EFFECTS OF SOCIOECONOMIC VARIABLES ON THE ADOPTION OF FISHING BOAT MOTORISATION BY ARTISANAL FISHERFOLKS ON EPE LAGOON, LAGOS STATE, NIGERIA.

Abasilim, Chinwe Frances[1] and Onyewuchi, Ikechukwu Vincent[1]
[1]Department of Agricultural Technology, Yaba College of Technology Epe Campus. P.M.B. 2011, Yaba, Lagos State, Nigeria.
Email: *chinwe.abasilim@yabatech.edu.ng*

ABSTRACT
This study analysed the effects of socioeconomic variables on the adoption of fishing boat motorisation by artisanal fisherfolks on Epe lagoon. It described the socioeconomic variables of the respondents and identified the major socioeconomic predictors influencing the adoption of fishing boat motorisation. Stratified random sampling technique was adopted. The respondents were grouped in two strata based on means of craft motorisation employed: Manual Propulsion Technology (MPT) and Motorised Technology (MT). Interview schedules were used to collect data from 60 respondents for each stratum. Properly filled schedules from47 MPT and 59 MT respondents were analysed using cross tabulation and binary logistic regression. The chi-square tests of the cross tabulations at 5% level of significance showed strong evidence of associations between means of fishing boat motorisation and sex, ethnic group, marital status, religion and educational attainment respectively. Significant predictor variables determining the adoption of MT at 5% level of significance, were household size (p =.046; Exp(B) (.193)=1.213); fishing income (p = .013; Exp(B)(.000) = 1.000) and savings ability (p = .027, Exp(B) (1.041) = 2.832.) The study recommends the organisation of the fisherfolks into cooperative societies: credit and thrift cooperatives to encourage savings for modern equipment and fisherfolks cooperatives to encourage group fishing and engagement in addressing mutual problems.

Keywords: *Artisanal fisherfolk, Fishing Boat Motorisation, Manual Propulsion Technology, Motorized Technology*

INTRODUCTION

Artisanal fishery, a synonym for small-scale fisheries, has been defined in many literatures in terms of its scale of production, technological development, capital employed, income level of the fisherfolks and other socio-economic attributes. Mathew (2001) described it as the type of fisheries characterized mainly as non-mechanized with low level of production. Mustapha (2013) described it as either a native fishery for sustenance or commercial fishery using indigenous or small-scale fishing gear like nets, traps and using motorised or non-motorised fishing boat during fishing activities. FAO (2005) described artisanal fishing as an inherited (natural) vocation in fishing and riverine communities. Coastal communities are therefore wholly dependent on fishing and the able-bodied men are proud to be fisherfolks.

Although artisanal fishery is described as mainly non-mechanized, a major technological change in the catching sector of artisanal fishery is the improvement and invention of equipment for fishing craft motorisation. The means of craft motorisation can be broadly classified into two groups: Manual Propulsion Technology (MPT), using paddles and sails and the Motorised Technology (MT), using outboard mounted engines or inboard diesel engines. Use of machine power in propelling the fishing crafts raises the depth range of operations and the fisherfolks become less fatigued. This will increase their productivity by affording the fisherfolks the ability to reach the fishing ground early thus raising their fishing time; enabling them to increase the distance range of fishing operations; and capturing the bottom dwelling or crustacean species like prawns, crabs, lobsters, etc.(Emmanuel, 2010; Ogundiwin, 2014).

Adoption of fishing boat motorisation by the fisherfolks is limited by the same plagues undermining adoption of innovation in other areas of agriculture. These include farmer age, education, years of experience, social and tenurial status, agro-climate, credit, and characteristics of the innovation itself such as its relative advantage, compatibility, complexity, techniques of communication, and the traditional culture (Ezeano, 2010). Fisherfolks cannot be assumed to be ignorant of the technological improvement and attendant benefits of craft motorisation but the lack of adoption can be attributed to a large extent, to poverty and inaccessibility of credit (Pollnac*et al.,* 2001). This is the case in Epe and Ibeju-Lekki Local Government Areas of Lagos State where most of those that used either local or Ghana type motorised canoes rented them from middlemen and traders for either cash or catch, thus reducing the net profit accruable to the fisherfolks (Lawal *et al.,* 2014).

The study focused on determining the effects of socioeconomic variables on the adoption of fishing boat motorisation by artisanal fisherfolks on Epe lagoon. Specifically, the study described the socioeconomic variables of the respondents and identified the major socioeconomic predictor variables that influenced their adoption of fishing boat motorisation with a view to providing relevant information to guide fisherfolks, researchers, extension workers and policy makers.

METHODOLOGY

Study area

Epe lagoon is one of the ten lagoons in Lagos State, south-west Nigeria (Badejo*et al.*, 2014). It is unique lagoon sandwiched between two other lagoons, the Lagos lagoon (brackish water) to the west and Lekki lagoon (freshwater) to the east. It isconnected to the Atlantic Ocean through the Lagos lagoon with River Oshun emptying into it (Edokpayi and Ikharo, 2011; Soyinka and Ebigbo, 2012). The lagoon opens into the Gulf of Guinea (the sea) via the Lagos harbour. The lagoon has a salinity of 0.24±0.19, pH 7.56±0.05 and temperature 30.35ºC±0.17ºC (Soyinka and Ebigbo, 2012). This unique positioning of Epe lagoon makes it to be relatively fresh and stable from season to season.Although Epe lagoon is not one of the major lagoons in Lagos State, it supports major fishing activities in Lagos State (Badejo*et al.*, 2014). Soyinka andEbigbo(2012) observed that there is relatively little or noseasonal variationin species composition in Epe lagoon as compared with these other lagoons.

Sampling technique and data collection

Epe is made up of two groups of fisherfolks: those that fish on the brackish lagoon water and those that fish on the fresh water streams and rivers in Epe. Since the focus of this study was Epe lagoon, eight communities living by the bank of the lagoon were purposively selected. A stratified sampling technique was adopted for this study. The respondents were stratified into two mutually exclusive strata based on means of craft motorisation employed: fisherfolks using MPT crafts (i.e. paddles, sails etc.) and fisherfolks using MT crafts (i.e. inboard engines or outboard engines). The sampling units were the fisherfolks' households, while the household heads were interviewed in either Yoruba or Pigeon English using the standardized interview schedule. An initial 60 respondents for each stratum were selected using snowball sampling technique, from whicha total of 106 appropriately filled interview schedules and were analysed. The 106 respondents comprised 47 MPT fisherfolks and 59 MT fisherfolks.

Analytical tools

Descriptive statistic of crosstabulation was used to describe the socioeconomic variables of the respondents. Chi-square test statistic was used to test if there were associations between the various socioeconomic variables and the means of fishing craft motorisation used. The p-value is a probability that measures the evidence against the null hypothesis. A 0.05 significance level (denoted as α or alpha) was used. If the p-value is less than or equal to the significance level, then there is a statistically significant association between the socioeconomic variables and the means of fishing craft motorisation,whichcannot be attributed to random disturbances. If the p-value is larger than the significance level, then there is not enough evidence to conclude that there is an association between the socioeconomic variables and the means of fishing craft motorisation, therefore any difference observed will only be due to random error.

Binomial regression was used to examine the effects of socioeconomic variables of the respondents on the adoption of fishing boat motorisation. The level of significance of predictor variables in the model were tested at 5% level of significance. The odds ratio, E(B), and the Regression Coefficient were used to determine the probability of the respondents adopting the MT. The dependent and independent variables are given in Table I.

RESULTS AND DISCUSSIONS

Socioeconomic characteristics of respondents

Sex and means of fishing craft motorisation

Table II reveals that males dominated the artisanal fishery in the study area. This finding validates the earlier researchers' positions that men were predominantly the harvesters of wild fish species, and artisanal fishery is predominantly a male profession in Lagos State. (Lawal *et al.*,2016; Okeowo*et al.*,2015;Olubanjo*et al.*, 2007). It also confirms Oladimeji (2015) position that the participation of females in actual fishing maybe due to death of male household heads, migration, divorce and economic reasons. However, the contribution of the women folks in active fishing in this study area cannot be underscored as they made up 10.4% of the respondents, which confirms Adeleke (2013) and Olaoye*et al.*, (2012) findings that it is a common feature to find females in the fishing communities participating actively in lagoon (non-ocean) fishing while their male counterparts exploit the ocean.

Table II also reveals that more of the male respondents, 52.8% used MT while 36.8% used MPT. Among the female respondents, 5.1% used MT while 17.0% used the MPT. The large percentage of the female fisherfolks that used the MPT shows that the MT technology may be either unaffordable to the female fisherfolks or the technology is complicated for them to use.

The p-value of .05 shows there is a statistically significant association between the sex of the respondents and the means of fishing craft motorisation.

Age categories and means of fishing craft motorisation

Defining old people as those who are above 60 years and the productive age as those between 20-60 years, Table III shows that only 5.7% of respondents can be said to be old while the majority of respondents (about 94.6%) fall within the productive age group. This finding was also observed by Lawal *et al.*(2016). Oladimeji (2015) explained that the preponderance of active and virile heads of households in the study area has a multiplier effects

on availability of able-bodied labour for primary production; ease of adoption of innovations; reduction in the degree of risk-aversion and as such will have a positive implication to sustainability of fishing enterprise in the state. Therefore, age has great potentials for increasing catch and production, hence, improving household income and reducing poverty in the study area. Table III also shows that the 8.5% of the MPT users could be categorized as old while about 3.4% of that age category used MT. Oladimeji (2015) explained that other things being equal, labour productivity is a function of age and that old people tend to adhere strictly to traditional methods of fishing, while young people tend to be more willing to adopt new production methods in order to increase production. However, the Table III shows low usage of MT (10.3%) among respondents that were less than 20 years. This may be as a result of the high cost of the MT and also being new entrants in the profession and may not have saved enough money to upgrade their business.

The p-value of the test statistic of 0.45, which is greater than the chosen significance level ($\alpha = 0.05$), does not suggest enough evidence to conclude that there was an association between the age categories of the respondents and means of fishing craft motorisation. It means that the difference observed will only due to random error.

Household size and means of fishing craft motorisation

A household is defined as composed of one or more people who occupy a housing unit (Jason and Lynne, 2011). The Table IV shows that the modal class of the respondents' household sizes was 5-9 people for both users of MPT and MT. This implied that the fisherfolks respondents had access to family labour which can be utilized for the fishing operations. Although this will lead to a reduction of explicit cost of production as explained by Olaoye (2012), the possession of large household size may also reduce the savings ability of the fisherfolks as most of the income will be used for the family upkeep instead of investment in the fishing business.

The corresponding p-value = .08, shows no significant association between household size and means fishing craft motorisation. Therefore, there is not enough evidence to suggest an association between household size of respondents and means of fishing craft motorisation.

Marital status and means of fishing craft motorisation

Many of the respondents, 55%, were in a married monogamous relationship as shown in Table V. Respondents in married monogamous and married polygamous relationships made up 45.8% each of the MT fisherfolks in the study area. This explains the considerably large household size in the study area. It further explains the reason behind fishing is a family occupation as the family members were the main source of labour used for fishing.

The corresponding p-value of the test statistic is $p = 0.00$ shows there is enough evidence to suggest an association between marital status of respondents and means of fishing craft motorisation.

Educational attainment and means of fishing craft motorisation

Table VI shows that 76.4% of the respondents had attained some level of formal educational. Some 45.3% of the respondents had primary school education, 28.3% had secondary school education and 2.8% tertiary education. Respondents without any formal education were 14.2% and 9.4% of MPT and MT respondents respectively. A high percentage of 68.9% respondents with either no education or only primary school educational depicted a low level of education among the fisherfolks. This finding was confirmed by Lawal *et al.* (2016) who discovered that many of the fisherfolks in Ibeju Lekki axis had primary school education. It also buttressed Akanni (2008) findings that many of the artisanal fisherfolks had below secondary school education. However, only 7.5% of these respondents with above primary school education used MT. Enlightenment and trainings/workshops on fisheries may further enhance the operations and fortune of the fisherfolks (Forde, 1994).

The corresponding p-value of the test statistic is $p = 0.05$, suggest enough evidence of an association between educational attainment of the respondents and means of fishing craft motorisation.

Primary occupation and means of fishing craft motorisation

Distribution of the respondents by primary occupation, as shown in Table VII, shows that the primary occupation of 84.9% of the respondents was fishing. This proves that artisanal fishing is an important and most predominant enterprise in the area of study. It also confirms the assertion of Oladimeji (2015) that fishing is the major occupation of people living in the coastal and riverine areas. About 58.9% of the fisherfolks whose primary occupation was fishing, improved their trade by adopting MT.

The p-value of the test statistic is $p = 0.11$, suggest lack of enough evidence of an association between primary occupation of respondents and means of fishing craft motorisation.

Fishing experience and means of fishing craft motorisation

The distribution of years of fishing experience of respondents in Table VIII shows that the 41% and 33% of the respondents have 11-20 years and 21-30 years fishing experience respectively. The mean year fishing experience was 23.7years and the modal class had a range of 11-20 years which is 41.5% of the respondents. About 3.8% of them have been in the

fishing business for over 40 years and above. The distribution indicates that approximately half of the respondents have spent less than 21 years in fishing. Kareem, Dipeolu, Aromolaran and Akegbejo (2013) explained that the effects of fishing experience on fish catch and processing may be positive or negative, because it would appear that up to a certain number of years, fishing experience would have a positive effect. After which, the effect may become negative as a result of aging or reluctance to change from old and familiar practices and techniques to those that are modern and improved.

Chi square tests value also suggests lack of enough evidence of an association between years of fishing experience and means of fishing craft motorisation, since the p-value of 0.43 is greater than the chosen significance level ($\alpha = 0.05$).

Weekly frequency of fishing and means of fishing craft motorisation

The Table IX has a p-value of the test statistic of 0.2, suggesting lack of enough evidence that there was an association between number of days fished weekly and means of fishing craft motorisation.

The effects of socioeconomic variables on the adoption of fishing boat motorisation

A binary logistic regression was performed to ascertain the effects of age, sex, household size, educational attainment, primary occupation, fishing experience, fishing frequency, fishing duration, fishing income, savings ability, access to credit and cooperative society membership, on the likelihood of respondents adopting motorized technology (MT).The output of the binary logistic regression is shown in Table X. The Cox & Snell R Square and NagelkerkeR Square of the model, were .225 and .302 respectively. These indicate that 22.5% to 30.2% of the variation in the dependent variable were explained by the model. The Cox & Snell R Square and NagelkerkeR Square values indicated that the model is good. The classification result of 70.2% shows that the classification the model is not too bad.Also,Hosmer and Lemeshow Test of the goodness of fit suggests that the model is a good fit to the data because p=0.934 (>.05).

The results of the binary logistic regression reveal thatthe variables respondent's household size (p =.046), fishing income (p = .013) and savings ability (p = .027), were the socio-economic explanatory variables that added significantly to the model/prediction at 5% level of significance.

Interpretation of Odds Ratios

The results reveal that respondent household size positively and significant statistically affected the adoption motorized technology (MT).The Regression coefficient (B) for respondent household sizes was .193. The odds ratio was Exp(B) (.193) = 1.213. Since the odd ratio is greater than 1, the odds of the respondent adopting the MT as a result of a unit increase in household size is increased 1.213 times. This increase is also evident in the coefficient which has a positive value.

The second significant predictor variable was fishing income (p = .013). The odds ratio was Exp(B) (.0000) = 1.000 indicating that there will be no change in odds of adopting the MT as a result of either a unit increase or decrease in fishing income (Null Odds ratio). This is also evident in the Regression coefficient (B-coefficient) which assumed the value of .000.

The third significant predictor variable was savings ability (p = .027). The odds ratio was Exp(B) (1.041) = 2.832. Since the odd ratio is greater than 1, the odds of the respondent adopting the MT by a unit increase in savings ability is increased 2.832times. This increase is also evident in the Regression coefficient (B-coefficient) which is a positive value.

CONCLUSION AND RECOMMENDATIONS

A chi square values of the socioeconomic variables tested in this study, revealed strong evidence of an association between the means of fishing boat motorisation employed by the respondents and their sex, ethnic group, marital status, religion and educational attainment. The study revealed that the socioeconomic characteristics which were significant to the adoption of fishing boat motorisation (MT), at 5% level of significance, were household size (p =.046), fishing income (p = .013) and savings ability (p = .027). However, the odds ratio of these significant predictor variables revealed a null odds ratio (Exp(B) = 1.000) for fishing income, meaning that a unit change in the fishing income will have no effect in the odds of the fisherfolks adopting MT.

Encouraging the artisanal fisherfolks to adopt MT, will not only improve the drudgery associated with the occupation but also improve their productivity. This can be achieved by:

i. encouraging the fisherfolks to form and join credit and thrift cooperatives which will improve their ability to save for investment in modern equipment that will improve their productivity;
ii. Since household size has a positive significant odds ratio in the adoption of MT, it may be because of reduction in the cost of labour. However, this variable can be maximized by the fisherfolks going into group fishing expeditions. This group fishing should be organised as a Fisherfolks Cooperative, in order to encourage mutual help.

REFERENCES

Adeleke, M. L. (2013). The Socio-economic characteristics of the artisanal fisher folks in the coastal region of Ondo State, Nigeria.

Journal of Economics and Sustainable Development. 4(2): 133-139

Akanni, K. A. (2008). Catch levels and capital investment of artisanal fishermen in Lagos State, Nigeria. *Turkish Journal of Fisheries and Aquatic Sciences*. 8: 361-368

Badejo, O.T., Olaleye, J. B. and Alademomi, A. (2014). Tidal characteristics and sounding datum variation in Lagos State. International Journal of Innovative Research and Studies.3(7): 435-457

Edokpayi, C. A. and Ikharo, E. A. (2011). The malaco-faunal characteristics of the sandwiched Lagoon Epe Lagoon, Lagos. *Researcher,* 3(1): 15-21

Emmanuel, B. E. (2010). Fishing crafts characteristics and preservation techniques in Lekki Lagoon, Nigeria. *Journal of American Science* 2010. 6(1):18-21

Ezeano, C. I. (2010). Constraints to sweet potato production, marketing and utilization among small-scale farmers in South-Eastern Nigeria. *Agronomical Nigeriana*. 9(1 &2): 280-282.

Food and Agriculture Organization (FAO), (2005). Increasing the contribution of small-scale fisheries to poverty alleviation and food security. Technical Guidelines for Responsible Fisheries No. 10, Rome. 79pp

Jason, F. and Lynne, M.C (2011). America's families and living arrangements. Current population reports. Current Population Reports 20-537 (2001): 1

Kareem, R. O., Dipeolu, A. O., Aromolaran, A. B. and Akegbejo, S. (2013). Analysis of technical, allocative and economic efficiency of different pond systems in Ogun State, Nigeria. *African Journal of Agricultural Research*. 3(4):246-254.

Lawal, J., Obatola, P., Giwa, E. J.and Alhaji, T. A. (2016) Socio-economic analysis of artisanal fishing operation in west and east axes of Lagos State, Nigeria. *World Journal of Agricultural Research.*4 (1): 31-35. DOI: 10.12691/wjar-4-1-5

Mathew, S. (2001). Small-scale fisheries perspectives on an ecosystem-based approach to fisheries management. Paper presented at the Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem, Reykjavik, Iceland. 18pp

Ogundiwin, D. I. (2014). Fisheries and economics survey of artisanal fishing gear and craft a case study of Kainji Lake lower basin, Nigeria. A Master thesis in International Fisheries Management. The Arctic University of Norway. 87pp.

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): 38-45. ISSN 2394-5907 (Print) & ISSN 2394-5915 (Online).

Oladimeji, Y. U. (2015). Analysis of poverty status of rural artisanal fisherfolks in Kwara State, Nigeria. A published Ph.D. dissertation in Agricultural Economics submitted to the School of Postgraduate Studies, Ahmadu Bello University, Zaria. 235pp

Olaoye, O. J., Idowu, A. A., Omoyinmi, G. A. K., Akintayo, I. A., Odebiyi, O. C. and Fasina, A.O. (2012). Socio-economic analysis of artisanal fisherfolks in Ogun Water-Side Local Government Areas of Ogun State, Nigeria. *Global Journal of Science Frontier Research Agriculture and Biology.*12 (4): 9-12

Olubanjo, O. O., Akinleye, S. O. and Balogun, M. A. (2007). Occupational characteristics, technology use and output determinants among fisher-folks in Ogun waterside area, Ogun State. *Farm Management Association of Nigeria Journal.* 8(2): 21-32

Pollnac, R. B., Pomeroy, R. &Harkes, I. (2001). Fishery policy and job satisfaction in three southeast Asian fisheries. *Ocean and Coastal Management*. 44: 532-544. DOI: 10.1016/S0964-5691(01)00064-3

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

Table I: Statistical summary of the variables

Variable Type	Variable Name	Description	Code
Dependent and binary	Means of motorisation	MPT MT	0 1
Independent and Continuous	Age (x_1)	Respondents' age (in years)	x_1
Independent and Categorical	Sex (x_2)	Male Female	x_2=1 x_2 = 2
Independent and Continuous	Household size (x_3)	Number of people in a household	x_3
Independent and Continuous	Educational attainment (x_4)	Years of formal schooling	x_4
Independent and Categorical	Primary occupation (x_5)	Non-fishing Fishing	x_5
Independent and Continuous	Fishing experience (x_6)	Years of fishing experience	x_6
Independent and Continuous	Fishing frequency (x_7)	Number of days fished per week	x_7
Independent and Continuous	Fishing duration (x_8)	Length of fishing expedition (hours)	x_8
Independent and Continuous	Fishing income (x_9)	Average monthly revenue realized from fishing (Naira)	x_9
Independent and Categorical	Saving's ability (x_{10})	Can you save from your income? No Can you save from your income? Yes	x_{10} =0 x_{10} = 1
Independent and Categorical	Access to credit (x_{11})	Do you have easy access to credit? No Do you have easy access to credit? Yes	x_{11}=0 x_{11} =1
Independent and Categorical	Cooperatives membership (x_{12})	Are you a member of cooperative society? No Are you a member of cooperative society? Yes	x_{12}=0 x_{12} =1

Table II: Crosstabulation of sex and means of fishing craft motorisation

			MPT	MT	Total
Sex of Respondents	male	Count	39	56	95
		% within means of fishing craft motorisation	83.0%	94.9%	89.6%
		% of Total	36.8%	52.8%	89.6%
	female	Count	8	3	11
		% within means of fishing craft motorisation	17.0%	5.1%	10.4%
		% of Total	7.5%	2.8%	10.4%
Total		Count	47	59	106
		% within means of fishing craft motorisation	100.0%	100.0%	100.0%
		% of Total	44.3%	55.7%	100.0%

X^2 (1, N = 106) = 4.01, p = .05

Table III: Crosstabulation of age category and means of fishing craft motorisation

			means of fishing craft motorisation		
			MPT	MT	Total
Age categories	≤ 20	Count	7	6	13
		% within age category	53.8%	46.2%	100.0%
		% within means of fishing craft motorisation	14.9%	10.2%	12.3%
	21-40	Count	18	30	48
		% within age category	37.5%	62.5%	100.0%
		% within means of fishing craft motorisation	38.3%	50.8%	45.3%
	41-60	Count	18	21	39
		% within age category	46.2%	53.8%	100.0%
		% within means of fishing craft motorisation	38.3%	35.6%	36.8%
	≥60	Count	4	2	6
		% within age category	66.7%	33.3%	100.0%
		% within means of fishing craft motorisation	8.5%	3.4%	5.7%
Total		Count	47	59	106
		% within age category	44.3%	55.7%	100.0%
		% within means of fishing craft motorisation	100.0%	100.0%	100.0%

X^2 (3, N = 106) = 2.65, p = .45

Table IV: Crosstabulation of household size and means of fishing craft motorisation

			means of fishing craft motorisation		
			MPT	**MT**	**Total**
Household size	≤ 4	Count	18	10	28
		% within household size	64.3%	35.7%	100.0%
		% within means of fishing craft motorisation	38.3%	16.9%	26.4%
	5-9	Count	26	43	69
		% within household size	37.7%	62.3%	100.0%
		% within means of fishing craft motorisation	55.3%	72.9%	65.1%
	10-14	Count	3	5	8
		% within household size	37.5%	62.5%	100.0%
		% within means of fishing craft motorisation	6.4%	8.5%	7.5%
	≥ 20	Count	0	1	1
		% within household size	0.0%	100.0%	100.0%
		% within means of fishing craft motorisation	0.0%	1.7%	0.9%
Total		Count	47	59	106
		% within household size	44.3%	55.7%	100.0%
		% within means of fishing craft motorisation	100.0%	100.0%	100.0%

X^2 (3, N = 106) = 6.70, p = .08

Table V: Crosstabulation of marital status and means of fishing craft motorisation

			means of fishing craft motorisation		
			MPT	**MT**	**Total**
Marital status	married monogamous	Count	28	27	55
		% within marital status	50.9%	49.1%	100.0%
		% within means of fishing craft motorisation	59.6%	45.8%	51.9%
	married polygamous	Count	10	27	37
		% within marital status	27.0%	73.0%	100.0%
		% within means of fishing craft motorisation	21.3%	45.8%	34.9%
	divorced/separated	Count	6	0	6
		% within marital status	100.0%	0.0%	100.0%
		% within means of fishing craft motorisation	12.8%	0.0%	5.7%
	never married	Count	3	5	8
		% within marital status	37.5%	62.5%	100.0%
		% within means of fishing craft motorisation	6.4%	8.5%	7.5%
Total		Count	47	59	106
		% within marital status	44.3%	55.7%	100.0%
		% within means of fishing craft motorisation	100.0%	100.0%	100.0%

X^2 (3, N = 106) = 6.70, p = .00

Table VI: Crosstabulation of educational attainment and means of fishing craft motorisation

			means of fishing craft motorisation		Total
			MPT	MT	
Educational attainment	none	Count	15	10	25
		% within educational attainment	60.0%	40.0%	100.0%
		% within means of fishing craft motorisation	31.9%	16.9%	23.6%
	primary	Count	17	31	48
		% within educational attainment	35.4%	64.6%	100.0%
		% within means of fishing craft motorisation	36.2%	52.5%	45.3%
	secondary	Count	12	18	30
		% within educational attainment	40.0%	60.0%	100.0%
		% within means of fishing craft motorisation	25.5%	30.5%	28.3%
	tertiary	Count	3	0	3
		% within educational attainment	100.0%	0.0%	100.0%
		% within means of fishing craft motorisation	6.4%	0.0%	2.8%
Total		Count	47	59	106
		% within educational attainment	44.3%	55.7%	100.0%
		% within means of fishing craft motorisation	100.0%	100.0%	100.0%

X^2 (3, N = 106) = 8.03, p = .05

Table VII: Crosstabulation of primary occupation and means of fishing craft motorisation

			means of fishing craft motorisation		
			MPT	MT	Total
primary occupation	fishing	Count	37	53	90
		% within primary occupation	41.1%	58.9%	100.0%
		% within means of fishing craft motorisation	78.7%	89.8%	84.9%
	non-fishing	Count	10	6	16
		% within primary occupation	62.5%	37.5%	100.0%
		% within means of fishing craft motorisation	21.3%	10.2%	15.1%
Total		Count	47	59	106
		% within primary occupation	44.3%	55.7%	100.0%
		% within means of fishing craft motorisation	100.0%	100.0%	100.0%

X^2 (1, N = 106) = 2.52, p = .11

Table VIII: Crosstabulation of years of fishing experience and means of fishing craft motorisation

			means of fishing craft motorisation		
			MPT	MT	Total
years of fishing experience	1-10	Count	5	5	10
		% within years of fishing experience	50.0%	50.0%	100.0%
		% within means of fishing craft motorisation	10.6%	8.5%	9.4%
	11-20	Count	22	22	44
		% within years of fishing experience	50.0%	50.0%	100.0%
		% within means of fishing craft motorisation	46.8%	37.3%	41.5%
	21-30	Count	12	23	35
		% within years of fishing experience	34.3%	65.7%	100.0%
		% within means of fishing craft motorisation	25.5%	39.0%	33.0%
	31-40	Count	5	8	13
		% within years of fishing experience	38.5%	61.5%	100.0%
		% within means of fishing craft motorisation	10.6%	13.6%	12.3%
	≥ 41	Count	3	1	4
		% within years of fishing experience	75.0%	25.0%	100.0%
		% within means of fishing craft motorisation	6.4%	1.7%	3.8%
Total		Count	47	59	106
		% within years of fishing experience	44.3%	55.7%	100.0%
		% within means of fishing craft motorisation	100.0%	100.0%	100.0%

Mean 23.7 Std. dev. 9.6 Minimum 2 Maximum 60
X^2 (4, N = 106) = 3.84, p = .43

Table IX: Crosstabulation of Weekly frequency of fishingand means of fishing craft motorisation

			means of fishing craft motorisation		
			MPT	MT	Total
Weekly frequency of fishing	1.00	Count	1	0	1
		% within weekly frequency of fishing	100.0%	0.0%	100.0%
		% within means of fishing craft motorisation	2.1%	0.0%	0.9%
	2.00	Count	0	1	1
		% within weekly frequency of fishing	0.0%	100.0%	100.0%
		% within means of fishing craft motorisation	0.0%	1.7%	0.9%
	3.00	Count	0	2	2
		% within weekly frequency of fishing	0.0%	100.0%	100.0%
		% within means of fishing craft motorisation	0.0%	3.4%	1.9%
	4.00	Count	11	5	16
		% within Weekly frequency of fishing	68.8%	31.3%	100.0%
		% within means of fishing craft motorisation	23.4%	8.5%	15.1%
	5.00	Count	8	14	22
		% within weekly frequency of fishing	36.4%	63.6%	100.0%
		% within means of fishing craft motorisation	17.0%	23.7%	20.8%
	6.00	Count	10	16	26
		% within weekfrequency of fishing	38.5%	61.5%	100.0%
		% within means of fishing craft motorisation	21.3%	27.1%	24.5%
	7.00	Count	17	21	38

	% within weekly frequency of fishing	44.7%	55.3%	100.0%
	% within means of fishing craft motorisation	36.2%	35.6%	35.8%
Total	Count	47	59	106
	% within weekly frequency of fishing	44.3%	55.7%	100.0%
	% within means of fishing craft motorisation	100.0%	100.0%	100.0%

X^2 (6, N = 106) = 314.92, p = .20

Table X: Binary logistic regression of the effects of socioeconomic variables on the adoption of fishing boat motorisation

	B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**
Age x_1	-.003	.030	.009	1	.924	.997
Sex x_2	-1.746	1.009	2.993	1	.084	.174
Household size x_3	.193	.097	3.964	1	.046***	1.213
Educational attainment x_4	.306	.308	.984	1	.321	1.358
Primary occupation x_5	-.797	.635	1.578	1	.209	.450
Years of fishing experience x_6	.003	.035	.005	1	.941	1.003
Frequency of fishing x_7	.104	.230	.204	1	.651	1.109
Fishing duration x_8	-.066	.089	.539	1	.463	.937
Fishing income x_9	.000	.000	6.168	1	.013***	1.000
Savings ability x_{10}	1.041	.470	4.901	1	.027***	2.832
Access to credit x_{11}	.592	.507	1.363	1	.243	1.807
Cooperative society membership x_{12}	.267	.621	.186	1	.667	1.307
Constant	-1.423	1.462	.948	1	.330	.241

***Significant at 5%

-2 Log likelihood = 115.751; Cox & Snell R Square = .225; Nagelkerke R Square = .302

Overall correct prediction is 70.2%; Hosmer and Lemeshow Test of the goodness of fit = p=0.934 (>.05)