0.64	5.23	5.7	2.33	1.17
Igbonla	Percentage of fishers (N=80)	16.44	15.56	12	8.44	16.44	18.22	8.44	4.44
	Range (Months)	5 -12	4 - 9	5 – 12	4 - 12	6 - 24	6 – 24	5 - 12	6 - 12
	Standard Deviation	5.85	6.22	3.44	2.2	5.36	5.88	2.71	2.25
Erepoto	Percentage of fishers (N=80)	18.71	16.33	13.27	8.5	17.01	18.03	6.12	2.04
	Range (Months)	5 – 12	4 - 12	5 – 24	3 – 12	5 - 24	6 – 36	6 - 12	7 - 12
	Standard Deviation	9.23	11.73	6.21	3.04	4.35	8.25	2	1.26

Fishing Trap Setting and Retrieving Time in Epe Lagoon

The setting and retrieving hours (time) of fishing traps among sampled fisherfolks in Epe lagoon is shown in Table III. From Epe lagoon, 11.9% of the fishers from Ebute-Afuye and 15.6% of the respondents from Erepoto fishing communities preferred to set their traps between 4-6am followed by 10.6% and 7.8% of the respondents from these fishing communities respectively who preferred the traps to be set between 4-6pm. 12.8% and 14.1% of fishers from Ejirin and Igbonla respectively preferred setting their traps between 4-6pm followed by 4-6am. However, it was noted that none of the fishers from Ebute-Afuye, Ejirin and Erepoto prefer to set traps between 7-9am. Some fisherfolks would either retrieve their catches between 4-6am or 4-6pm and catches were noted to be retrieved after 3 to 4 days or a week later (from the setting date) as noted from the stations.

Durability of Fishing Traps Used in Epe Lagoon

Big cylindrical basket trap has the maximum lifespan of about twelve (12) months in all the stations (Table IV). It range between 6 - 12 months in Ejirin as reported by 34 fisherfolks while in all others stations (Ebute- Afuye, Igbonla and Erepoto), this trap durabity range between 5 - 12 months. The least lifespan (4 - 9 months) of small cylindrical basket trap was reported at Igbonla by 35 fisherfolks followed by Ebute – Afuye and Erepoto (4 - 12 months) in both stations as indicated by 27 and 48 fisherfolks respectively. However, 31 fisherfolks from Ejirin used small cylindrical basket trap and lasted a period of 5 - 12 months.

Wire guaze trap recorded most durability at Erepoto and lasted in period of 5 – 24 months as reported by 39 fisherfolks. In Ebute – Afuye and Igbonla, it is used between 5 - 12 months according to 15 and 27 fisherfolks respectively. However, 14 fisherfolks from Ejirin used wire guaze trap for a period of 7 and 12 months.

Bamboo trap lasted between 4 – 9 months at Ebute - Afuye as recordedby 15 fisherfolks while the longest lifespan (4 - 12 months) of this trap was observed at Ejirin and Igbonla as reported by 7 and 19 fisherfolks respectively. Bamboo trap was being used for between 3 - 12 months precisely at Erepoto according to 25 fisherfolks.

Lifespan of pot trap was about 24 months in all the stations. Precisely at Erepoto, the highest number of fisherfolks (50) using pot traps was recorded, and they used this trap between 5 - 24 months while the least number of fisherfolks was recorded at Ebute - Afuye (23 fisherfolks), who reported the lifespan of bamboo trap to be between 8 - 24 months. Durability of drum trap was between 6 - 36 months among fisherfolks in Erepoto by 53 respondents. 41 fishers from Igbonla used the drum trap between 6 - 24 months while 24 and 30 fisherfolks from Ebute – Afuye and Ejirin respectively used this trap between 8 - 24 months in each station.

Lifespan of gura trap ranged between 5 - 12 months in Ebute – Afuye and Igbonla, 6 - 12 months in Ejirin and Erepoto. However, the largest number of fisherfolks (19) using gura trap was recorded at Igbonla while the least number of fisherfolks was recorded at Ebute – Abuye (10 fisherfolks).PVC trap is used by 4, 7 and 10 fishers from Ebute – Afuye, Ejirin and Igbonla respectively for between 6 - 12 months while it is used in Erepoto by 6 fisherfolks between 7 - 12 months.

Trap Conservation Methods in Epe Lagoon

Different methods used in conservation of fishing traps in Epe lagoon are shown in Fig. V-VIII, these include keeping of traps: in the store, under the shade, in the bush, near fire and in the water while some adapt none of these methods. Among fisherfolks in Epe Lagoon, 33.8% from Ebute – Afuye station keep their traps in store, 18.8% keep their traps under shade, 21.3% leave traps in the water and 26.1% reported no conservation method (Fig. V). In Ejirin, 30% fisherfolks keep their traps under shade for conservation while 20% among them keep their traps in store and some (27%) reported that their traps were always in water (Fig. VI). Fishers (40%) from Igbonla recorded leaving of traps in water as a method of conserving the traps while 30% preferred to keep traps under shade but very few indicated keeping traps in the bush and also near fire as means of conservation as shown in Fig. VII. About 35% of respondents from Erepoto were noted for no conservation, 26.2% keep traps in store and under shade while the rest either keep their traps in bush, near fire or leave them in water (Fig. VIII).

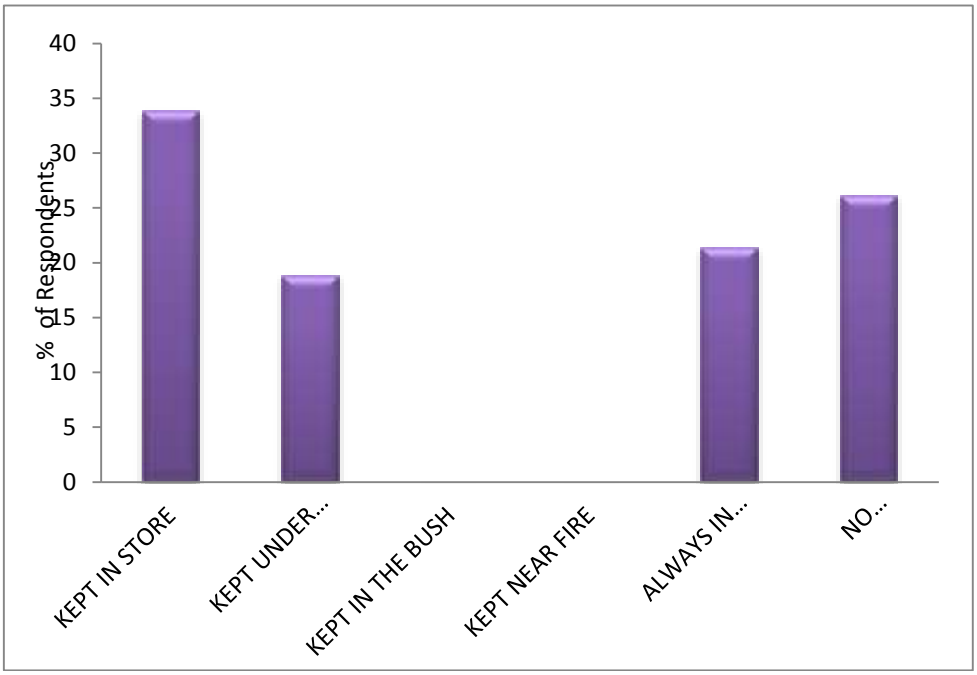

Figure V: Trap Conservation Methods in Ebute-Afuye.

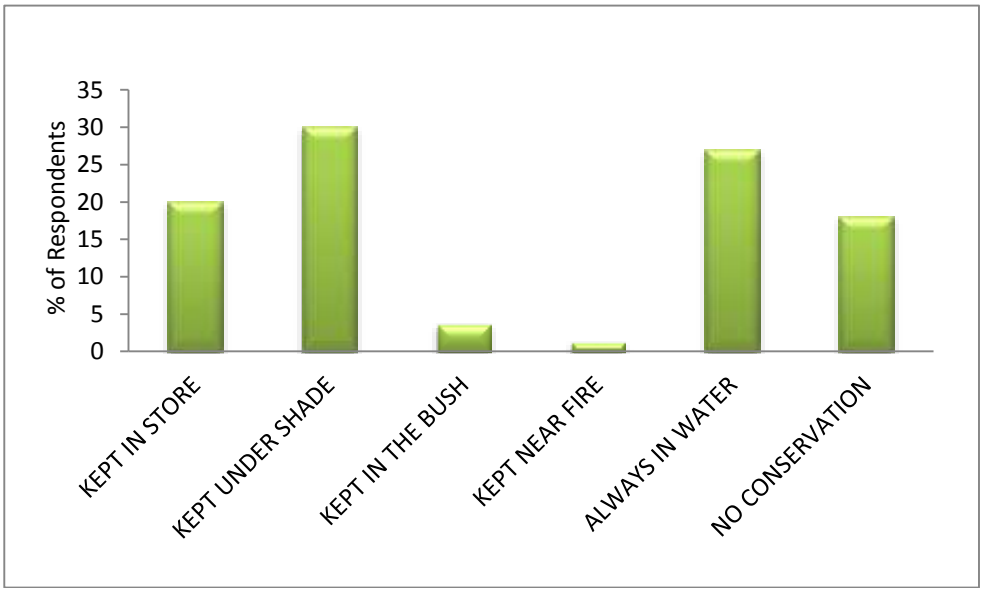

Figure VI: Trap Conservation Methods in Ejirin

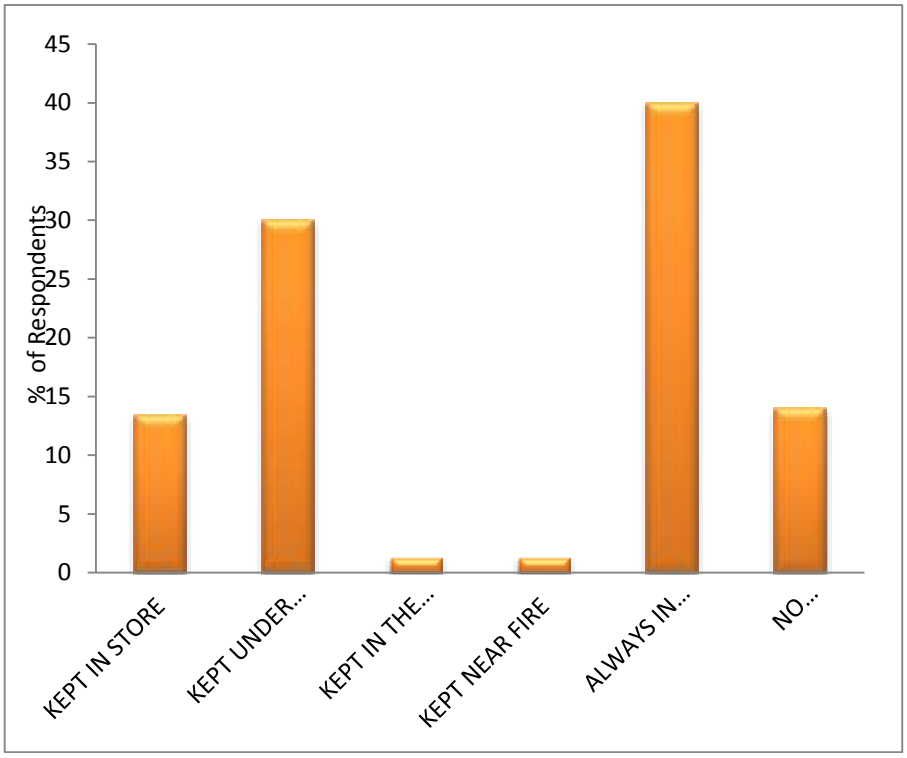

Figure VII:Trap Conservation Methods in Igbonla

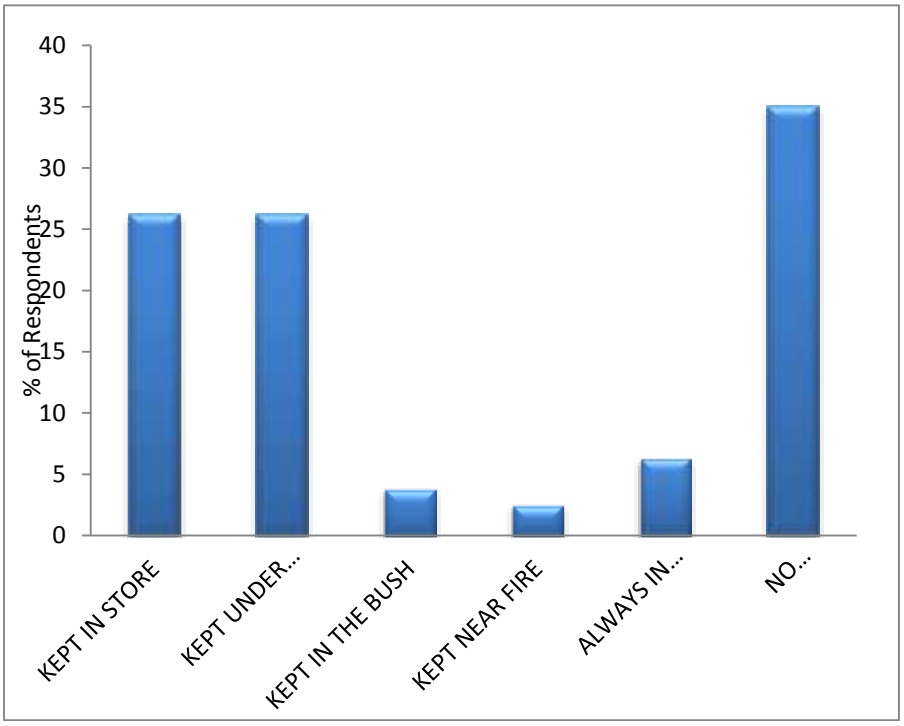

Figure VIII: Trap Conservation Methods in Erepoto

DISCUSSION

The study employed multi-stage sampling procedure with the locations purposively selected and the participants randomly selected. Purposive sampling technique (a series of strategic choices that depends on the aim of objectives of the research) was used in this study (Palys, 2008). The basis for selection of the location was preponderance of fishing activities with the aid of fishing traps.

The result revealed that the most used fishing trap from the sampled stations is the big cylindrical basket trap followed by the small cylindrical basket trap. These traps are the commonest type of traditional traps used among fisherfolks (Udolisa *et al.,* 1994) and this can be due to the fact that it can be easily constructed, operated and known to be efficient in catching different species. Big cylindrical basket trap is reported to be efficient in catching different fish species while the small cylindrical basket trap is known for catching of shrimps in addition with some fish species. Wire guaze trap is known to be efficient in catching crabs and only the fisherfolks who are more interested in catching more crabs use it; this shows in the moderate number (16%) of respondents who use the traps at the sampled fishing communities in Epe Lagoon. The findings agree with that of Emmanuel and Olojede (2010) who reported that the galvanized wire guaze trap was highly selective for the crab, *Callinectes amnicola* in Abule - Eledu Creek and the effectiveness of the trap in the creeks made it a good small-scale fishing gear. Only few respondents use the gura, pvc and bamboo traps. This contributes to scanty information available on gura, pvc and bamboo traps most especially in Epe lagoon.

Most traps are set in shallow waters between 1-2metres depth for better performances of the choices of trap sizes. Slack – Smith (2001) reported that trap types (pots) are known with its movable smaller or portable sizes which can be set from the boat or by hand because they are effective in shallow waters. Early hour (4-6am) and evening (4-6pm) time are preferred by fisherfolks as setting and retrieving period of traps respectively by fisherfolks. This may be attributed to the fact that most fisherfolks combines another occupation with trap fishing. The early hours and evening time is enough for trapping and does not interfere with another occupation of the users. These agree with Umar and Ipinjolu (2001) who reported that operation of trap is not time consuming.

Analysis revealed that most of these traditional traps have a short life span and lasts for only a few months especially the basket traps and the bamboo traps even with different conservation methods adopted because of the material they are made up of. This is in agreement with Baruah, *et al.* (2013) who stated that trap made up of bamboo splinters are subject to putrefaction subjecting to lesser life span for a few months.

CONCLUSION

This study revealed that different fishing traps are used in Epe Lagoon but preference is for the big and small cylindrical basket traps because of the catches obtained from these traps, however availability of the materials for constructing these traps and its durability are challenges facing the artisanal fisherfolks in Epe Lagoon and this may affect productivity. There is therefore a need for the modification of these traps with more durable and readily available materials which will make trap fishing more efficient in term of catches and productivity.

REFERENCES

Adeogun, O.A., Solarin, B.B., Ambose, E.E., Ogunbadejo, H.K., Orimogunje, R.O., Bolaji, D.A., Ajulo, A.A., Olusola, A.O., Aroriode, R.O. and Adeogun, M. O. (2011). Crab Fishing and Socio-economic Considerations in Lagos Lagoon system in Nigeria. *Nigeria Journal of Fisheries.* **8**(2):300-309.

Akinnigbagbe, R.O. and Osibona, A.O. (2017). Fish weight and species diversity of traditional and modified traps in selected fishing communities in lagoslagoon. *International Journal of Fisheries and Aquatic Studies*. **5**(4): 363-370.

Balogun, J.K. (1987). Studies on some aspects of the Biology of *Pellonula afzeliusi* (Johnels) in Epe Lagoon, Nigeria. *Arch. Hydrobiol*. **109**: 517-530.

Baruah, D., Dutta, A. and Pravin, P. (2013). Traditional fish trapping devices and methods in the Brahmaputra valley of Assam. *Indian Journal of Traditional Knowledge*. **12**(1): 123-129.

Edokpayi, C.A. and Uwadiae, R.E. (2011). The Malaco-Faunal Characteristics of the 'Sandwiched' Epe Lagoon, Lagos. Department of Marine Sciences, University of Lagos, Nigeria. **3**(1):1-7pp.

Emmanuel, B.E. (2009). The artisanal fishing gears, crafts technology and their efficiency in the Lekki Lagoon, Nigeria. Ph.D Thesis. University of Lagos. 256pp.

Emmanuel, B.E. and Olojede, E.T. (2010). Comparative studies on the catch selectivity of galvanized wire gauze trap from fresh and brackish water tropical creeks in South-Western Nigeria. *Journal of life and physical sciences.* **3**(2): 91 – 101.

Emmanuel, B. E. and Awojide, A. M. (2016). Bait preference in basket trap fishing operation and heavy metal contamination in the fishes caught from the Lagos Lagoon, Nigeria. *Journal of Aquatic Sciences*. **31**(1):185-203.

Fakoya, E. O and Oloruntoba, A. (2002). Comparative Analysis of Women's Involvement in Artisanal Fisheries in Epe and Eti -Osa Local Government Areas of Lagos State, Nigeria. *Journal of Agricultural Extension*. 7pp.

Food and Agricultural Organization (FAO) (1985) Practical guidelines for statistical monitoring of fisheries in manpower limited situations. *FAO*

Fisheries Technical Paper 257 FIRM/FIDI/T257. 78pp.

Food and Agricultural Organization (FAO) (1999). Guidelines for the routine Collection of Capture Fishery Data. Prepared at the FAO/DANIDA expert consultation Bangkok, Thailand.

Food and Agricultural Organization (FAO) (2002). Sample-based Fishery Surveys. FAO Fishery Technical Paper. (425): 144pp.

Ipinjolu, J.K.,Agbelege, O.O. and Hassan, W.A. (2005). *Exploratory survey of Malian and Ndururu traps in River Rima, north western Nigeria.***In**: 19th Annual Conference of the Fisheries Society of Nigeria (FISON), 29 Nov - 03 Dec 2004, Ilorin, Nigeria. *Journals of Aquatic commons*. 341-348pp.

Kjerfve, B. (1994). Coastal lagoon processes. *Elsevier Oceanography Series.* 60, Elsevier, Amsterdam. 577pp.

Kumolu-Johnson, C.A., Ndimele, P.E., Akintola, S.L. and Jibuike, C.C. (2010). Copper, Zinc and iron concentrations in water, sediment and *Cynothrissa mento* (Regan, 1917) from Ologe Lagoon, Lagos, Nigeria: A preliminary survey. *Afr. J. Aquat. Sci.***35**:87-94pp.

Moran, M.J. and Jenke, J. (1989). Effects of Fish trapping in the Shark Bay snapper fishery. West Australian Fisheries. *Department Fisheries Report.* **82:** 29pp.

Ogundiwin, D. I. (2014). Survey of artisanal fishing gear and craft. A case study of Kainji Lake lower basin, Nigeria. Master's thesis in International Fisheries Management. UIT The Arctic University of Norway. 76pp.

Okeowo, T. A., Bolarinwa, J. B. and Dauda, I. (2015). Socioeconomic Analysis of Artisanal Fishing and Dominant Fish Species in Lagoon Waters of Epe and Badagry Areas of Lagos State. *International Journal of Research in Agriculture and Forestry*, **2** (3): 38-45pp.

Onyema, I.C. (2009a). Notes on the existence of an additional lagoon in South-western Nigeria: Apęsę Lagoon. *Journal of American Science*. **5**(4):151-156pp.

Oyebisi, R., Lawal-Are, A. and Alo, B. (2012). Comparative Study of Persistent Toxic Metal Levels in Land Crab (*Cardiosoma armatum*) and Lagoon Crab (*Callinectes amnicola*) in Lagos Lagoon. *Scholarly Journals of Biotechnology.***1** (4):72-79.

Palys, T. (2008). Purposive sampling. **In:** *The Sage Encyclopedia of Qualitative Research Methods.* Given, L.M. (Ed.). Sage, Los Angeles. **2**(69):7-8.

Slack- Smith, R. J. (2001). Fishing with traps and pots. *Report in FAO*. **26**: 62pp.

Solarin, B.B. and Udolisa, R.E. (1993). An investigation of brush park fishing in Lagos lagoon. *Niger. J. Fish. Res*. **15**: 331-337pp.

Solarin, B.B., Ambrose, E.E., Adeogun, O., Bolaji, D.A., Akinnigbagbe, R.O., Adegbile, O.M., Abass, M., Gadzekpo, A., Ajulo, A.A.,Obienu, J. and Kumolu-Johnson, C.A. (2011).Bycatch of Sea Turtle and Manatee in Small Scale Artisanal Fishing Gear in Nigeria. *African Journal of Applied Zoology and Environmental Biology*. **13**.

Soyinka, O.O. and Ebigbo, C.H. (2012). Species diversity and growth pattern of the fish fauna of Epe Lagoon, Nigeria. Department of Marine Sciences, University of Lagos, Nigeria. *Journal of Fisheries and Aquatic Science.* **7**(6): 392-401pp.

Udolisa, R.E., Solarin, B.B., Lebo, P. and Ambrose, E.E. (1994). A catalogue of small scale fishing gear in Nigeria. RAFR Publication. 142pp.

Umar, K. A. and Ipinjolu J.K. (2001). The efficiency of baited Malian and Ndurutu trap in three freshwater bodies in North West Nigeria. *Journal of Agriculture and Environment* .**2**(1): 101-111.