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The Impact of Micro-Credit Projects on Poverty Alleviation: A Case of Farming Households in Ijebu-Ode Local Government Area of Ogun State, Nigeria

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Abstract - In an attempt to reduce the poverty level of the populace especially the rural households, Nigerian government introduced poverty alleviation programme. One of the programmes is the introduction of micro-credit projects. This study therefore examined the impact of micro-credit projects on poverty alleviation among farming households in Imowo community in Ijebu-Ode Local Government Area (LGA) of Ogun state, Nigeria. The study focused on the evaluation of community development as a result of the introduction of some micro-credit projects. Structured questionnaires were used to collect information from the respondent in the farming households. The information collected included the socio-economic characteristics of the respondents as well as the level of income of the beneficiaries before and after the micro-credit projects. The collected data were analysed using descriptive statistics. The study revealed that 90 percent of the respondents were aged between 21 and 60 years while 80 percent of the household heads had formal education. Eighty six percent of the households had Child Dependency Ratio (CDR) of between 0.01 and 1.0 with 10 percent having zero CDR. The monthly expenditure analysis revealed that the Mean Per Adult Equivalent Household Expenditure (MPAEHE) ranged from N845.14 (US$5.63) for the first expenditure decile to N3,879.42 (US$25.86) for the tenth decile.

Keywords : *Micro-credit, projects, impact, households, poverty.*

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The Impact of Micro-Credit Projects on Poverty Alleviation: A Case of Farming Households in Ijebu-Ode Local Government Area of Ogun State, Nigeria

Oluyole, K.A.

Abstract - In an attempt to reduce the poverty level of the populace especially the rural households, Nigerian government introduced poverty alleviation programme. One of the programmes is the introduction of micro-credit projects. This study therefore examined the impact of micro-credit projects on poverty alleviation among farming households in Imowo community in Ijebu-Ode Local Government Area (LGA) of Ogun state, Nigeria. The study focused on the evaluation of community development as a result of the introduction of some micro-credit projects. Structured questionnaires were used to collect information from the respondent in the farming households. The information collected included the socio-economic characteristics of the respondents as well as the level of income of the beneficiaries before and after the micro-credit projects. The collected data were analysed using descriptive statistics. The study revealed that 90 percent of the respondents were aged between 21 and 60 years while 80 percent of the household heads had formal education. Eighty six percent of the households had Child Dependency Ratio (CDR) of between 0.01 and 1.0 with 10 percent having zero CDR. The monthly expenditure analysis revealed that the Mean Per Adult Equivalent Household Expenditure (MPAEHE) ranged from N845.14 (US$5.63) for the first expenditure decile to N3,879.42 (US$25.86) for the tenth decile. However, the share of food in the total household expenditure was 64.5 percent for the first decile and 45.3 percent for the tenth decile. Meanwhile, a poverty line of N2,586.28 (US$17.24) was obtained for the study area and a sum of N1,586.53 (US$10.57) would be required to provide a food basket that will meet the Recommended Dietary Allowance (RDA) of 69,000kcal per month. Furthermore, the study revealed that there is significant difference between the mean income of the beneficiaries before and after the micro-credit project ($p<0.05$).

The study recommended that in as much that the project had positive effect on the income level of the beneficiaries, government should endeavour to encourage the communities with good poverty alleviation efforts and other communities should be sensitized on their roles toward assisting themselves by embarking on developmental projects that can alleviate their poverty.

Keywords : Micro-credit, projects, impact, households, poverty.

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I. Introduction

Poverty refers to lack of command over resources to meet essential needs (Ravallion and Bidani, 1994; Olayemi, 1995). Poverty, according to the World Bank (World Bank, 1990) has also been defined as the inability to attain a minimum standard of living. Inequality, poverty and unemployment have been recognized as major blemishes in developing economies ever since economists began to take interest in the "Third World" (Killick, 1981; Oluyole *et al*, 2009). One can not meaningfully talk about development without addressing what is happening to poverty, unemployment and inequality. These three problems are related and they confront any socio-economic system (Killick, 1986). Accoding to Okunneye, 2002, a poor person is considered as one without a job, who cannot help himself or cater for his family, who has no money, farm or business. Adolescent males and females are poor if they have no parents, no education, no good food, clothes and health. A poor person is described as one who is undernourished and ageing fast, one without self confidence, looks dirty and lives in filthy environment, one who cannot cater for his family, train his children in the school and unable to pay medical bills (World Bank, 1992). World Bank sees poverty as inability to meet the basic needs such as food, health care, education and shelter requirements of a meaningful life.

In 1960, according to the Federal Office of Statistics, about 15 percent of the Nigerian population was poor but by 1980 this had grown to 28 percent. The Federal Office of Statistics estimated that by 1985, the extent of poverty was about 46 percent although it dropped to 43 percent by 1992. However, by 1996, poverty incidence in the country was 66 percent or 76.6 million Nigerians out of a population of 110 million. The United Nations Human Poverty Index in 1999 which credited Nigeria with 41.6 percent captured the phenomenon more succinctly as the figure placed the nation as amongst the 25 poorest nations in the world. Today, it is estimated that two thirds of the country's 120 million people or 80 million are said to be poor and this

is in spite of the fact that since independence, Nigeria is said to have realized $300 billion in oil and gas revenues and development aid. Nigeria is now generally regarded as a poor against the background of the living conditions of its citizens. The country was ranked 54th on Human Poverty Index among developing countries in the world (Human Development Report, 2003). Socio-economic statistics on the average income in the country showed that per capital GDP declined precipitously from $1284.30 in 1980 to $392.50 in 1990 and further down to $53.90 in 1992 (Central Bank of Nigeria, 1993). This statement was however consolidated by Okunmadewa (2001) who claimed that despite Nigeria's physical and human resources there had been progressively worsening welfare and poverty condition of its nationals. The major causes of poverty according to World Bank (1996) are inadequate access to: employment opportunities, the means of supporting rural development, market and assistance to those living at the margin. A survey conducted by the Federal Office of Statistics in 1999 revealed that the incidence of poverty in Nigeria is greater in the rural (farming households) than in the urban areas.

However, if incidence of poverty runs counter to the developmental aspiration, its alleviation or eradication becomes a worthwhile endeavour, hence, poverty alleviation should be a prime focus of economic policy. At independence in 1960 and for the best part of the 1960s, poverty eradication efforts in Nigeria was centered on education, which was seen as the key to economic, technological and intellectual development of the nation. Thus, education programmes were implemented alongside agricultural extension services, which encouraged increased food production. The oil boom in the 1970s skewed this outlook as rising global oil prices boosted exports from N4 billion in 1975 to N26 billion in 1980, while Gross National Product per capita rose from $360 to more than $1000. By the time oil prices fell, so did the nation's export receipts. This also translated into negative growth and a fall in Gross National Product per capita to $370 in the 1980s. Further efforts made by successive governments include the establishment of the Department of Food, Roads, and Rural Infrastructure (DFFRI) with the major aims of opening up the rural areas and improvement of the conditions of the vulnerable poor; this project had long been abandoned but it achieved the set objectives before the abandonment. The establishment of National Directorate of Employment (NDE) to tackle the problem of mass unemployment in the country (Nigeria). Through this programme (NDE), many unemployed youths were engaged. Also, the establishment of People's Bank of Nigeria (PBN) to cater for the credit needs of Nigerians. The bank was able to meet the credit requirements of the less privileged Nigerians. Others included the Better Life Programme (BLP) which was gender specific. It was meant to improve the life of rural women. The programme was later replaced by Family Support Programme (FSP). The programmes failed because they were hijacked by position seeking individuals, who used most of the resources for personal aggrandizement rather than for the set objectives. Others such as National Agricultural Land Development Authority (NALDA), The Strategic Grains Reserve Authority (SGRA) and the Accelerated Crop Production (ACP) were all established to improve the productive capacities of peasant farmers as well as improving their incomes and well-being. To assist in the eradication of illiteracy, which was found to be a major cause of poverty, the Nomadic and Adult Education Programmes were established. However, with the return of democracy in 1999, the Federal Government embarked on poverty reduction programmes. Specifically, government put in place a National Poverty Eradication Programme (NAPEP) in the year 2002. The programme was aimed at eradicating abject poverty in Nigeria. However, as an offshoot of NAPEP is the provision of micro-credit assistance to meet with the credit needs of the people. However, since the introduction of the project, its impact on the poverty level of the beneficiaries has not been established. Therefore, it was the focus of this study to assess the impact of the projects on poverty alleviation among farming households. The study's objectives were:

(i) to identify the socio-economic characteristics of the respondents;

(ii) to examine the effects of micro-credit projects on the income level of the households;

(iii) to determine the expenditure pattern of the respondents' households.

Hypothesis testing

The hypothesis tested is:

There is no significant difference between the income of the beneficiaries before and after the micro-credit project.

II. Conceptual Framework

According to Ravallion and Bidani (1994) poverty is referred to as lack of command over basic consumption needs, that is, a situation of inadequate level of consumption; giving rise to insufficient food, clothing and shelter. Aluko and Sen (Aluko, 1975; Sen, 1987) defined poverty as lack of certain capabilities, such as being able to participate with dignity in societal endeavours. Poverty has also been defined by World Development Report as the inability to attain a minimum standard of living (World Development Report, 1990). The report constructed two indices based on a minimum level of consumption in order to show the practical aspect of the concept. While the first index was a country specific poverty line, the second was global, allowing cross-country comparisons (Walton, 1990). Other indices put forward by United Nations include life expectancy, infant mortality rate, primary school ratios

and number of persons per physician. However, poverty, unemployment and inequality are interrelated and most of the fundamental questions relating these three was posited by seers (Seers, 1972), which include what has been happening to poverty, what has been happening to unemployment and what has been happening to inequality? If all of these three have declined from high levels, then this has been a period of development in the country concerned. He further added that if one or more of these central problems have been growing worse, especially if all three have, it would be strange to call the result development even if per capital income doubles. For most of the urban population, it is the position of the individual or household in the labour market that is most influential in whether they can or cannot avoid poverty. In most cases, it is not the income earned that affects the level of poverty but also the nature of employment-related social benefits such as health insurance if any are provided. For households, the capacity to avoid poverty also centre on the number of household members who can find some source of income. Thus, a great range of studies conducted have shown association between households with unskilled workers, low educational attainment parent household with higher rates of poverty among particular ethnic or immigrant communities (UNCHS, 1996).

III. Methodology

The study was undertaken in Imowo community in Ijebu-Ode Local Government Area (LGA) of Ogun state. Ijebu-Ode Local Government Area covers a total land area of 82,986.62 hectares. It has a tropical climate and it is designated as a coaster area. Its vegetation has a wide variety of thick forest. The land is suitable for a wide variety of agricultural products ranging from cash crops, such as kolanut, cocoa and palm produce, to food crops; like yam, cassava, maize, rice cocoyam and vegetables. Imowo community is located on the outskirt of Ijebu-Ode Local Government Area. The community was chosen as the study area because the inhabitants of the community are predominantly farmers with few artisans and civil servants. Also, the community is about 1.2 kilometers away from the headquarters of the Local Government hence this made it easy for the inhabitants to have access to social facilities such as good roads, health centers and electricity. The implication of this is that the beneficiaries of the micro-credits would not be spending part of the credits to be providing these facilities and hence the credit would be used for the purpose it meant for. Micro-credit facilities were put in place in the community by a Non- Governmental Organisation (NGO). Under the project, monetary assistance in terms of loan ranging from N25,000 to N40,000 (US$167 to US$267) with an interest rate of 5% per annum were given out to adult workers (farmers and artisans) to invest into their business/farming and the project was run for one year. However, the project was not executed nationwide, it was restricted to the Local Government Area.

Since this study was interested in the farming households, therefore, purposive random sampling technique was used to select fifty farming households among the beneficiaries of small scale credit projects in the study area. There were about 200 beneficiaries of the project that comprised of both the artisans and farming households. Structured questionnaire was used to collect information from the respondent farming households and the information was collected once, that is, at the end of the project which was at the end of the year; hence, the duration of the project was one year. Some of the information collected include the socio-economic characteristics of the respondents as well as the level of income of the beneficiaries before and after the micro-credit projects. The data collected were analysed using descriptive statistics and difference of means. Descriptive statistics was used to analyse the demographic variables as well as the expenditure patterns of the sampled households. Difference of means was used to find the difference in the level of income of beneficiaries before and after the small scale credit project. These were then compared to establish if there is any significant difference between the income of beneficiaries before the small scale credit project and their income after the small scale credit project.

$$S(\bar{X}_A - \bar{X}_B) = \sqrt{SD_A^2/n_A + SD_B^2/n_B}$$

Where: $S(\bar{X}_A - \bar{X}_B)$ = Standard error of difference of means;

$\bar{X}_A$ = Mean of income of beneficiaries (in Naira) after the micro-credit project;

$\bar{X}_B$ = Mean of income of beneficiaries (in Naira) before the micro-credit project;

SD_A^2 = Square of the standard deviation of income of beneficiaries (in Naira) after the micro-credit project;

SD_B^2 = Square of the standard deviation of beneficiaries (in Naira) before the micro-credit project;

n_A = Number of beneficiaries sampled after the project;

n_B = Number of non-beneficiaries sampled before the project.

IV. Results

By end of the project, only 10% of the respondents were sixty years and above hence most of the respondents were still in their active age.

Ninety percent of the respondents had formal education ranging between primary and tertiary education, hence majority of the respondents were enlightened.

About 86% of the respondents had household size of between 1 and 8 while the mean household size was 6.0.

More than eighty percent of the household's heads belonged to at least one cooperative society, this tends to raise the status of their income and reduce the poverty level in the households.

Eighty percent of the households had Child Dependency Ratio (CDR) of less than 1, 16% had CDR of 1 while 4% had CDR of greater than 1.

Difference of Means showed that there was a significant difference in the mean of the income of the beneficiaries before and after the micro-credit project, hence, there was an increase in the income of the beneficiaries after the micro-credit projects.

The mean annual income of the beneficiaries before the micro-credit project was below N150,000 (US$1000) while it was above N150,000 after the micro-credit project.

The per adult equivalent household expenditure increases from the first expenditure decile to the tenth decile. It was N845.14 per month for the first decile and N8413.17 for the tenth decile per month. These expenditures respectively are 2.18% and 21.69% of the total per adult equivalent household expenditures.

V. Discussion

a) Socio-economic characteristics of the respondents

Table 1 shows that 80 percent of the households in the community were headed by men while only 20 percent were headed by women. This may connote that the proportion of poor in the male headed households are more and this is in line with Omonona (2001) which claimed that poverty is more among male headed households than the female headed households. More than half (66%) of the households are headed by persons aged between 41 and 60 while 10 and 24 percent are headed by individuals aged above 60 years and 21-40 years respectively- as shown in Table 1. With the findings, the incidence of poverty was not likely to be much among the respondent's households. This is because the prevalence of poverty increases with age is above 60 years. This finding is in line with Omonona (2001) who discovered that the prevalence of poverty is more within household heads aged 60 years and above. Table 1 also shows that 20 percent of the households had no formal education, 20 percent with primary school education while 40 percent had secondary school education. Twenty percent of the households attended various tertiary institutions. Hence, about 80 percent of the households can be said to have formal education or are literate. This implies that poverty situation in the community may not be as high as may be expected in a typical (remote) setting (Omonona, 2001). It could also be observed in table 1 that 62 percent of the households had household size of between 5 and 8 persons. In African setting, this household size is small. Hence, the level of poverty is not severe in this community because of the smallness of its family size. This agrees with Omonona (2001) who found out that the prevalence of poverty increases as the household size increases. As regards the cooperative societies' membership of the household head, the study showed that 84 percent of the household heads were members of cooperative societies because of the awareness about the benefits accruable to members. As regards the Child Dependency Ratio (CDR), the study revealed that after the project that 86 percent of the households had CDR of between 0.01 and 1.0 with 10% having zero CDR. This implies that the extent of poverty is moderate among the majority of the sampled population.

b) The effects of micro-credit projects on the income of the respondents

In knowing the effects of micro-credit project on the respondents' income, the average income of the respondents before and after the project were compared using the difference of two means.

Difference of two means was carried out to determine whether there is any significant difference between the means of income of the beneficiaries before and after the project. Using a two-tail test at 5% level of significance,

$$S(X_A - X_B) = \sqrt{SD_A^2/n_A + SD_B^2/n_B}$$

Where: $S(X_A - X_B)$, X_A, X_B, SD_A^2 SD_B^2 are as previously defined

$$n_A = n_B = 50$$

$$S(X_A - X_B) = \sqrt{105.5^2/50 + 120^2/50}$$
$$= 22.60$$

$$Zc = \frac{\bar{X}_A - \bar{X}_B}{S(\bar{X}_A - \bar{X}_B)}$$

$$= 3300\text{-}2800/22.60$$

$$= 22.12$$

At 5% level of significance, the $Z_t = 11.96$ for a two tail test. So, as the calculated Z- score is above this value, it means then that there was significant difference between the means of income of the beneficiaries before and after the micro credit project. The Null Hypothesis was thus rejected. The above confirmed that the micro-credit project has actually helped the beneficiaries to improve their income. This fact was further substantiated by the result presented in table 1. The table shows that the mean annual income of the beneficiaries before the micro-credit project was below N150,000 (US$1,000) while it was above N150,000 (US$1,000) after the micro-credit project. This amount is however greater than national household average annual income of N108,900 (US$726) (World Factbook, 2008).

c) Household food and non-food expenditure

Table 2 shows that the food share in total expenditure decreases from the first expenditure decile (64.5%) to 43.0% in the tenth expenditure decile. On the other hand, the non-food share in the Per Adult Equivalent Household Expenditure (PAEHE) increases from the first to the tenth decile. It was 35.5% for the first decile and 54.7% for the tenth decile. These results confirmed Engel's law which states that the proportion of income spent on food items decreases as the level of income increases while the proportion of income spent on food items increases as the level of expenditure increases (Syrovatka, 2003). Therefore, it could be deduced from these results that the income of the respondent households increases continuously after the micro credit project.

However, the total Mean Per Adult Equivalent Household Expenditure (MPAEHE) was N38,794.21 and this divided by 10 (10 expenditure deciles) to give an average of N3879.42. Two third of N3879.42 gives the poverty line for the study area and the value is N2,586.28. The Per Adult Equivalent Household Expenditure was used because of the fact that the needs of children are different from that of adult members. In addition, the needs of male members are quite different from female members of the same age. So, household expenditure was converted into adult equivalent household expenditure based on the nutritional requirements, sex and age of the members of the households. Table 3 illustrates the standardization/conversion of household expenditure into Adult Equivalent Household Expenditure.

VI. Conclusion and Recommendations

Difference of means shows that there was significant difference between the mean of income of the beneficiaries before and after the micro credit project. This points to the fact that the micro credit project had actually helped the beneficiaries to improve their income. Therefore, it could be concluded that the introduction of the micro credit projects had impacted positively on the income of the beneficiaries and hence had reduced the poverty level of the respondent households in the study area. The poverty level was measured by the Child Dependency Ratio (CDR), number of times food is taken per day and mean annual income. All these however improved after the micro-credit project.

The following recommendations are derived from the study:

1. Government should encourage the communities with good poverty alleviation efforts while other communities should be sensitized of their roles toward assisting themselves by embarking on developmental projects that can alleviate their poverty.
2. Assistance should be sought from other NGOs on the future community projects to reduce the financial stress on the community.
3. All the working class (traders, artisans and farmers) in the community should be identified and the micro-credit project should be extended to them to further improve their financial base so that they will have enough money to do their work. In case fund is not available to consider all the working class at the same time, then they could be taken in batches.

Table 1: Socio-economic variables of the respondents

Variable	Before micro-credit project %	After micro-credit project %
Sex of household head		
Male Headed	80	80
Female Headed	20	20
Total	100	100
Age of household heads (years)		
21-40	26	24
41-60	67	66
Above 60	7	10
Total	100	100
Educational status of household head		
No formal education	20	20
Primary education	20	20
Secondary education	41	40
Tertiary education	19	20
Total	100	100

Household size		
1-4	26	24
5-8	64	62
Above 8	10	14
Total	100	100
Membership of cooperative societies by household heads		
Yes	84	84
No	16	16
Total	100	100
Child Dependency Ratio		
0	8	10
0.01-0.99	71	70
1.0	16	16
Above 1.0	5	4
Total	100	100
Number of times food is taken per day		
< 3 times per day	58	26
≥ 3 times per day	42	74
Total	100	100
Mean Annual Income		
≤ N50,000	30	0
N50,001 – N100,000	60	0
N100,001 – N150,000	10	0
> N150,000	0	100
Total	100	100

Source : Field survey, 2006

Table 2 : Per Adult Equivalent Food and Non-food Expenditure Share by Deciles

Decile	MPAEHE (N)	Food Share (%)	Non-food share (%)
First	845.14	64.52	35.48
Second	1021.22	62.43	37.57
Third	1754.08	61.21	38.79
Fourth	2104.13	60.24	39.76
Fifth	3472.15	59.38	40.62
Sixth	3847.42	57.32	42.68
Seventh	4952.81	52.67	47.33
Eighth	5434.25	50.26	49.74
Ninth	6949.84	47.31	52.69
Tenth	8413.17	45.32	54.68

Source : Field Survey, 2006

Table 3 : Nutrition (Calorie) based equivalent scales for standardizing household sizes

Age (Years)	Men	Women
0-1	0.33	0.33
1-2	0.46	0.46
2-3	0.54	0.54
3-5	0.62	0.62
5-7	0.74	0.70
7-10	0.84	0.72
10-12	0.88	0.78
12-14	0.96	0.84
14-16	1.06	0.86
16-18	1.14	0.86
18-30	1.04	0.80
30-60	1.00	0.82
60 above	0.84	0.74

Source : Stefan and Pramila (1998)

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Socio-Economic Analysis of Artisanal Fisher Folks in Ogun Water-Side Local Government Areas of Ogun State, Nigeria

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Abstract - This study was conducted to evaluate the socio-economic analysis of artisanal fisher folks in Ogun Waterside Areas, Ogun State using structured interview guides to collect primary data randomly from eighty respondents in four fishing communities (Iwopin, Oni, Makun-omi and Agbalegiyo) in 2011 fishing season. The information collected was analyzed using descriptive and budgetary analysis. The results reveals that almost average (53.8%) of the fisher-folks were males while 81.2% were in the active age distribution of 20- 60 years, no formal education (60.0%) while 37.5% are in the bracket of 11-20 year fishing experiences, married (91.3%) and (68.8%) are not members of any fisher cooperative societies. Most (71.4%) of the fisher folks inherited the fishing knowledge within the household. The total revenue (N83,762.50), Benefit Cost Ratio (0.45) and Gross Margin Ratio (49.30) showed profitability of fishery business. Constraints faced artisanal fisher folks includes inadequate storage (96.3%), infestation by water hyacinth (93.8%), inadequate power (88.8%), inadequate technology (87.5%), inaccessible credits and high cost of fishing inputs.

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GJSFR-D Classification : *FOR Code: 8904, 070403*

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Keywords : artisanal fishing, fisheries, households, Nigeria, socio-economic analysis.

I. Introduction

Nigeria is blessed with inland water, brackish water, and marine water fisheries resources. On the basis of her resources, fisheries can be broadly classified into: Artisanal fisheries (85%), industrial fisheries (14%), and culture fisheries (1%) (Federal Department of Fisheries, FDF, 2005).

Fishing is an ancient human tradition. It is a traditional activity involving the hunting and gathering of aquatic products for food. Fish and marine products include freshwater and ocean fish, shellfish, ocean mammals and seaweed as well as plankton.

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They represent a major food source, which is invaluable for the protein they provide and the industrial products they produce. Fish satisfies a vital food need for billions. Fish is also economically, socially and culturally important as a global dietary aspect of sustainable food security. Economically fish provides an important source of food and income for both men and women and fishing has an important social and cultural position in riverine communities. However, the tradition of fishing has been transformed over several decades of human civilization to become a resource extraction industry spanning the entire globe. Man first learned to catch fishes in traps and nets. These fishing activities were limited at first to the lakes and rivers, but as men improved on the boats and fishing technologies, they ventured into sheltered coastal areas, river mouths and eventually farther out on to the continental shelves, relatively shallow ocean plains between the land and the deeper ocean areas (Williams, 1987; Olubanjo et al., 2007).

Fishing settlements represent one of the oldest forms of community living known to mankind. In these settlements, fisher-folks including children, men and women have evolved over time, different crafts, skills and technologies for fishing and for day to day survival. This is, in addition, to those associated with the preservation and processing of fish catch. In typical fishing settlements (or landing sites), men are predominantly the harvester of wild fish species (Williams, 1987; Olubanjo et al., 2007). The extent and nature of the involvement in the capture fisheries in Nigeria however varies by locality, religion, level of education and form of fish sales, among other factors.

Small-scale fisheries can be broadly characterized as a dynamic and evolving sector employing labour, intensive harvesting, processing and distribution technologies to exploit marine and inland water fishery resources. The activities of this sub-sector, conducted full-time or par time, or just seasonally, are often targeted on supplying fish and fishery products to local and domestic markets, and for subsistence consumption. Export oriented product, however, has increased in many small-scale fisheries during the last one to two decades because of greater market integration and globalization. While typically men are engaged in fishing and women in fish processing and

marketing, women are also known to engage in near shore harvesting activities and men are known to engage in fish marketing and distribution. Other ancillary activities such as net-making, boat-building, engine repair and maintenance, etc can provide additional fishery-related employment and income opportunities in marine and inland fishing communities. Small-scale fisheries operate at widely differing organizational levels ranging from self-employed single operators through informal microenterprises to formal sector businesses. This sub-sector, therefore, is not homogenous within and across countries and regions and attention to this fact is warranted when formulating strategies and policies for enhancing its contribution to food security and poverty alleviation (FAO, 2004).

The families (household) livelihood strategy in this area tends to combine various ways of earning a living. The most dynamic livelihood strategies rely on the largest possible range of approaches and available assets, thus reducing risks created by natural or market vagaries. One proven fisheries livelihood strategy is, as mentioned above, harvesting various fisheries resources with different gears depending on the season. Another is simply doing nothing during the "dead" period (particularly when the climate is very harsh) provided enough resources are generated during the active season.

Still a third - and particularly frequent and solid strategy in the rural areas - is to engage in fisheries during the "peak abundance" main season and to undertake another productive activity the rest of the year, such as raising pigs or repairing farm tools for the village. However, these people might be considered only part-time fishers and part-time farmers, and as such be excluded by modern administrations from a number of development schemes and benefits despite the fact that they might be the more robust and efficient contributors to society. Furthermore, multiple livelihood sources help reduce the catastrophic effects fisheries management measures can have where a fishery must be closed or reduced due to the state of resources.

There are some advantages associated with small scale fisheries especially in the study area such as the Lower running costs and fuel consumption. In general, having less mechanical power than industrial fisheries, they tend to optimize human power and reduce fuel costs, using more passive gears and practices such as hand lining, long lining, gillnets, fish traps and light attraction. Another is the Lower ecological impact. While artisanal/small-scale fishers may, and do, use destructive methods (such as poison and dynamite), it is usually agreed that their environmental impact is reduced because they employ mainly passive gears. However, this does not mean that they cannot overfish available resources. Higher employment opportunities being more labour-intensive, small-scale fisheries are naturally suited in rural areas with high demographic growth, providing employment in catching as well as processing and trade of fish and fishery products. Still, without proper user rights and control of fishing capacity, overfishing is easily possible.

Nigeria is endowed with a coastline of 853km and over 14 million hectares of inland waters. The coastline stretches from the Western border with Republic of Benin to the Eastern border with Cameroon Republic. In 1978, Nigeria established an Exclusive Economic Zone (EEZ) which is an area beyond and adjacent to the territorial sea extending 200 nautical miles from the baseline. The surface area of the continental shelf is 46,300km^2 while the EEZ covers an area of 210, 900km^2, within which Nigeria exercises sovereign rights for the purpose of exploring, exploiting, conserving, and managing the natural resources. Nigeria is therefore blessed with an abundance of marine, brackish and inland water resources. Fish and fishing contribute immensely to the national economy by providing high animal food protein source, employment and poverty alleviation.

The coastline in Nigeria, and especially of the Ogun Waterside Area of Ogun State, is well-endowed with river networks, and a large expanse of exclusive ocean waters for commercial fishing. Moreover, capture fisheries account for over 90 percent of total annual fish production in Nigeria (Tobor, 1984). Consequently, several of the natives and residents in coastal (or littoral) states and communities in Nigeria are involved in the capture fisheries sub-sector of the nation's economy. Similarly, in the Ogun Waterside Area, the people (i.e. men, women and children) are engaged predominantly or on part-time basis in one or more activities in the capture fisheries sub-sector.

II. Objectives of The Study

The main objective is to examine the socio-economic analysis of artisanal fishing households in the study area as it improves their livelihood.
The specific objectives are to:

- Examine the socio-economic characteristics of the small scale fisher folks in the study area.
- identify the types of fishery practices and characteristics in the study area
- Determine the size of capital investments and the profitability of small scale fishing.
- Investigate the constraints affecting artisanal fisheries in the study area.

III. Hypotheses

$H0_1$: There is no significant difference between socio-demographic and income level of the artisanal fisher folks.

$H0_2$: There is no significant difference between profit level and constraints faced fisher folks

HO_3: Artisanal fisheries are not profitable in Ogun waterside Local Government Area of Ogun State.

IV. Justification of The Study

Food even more than clothing or shelter is the indispensible necessity of mankind. The fish industry as a whole has been known to contribute immensely to both economic and nutrition of the nation. Fresh fish provides an excellent source of protein for human diet. This protein is relatively of high digestibility, biological and growth promoting value for human consumption, nutritional studies have proved that fish protein ranks in the same class as chicken protein and are superior to milk, beef protein and egg albumen. Fish protein comprise of all the ten essential amino acids in desirable strength for human consumption. Nigeria is endowed with inland water bodies being used by small scale fish holders here in we have fish (renewable natural resource) which should be exploited rationally on sustainable basis. What is needed is a more dynamic approach to implement the available knowledge while exploring ways to ameliorate the performance of the industry. The contribution of the fisheries sector to the National economy is largely positive. Significant progress could occur in National fisheries development, which could result in the consolidation of small industrial base, growing export receipts resulting to a positive trade balance. The major challenge for the fisheries sector is meeting the current levels of consumption.

V. Methodology

a) Area of study

The area of study is Ogun Waterside Local Government Area in the Ijebu Division of Ogun State. She is located in the eastern part of Ogun state sharing boundaries with Ondo state in the north, Lagos state in the south and Ijebu east local government in the west. About half to three quarter of the length of the local government is surrounded by water extending from Lagos state to Ondo state, this peculiar feature gave birth to the name waterside.

The area comprises over 50 towns and villages with headquarter at Abigi at 6°29′N 4°24′E / 6.483°N 4.4°E (www.wikipedia.com), while the main town in this area are Iwopin, Omi, Ibiade, Abigi, Efire, Ilushin, Makun-omi, Ode-omi and Lomiro, the area consists largely of Yoruba-speaking people of which, the Ijebus comprise about 70 percent, with the Ikales, Ilajes, Itsekiris and Urhobos making up the remaining 30 percent. It has an area of 1,000 km² and a population of 72,935 at the 2006 census. This area is also blessed with a large expanse of fertile land (soil) rich in organic matter, well drained and deep which makes it support various crop cultivation especially plantation crops such as oil palm and coconut. The major occupations are Farming and Fishing. The major agric products are Garri, Fish, Rubber, Rice and Maize. Major natural resources are Timber, wild Oil Palm Trees, and Vast manila forest. (www.ogunministryoflocalgovtandchief taffairs.com).

The choice of the local government is by its close proximity to the Atlantic Ocean and its relative endowment with a complex network of streams, rivers, brackish water and in particular the extension of the Lagos (Lekki) Lagoon to the area. It is the only area of the state with a coastline on the Bight of Benin and also borders Lagos lagoon. Ogun state's artisanal outputs are: 2009 (13,170.790), 2010 (23,180.764) with 76 percent change (NAERLS & NPAFS, 2010) while Nigeria output was 2007 (564277mmt) and 2008 (511382mmt) with negative percent change (FDF, 2008).

b) Sampling procedure and sample size

A total of eighty respondents (fishermen and fisherwomen) were selected randomly and administered interview guides from four fishing villages (Makun-omi, Oni, Iwopin and Agbalegiyo) in the lagoon area of Ogun Waterside local government area (Table 1). The sampling population of eighty was used to actualize the main objective of the research, which is to know the profitability of the business.

Table 1 : Sample number and study location

Ogun Waterside Local Government Areas (LGAs)	Number of Respondents	Villages
1	20	Makun-omi
2	20	Oni
3	30	Iwopin
4	10	Agbalegiyo

c) Data collection

Quantitative data was collected with the aid of structured and pre-tested interview guides and personal communication which were designed to achieve the objectives of the study. The interview schedule is structured in such a way to consists of both open and close ended questions. The open ended questions allow the respondent to express their own opinions about specific situations in order to fulfill the specific objectives of the study. The sampling frame was obtained from Ogun State Agricultural Development Programme (OGADEP) frontline extension agents, out of which 80 artisanal fishing households were purposefully and randomly selected.

The secondary sources of data were from past related research reports, Federal department of Fisheries, text books and information from government establishments.

d) Analytical techniques

A combination of various analytical tools was used in the study. These tools include descriptive statistics such as means, frequency and percentages, and budgetary analysis such as net farm income (NFI), gross margin (GM) and profitability ratios. Specifically,

the first to three objectives was achieved using descriptive statistics while the four objectives (cost and return of fishery enterprises) was achieved using Benefit-Cost ratio, NFI, GM and profitability ratios. Thus:

Net Farm Income (NFI): gives an overall level of profitability of a fishery enterprise by adding fixed and variable costs together and subtracting the cost from the total revenue in naira.

Hence; NFI = TR – TC (i.e. TFC+TVC)
Where: TR = Total Revenue {P = Unit price of output (Naira) multiply by
Q = Total quantity of output (Kg)}, TC = Total cost.

Gross Margin (GM)

Gross margin is the difference between the gross farm income (i.e. total revenue in naira) and the total variable cost in naira.
Hence; GM = GFI – TVC
Where: GM = Gross margin, GFI = Gross farm income, TVC = Total variable cost.

Profitability Ratios

Profitability ratio is a class of financial metrics that helps investors assess a business's ability to generate earning compared with its expenses and other relevant costs incurred during a specific period. When these ratios are higher than a competitor's ratio or than the company's ratio from a previous period, this is a sign that the company is doing well (Businessdictionary.com, 2010, Olaoye and Odebiyi, 2011, Okwu and Acheneje, 2011). Some examples of profitability ratios are listed and explained below:

Cost-Benefit Ratio (CBR or BCR)

Cost-benefit ratio or analysis is the term that either refers to helping to appraise, or assess the case for a project programme or policy proposal and an approach to making economy decision of any kind. From the above definition, the process involves whether explicitly or implicitly weighing the total expected costs against the total expected benefits of one or more actions in order to choose the best or most profitable option (Olaoye and Odebiyi, 2011, Okwu and Acheneje, 2011).

Therefore; BCR = TR/TC
Where, TR = Total Revenue (Naira); TC = Total cost (Naira)

Expense structure ratio (ESR) = FC/VC
Where, FC = Fixed cost (Naira) and VC = Variable cost (Naira)

Rate of return (ROR) = NR/TC
Where, NR = Net Return (Naira)

Gross Ratio (GR) = TFE/GI
Where, TFE = Total farm expenses (Naira) and GI = Gross income (Naira).

VI. Results and Discussion

a) Socio - demographic characteristics of the respondents

Entries from the descriptive analysis of socio-economic characteristics of respondents in the study area in Table 1, shows that: Age is an important socio-economic characteristic because it affects productivity, output and adoption of innovation. It was obtained from the survey that 81.2% of the respondents' ages in the study area are between 20 and 60 years while 5% are above 60 years. This implies that most people engaged in fish catching were still active and physically fit to paddle the canoes. The implication was that the respondents are within the productive and economic active age, and could be able to increase fish catch and improve livelihood of the families. The finding was in agreement with those of Olaoye (2010), who found that most of the fisher folks are in their economic active ages to undertake strenuous task associated to the fishing enterprise and also in line with Bello, (2000) ascertain that age has positive correlation with acceptance of innovation and risk taking. Of the total 80 respondents, 53.8% were found to be males while 46.3% were female. This is a throwback to the belief on women access to productive resources of which credit is one; this is contrary to Lahai et al. (2000), which suggest that women participated more than man in most farming activities. Fishing practices are not limited to a particular gender both male and female are engage in capture fisheries to increase fish production, income level and improve food security of the economy, it was seen in the study area that a larger proportion of the fisher folks (91.3%) were married. This implies that occupational mobility will be reduced and family labour will be available for collective responsibility.

Almost half (52.5%) of the respondents had household size of 1-5 persons while 47.5% had between 6 and 10 persons. This implies that the lower the number of family dependant on capture fisheries the better the fishing performance because less time is spent on family issues and more on fishery. The relatively small household size may increase the number of labour needed as a against (Adegbite and Oluwalana, 2004; Adegbite et al., 2007) that the lengthy the household size, the more likelihood for labour efficiency on fisher folks but this was not so because the most common type of labour in the study area is the family labour (68%). The implication was that family labour will be available during the fishing activities and reduction of cost of product ion, hence increase profit. Also, it was noticed that in the study area majority of the respondents were Ijebu (31.3%) closely followed by the ijaws (30.0%) and the others were Igbo, Ikale, Ilaje and Yoruba respectively. This made communication easy amongst the fisher folks. With 60.0% respondents that were uneducated which is an important factor and

similar to the general opinion that most farmers are illiterates or semi-illiterates most of whom dropped out of formal school system as evidence from the studies of Ozor (1998) and Okwoche et al. (1998). Forde (1994) again stated that the low level of fishing education and social status of the artisanal fishermen were some of the constraints to their fish catching levels and indeed their development. Enlightenment and training/ workshops on fisheries may further enhance the operations and fortune of the fishermen.

Cooperative society involves a social participation that helps farmers to pool their resources together, to have access to fishing inputs and to have insight in their fishing issues. Membership of cooperative societies is therefore a factor which influences the adoption to improve fishing technologies and apparently alleviation. From the result, it was noted that 68.8% of the respondent do not belong to any fish association while only 30.0% are members, which may be reason for not benefitting from any source of credit facilities which is in line with the position of (Akinbile, 1998). The groups should ensure that members derive benefits from the group such that they will not have derived individually if they were acting alone.

The total revenue showed that many of the respondents (37.6%) earned a total of ₦70,000 - ₦84,000 while just 13.9% earned between ₦100,000 and ₦150,000, thus having an overall mean of N83,762.5000. Most of the respondents said that their rate of catch is at a moderate level (90%) while most stated that their major source of finance is from the family (52.5%), since the business by majority is family oriented thus little involvement with fish societies and the few that were not family oriented took loans from friends. Clark et al. (2005), for instance, reported that the non-availability of a credit scheme taking into full consideration the peculiar circumstances of small-scale fisheries militate against capital –intensive expansion. Forde (1994) also supported this position when he wrote that the shortage of credit facilities was one of the major constraints to artisanal fishermen. Generally, lack of liquidity and the poverty of the practitioners have retarded the growth of artisanal fisheries. The availability of credit facilities for the use of the artisanal fisher folks could also increase the likelihood of their adopting the use of outboard engines as against the use of traditional, manual-propelled boats/canoes. The credit facilities will enable the fisher folks to acquire the fishing machines that are capable of reaching far into distant waters and thus increase the fish catch levels of the artisanal fisher folks. This is important, because the nearby coastal waters are usually over-exploited and therefore depleted. Again, the target of increasing fish catch level by the fisher folks could also make them abandon the manually paddled canoes and adopt the use of modern outboard engines that reach out far into the water to make good catches. Majority (85%) of the respondents sourced their labour from family members while only 15% obtained paid labour.

From the survey, (77.5%) of the respondents agreed that there is a ready market for fish harvested and 80.0% sell per hand (which varies having the highest value (37.5%) to be 200 pieces) with prices ranging due to the size and quantity. The fish harvested is mostly sold fresh and smoked (47.5%) so as to reduce level of spoilage as there are no adequate storage systems. From the sales of fish species in the study area many (41.3%) of the respondents obtained between ₦15,000 and ₦20,000 while 22.6% obtained between ₦5,000 and ₦10,000. From the survey we deduce that 86.3% of the respondents had a moderate income level while only 2.5% recorded low income.

Table 2 : Percentage distribution of socio-economic characteristics of respondents (N= 80)

Variables	Frequency	%	Mean	Std	Std Error
AGE (Years)					
<20	11	13.8			
20 – 30	17	21.2			
31 – 40	22	27.5			
41 – 50	18	22.5			
51 – 60	8	10.0			

Above 60	4	5.0			
TOTAL	**80**	**100.0**	**20.84**	**1.1904**	**1.3309**
SEX					
Male	43	53.8			
Female	37	46.3			
TOTAL	**80**	**100.0**			
MARITAL STATUS					
Single	4	5.0			
Married	73	91.3			
Widow	3	3.8			
TOTAL	**80**	**100.0**			
HOUSEHOLD SIZE (Persons)					
1 – 5	42	52.5			
6 – 10	38	47.5			
TOTAL	**80**	**100.0**	**5.1125**	**0.561**	**0.503**
TRIBE					
Ijebu	25	31.3			
Ijaw	24	30.0			
Igbo	2	2.5			
Ikale	4	5.0			
Ilaje	10	12.5			
Yoruba	15	18.8			
Level of education					
No formal education	48	60.0			
Completed Pry School	13	16.3			

Uncompleted Pry School	4	5.0			
Completed Secondary School	11	13.8			
Uncompleted Secondary School	1	1.3			
Tertiary education	3	3.8			
Fisher Cooperative Society					
Membership	24	30.0			
Non-membership	55	68.8			
Total Revenue (Naira)					
57000-69000	18	22.7			
70000-84000	30	37.6			
85000-100000	21	26.3			
100000-150000	11	13.9			
TOTAL	80	100.0	**83,762.50**	**22,468.68**	**2,512.07**
Source of Capital (Naira)					
Families	42	52.5			
Loan	3	3.8			
Borrowed	11	13.8			
Families & Loan	3	3.8			
Others	21	26.3			
Source of Labour (Man-hour)					
Families	68	85.0			
Hired Labour	12	15.0			
Ready Market					
Available	62	77.5			
Unavailable	18	22.5			

Mode of sales					
Kilo	6	7.5			
Hand	64	80.0			
Dozen	10	12.5			
Forms of fish sales					
Fresh	39	48.8			
Smoked	3	3.8			
Fresh & Smoked	38	47.5			

b) Fishery practices and characteristics of the fishing households

Most of the respondents are involved in the fishing business (97.5%) while the other respondents were involved in one or two other income generating activities that supplement their income. This implies that fishery activities alone were not sufficient to meet their family financial obligations. As shown in the Table 3, most of the respondents took up fishing as an occupation because of their family background (71.4%), while 2.6% took it as a hobby.

The result also revealed that most of the respondents in the study area had 11 – 20 years of fishing experience. It is believed that this would enhance their efficiency. This finding is in line with Schumpeterian theory of economic development which suggest that technical efficiency is influenced by technical knowledge and understanding in addition to other socio – economic environment with which the fisher folks must take decision (Kalirajan, 1990). Normally, the more the fishing experience, the higher the fish catch level since experience aids fishermen's the performance and fortune (Olomola, 1991). This is also substantiated by the findings of Olaoye (2010) who observed that fishing experience is important in determining the profit levels of artisanal fisher folks, the more the experience, the more fishers understand the system, condition, trends, prices, etc.

In the study area most of the respondents made use of boats without engine (86.3%) while (13.8%) who could afford it made use of boats with engine for example Suzuki with different horse powers of 15, 25, 40, to mention a few as this improved their catch statistics. For those who made use of boats without engines and with engine, their boats were generally made of woods and dug-out respectively. The implication of this is that the majority (86.3%) who used plank canoes propelled by paddling with or without cloth sails spent almost half of the time of their operations in canoe paddling. This is laborious particularly when the journey is entangled with water hyacinths.

In the study area we were able to know what the canoes are really made of, most of the respondents made use of Dug-out canoes (51.3%), while a few made use of both the wooden and the dug-out canoes (10%). Aside the boats been used by these fisher folks, during fishing they make use of various fishing gears comprising mostly of hook and line, traps (58.9%) which are used to catch different types of fish species such as Tilapia (Tilapia zilli), Catfish (Clarias gariepinus), slap water (Heterotis niloticus) e.t.c. while 2.5% are using other forms of fishing gears. The different species harvested, fish harvested most are the tilapia, catfish and korowo (37.5%). Majority of the respondents 90% are operating on a medium scale.

Table 3 : Percentage distribution of fishery practices and characteristics by the respondents (N=80)

Variables	Frequency	Percentage (%)
Primary occupation		
Fishing	78	97.5
Sowing	2	2.5
Reason for fishing as major occupation		
Commercial purpose	9	11.3
Family business	57	71.4
Occupation at disposal	12	15.1
Hobby	2	2.6
Time Fishing Operation commences		
0 – 10	25	31.3
11 – 20	30	37.5
21 – 30	15	18.8
Above 30	10	12.5
Type of fishing crafts used		
Boats with engine	11	13.8
Boats without engine	69	86.3
Type of Canoes used		
Dug-out canoes	41	51.3
Wooden	31	38.8
Wooden & dug-out	8	10.0
Common gears used		
Hook and line	47	58.9
Cages	33	3.8
Hook and line, traps & cages	28	35.0
Others	2	2.5

Distance gone for Fishing activities (Km)		
1.00	14	17.5
2.00	46	57.5
3.00	13	16.3
4.00	7	8.8
Fish Species harvested		
Tilapia	3	3.8
Catfish & Tilapia	23	28.8
Catfish, Tilapia & Korowo	30	37.5
Catfish, Tilapia, Korowo & Gymnarchus	23	28.8
Others	1	1.3
Level of fish catch		
Small	3	3.8
Medium	72	90.0
Large	5	6.3

Source : Field survey, 2011

c) Cost and Return of Artisanal Fishing

From the survey the cost and return structure had a total fixed cost of ₦78.8100 while the total variable cost is ₦21.1820 having a total cost of ₦186,185.0, a gross margin of ₦ 41,295.13 and a gross margin ratio of ₦ 49,30026.

Table 4 : Cost and Return Structure for the respondents

	Amount (₦)	% total cost	total (TFC+TVC)
Cost of fishing net	4457.5	2.39412	
Cost of boat	30,450	16.3547	
Cost of engine	111562.5	59.9202	
Cost of line	245.63	0.13193	
TFC	146,715.63	78.8100	78.8100
Cost of Styrofoam	5000	2.66855	
Cost of fuel	31875	17.1201	

Cost of lamp	485	0.26049	
Cost of kerosene	1656.25	0.88957	
Cost of paddle	453.125	0.24337	
TVC	42,467.37	21.1820	21.1820
		99.99	
TC	186,185.01		
TR	**83,762.50**		
Gross Margin	41,295.13		
Gross Margin Ratio	49.30026		
BCR	**0.45**		
ESR	**3.46**		
ROR	**-0.56**		
RR	**2.22**		
Rate of Profit (%):			
High		6 (7.5)	
Moderate		69 (86.3)	
Low		2 (2.5)	

Source : Field survey, 2011

d) The major constraints affecting artisanal fisher folks in the study area

From Table 6, the constraints faced by the artisanal fisher folks in order of severity were as follows: inadequate storage (96.3%); infestation by water hyacinth (93.8%); inadequate power supply (88.8%); inadequate technology (87.5%); high cost of fishing input; inaccessibility of credit facilities; lack of preservation equipment and inaccessible roads.

Table 6 : Constraints faced by the artisanal fishing households

Problems	Very severe		Severe		Non-severe	
	Freq	%	Freq	%	Freq	%
Inaccessibility of credit	10	12.5	52	65.0	17	21.3
Distance of market	----	-----	17	21.3	61	76.3
Inadequate power	71	88.8	7	8.8	----	----
High cost of equipment	7	8.8	69	86.3	3	3.8
Climatic conditions	1	1.3	74	92.5	1	1.3
Inadequate technology	70	87.5	5	6.3	4	5.0
Inadequate storage	77	96.3	2	2.5	----	----

Poor gear design	4	5.0	13	16.3	61	76.3
Diff access to fuel	4	5.0	10	12.5	63	78.8
Infestation by hyacinth	75	93.8	2	2.5	2	2.5
Menace of trawlers	---	----	12	15.0	61	76.3
Unavailability of parts	----	----	30	37.5	48	60.0
Difficulties of access		33.8	52	65.0	19	23.8
Scarcity of fish inputs	---	---	52	65.0	27	33.8
Poor maintenance	---	---	53	66.3	22	27.5

e) Significant difference between socio-demographic characteristics and income level of the respondents (T-test)

Table 7 shows the result of the socio-demographic characteristics of the respondents to their income level. This shows that out of the five variables tested all was significant at $p<0.05$. Therefore, socio-demographic variables were significant.

Table 7 : Significant difference between socio-demographic characteristics and income level of the respondents (T-test)

	T	df	Sig 1	Decision
Age	-36.343	79	0.000	Reject H_0
Sex	-38.471	79	0.000	Reject H_0
Marital status	-28.871	79	0.000	Reject H_0
Experience	-23.678	79	0.000	Reject H_0
Level of education	-33.343	79	0.000	Reject H_0

Decision criterion is to reject null hypothesis when $P<0.05$ of a degree of freedom.

f) Significant difference between constraints faced artisanal fisher folks and profit level of the respondents (T-test)

Table 8 shows the T-test with a value of 28.696 and a significant of 0.0001 showed that there is a significant difference between constraints faced by the artisanal fisher folks and their income level.

Table 8 : Significant difference between constraints faced artisanal fisher folks and profit level of the respondents (T-test)

	T	df	sig 1	Decision
Constraints	24.69	79	0.011	Accept H_1

Decision criterion is reject null hypothesis when $P<0.05$ of a degree of freedom.

III. Conclusion and Recommendations

The conclusion drawn from the study area shows that most of the fisher folks are males and their age was within the economic active range which favoured the adoption of fishing development. Most of the fisher folks are married and highly experienced in fishing because of families' inheritance. The study revealed the undermining role played by capital which poses very serious threat to adoption of fishing technologies. Majority engaged in fishing because it was a family business and to augment income from other sources. The high levels of illiteracy, non member of fishery cooperative societies, no storage facilities, inadequate technologies and water hyacinth were a hindrance in the fishing environment. The artisanal fishing was moderately profitable in the study area.

Based on the findings of the study we strongly recommend the following:

- Fisheries extension services should be intensified with adequate programmes that will encourage improved fishing practices and technology adoption in order to boom fish production and limit the present losses experienced by the fisher folks.
- Artisanal fisher folks should properly organize themselves into cooperative societies so that they can pool resources together (common voice) and government can channel various aids, loans and other fishing facilities through cooperative bodies.
- Adequate credit facilities should be made available to artisanal fisher folks for the expansion of their fishing activities. There is need to design special programmes to improve access of artisanal fishers to credit facilities. The fisher folks should be linked up with Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB) and Ogun State Agricultural Multipurpose Credit Agency (OSAMCA) for timely credit facilities.
- Enlightenment and training/workshops on fisheries may further enhance the operations and fortune of the fishermen.
- Government should intensify more effort on water hyacinth control programme to boost fish production and easy water transport services.
- Adequate infrastructure such as motorable roads, electricity and resources for preservation of equipment should be provided in the rural fishing villages.

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Effect of Feeding Graded Level of Decomposed Rumen Content to Snails

By Lawal, Wasiu Sesan
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Abstract - The effect of graded level of rumen content fed to ninety growing snail, Achatina Achatina was investigated in a ten week experiment. Complete randomised designed (CRD) was used in which snails were assigned to three dietary treatment groups 10%,15% and 20% decomposed rumen content respectively, each treatment had three replicates with ten snails per replicate. The snails were fed ad-libitum. Growth parameter (weight Gain, feed intake feed to gain ratio were taken on weekly basis .snail fed 10% decomposed rumen Content recorded the highest weight gain ($p<0.05$) while those fed 20% decomposed rumen content recorded the least value of weight gain though there were no significant difference between those feed containig15% and 20% rumen content ($P>0.05$). Feed intake of those fed 10% rumen content was significantly higher ($P<0.05$) than the Other two feed samples .there was no significant difference among the three feed samples in terms of feed to gain ratio. The result shows that there is higher growth performance in snails fed 10% rumen content.

Keywords : *Rumen content, Achatina achatina, Growth parameter, feed.*

GJSFR-D Classification : *FOR Code: 291599*

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Keywords : Rumen content, Achatina achatina, Growth parameter, feed.

I. Introduction

As a result of continuous increase in growth of Nigerian population, then the demand for animal protein became very acute. This increase in demand of proteineous food made the price to increase since the supply cannot meet the ever increasing demand .It is therefore necessary for man to look for a cheaper source of animal protein and that is why snailry comes in focus, Snailery refers to rearing and management of edible snails. The increase desire to develop affordable and acceptable proteineous food for our local resources to prevent proteineous malnutrition in Nigeria economy has led to the consumption of snail, a gastropods mollusc which is meat from sources other than beef, poultry, mutton, goat meat and fish. snail meat has become popular culinary in various household(Ajayi et al 1978).The cost of convectional proteineous food is on high side, so there is need to explore the non-convectional one like snail meat, in order to increase protein supply. Also when poultry meat consumption has fallen in many countries as a result of highly pathogenic avian influenza (HPAI), snailry and other micro livestock should be given adequate attention.

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Snail are highly appreciated in many countries for its high nutritive and medicinal values (Cobbinal1993, Akinnusi1998), the material used in feeding snail are not in competition with man since man do not consume most of these materials. In animal production about 50-80% of total cost of production is on feeding these animals (Adams and Tewe 1996).So many attention has been made to use non convectional ingredients like leaves, peels of cassava (Akinfala et al., 2000, Tewe1982).

The process of raising snail is heliciculture, if heliciculture is to be practised on large scale then it requires considerable investment in time requirement and resources. Heliciculure has various alternative system of production with different handling and feeding options. Extensive heliciculture is characterised by low technification level and these support feed on green vegetable while its intensive system is with high level of technification and compounded feed are used in feeding them. Feeding snail with green vegetable do not provide adequate growth rate when compared to commercial snail breeding (Daguzan 1981.)

Snail gradually emerge as domestic micro livestock of importance in Nigeria .Snail farming is now been practised as hobby by individual farmer, while commercial large venture are expected to spring up when people eventually come to appreciate the advantage of snail farming which is high returns on investment with low inputs.

Research has shown that exposure of snail to continuous light at night increased their activity and rate of food consumption and this promote their rapid growth. Though there feeding is sporadic, interspersed with exploratory movement , so less food will be consumed at normal darkness hour

Many author described snail as herbivores, that can feed on wide range of food items (Ajayi et al., 1978, Akinwumi 1998 and Conbbinal 1990).Then feed on rotten plants & animal matter, green leaves, fruits, tubers and flower when they are on wild but do well when fed with compounded feed in the intensive .Phillips 1992 ranked pawpaw leaves as best snail compared with other plant parts. Maize chaff has higher potentials for use as energy supplement than sweet potatoes, cocoyam, and cassava (Omole et al., 1998). The result of these experiments was carried out by Hamzat et al., 2002, When formulating snail feed. The calcium and protein content of the feed must be made a little higher.

The calcium will assist in shell growth and extension while the protein will assist in flesh growth. Some researcher uses chicken mash feed as snail mash. Commercial chicken feed is around 16% to 17% protein. The fish meal or meat meal some of the mash contain made it good for growing snail (Iglesias,j castillejo 1990).supplying mash to hatching might reduce cannibalism. The feed that snail like and that promote growth are broiler finisher, layer mash .Rabbit pellet is not very good for snail as they do not perform well mash is generally better for growing snail and old snail because they will grow faster.

When snail mash is mixed with 10% sand, they last for some time and do not cause offence and the snail will perform better.

The variation of dry matter, rate of protein intake, growth rate, growth efficiency factor and protein retention rate depend on dietary protein content and the age of the animal, is in agreement with what happens in other animals Sanz-sampelayo, M.R. Fonolla.J. And Extremera F.G thereof (1991).These result suggest that there is no need to use diet with more than 17.5% crude protein in feeding snail.

II. Material and Methods

a) Animals

Ninety growing Achatina achatina with mean weight ranging from 120g-160g were obtained from Ede town in Osun State Nigeria.

b) Rumen Content

Rumen content were collected from ipata market and was dumped on the ground for five days so that maggot can grow on it, it was later boiled so that microorganism in it is killed and then sun dried to about 8% moisture content .After which it was milled into powder form so that it can be well included in the feed for animals.

c) Diet

Entire ninety snails were subjected to cafeteria feeding for two weeks before the commencement of the experiment, this will allow the snail to have a wide range of feed from any of the treatments available for the experiment at same time so that the snail can select and feed on any feed sample that is acceptable to them. there are six feed containing decomposed rumen content at 10%,15%,20%,25%,30%,35% respectively.it was observed that feed containing 25%,30%,35% was completely rejected by snails while those of 10%,15% and 20% rumen content were fed on at different rate.it was also observed that the more the decomposed rumen content the less they consume the feed

d) Experimental Design

A complete block design (CRD) was used for the experiment, the trial comprise of three treatment, those feed containing 10%,15% and 20% decomposed rumen content. Each treatment has three replicate containing ten snails each making thirty snails per treatment. The feed trial lasted for ten weeks.

e) Management And Rearing Methods

The snail were reared in a concrete compartment and the bottom of the pen was filled with Moist sandy loam soil to depth of 15cm and the top was covered with mosquitoes net and re enforced with wire netting for aeration. Snail is nocturnal animals because they are active at night, so the feeding and other management practise is restricted till evening. snail were fed once a day at about between 5-6pm because they are also nocturnal feeder ,the next day, the remnant is removed and replaced with fresh mash ,water is also supply in a flat plastic plate same used in saving the mash,they were fed ad-libitum throughout the period of the experiment. The environment is watered to make moist soil

f) Measurment

Feed intake was taken on daily basis by subtracting the ruminant from the feed served. Data were collected on weekly basis and the body weight, growth rate, feed conversion ratio, and daily feed intake. There was no mortality throughout the period of the experiment.

g) Stastical Analysis

The result obtained were analysed using analysis of variance (ANOVA) sources of variation were treatment, block and error Duncan multiple range test (Steel and Torrie,1980) was used to separate significant different among mean.

III. Results and Discussion

Table 1 : Feed intake /Snail/day (g)

	Week1	Week2	Week3	Week4	Week5	Week6	Week7	Week8	Week9	Week10
10%	13.25	14.30	15.77	18.66	20.92	19.80	17.73	18.93	19.83	21.16
15%	12.43	13.30	13.83	17.60	19.58	17.74	16.40	16.25	18.50	16.70
20%	8.80	9.74	7.74	9.57	8.60	7.11	7.46	7.96	9.62	7.72

Table 2 : Weight gain/snail/week (g)

10%	10.76	12.56	7.80	14.80	4.50	6.56	2.70	3.16	3.00	3.90
15%	4.76	9.46	10.10	3.26	3.10	1.00	1.43	5.00	2.03	1.70
20%	2.43	1.63	1.80	3.93	12.20	4.50	1.40	1.90	1.90	1.20

Table 3 : Body weight /Snail/week (g)

Initia	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	
10%	167.0	177.7	190.3	198.1	212.9	217.4	224.0	226.7	229.8	232.8	236.7
15%	166.8	171.6	181.0	191.1	194.4	197.5	198.5	199.9	204.9	207.0	208.7
20%	166.2	168.6	170.3	230.3	175.9	188.1	192.6	194.0	194.2	197.8	199.0

Table 4 : Feed/gain ratio/snail/week(g)

Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Wk8	Wk9	Wk10	
10%	1.35	1.16	2.42	1.32	16.09	3.1	6.58	6.36	6.76	5.59
15%	3.0	1.45	1.36	8.4	12.9	14.47	14.13	3.5	11.5	12.17
20%	5.61	7.9	17.54	2.94	0.86	1.64	8.23	4.8	6.08	7.15

Performance Characteristic Of Snail Fed Graded Level Of Rumen Content

	10%	15%	20%
Initial body wt	167.00a	166.80b	166.20c
Final body wt	236.70a	208.70b	199.00c
Actual body wt	69.7a	41.9c	32.8b
Feed intake(g/snail/day)	7.05a	5.56b	2.57c
Feed/gain ratio	3.73a	4.16b	8.61c

Treatment means in same row follow by same subscript are not significantly different P>0.05

The observation made in the study shows that snail fed mainly at night irrespective of the time their feed was presented to them. Before feeding, snail explore feed with their tentacles before they protrude their lips to test the feed. All the experimental diets were received and were eaten at different rates.

Table 4.1 shows the performance characteristics of snail fed graded level of decomposed rumen content ,it was found that the feed with 10% rumen content was consumed most while those feed with 15% rumen content was consumed more and the feed with 20% rumen content was consumed least. There was no significant different between feeds 10% and 15% (P>0.05) but there was a significant difference when the two feeds when compared to that feed containing 20% decomposed rumen content(P<0.05)

There was appreciable weight gain in feed consumed in 10% rumen content (P<0.05) when compared with those feeds 15% and 20%decomposed rumen content that has no significant different between themselves (P<0.05). There was no significant different in feed to gain ratio for all the feeds used in the experiment.

IV. Discussion

The result of the study showed that snail feed only at night between 10pm and 1am even though the diet was presented earlier. The observation agreed with the finding of Amusan and Omidiji (1998) and Akinnusi (2002).Feeding was preceded by diet exploration of diet by snail with their tentacle and lips, which is an indication that snail depend on olfactory and gustatory cues to explore their environment by injestion of food (south1992)

The highest feed consumed by snail (10%decomposed rumen content feed) was as a result of low fibre content in the feed when compared to other feed samples of 15% and 20% rumen content (Omole et al., 1990). snail cannot digest feed containing very high fibre content.

The appreciable weight gain obtained in 10% rumen content feed was as a result high rate with which the feed was consumed when compered with other feed. The feed consumed is then converted to flesh because of low fibre content it contained when compared with other feed samples containing 15% and 20% decomposed rumen content which was consumed in less quantity and hence less feed to flesh conversion was obtained from them.

V. Conclusion

The experiment was design to investigate the effect of graded level of decomposed rumen content on the performance characteristic of growing snail (Achatina achatina). The result shows that better performance was obtained with those that fed on 10% rumen content Based on the result, it could be recommended that

1) Snail farmer should be encouraged to adopt formulated feed so as to enhance the performance of the snails
2) The use of rumen content on other types of animals could be tried because of the protein contained in decomposed rumen content, this is because feeding animals is a major problem to farmers as most of the available ingredients are in serious competition between man and animals and that's why feeding alone took about 60%-80% of the total cost of raising farm animals

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Social Network Among Grain Sellers: A Veritable Tool in Microcredit Delivery in Some Markets in Ibadan, Oyo State

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Abstract - This study examined the effect of social network on microcredit access among grains sellers in Ibadan metropolis, Oyo State, Nigeria. Multistage stratified random sampling procedure was employed to collect data from 150 grains sellers from three randomly selected local government areas (LGAs) in Ibadan. Primary data were collected using a well structured questionnaire. The data were analyzed using descriptive statistics and probit regression analysis and 2-stage least square. The result showed banks and cooperatives as two main sources of credit for the grain sellers and majority of the grain sellers reported that local level institutions (LLIs) facilitate their access to credit. The result of probit regression showed that age, age squared, marital status and religion; social capital index, cash contribution, labour contribution index and decision making index significantly affect microcredit access. It revealed that the higher the cash and labour contribution of grain seller to their associations the more access to microcredit. The result of bi-causal relationship showed that social capital was truly exogenous to grain seller's access to microcredit with no reverse causality. The study concluded that social capital positively affected credit access.

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Social Network Among Grain Sellers: A Veritable Tool in Microcredit Delivery in Some Markets in Ibadan, Oyo State

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I. Introduction

Small and medium size enterprises (SME) are regarded as the engine of economic growth in all economies of the world (Wooldie and Adersua, 2004; Gerrad et. al, 2003; Hamilton and Dana, 2003). Evidences from developing countries support the fact that entrepreneurs do not have easy access to credit for their entrepreneurial activity (Ibru, 2009; Iganiga, 2008; Iheduru, 2002; Kuzilwa, 2005; Lakwo, 2007; May, 2007; Okpukpara, 2009). In Nigeria, trading has suffered setbacks due to poor credit disbursement procedures, inadequacy of credit institutions to cater for the financial needs of the teaming population of traders and poor loan repayment possibilities among traders (Ugo, 1973; Oshuntogun and Oludimu, 1973).

It is emphasized that access to microcredit is important for investment to support off-farm enterprises. It is also recognized that the poor have diverse financial needs including credit for the purchase of small capital assets, working capital and consumption. The Table 1 shows the decreasing amount of commercial loans to small scale businesses in Nigeria (both rural and urban). A closer look at the commercial bank total credit and loans to small scale enterprises in Nigeria, shows that there was an increase in total volume of credit of commercial bank (that is, N48, 056.0 millions) to small scale enterprises (N15, 462.5 millions) in 1993 to N8.791 billion and N15, 825.2million in 2009 respectively. Also, during the year 1993 to 2009, the ratio of commercial bank loan to small scale enterprises continue nose-dive steadily from 32.2% in 1993 to about 0.2% in 2009. This decrease attests to the fact that entrepreneurs, particularly in Nigeria, have limited or no access to credit for their entrepreneurial activity and as such performance of small businesses tend to be woeful.

Table 1 : Ratio of Loan to Small Scale Enterprises to Bank Total credit (rural and urban)

Year	Commercial Bank Loan to SMEs	Commercial Banks Total Credit	Commercial Banks Loan To SMEs as Percentage Of Total Credit
1992	20,400.0	41,810.0	48.8
1993	15,462.9	48,056.0	32.2
1994	20,552.5	92,624.0	22.2
1995	32,374.5	141,146.0	22.9
1996	42,302.1	169,242.0	25.0
1997	40,844.3	240,782.0	17.9
1998	42,260.7	272,895.5	15.5
1999	46,694.1	353,081.1	13.3
2000	44,542.3	508,302.2	9.7
2001	52,428.4	796,164.8	6.6

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2002	82,368.4	954,628.8	8.6
2003	90,176.5	1,210,033.1	7.5
2004	54,981.2	1,519,242.7	3.6
2005	50,672.6	1,899,346.4	2.7
2006	71,896.5	1,847,822.6	3.9
2007	26,981.0	3,155,029.7	0.7
2008	18,824.2	5,453,188.2	0.4
2009	15,825.2	8,791,800.9	0.2

Source : Central Bank Nigeria Statistical Bulletin Dec.2006 and 2010

Grain traders are often plagued with the problem of inadequate capital to run their enterprises which may be as a result of the informal nature of their businesses. The formal financial sector in developing countries considers the poor as risky borrowers on account of their lack of suitable collateral that could be pledged for credit. Failure of institutional initiatives in providing microcredit to the poor traders in running their enterprises and meeting their financial requirements gave rise to their poor performance. This study therefore looks at how problem of credit access can be tackled in Ibadan Metropolis by social networking among grain sellers.

II. Theoretical/Conceptual Framework and Literature Review

The concept of entrepreneurship has a wide range of meanings. Two schools of thought about entrepreneurship are famous while defining entrepreneurship; these are Schumpeter's theory of entrepreneurship and Austrian theory of entrepreneurial discovery. Schumpeter's theory of Entrepreneur is evolved while contributing knowledge in theory of economic development by Joseph Schumpeter. According to Schumpeter (Swedburg, 2000), innovation is that to combine materials and forces, which are under reach, with different method or with new combination to produce a new innovative products. By this definition, it is important to consider that Schumpeter emphasize innovation rather invention. According to Mondal, "Schumpeter's model works through the transformation of production function. Other major contribution of Schumpeter theory also discusses motivation of the entrepreneur. First, it discusses about the desire and will of entrepreneur to establish an organization where entrepreneur can work independently and enjoy power. Second, that he/she has will to become successful in his/her business. And third is joy and satisfaction on reaching his/her goals (Swedburg, 2000).

Austrian Theory of Entrepreneurship described, entrepreneur as anticipating market and need of customers exactly and correctly, produce more cheaply than competitor and earn profit. By this theory, it is showed that successful entrepreneur will be that who can earn more profit. Entrepreneurial discovery emerged in Austrian economics by evolving two elements. One, market is act as entrepreneurially driven process and other is knowledge which can be increase by market interaction (Kirzner, 1997).

Austrian entrepreneurial discovery theory has three main concepts which are entrepreneurial role, the role of discovery and rivalries competition. From discussion, we can perceive that Austrian approach emphasize entrepreneurship with economic activity and market process. Both theories have different and similar aspects on entrepreneurship. Different authors have different approaches on entrepreneurship; this may be due to their research, the environment in which they are working, the previous research and literature available. Innovation, risk taking and creativity are almost essential part of both theories. Schumpeter's theory mainly emphasize on innovation, emphasizing to redefine and regroup resources to produce new product or service. And innovation always has risk with itself. By producing new product, accessing new market, adopting new production system, all lead to risk. In case of Austrian theory of Entrepreneurship, anticipating market and customer need is somewhat need an innovative idea and it also lead to risk. So compete this, creative mind, technique is needed. According to Boettke and Coyne, "As compared to Schumpeter's characterization of the market process as creative destruction, Krizner emphasized that markets tend continually …towards equilibrium, as consequence of continually-stimulated entrepreneurial discoveries". So Schumpeter emphasize on creative destruction while Austrian approach argue towards market knowledge which priory unknown. Microfinance is an emerging tool for economic development, poverty alleviation, empowering of low income communities and contributing a new role in micro-entrepreneurship. It has gained a prominent role in developed and also developing countries. Most of research on micro financing is developed on issue of poverty alleviation and empowering of the poor but not so many areas have been covered by researchers on Micro enterprise and Micro-entrepreneurship. This study is thus based on how micro financing is contributing in entrepreneurship.

III. Materials and Methods

Study Area: The study was carried out in Ibadan. It is the capital city of Oyo State located about 145 km North-east of Lagos, the commercial nerve centre of Nigeria. Its population is 2,550,593 according to 2006 census results, including 11 local government areas namely: Ibadan North, Ibadan North east, Ibadan South East, Ibadan South West, Ibadan North West, Ido,

Oluyole, Ona-Ara, Akinyele, Lagelu and Egbeda. The population of central Ibadan, including five LGAs, is 1 338 659 according to census results for 2006, covering an area of 128 km^2.

Ibadan is the centre of trade for a farming area producing cocoa, cola, palm oil, yam, cocoyam, cassava, maize, vegetables and all kinds of fruits. The people of Ibadan are predominantly traders, civil servants, entrepreneurs and artisans. The location falls in the humid tropic region favoring production of food crops like maize, cassava, and vegetables among others. The climate is characterized by fairly high uniform temperature, moderate to heavy seasonal rainfall and high relative humidity. The rainfall pattern of Ibadan is bimodal with peaks in the months of May and August.

Sampling Procedure and Sample size: Primary data were collected at the market level with the aid of well structured questionnaire. Multistage stratified random sampling procedure to obtain relevant information from grain marketers in Ibadan Metropolis. The first stage of the stratification is the selection of three grain markets from Ibadan metropolis. In the second stage, three markets were selected from the grain markets in the study area. In the last stage, one hundred and fifty (150) respondents were interviewed in all the three markets. In all, one hundred and twenty questionnaires with complete and meaning information were retrieved and used for analysis.

a) Analytical Techniques

Descriptive Statistics : The descriptive tools used include mean, mode, frequencies and percentages. These tools were used to profile social capital dimension and categorize credit sources available to grain sellers.

Probit Regression : Probit regression models was used to measure the effect of social capital and other demographic variables on the probability of access to micro credit by grain seller in the study area. It is appropriate when the response takes one of only two possible values representing presence or absence. The model was adopted as used by Gujarati (2003) and Ajani and Tijani (2009).

$$Pi\,[y=1] = [Fzi]$$

Where,

$$Zi = \beta_0 + \beta_1 X_1 \qquad (1)$$

$$y_1 = \beta_1 + \beta_2 X_{2i} + \ldots\ldots + \beta_k X_{ki} \qquad (2)$$

yi* is unobserved but $y_i = \begin{cases} 0 \text{ if } y_i^* < 0 \\ 1 \text{ if } y_i^* \geq 0 \end{cases}$

$$P(y_1 = 1) = P(y_i^* \geq 0)$$

$$= P(u_1 \geq -\beta_1 + \beta_2 X_{2i} + \ldots\ldots + \beta_k X_{ki}) \qquad (3)$$

i = 1,2,…..120

Y_i = Grain seller's access to micro credit (Dichotomous variable 1= Yes; 0=No)

X_1= Sex (1=Male; 0=Female).

X_2 = Age of grain seller (Years)

X_3= Age squared of grain seller's (Years) 2

X_4= Household size (Continuous)

X_5= Years of formal education (Years)

X_6 = Marital status (Yes =1 if Married, 0=Otherwise)

X_7= Bodija market (Yes =1, 0= Otherwise)

X_8= Shasha market (Yes =1, 0= Otherwise)

β_1= Coefficient of exogenous variables

μ = error term

It has been argued that social capital like physical capital can be in part consumption good (Grootaert, 1999). It is therefore imperative to validate the assumption of social capital being truly a capital. In order to do this, the study will investigate the existence of bi-causality between social capital and credit with the aid of instrumental variables.

b) Variables definition and expected signs

Gender (X_1): Gender may create differences in preferences and barriers to social capital formation because of differences in roles and constraints. Compared to men, women in rural Africa tend to have a higher opportunity cost of time, and gender norms in the community sometimes constrain their social interactions. Female-headed households may also be unable to participate in organizations that require membership fees or other contributions (Maluccio et al. 2003). However, such organizations require a high degree of cooperation among members, and such cooperation is likely to be higher among women than men (Molinas 1998). Hence, the effect of gender on social capital formation cannot be determined a priori and is likely to depend on the type of social capital.

Age (X_2): The age of an individual influences how he discounts the future and lowers the tendency to invest in social capital (Glaeser et al. 2001). The effect of age on participation in associations and subsequently credit access is likely to depend on the type of organization. Age may increase the likelihood of participation in social interactions that require trust (Haddad and Maluccio 2003) because the two are positively correlated (Alesina and La Ferrara 2002).

Age squared (X_3): Age Squared measures the life cycle of the household-head.

Household size (X_4): Household size is the number of people eating from the same pot.

Years of formal education (X_5): Education is linked to information acquisition and trust formation (Alesina & La Ferrara 2002). An individual's confidence to speak up in a group also increases with education. Better educated households may have a higher demand for membership in organizations because they can more easily benefit from their positive externalities (Helliwell & Putnam 1999).

Marital status (X_6): Marital status is whether the grain seller is married or not. It is represented by a dummy variable.

Bodija market (X_7): Grain sellers in Bodija market

Shasha market(X_8): Grain sellers in Shasha market

Density of membership (X_9): This is measured by the number of active grain seller household membership in existing associations. A complete inventory existing associations was made at the markets; each grain seller household was then given that inventory and asked which associations they are members. In other words, the proportion of membership of associations by grain seller is found and rescaled to 100.

Decision making index (X_{10}): It has been argued that associations, which follow a democratic pattern of decision-making, are more effective than others. The questionnaire asked association members to evaluate subjectively whether they were "very active" "active" or "not very active" "passive" "very passive" or not participating in the group's decision making. This response was scaled from 4 to 0 respectively, and averaged across the three most important groups in each household. The summation was calculated from subjective responses from the households' members on their rating in participation in decision making in three important associations to them. The responses were averaged across the three associations and multiplied by 100 for each grain seller.

Heterogeneity index (X_{11}): The questionnaire identifies the three most important associations for each grain seller. For those associations, a number of supplementary questions were asked including about the internal homogeneity of the group. This was rated according to twelve criteria: neighbourhood, kin group, same occupation, same economic status, same religion, same political, same gender, same age, same education level, cultural practices, belief and trust. Hence, for each of the factors a yes response was coded 2 while no was coded 1 (Lawal et al., 2009). A maximum score of 24 for each association represents the highest level of heterogeneity. The score of the three associations were averaged for each household by dividing by maximum score 72 to obtain the index. The resulting index was then multiplied by 100 (whereby a zero value represents complete homogeneity and 100 correspond to the highest heterogeneity).

Meeting attendance index (X_{12}): This index was measured by finding the number of times members of association actually met as a group over a period of time This is obtained by summing up of attendance of the household members at meeting and relating it to the number of scheduled meetings of the associations. The value is multiplied by 100.

Cash contribution index (X_{13}): This was achieved by taking records of payment of membership dues and other contributions. The summation of the total cash contributed to the various associations, which the grain seller belongs to was calculated. The actual contribution for each grain seller was rescaled by dividing the amount by the contribution by household members relative to average grain seller in the data and multiplying the resultant fraction by 100.

Labour Contribution index (X_{14}): This is the number of days that individual members belonging to institution claimed to have worked for their institutions. This represents total numbers of man- hour's days worked by household members. This is also rescaled to 100 using the same method of cash contribution

IV. Results and Discussions

The result of socioeconomic characteristics of grain sellers is presented in Table 2. Result showed that the average age of grain seller is about 39 years. The result shows that majority (50.8%) of the grain sellers fell within the age range of 30 – 40 years. This implies that most grain sellers are still within the active working age, they are therefore economically productive. This may be unconnected to requirement of energy and strength to both transport during purchase and sell in the markets. However, there were more male grain sellers (70 %) than female grain sellers (30%) in the study area. This has two implications, male grain sellers have the energy to withstand the rigour that is involved in buying and selling of grains and male counterparts also have properties such as land, houses that can be pledged as collateral for loan. The Table also showed that majority of grain sellers were married while mean household size was 5.0 with standard deviation of 3.5. Across the markets, there is uniform household size. Grain sellers across the markets had an average of 9 years of formal education.

Table 2 : Socioeconomic Characteristics of Grain Sellers

	Bodija	Oja oba	Shasha	All
Age (Years)				
< 30	4.6	7.7	11.8	8.3
30 – 40	51.2	65.4	43.1	50.8
>40	44.2	26.9	45.1	40.9
Total	100.0	100.0	100.0	100.0
Mean	40.0	37.0	39.0	39.0
SD	7.9	68.0	9.3	8.4

Sex				
Female	23.3	30.8	35.3	30.0
Male	76.7	69.2	64.7	70.0
Total	100.0	100.0	100.0	100.0
Marital Status				
Married	95.4	88.5	97.7	88.3
Otherwise	4.6	11.5	2.3	11.7
Total	100.0	100.0	100.0	100.0
Household Size				
1 – 3	4.7	11.5	9.8	8.3
4 – 8	65.1	73.1	58.8	64.2
> than 8	30.2	15.4	31.4	27.5
Total	100.0	100.0	100.0	100.0
Mean	6.0	5.0	5.0	5.0
SD	2.0	2.0	3.0	3.0
Educational status				
No formal	4.6	11.5	7.8	7.5
Primary completed	27.9	11.4	23.5	22.5
Secondary	55.8	73.8	68.6	65.0
completed				
Tertiary	11.6	3.8	0.0	5.0
Mean	9.9	10.0	9.6	9.8
S.D.	4.0	4.4	3.8	3.9

Source : Field survey, February 2011

Table 3 shows the reason for involvement in local level association of the grain sellers in markets in Ibadan. Majority (36.7%) of the respondents reported that local level institutions (LLIs) facilitate their access to credit while 16% joined LLI to enhance their access to market information. Only 7.5% used it as a mean of socialization with other people. However, 12.5% of the grain sellers used it as a channel through which their supplies come from.

Table 3 : Reason for involvement in local level association of the grain sellers

Motivation	Bodija	Ojaoba	Shasha	All
Access to Credit	20.9	15.4	60.8	36.7
Access to Information	20.9	19.2	9.8	15.8
Socialization	11.6	7.7	3.9	7.5
Access to Grain Supply	2.3	15.4	19.6	12.5
Others	44.2	42.3	5.9	27.5
Total	100.0	100.0	100.0	100.0

Source : Field survey, February 2011

Prominent among the available credit sources to grain sellers in the selected markets are: bank, cooperatives, government agencies, local money lenders, friends and family. Table 4 presents the amount of credit requested, amount of credit granted and gap in credit through different credit sources across the three selected markets. The overall average amount of credit requested by grain sellers from the two major sources of credit (i.e. bank and cooperatives are ₦220,590.7 and ₦170,870.2 while only ₦205,557.3 and ₦162,103.5 were granted respectively. Across the markets, the highest credit was requested among the Bodija grain sellers.

Table 5 : Different Sources of Credit patronized by grain sellers across Markets

Sources of credit	Bodija			Oja oba			Shasha			All		
	Amount Requested	Amount Granted	Gap: 1—G/R	Amount Requested	Amount Granted	Gap: 1—G/R	Amount Requested	Amount Granted	Gap: 1—G/R	Amount Requested	Amount Granted	Gap: 1—G/R
Bank	246,834.1	231,612.4	0.07	218,961.5	201,923.1	0.08	210,294.1	198,235.3	0.06	220,590.7	205,557.3	0.07
Coop	123,398.5	114,806.2	0.07	145,981.7	134,622.2	0.08	140,203.1	132,163.5	0.06	170,870.2	162,103.5	0.06
Government Agencies	-	-	-	-	-	-	-	-	-	-	-	-
Local Lenders	-	-	-	-	-	-	-	-	-	-	-	-
Personal Savings	-	-	-	-	-	-	-	-	-	-	-	-
Standard Deviation	349,838.2	359,227.4	_	90,013.5	98,005.8	_	109,354.5	54,943.8	_	102,454.5	59,743.8	_
Minimum	20,000	20,000.0	_	10,000	10,000.0	_	10,000	10,000.0	_	10,000	10,000.0	_
Maximum	2,000,000	2,000,000.0	_	400,000	250,000.0	_	500,000	500,000.0	_	500,000	500,000.0	_

Source : Field survey, February 2011

The activities of grain sellers in local level institutions are shown in the Table 6. Table 6 shows that average grain sellers attend at least three out of every four association meetings and Shasha grain sellers are most frequent with meeting attendance index of 80%. Decision making in associations revealed moderate level of participation. Cash contribution index is generally low across the markets. In terms of labour contribution, grain sellers are more willing to contribute their time and labour to their associations with average of 77.8%. The level of diversity in association was high with heterogeneity index of 74.6%. In general, Bodija markets associations are more heterogeneous than their Ojaoba and Shasha counterparts because of the various ethnic groups that come to trade in the market.

Table 6 : Activities of grain sellers in local level institutions

	Bodija	Ojaoba	Shasha	All
Density of Membership Index	37.0	39.7	36.8	37.5
Cash contribution index	24.7	37.8	19.8	37.5
Labour contribution index	56.9	77.8	98.1	76.2
meeting attendance index	77.8	37.5		
Decision making Index	52.0	55.9	57.2	55.0
Heterogeneity index	80.9	67.9	70.0	74.6

Source : Field survey, February 2011

The relationship between social capital and microcredit access is presented in Table 7. In the first column, the result shows that age, age squared, marital status and trading in Ojaoba significantly influenced access to credit. Age of grain seller household head positively increased credit access. A unit increase in age increased credit access by 0.061. Age squared measures the life cycle of the grain seller household head. The variable has negative sign and significantly affected credit access. The implication is that, as grain seller advances in age, there is tendency for him/her to become averse in taking credit risk for fear of indebtedness. Also, being married increased credit access because credit institutions view married individual as been responsible and will not see approved credit as risky. Trading in Ojaoba, has positive and significantly relationship with credit access. In the second column of the table, the multiplicative social capital variable is introduced. Along with the demographic variables, aggregate social capital index significantly influences the credit access of grain sellers. The coefficient of social capita index shows that a one unit increase in social capital would increase credit access by 0.001 percent.

The third column of Table 7 reveals the inclusion of six additive social capital variables which truly increases credit access by grain sellers in the study area. The new model presents a better explanatory power as reflected in the chi-squared of 49.95. This separation shows that the effect of social capital on credit access can be traced to cash contribution, labour contribution and participation in decision making within association. In line with the view of Grooteart (1999) Yusuf (2008) and Balogun and Yusuf (2011), an increase in cash contribution, labour contribution and decision making index in local level institutions increases the probability of access to credit at 1% of significant level.

The marginal effects show that 1% increase in cash contribution, labour contribution and decision making of grain sellers to associations increased access credit by 0.02%, 0.01% and 0.03% respectively. Labour contribution and cash contribution to association also show the level of commitment of grain sellers to their association.

Table 7 : Effect of Social Capital on Access to Microcredit in Ibadan

Variables	Basic model			With Multiplicative social capital index			With Additive social capital variables		
Variables	Coeff.	Z stat	Marginal Eff.	Coeff.	Z stat	Marginal Eff.	Coeff.	Z stat	Marginal Eff.
Constant	-5.508	-0.07	0.000	-5.667	-2.18		-6.707	-1.88	
Sex	0.003	0.01	0.000	-0.028	-0.09	0.008	-0.136	-0.42	-0.037
Age	0.213**	2.02**	0.061	0.212**	2.05**	0.060	0.201**	1.81**	0.055
Age square	-0.002**	-2.10**	-0.000	-0.002**	-2.15**	-0.000	-0.002**	-1.99**	-0.000
Marital status	0.983**	2.48**	0.067	0.218**	0.01**	0.211	0.905**	2.18**	0.196
Bodija	0.323	0.71	0.098	0.460	0.96	0.142	0.727	1.26	0.229
Oja Oba	1.573***	4.26***	0.476	1.590***	4.28***	0.478	1.595***	3.99***	0.471
Social capital index	-	-	-	0.006***	3.14***	0.001	-	-	-
Cash index	-	-	-	-	-	-	0.088***	4.58***	0.002
Labour index	-	-	-	-	-	-	0.004**	1.83**	0.001
Density index	-	-	-	-	-	-	0.010	0.98	0.002
Decision index	-	-	-	-	-	-	0.013**	2.18**	0.003
Heterogeneity index	-	-	-	-	-	-	-0.015	1.33	0.004
Meeting atten. Index	-	-	-	-	-	-	-0.002	-0.09	0.000
Number of observation	120			120			120		
Log-likelihood	-49.25***			-48.59*			-46.55***		
Chi-squared	44.55***			45.87*			49.95***		

Source : Field survey, February 2011

In order to empirically validate the argument of whether social capital is truly a consumption good like human capital or an input in grain seller's trading and whether there is strong bi-causal relationship between credit access and social capital (Balogun and Yusuf, 2011), there is need to test if the social capital index included in the OLS regression is truly endogenous or not. It was assumed that the social capital of the grain sellers is truly endogenous in the OLS regression. This study tested for existence of bi-causal relationship between social capital and credit access with the aid of instrumental variable. The instrument chosen is the "trust". The original social capital index was replaced by the instrumental variable (trust within membership of the associations). This choice was guided by available information and submissions of (Grootaert and Braithwaite, 1998; Okunmadewa et al, 2005; Omonona et al, 2008, Balogun and Yusuf, 2011).

Table 8 presents the result of two-way causal relationship between social capital and access to credit. The result found that the use of instrumental variable led to an increase in the value of the explanatory power of the model (i.e. adjusted R2) from 0.3206 to 0.3306 compared with the use of actual social capital index. In addition, the instrumental variable method leads to higher coefficient for the social capital index than in the OLS method. A reverse causality could have been inferred if there is no improvement or reduction in the instrumental variable. Since, there is improvement on both counts, one can infer the absence significant reverse causality and thus confirms the exogeneity of social capital. A one unit increase in the level of instrumented social capital leads to 0.67 percent increase in credit access of grain seller's.

Table 8 : Social Capital and Credit Access: Is there Any Two Way Causal Relationship?

	Without instrumental variables OLS		With instrumental variables 2SLS	
Intercept	-5.6674	-2.18	-1.2052	-0.92
Sex of grain seller	-0.0289	-0.09	-0.8395	-0.44
Age of grain seller	0.2124**	2.04**	-0.0106**	-2.10**
Squared age of grain seller	-0.0006**	-2.13**	0.0000**	2.02**
Marital status of grain seller	0.9551***	2. 43***	0.2378***	2.55***
Bodija Market	0.4605	0.96	-0.0325	-0.15
Oja oba Market	1.5909***	4.28***	0.5596**	1.96**
Social Capital Index	0.0067***	3.14***	2.1066***	4.59***
Number of observation	120		120	
Adjusted R^2	0.3206		0.3306	

*Asterisks denote significance***, **,* at 1%, 5%, 10% significance levels*
Source : Researcher's computation on data gathered from field survey, February 2011

v. Conclusion and Recommendation

The basis of this study is centered on effects of social capital on microcredit access among rural grain seller in Ibadan. It is evident from the result that the credits markets are functioning below their potential as the credit demand of grain sellers are not being satisfied fully. This study has revealed that majority of the grain sellers are in their economic active age. It is therefore recommended that credit which is critical factor in ensuring the success of this enterprise should be made available to them to enhance the profitability of their enterprise.

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Effects of Crude Oil Pollution on Horticultural Crops in Rivers State, Nigeria

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Abstract - The study focused on effects of crude oil pollution on horticultural crops in Rivers State, Nigeria. Multistage sampling procedure was used to obtain data from 17 local government areas. A total of 296 questionnaires were analysed to obtain the results. The results showed that average hectare of horticultural farm cultivated was smaller in crude oil polluted farms (1.04ha) than in non – polluted farms (1.17ha). The results also revealed that output of horticultural crops in crude oil polluted farms (15.98tons) were lower than in non-polluted farms (18.75 tons), while farm income realised per farm was also lower in crude oil polluted farms ($324.70) than in non-polluted farms ($365.84). The values of output and farm income of fruits, banana, pepper, okra, leafy vegetables and melon were higher in non-polluted farms. This study concluded that crude oil pollution had detrimental and negative effects on horticultural crops output, farm income and area of farmland cropped.

Keywords : Horticultural crops; crude oil pollution; oil and gas exploration; crude oil polluted farms; non polluted farms; Rivers State Nigeria.

GJSFR-D Classification : FOR Code: 079901,900401

Strictly as per the compliance and regulations of :

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Abstract - The study focused on effects of crude oil pollution on horticultural crops in Rivers State, Nigeria. Multistage sampling procedure was used to obtain data from 17 local government areas. A total of 296 questionnaires were analysed to obtain the results. The results showed that average hectare of horticultural farm cultivated was smaller in crude oil polluted farms (1.04ha) than in non – polluted farms (1.17ha). The results also revealed that output of horticultural crops in crude oil polluted farms (15.98tons) were lower than in non-polluted farms (18.75 tons), while farm income realised per farm was also lower in crude oil polluted farms ($324.70) than in non-polluted farms ($365.84). The values of output and farm income of fruits, banana, pepper, okra, leafy vegetables and melon were higher in non-polluted farms. This study concluded that crude oil pollution had detrimental and negative effects on horticultural crops output, farm income and area of farmland cropped.

Keywords : *Horticultural crops; crude oil pollution; oil and gas exploration; crude oil polluted farms; non polluted farms; Rivers State Nigeria.*

I. Introduction

The Niger Delta region of Nigeria is one of the world's largest wetlands and includes by far the largest mangrove forest in Africa. Its biological diversity is of global significance. Within the extremely valuable ecosystem, oil activities are widespread (Niger Delta Development Commission, 2006). The emergence of oil as the world's leading fuel was partly due to its relative cleanliness but the enormous scale of the petroleum industry's operation has inevitably created a new set of difficult environmental problems as being experienced today in the Niger Delta region of Nigeria (Ekanem, Ejue, Amim and Adalikwu, 2010; Ugbomeh and Atubi, 2010; Onyenekenwa, 2011(a)). The Niger Delta region of Nigeria includes the following states: Rivers, Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo and Ondo States.

Presently, in Nigeria, oil spills regularly occur in the oil producing areas of the country, while gases are continually flared in these areas (Abii and Nwosu, 2009; Idodo – Umeh and Ogbeibu, 2010). With advanced technology in use in the oil industry, accidents should be less frequent but this certainly has not completely eliminated accidents and vandalisations (Iturbe, Castro, Perez, Flores and Torres, 2008; Ogbu, 2008).

Exploration of natural gas deposits of the Niger Delta region of Nigeria has not been economically viable until recently (NDDC, 2006). As a result much of it has been burnt off and is still being burnt off to allow access to underlying oil (Platform, 2006; Cohen 2008). The burning gas (flares) produce gases such as nitrogen oxide and sulphur dioxide which are released into the air. These air-borne pollutants are highly toxic (Mourad, Ghazi and Noureddine, 2009; Nkwocha and Pat – Mbano, 2010), and the growth of plants (especially horticultural and annual crops) are particularly inhibited by the hot, sooty emissions (Bello, Aladesanwa, Akinlabi and Mohammed, 1999; Dung, Bombom and Agusomu, 2008).

In effect, the Nigerian environment (especially Rivers State with its petrochemical industries, heavy oil and gas production and refining activities) is not safe judging from the effect of oil and other human activities on the environment and it will require much efforts to make it safe, which very few had paid attention to including the government, multinational oil companies and individuals (Ajibade and Awomuti, 2009; Ezeabasili, 2009; Onyenekenwa, 2011 (b)).

II. The Problem and Significance of Study

This environmental impact of the oil and gas industry essentially results from the activities and processes necessary for the successful operations of the oil and gas industry by the multinational oil companies. This had caused a lot of distortions in the soil, flora and fauna, traditional economies (such as farming, fishing, livestock and wildlife production), and social practices of the people of the area (Orta-Martinez and Finer, 2010; Huang, Jiang, Zeng, Chen, Zhao, Liao, Shou and Xu, 2011). It has also engendered poverty, food contamination and lack of security of human life (Onwuka, 2005; Enemugwem 2009; Ajibade and Awomuti, 2009).

With irregularities in the major primary sources of livelihood activities of the people of Rivers State, Nigeria due to oil and gas exploration and production, the question this article poses therefore is: to what extent is crude oil pollution a problem to horticultural crops in Rivers State of Nigeria?

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There is scarcity of researched data on the effects of crude oil pollution on horticultural crops in Rivers State, Nigeria (Dung et al., 2008). Many studies had examined the effects of crude oil exploration and production on Nigerian agriculture. The earlier studies include Odu (1983) and Bello et al. (1999). The more recent studies include Ekundayo, Emede and Osayande, (2001); Achuba (2006), Agbogidi, Eruotor and Akparobi, (2007), Eriyameru, Asagba, Onyeneke and Aguebor – Ogie, (2007); Abii and Nwosu (2009); Idodo – Umeh and Ogbeibu (2010). None of these studies had examined the effects of crude oil pollution on horticultural crops production and its economic implications on farmers in Rivers State in details.

Effects of crude oil pollution in this context will include the various degrees of oil spillages on farmland and areas of land formerly used for horticultural crops production but now occupied by flow stations, oil well sites, gas flaring sites, borrow pits excavated during construction and installations of equipment for crude oil production operations, laying of pipelines and other oil and gas activities.

III. The Objectives of The Study

The main objective of this study is to examine the effects of crude oil pollution on horticultural crops production in Rivers State, Nigeria.

The specific objectives are to:

(i) Examine and compare the areas of farmland used for horticultural crops production in crude oil polluted and non polluted farms in Rivers State.

(ii) Estimate and compare the output of horticultural crops produced in crude oil polluted and non-polluted farms in the study area.

(iii) Estimate and compare the farm income realized from horticultural crops in crude oil polluted and non polluted farms in Rivers State.

(iv) Suggest policies to ameliorate the negative effect of crude oil pollution on horticultural crops in Rivers State of Nigeria.

IV. Literature Review

Odu (1983) reported that plants are adversely affected by gas flares. This effect become progressively more serious as one gets nearer the flares. Vernalisation (i.e the requirement of low temperature for stimulation of flowering) fails, or slow photoperiod response (a reaction to the duration and timing of the light and dark conditions, i.e relative length of day and night), except in a few local horticultural crops like okra and some varieties of cowpea and maize, fail to occur. The study further reported that direct heat radiation, apart from consideration of comfort, standards and human performance near flares, result in dehydration and affect seed setting in some plants. The premature of defoliation and malformation of leaves of pawpaw, banana, plantain, coconuts and oil palm trees at proximal farming locations to the flares could also had been caused by sooty emissions.

Bello et al. (1999) experimentally examined the effects of gas flaring at the Ozombe oil flow station in Oguta Local Government Area (LGA) of Imo State, Nigeria, on the growth and yield of maize on farms located at distances of 200 metres, 600metres and 1000 metres respectively, east, west, south and north of the gas flaring point. Another farm located 10km away from the gas flaring point was included as control experiment. Experimental finding indicated that crops mean percentage of plant survival and grain yield were significantly reduced in all the locations compared with the control. The study observed that farms located 200metres away from the flaring point failed to produce any yield.

Ekundayo et al. (2001) studied the effect of crude oil spillage on growth, productivity and nutrient uptake of maize (Zea mays L.) The results showed that in crude oil polluted soils, germination was delayed and the germination percentage was significantly affected by oil pollution. Growth was poor in polluted soils using parameters such as plant height; stem girth, ear height, leaf area at four weeks after planting, leaf area at maturity and average length of primary roofs as growth indicators. Grain yield was significantly reduced at 95% level of probability when compared with the control. Leaf analysis of the maize plants grown in soils contaminated with crude oil a week before planting (preplant treatment) revealed mean levels of heavy metals which were higher than maximum permissible levels for maize in tropical soils.

Achuba (2006) studied the effect of crude oil contaminated soil at various sublethal concentrations on the growth and metabolism of cowpea (vigna unguiculata) seedlings. The results showed that crude oil induced environmental stress in the seedlings. Agbogidi et al. (2007) results showed that soil treatment with crude oil at four weeks after planting (4WAP), maize died within 24 hours while the plant without crude oil treatment remained intact. The study showed that the time of application of crude oil to soil has a significant effect on growth of the maize. Eriyameru et al. (2007) studied the effect of contaminating soil with Bonny light whole crude, or its fractions on germinating beans (phaseolus vulgaris L.) and maize (Zea mays L.). The results showed that there was dose dependent reduction in the number of bean or maize seeds that germinated in the contaminated soils compared with the control ($p < 0.05$), with the least number recorded in the 0.3% contaminated soil.

Dung et al. (2008) explored the spatial variability effects of gas flaring on the growth and development of cassava, water leaf and pepper, crops commonly cultivated in the Niger Delta. Results showed that retardation in crop development manifested in decreased dimensions of leaf lengths and width of

cassava and pepper crops closer to the gas flare point. Cassava yields were higher at location further away from flare points. Higher temperature around the gas flare appear to be the cause of the retardation in crops.

Abii and Nwosu (2009) studied two oil spill affected areas (Ogali and Agonchia) while an unaffected area (Aleto) all in Eleme LGA, Rivers State was used as control. The results showed that there was a significant decrease in the Ca, K, P, (CEC), as well as a significant increase in the sand fraction and Na content of the oil-spill affected soils when compared with the non affected soil. The results further showed that oil-spill had adversely affected the nutrient level and fertility states of Eleme soil.

Idodo-Umeh and Ogbeibu (2010) investigated the bioaccumulation of heavy metals in cassava tubers and plantain fruits grown in soils impacted with petroleum and non-petroleum activities in Olomoro in Isoko South LGA of Delta State, Nigeria. The results showed that all heavy metals revealed higher values in petroleum impacted soil than non – impacted soil. The values of heavy metals were higher both in epicarp and mesocarp of plantain fruits harvested from petroleum impacted soil than from non petroleum impacted soil. In cassava tubers, the values of heavy metals in the cortex were all higher in the petroleum impacted soil than in non impacted soil.

V. Methodology

This study was conducted in Rivers State of Nigeria, between August 2002 and April 2003. Rivers State is blessed with abundant natural resources including majority of Nigeria's oil and gas deposits (NDDC, 2006). As at today on shore and off shore oil fields in Rivers State involving crude oil exploration activities are scattered throughout the 23 LGAs of the state. The state is characterized by two distinct seasons; wet and dry, which favour the production of horticultural crops such as leafy vegetables, okra, melon, pepper, banana, and assorted types of fruits.

The primary data were collected through personal interviews, observations and structured questionnaires distributed among farmers in crude oil polluted and non-crude oil polluted areas of the state. A multistage stratified sampling procedure was used to obtain the data for this study. The first stage involved the selection of 17 LGAs out of the existing 23 LGAs in the state. These 17 LGAs were selected based on the fact that they were more crop farming inclined than the others. The second stage involved the stratification of farmers in a LGA into two sampling units namely crude oil polluted and non-crude oil polluted (non-polluted) farms. This was because information was required from both the crude oil polluted farms and non polluted farms. The third stage involved the random sampling of ten (10) farmers from crude oil polluted areas in a selected LGA and a corresponding number of ten (10) farmers from non-polluted farmlands in the same locality in a selected LGA.

A total of 340 questionnaires were distributed among horticultural crop farmers in the 17 LGAs selected in Rivers State. Out of the 340 questionnaires distributed, due to difficult terrain, uncompromising attitudes of the farmers, the politicking of crude oil pollution issues and persistent youth restiveness in the state (Ekanem et al., 2010; Ugbomeh and Atubi, 2010), 14 questionnaires were not retrieved. Furthermore, 30 questionnaires were found inconsistent with the objectives of the study. Hence, only 296 questionnaires were found suitable for the analysis. Data were analysed using descriptive statistics.

VI. Results and Discussion

The results and discussion were made under three sub headings according to set objectives namely: area of farmland used for horticultural crops production in crude oil polluted farms and non-polluted farms, horticultural crops output produced by farmers surveyed; and farm income realized from horticultural crops produced.

a) Area of farmland used for horticultural crops.

The average farm size cultivated per horticultural crop grown (ha) was obtained by dividing the total number of hectares cultivated by the number of farmers cultivating that horticultural crop as shown in Table 1. The coefficient of variation described the relationship between the standard deviation and average farm size, expressed in percentage. The ranking was done according to the total number of hectare cultivated per horticultural crop.

The total number of hectares of horticultural crops cultivated in the crude oil polluted farms was higher (454.61ha) than in the non-polluted farms (347.10ha); so also was the mean value in crude oil polluted farms (75.77ha) higher than the mean value in non-polluted farms (57.85ha). The number of farmers involved in cultivating horticultural crops in crude oil polluted farms was higher (454) than the number of farmers involved in non-polluted farms (316). Despite the higher number of respondents (farmers) cultivating horticultural crops in the crude oil polluted farms the average farm size cultivated (1.04ha) was lower than that of the non-polluted farms (1.17ha). The differences in the average farm sizes cultivated between the crude oil and gas polluted farms and non-polluted farms were clearly noticed in the following crops: fruits (1.06ha) in crude oil polluted farms, as against (1.54ha) in non-polluted farms; leafy vegetables (1.03ha) in crude oil polluted farms as against (1.15ha) in non-polluted farms; melon (1.03ha) in crude oil polluted farms, as against (1.13ha) in non-polluted farms. This is to say that because of crude oil spillages on the farmlands, acquisition of farmlands for installation and construction oil well sites, flow stations, gas flaring sites and laying of pipelines etc., the farm sizes had been reduced. Therefore , crude oil and gas exploration, exploitation

Table 1 : Distribution of horticultural crops grown and areas of farmland used in Rivers State.

Horticultural crops cultivated	Total number of hectares cultivated (ha)	Average farm size (ha)	Standard deviation (S.D) (ha)	Minimum value (ha)	Maximum value (ha)	Coefficient of variation (C.V.) (%)	Number of farmers involved	Ranking
Crude Oil polluted farms								
Pepper	74.38	0.88	0.62	0.20	2.50	70.45	85	3rd
Okra	84.70	0.89	0.69	0.10	3.00	77.53	95	2nd
Melon	67.65	1.03	0.89	0.20	10.00	86.41	66	4th
Vegetable (leafy)	134.53	1.03	0.81	0.10	5.00	78.64	130	1st
Fruits	41.15	1.06	0.79	0.30	5.00	74.53	39	6th
Banana	52.20	1.34	0.79	0.20	6.00	58.96	39	5th
Total	454.61	6.23	4.59	1.10	31.50	-	454	-
Mean value	75.77	1.04	0.77	0.18	5.25	74.42	76	-
Non – polluted farms								
Pepper	5.65	0.88	0.49	0.10	2.50	55.68	59	5th
Okra	61.85	0.90	0.53	0.10	2.00	58.89	69	3rd
Melon	64.65	1.13	0.92	0.20	7.00	81.42	57	2nd
Vegetable (leafy)	80.75	1.15	0.82	0.10	5.00	71.30	70	1st
Fruits	33.80	1.54	0.65	0.10	5.00	42.21	22	6th
Banana	54.40	1.39	0.84	0.45	5.00	60.43	39	4th
Total	347.10	6.99	4.25	1.05	26.50	-	316	-
Mean value	57.85	1.17	0.71	0.18	4.42	61.66	53	-

Source : Field Survey, 2003

and production in Rivers State of Nigeria had negative effects on areas of farmland cultivated with horticultural crops. These results go to support the fact that crude oil pollution and exploration activities have negative effects on farmland i.e reducing available areas for farming activities (Odu, 1983; Onwuka, 2005; Abii and Nwosu, 2009).

b) Horticultural crops output produced by farmers

The distribution of horticultural crops output in crude oil polluted and non – crude oil polluted farms were presented in Table 2. The results on Table 2 showed that total value of output from all cultivated horticultural crops by respondents in crude oil polluted farms was 15.98tons and 18.75 tons in non – polluted farms. The table further showed that values of output of fruits, banana, pepper, okra and leafy vegetables in the non-polluted farms were considerably higher than the values of their output in crude oil polluted farms. The average output per horticultural crop farm produced in crude oil polluted farms was 384.58kg and 550.94kg in non-polluted farms. Again, the values of average output produced per fruits, leafy vegetables, pepper, okra, banana and melon farms cultivated were significantly higher in non-polluted horticultural farms than in crude oil polluted farms. This means that output of horticultural crops both in total values and average per farm produced was higher in non-polluted farms than in crude oil polluted farms, which goes to say that crude oil pollution resulting from the oil and gas exploration, exploitation and production in Rivers State of Nigeria had a negative effect on the quantity of output produced, despite the fact that total areas cultivated in the crude oil polluted farms category were higher (454.61ha) than in the non-polluted farms category (347.10ha). These negative effects of crude oil pollution on crops had been earlier highlighted by Odu (1983), Bello et al. (1999), Ekundayo et al. (2001), Dung et al. (2008). Therefore, this study supported the findings of the above named authors and confirmed that the results were similar from the point of view of output reduction on crude oil polluted areas.

The grain equivalent figures were obtained after the actual produced weights were carefully converted into grains equivalent to uniformise the output into standard grain forms. The grain equivalent value in crude oil polluted farms was 3.64 tons which was lower than the 4.33 tons obtained in non-polluted farms. The average output per horticultural farm for the total grain equivalent in crude oil polluted farms (83.80kg) was lower than the 98.10kg obtained per cultivated horticultural farms in non-polluted farms. These results go to confirm that crude oil pollution had negative effects on the output of crop farms either in absolute values or grain equivalent forms.

Table 2 : Distribution of horticultural crops output in Rivers State

Horticultural crops produced	Total number of hectares cultivated (ha)	Number of farms cultivated	Output from all farms cultivated (tons)	Standard deviation (S.D.) (tons)	Average output per farm cultivated (kg)	Coefficient of variation (C.V..) (%)	Ranking
Crude Oil polluted farms							
Pepper	74.38	85	0.32	0.17	3.76	53.13	5th
Okra	84.70	95	0.38	0.25	4.00	65.79	4th
Melon	67.65	66	0.11	0.09	1.67	81.82	6th
Vegetables (leafy)	134.53	130	0.77	0.63	5.92	81.67	3rd
Fruits	41.15	39	3.00	2.65	76.92	81.82	2nd
Banana	52.20	39	11.40	9.91	292.31	86.93	1st
Total value	454.61	454	15.98	13.50	384.58	84.48	-
Mean value	75.77	76	2.66	2.25	64.10	84.59	-
Total Grain Equivalent value	-	-	3.64	2.26	83.80	62.09	-
Mean Grain Equivalent value	-	-	0.16	0.38	13.97	62.30	-
Non polluted farms							
Pepper	51.65	59	0.49	0.28	8.31	57.71	4th
Okra	61.85	69	0.48	0.27	6.96	58.25	5th
Melon	64.65	57	0.17	0.13	2.98	76.47	6th
Vegetables (leafy)	80.75	70	0.88	0.63	12.67	71.59	3rd
Fruits	33.80	22	4.60	3.17	209.09	68.91	2nd
Banana	54.40	39	12.13	7.81	311.03	64.39	1st
Total value	347.30	316	18.75	12.29	550.94	65.55	-
Mean value	57.88	53	3.13	2.05	91.82	65.50	-
Total Grain Equivalent Value	-	-	4.33	2.79	98.10	64.43	-
Mean Grain Equivalent Value	-	-	0.72	0.47	16.33	65.28	-

Source : Field Survey, 2003.

c) Farm income realized from horticultural crop sales

The average annual farm income realized from horticultural crops produced in Rivers State was presented in Table 3. The original monetary value of horticultural crops produced in Rivers State in 2003 was in local Nigerian currency, the Naira. The naira value were converted into United States of America dollars (US $) using the prevailing exchange rate of N120 for a US $1.00 as at the period of survey in 2003. The results in Table 3 showed that the total mean value of horticultural crops produced in crude oil polluted farms was $324.70 and $365.85 in non-polluted farms. These results obtained in Table 3 showed that the average values of crop produced per farm in non polluted farms were higher than in crude oil polluted farms. This was more evident in crops such as banana, leafy vegetables and pepper.

The total average farm income realized per ha of horticultural crops produced in crude oil polluted farms was $302.69 and $329.14 in non-polluted farms. These results also showed that values of horticultural crops in crude oil polluted farms were considerably lower in all crops than in non-polluted farms, as was evident in the value of pepper, leafy vegetables and banana respectively. These lower values of farm income in crude oil polluted farms had been caused by the negative effects of crude oil pollution on horticultural crops output. These results are similar to and support the findings of Odu (1983), Bello et al. (1999), Dung et al. (2008), Abii and Nwosu (2009), whereby oil and gas exploration, exploitation and production affected the value of crops produced through their effects on soil, directly on crops and/or atmospheric impacts. This study states categorically that farm incomes declined where crude oil pollution had occurred on horticultural crop in Rivers State, Nigeria as compared to non-polluted areas.

VII. Conclusion and Recommendation

a) Conclusion

In conclusion, the results of this study showed that the average hectares of horticultural crop farms cultivated during the period of survey was least in crude oil polluted farms (1.04ha) as compared to the non-polluted farms (1.17ha). Secondly, the findings of this study revealed that the output of horticultural crops in crude oil polluted farms

Table 3 : Average annual farm income realized from horticultural crops produced in Rivers State (US$)

Horticultural crops produced	Average produced per farm ($)	Standard deviation (S.D.) ($)	Average farm size (ha)	Average farm income produce per ha ($)	Coefficient of variation per ha ($)	Ranking
Crude Oil polluted farms						
Pepper	31.27	14.65	0.88	35.53	46.85	6th
Okra	31.47	23.56	0.89	35.38	74.86	5th
Melon	54.70	42.18	1.03	53.11	77.11	3rd
Vegetable (leafy)	64.97	53.15	1.04	62.47	81.81	2nd
Fruits	50.78	45.14	1.06	47.91	88.89	4th
Banana	91.51	75.13	1.34	68.29	82.10	1st
Total value	324.70	253.81	6.24	302.69	78.17	-
Mean value	54.12	42.30	1.04	50.45	78.16	-
Non-polluted farms						
Pepper	38.74	23.50	0.88	44.02	6-.66	5th
Okra	36.98	20.37	0.90	41.05	53.13	6th
Melon	60.36	55.19	1.13	53.42	91.43	3rd
Vegetable (leafy)	73.73	53.66	1.15	64.11	72.78	2nd
Fruits	53.24	43.93	1.54	54.57	82.51	4th
Banana	102.82	65.41	1.39	73.97	63.62	1st
Total value	365.84	262.06	6.99	329.14	71.63	-
Mean value	60.97	43.68	1.17	54.86	71.64	-

Source : Field Survey, 2003

(15.98tons) were significantly lower when compared with non-polluted farms (18.75tons). Lastly, this study also reported that farm income realized from horticultural crops produced per farm was significantly lower in crude oil polluted farms ($324.70) than in non polluted farms ($365.84). Therefore, this study states categorically that crude oil pollution had detrimental and negative effects on the area of farmland cultivated, horticultural crops output produced and hence farm income.

b) Recommendations

In order to ameliorate the observed negative and detrimental effects of crude oil pollution on horticultural crops produced in Rivers State, Nigeria, it is being recommended that crude oil pollution in the state in whatever form (acquisition of farmland for production, exploration and exploitation of oil and gas or crude oil spillages) should be minimized to acceptable minimum standard as it is practiced by the same multinational oil and gas companies in other parts of the world (Otton, Zielinski, Smith, Abbott and Keeland 2005). This could be done by all stakeholders in the Nigerian oil and gas industry to enact and enforce laws for effective control of rate of crude oil spillages (Eweje, 2006; Ezeabasili, 2009; Ajibade and Awomuti, 2009) and pipelines vandalisation on farmland, prevention of gas flaring (by re-injecting the gas back into the ground for a more adequate and better future use), and keeping to agreed dates of stopping the flaring of gases (Patform, 2006; Cohen, 2008; Ogbu, 2008) as these devastate crops planted, crops output produced and hence reduce farm income accruable to crop farmers, thereby causing heavy economic losses to crop farmers (Onwuka, 2005). Secondly, when oil spills and/or farmland is acquired for oil and gas production and exploration purposes by

multinational oil and gas companies adequate list of affected farmers should be compiled by authorities concerned and authenticated, and commensurate amount of compensation paid to them in line with the economic trends in the country. This will help relocate such affected farmers and/or to diversify their sources of income.

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Effects of Poverty on Rural Household Welfare in Oyo State, Nigeria

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Abstract - Poverty affects both men and women in most rural households. The study therefore examined the effects of poverty on rural household in Orire Local Government Area of Oyo State, Nigeria. Simple random sampling technique was used in selecting 120 respondents. Data were collected on socio economic characteristics, measurement of poverty and perception of poverty, using structured interview schedule. Descriptive and inferential statistics were used to analyze the data collected. The mean age of the respondents is 43, while majority (80.8%) of the respondents were married with an average annual income of #181,291.67. The most severe measurement of poverty is low income level (WMS = 1.58) while lack of access to good health is a major way of perceiving poverty (WMS = 4.30) among the respondents. The findings of the study also revealed that the major effect of poverty on household is low standard of living (98.3%). A significant relationship was found between age (r = .018*, p = 0.05), household size (r = .025**, p = 0.01), level of income (r = -.068**, p = 0.01) and the effects of poverty. The study therefore recommends that Government should invest more in farming especially in rural areas to increase the purchasing power of households. Also to provide finance for investment so as to increase the rural income level and thereby improving their standard of living.

Keywords : *poverty, perception, strategies, household, welfare.*

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I. Introduction

Poverty is a condition of having insufficient resources or income and can also be defined as the state of one who lacks a certain amount of material possessions or money (Encarta 2009). Fundamentally, poverty is a denial of choices and opportunities, a violation of human dignity. It means lack of basic capacity to participate effectively in society, and it implies not having enough to feed and clothe a family, not having a school or clinic to go to, not having the land on which to grow one's food or a job to earn one's living and not having access to credit. Poverty can also mean insecurity, powerlessness and exclusion of individual households and communities. Poverty can further be explained as susceptibility to violence, and it often implies living in marginal or fragile environments, without access to clean water or sanitation (''Indicators of poverty and hunger''.un.org.). World Bank (2001) refers to poverty as pronounced deprivation in well being, and comprises many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. World Bank (2001) also describes poverty to encompass low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voice and insufficient capacity and opportunity to better one's life. David Moore (2009) argues that some analysis of poverty reflect pejorative, sometimes racial stereotypes of impoverished people as powerless victims and passive recipients of aid programs.

Poverty in its most extreme form is a lack of human needs such as adequate and nutritious food, clothing, housing, clean water and health services. Extreme poverty can cause terrible suffering and death, and even modest levels of poverty can prevent people from realizing many of their desires. The world's poorest people are many of whom live in developing areas of Africa, Asia, Latin America and eastern Europe struggle daily for food, shelter, and other necessities. They often suffer from severe malnutrition, epidemic diseases outbreaks, famine and war. In wealthier countries such as the United States, Canada, Japan, and those in Western Europe, the effects of poverty may include poor nutrition, mental illness, drug dependence, crime and high rates of diseases (Encarta 2009). Perception of poverty is an imaginative extension of thought that conceives of poverty as an agent of pollution. The World Bank (2007) defines extreme poverty as living on less than $1.25(PPP) per day, and moderate poverty as less than $2 a day (but note that a person or family with access to subsistence resources e.g. subsistence farmers may have a low cash income without a correspondingly low standard of living, they are not living ''on'' their cash income but using it as a top up). It estimates that in 2001, 1.1billion people had consumptions levels below $1 a day and 2.7billions lived on less than $2 a day. A dollar a day, in nations that do not use the dollar as currency, does not translate to living a day on the amount of local currency as determined by the exchange rate. Rather it is determined by the purchasing power parity, which would look at how much local currency is needed to buy the same things that a dollar could buy in the United States. [''When a dollar a day means 25 cents''.bbcnews.com].World Bank (2007) data also shows that the percentage of the population living in households with

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consumption or income per person below the poverty line has decreased in each region of the world since 1990.The importance of studying the effects of poverty cannot be overemphasized for Some people believe that poverty results from lack of adequate resources on global level. Resources such as land, food and building materials that are necessary for the well being or survival of the world's poorest people. Some individuals are still unaware of their poverty status and some considered poverty a necessary or desirable condition which must be embraced to reach certain spiritual, moral or intellectual states. This study explored the use of qualitative approach to measure the perception and effect of poverty on the farmers' household. It is on this background that the study identified the socio economic characteristics of the respondents; determined the qualitative measurement of household poverty, the perception of poverty by households in the study area and the coping strategies of households to poverty were also determined. The study further determined the significant relationship between the socio economic characteristics of the respondents and the effects of poverty on the household welfare.

II. Methodology

The study was carried out in Orire Local Government area of Oyo State. The area consists of 10 political wards. The Local Government is governed by an elected chairman and councillors elected from each ward. It has an area of 23km square and a population of 142,070 at 2006 census. The post code of the area is 210. It is part of the Local Governments of Ogbomoso Area of Oyo State, other local government in the area are Ogbomoso North, Ogbomoso South, Surulere and Ogo Oluwa. The tribe that mainly dominate Orire Local Government area are the Yorubas. The indigenes are mostly farmers, local school teachers and petty traders. The population of study includes the household heads in the study area. Simple random sampling technique was used in selecting 20% of the political wards after which six villages were randomly selected from the two wards namely: Iluju, Ikoyi, Aipo (ward 1) and Tewure, oja titun, Olose (ward 2). Thereafter twenty respondents were randomly selected from each village making a total sample size of one hundred and twenty respondents. Data was collected with the administration of interview schedule which contained both open and close ended questions relating to perception of poverty and its effects on household welfare and information was collected based on the objectives of the study. The variables for the study include both dependent and independent variables. The dependent variable is the effect of poverty and the independent variables include age, sex, marital status, and level of education. The statistical tools that were used to analyse the data collected, include descriptive and inferential statistical tools. Frequency count, percentages, and mean values were used as the descriptive tools while Pearson Product Moment Correlation was used to determine the relationship between the variables.

III. Data Analysis and Interpretation

a) Socio economic characteristics of the respondents

Table 1 show that majority of the respondents (37.5%) were between ages 40 and 49. The mean age of the respondents was calculated to be 43 years and it implies that majority of the respondents were still in their economically active age. 62.5% of the respondents were Christians, and this shows that Christianity is prevalent in the study area. 80.8% of the respondents were married. The high percentage of married people is an indication of more responsible adults in the area, which implies that the respondents enjoy support from their spouses and children. 64.2% of the respondents had about 5 members in their household with most of them having one form of formal education or the other. 66.7% of the respondents were involved in farming as their primary occupation while 31.7% were involved in other occupations such as teaching and trading. Which implies that majority of the respondents earn a living from farming. This findings conforms with that of Omoregbee and Edeogbon (2006), in their study on diversification of livelihood among rural households noted that 90% of poor households relied on farming as a major source of income. The average annual income is #181,291.67 which implies that majority of the respondents earns about #200,000 annually.

b) Measurement of household poverty

Table 2 shows the mean score and rank of the items that measures household poverty. The level of poverty was measured on 3 point scale based on severity: very severe, severe and not severe. Low income level (WMS=1.58) was ranked as the most severe measurement of household poverty, followed by poor access to good security (=1.44), poor access to standard health facilities (=1.38), poor housing quality (=1.28), and precarious livelihoods (=1.13). Others are excluded locations (=1.06), weak community organisations (=1.04), poor gender relationships (=1.01) and disempowering institutions (=1.01). Problems in social relationships (=0.86), limited capabilities (=0.79), physical limitations (=0.78), abuse by those in power (=0.75) and poor access to portable water. This implies that the most severe measurements of poverty were low income level and poor access to good security.

c) Perception of poverty

The perception of poverty by respondents in their households was measured on five point scales which are strongly agreed, agreed undecided, disagree and strongly disagree. Table 3 shows that some of the respondents strongly agreed that lack of access to good health (WMS=4.30) and lack of access to basic

necessity of life (=4.20) were the major ways by which poverty can be perceived. Others are inadequate care (=4.12), inability to own property (=4.12) and inability to meet social and economic obligation (=4.05). Lack of information or access to modern agricultural inputs (=4.03), Lack of stable job due to lack of skill (=3.63), inadequate self education (=3.54), lack of money for children education (=3.07) and high mortality rate (=2.43). This implies that lack of access to good health and lack of access to basic necessity of life were the major ways of perceiving poverty by the respondents.

d) Poverty coping strategies

Table 4 shows that 98.3% of the respondents sell their farm produce, 96.7% pray to God in Church and Mosque and 84.2% have personal savings as their poverty coping strategies. 70.0% of the respondents accept gift from better off members of the family while 58.3% deny themselves and family of food and clothing. Another 46.7% borrow from friends and relations, 18.3% deny themselves and family of proper medical care when needed and 13.3% eat starchy food without meat, 9.2% involve themselves in town development unions. Also 7.5% buy food on credit, 6.7% are local leaders, 5.8% take credit for benefits, 3.3% sell their assets, 0.8% pack leftover food at social functions and withdraw children from school. Some of these major strategies such as praying to God in Church of Mosque and gift from better off members of the family are not income generating since they may encourage laziness and hence the tendency to remain in poverty and impoverish other members of the community.

e) Effects of poverty

Table 5 shows that all the respondents were adversely affected by poverty in their household in one way or the other. To 98.3% of the respondent, low standard of living was the major effect of poverty they experienced. 89.2% had low income level, 75.0% experienced low life expectancy, 67.5% had low rate of employment and 58.3% had poor housing condition. 52.5% were affected by poor nutrition, 45.8% experienced high rate of illiteracy and 42.5% had overpopulation rate. Another 20.8% were affected by high level of starvation or hunger, 15.0% experienced high rate of crime and violence while 9.2% had incidence of infectious diseases, 3.3% were affected by high level of mental illness and high rate of alcoholism while 0.8% were affected by physical health problems, high infant mortality rate and drug dependence. This implies that the major effects of poverty on the respondents were low standard of living, low income level and low life expectancy.

f) Relationship between the socio economic characteristics of the respondents and the effects of poverty on their household.

Ho1:- There is no significant relationship between the socio economic characteristics of the respondents and the effect of poverty on the household.

The result of the findings in table 13 revealed that there were positive and significant relationships between the age of the respondents (r = .018), household size (r =.025) and the effect of poverty on household. However there was an inverse relationship between the annual income of the respondents (r = -.068) and the effect of poverty. This implies that respondents that are older and have larger household sizes are more affected by poverty. This could be attributed to the need for survival as responsibilities tend to increase with age and household size. Also, respondents that earn higher income will be able to afford the basic necessity of life and household needs therefore, the lower the effects of poverty.

IV. Conclusion and Recommendation

From the study, the mean age was 43 years which show that majority of the respondents were still in their economically active age. 62.5% were Christians and majority were married which implies that they enjoy support from their family. The average size of the households was 5 and majority of the respondents earn their living from farming which means that farming is the main source of livelihood in the households. The average annual income of the respondents was #181,291.67 that is, majority of the respondents earn about #200,000 annually. The most severe measurements of poverty were low income and poor access to good security while the major ways of perceiving poverty were lack of access to good health and lack of access to basic necessity of life. The major poverty coping strategies of the respondents were selling of farm produce and praying to God in Church or Mosque. Also, the respondents agreed that poverty had various adverse effects on their households. The major adverse effect of poverty on households is low standard of living. The study concluded that age, household size and annual income had influence on the effect of poverty on the households. The study therefore recommended that Government should invest more in farming especially in rural areas to increase the purchasing power of households and also to provide finance for investment. Also the respondents should be encouraged to do away with unproductive poverty coping strategies such as dependence on other people.

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Table 1 : Socio economic characteristics of the respondents [N = 120]

Variable	Frequency	Percentage
Age (in years)		
20 – 29	16	13.3
30 – 39	25	20.9
40 – 49	45	37.5
50 – 59	31	25.8
60 – 69	3	2.5
Religion		
Christianity	75	62.5
Islam	45	37.5
Marital Status		
Single	12	10.0
Widow	11	9.2
Married	97	80.8
Household size		
1 – 5	77	64.2
6 – 10	43	35.8
Level of Education		
Non formal education	12	10.0

Primary education uncompleted	1	0.8
Primary education educated	21	17.5
Secondary education uncompleted	28	23.3
Secondary education completed	51	42.5
Tertiary education completed	7	5.8
Primary Occupation		
None	2	1.6
Others	38	31.7
Farming	80	66.7
Annual Income (#)		
< 100,000	9	7.5
101,000 – 200,000	69	57.5
201,000 – 300,000	39	32.5
301,000 – 400,000	2	1.7
401,000 – 500,000	1	0.8

Table 2 : Distribution of respondents by measurement of poverty

Items	Very severe	Severe	Not severe	S WMS		Rank
Poor access to good security	56(46.7)	61(50.8)	3(2.5)	173	1.44	2
Poor access to portable water	11(9.2)	50(41.7)	59(49.2)	72	0.60	14
Precarious livelihoods	21(17.5)	93(77.5)	6(5.0)	135	1.13	5
Excluded locations	14(11.7)	99(82.5)	7(5.8)	127	1.06	6
Problems in social relationships	12(10.0)	79(65.8)	29(24.2)	103	0.86	10
Abuse by those in power	6(5.0)	79(65.8)	36(30.0)	90	0.75	13

Limited capabilities	2(1.7)	91(75.8)	27(22.5)	95	0.79	11
Disempowering institutions	12(10.0)	97(80.8)	11(9.2)	121	1.01	8.5
Low income level	72(60.0)	45(37.5)	3(2.5)	189	1.58	1
Poor access to health facilities51	(42.5)	63(52.5)	6(5.0)	165	1.38	3
Poor housing quality	39(32.5)	76(63.3)	5(4.2)	154	1.28	4
Weak community organisations	14(11.7)	97(80.8)	9(7.5)	125	1.04	7
Gender relationships	12(10.0)	97(80.8)	11(9.2)	121	1.01	8.5
Physical limitations	7(5.8)	79(65.8)	34(28.3)	93	0.78	12

Source : Field research, 2011

Table 3 : Distribution of respondents by perception of poverty

Items	Strongly	Agree	Undecided	Disagree	Strongly	Score	WMS	Rank
Inadequate care	21(17.5)	96(80.0)	0(0)	2(1.7)	1(0.8)	494	4.12	3
Lack of stable job due to lack of skill	11(9.2)	70(58.3)	25(20.8)	12(10.0)	2(1.7)	436	3.63	8
Inability to own property	35(29.2)	71(59.2)	7(5.8)	7(5.8)	0(0)	494	4.12	3
Lack of access to good health	45(37.5)	66(55.0)	9(7.5)	0(0)	0(0)	516	4.30	1
Inadequate self education	5(5.2)	59(49.2)	52(43.3)	4(3.3)	0(0)	425	3.54	9
Lack of money for children education	5(4.2)	44(36.7)	29(24.2)	38(31.7)	4(3.3)	368	3.07	10
High mortality rate	0(0)	16(13.3)	33(27.5)	57(47.5)	14(11.7)	291	2.43	11
Lack of access to basic necessity of life	28(23.3)	89(74.2)	2(1.7)	1(0.8)	0(0)	504	4.20	2
Unable to meet social and economic obligation	13(10.8)	103(85.8)	2(1.7)	1(0.8)	1(0.8)	486	4.05	5

Inadequate access to infrastructure and services	6(5.0)	108(90.0)	1(0.8)	4(3.3)	1(0.8)	474	3.95	7
Lack of access to modern agricultural input	4(3.3)	115(95.8)	1(0.8)	0(0)	0(0)	483	4.03	6

Source : Field survey, 2011

Table 4 : Distribution of respondents by coping strategies.

Poverty coping strategies	Frequency	Percentage	Rank
Gift from better off members of the family	84	70.0	4
Selling of farm produce	118	98.3	1
Praying to God in Church or Mosque	116	96.7	2
Involving in town development unions	11	9.2	9
Local leaders	8	6.7	11
Eating starchy food without meat	16	13.3	8
Deny of oneself and family of proper medical care	22	18.3	7
Selling of assets	4	3.3	13
Personal savings	101	84.2	3
Borrowing from friends and relations	56	46.7	6
Packing of leftover food at social functions	1	0.8	14.5
Denying oneself and family of food and clothing	70	58.3	5
Withdrawing of children from school	1	0.8	14.5
Running away from creditors	0	0	16
Buying food on credit	9	7.5	10
Taking credit for benefits	7	5.8	12

Source : Field survey, 2011

Table 5 : Distribution of respondents by effects of poverty

Effects	Frequency	Percentage	Rank
Poor nutrition	63	52.5	6
High level of starvation or hunger	25	20.8	9
Low rate of employment	81	67.5	4
Overpopulation rate	51	42.5	8
Low income level	107	89.2	2
Incidence of infectious diseases	11	9.2	11
Poor housing condition	70	58.3	5
Physical health problems/disability	1	0.8	15
High infant mortality rate	1	0.8	15
High level of mental illness	4	3.3	12.5
Drug dependence	1	0.8	15
High rate of illiteracy	55	45.8	7
High rate of crime and violence	18	15.0	10
High rate of alcoholism	4	3.3	12.5
Low standard of living	118	98.3	1
Low life expectancy	90	75.0	3

Source : Field survey, 2011

Table 6 : Relationship between the socio economic characteristics of the respondents and the effect of poverty on their household.

Variables	r value	Decision
Age	.018*	Significant
Household size	.025**	Significant
Number of years spent in school	-.026	not significant
Primary occupation	.085	Not significant
Annual income	-.068**	Significant

**Correlation is significant at 0.05 level of significance (2 tailed)*

***Correlation is significant at 0.01 level of significance (2 tailed)*

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Scleractinian Diversity of Ritchie's Archipelago, Andaman & Nicobar Islands

By Tamal Mondal, C. Raghunathan & K. Venkataraman
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Abstract - Ritchie's Archipelago, being the part of South Andaman, shows a variety of marine biodiversity in each of its thirteen islands. These islands show a great deal of scleractinian life on its continental shelf in a fringing pattern. The study will help up to get a summarized data of scleractinian diversity of this archipelago. The will be to take conservatory measure for the proper sustainable development of coral reef of the islands. A Total of 168 species of scleractinian corals were recorded during the study period from the study areas. Shannon –Weaver Diversity index (H^-) of Scleractinian corals ofthe islands was recorded between 4.718 and 6.556, indicating very high coral diversity of those places. Similarity index (S) was also ranges from 29.41% to 73.89%, suggeststhe existence of species strong links between islands. Ritchie's Archipelago is a group of islands which shows a variety of scleractinian corals. high level of species co-existence which harbours with the other associated faunal communities for their survival. The diversity of scleractinian corals in the Ritchie's Archipelago is discussed in detail in this paper.

Keywords : *Scleractinian Coral, Diversity, Ritchie's Archipelago, Andaman, Shannon –Weaver Diversity index, Similarity index.*

GJSFR-D Classification : *FOR Code: 050202, 960802*

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Tamal Mondal [α], C. Raghunathan [α] & K. Venkataraman [σ]

Abstract - Ritchie's Archipelago, being the part of South Andaman, shows a variety of marine biodiversity in each of its thirteen islands. These islands show a great deal of scleractinian life on its continental shelf in a fringing pattern. The study will help up to get a summarized data of scleractinian diversity of this archipelago. The will be to take conservatory measure for the proper sustainable development of coral reef of the islands. A Total of 168 species of scleractinian corals were recorded during the study period from the study areas. Shannon –Weaver Diversity index (H^-) of Scleractinian corals of the islands was recorded between 4.718 and 6.556, indicating very high coral diversity of those places. Similarity index (S) was also ranges from 29.41% to 73.89%, suggests the existence of species strong links between islands. Ritchie's Archipelago is a group of islands which shows a variety of scleractinian corals. high level of species co-existence which harbours with the other associated faunal communities for their survival. The diversity of scleractinian corals in the Ritchie's Archipelago is discussed in detail in this paper.

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I. Introduction

The Andaman & Nicobar Islands are a low mountain chain of islands, which rise from a submerged north-south trending ridge separating the sea from Bay of Bengal between 6°-14° N and 92°-94° E. There are 572 islands in the chain, some of which are volcanic. The islands occupy an area of 8293 sq km. with a coastline of 1962 km and account for 30% of the Indian Exclusive Zone [1]. Ritchie's archipelago is one of the most diverse areas with various marine biodiversity. This archipelago is the combined form of thirteen islands such as, Sir William Peel Island, Nicolson Island, Wilson Island, Henry Lawrence Island, Havelock Island, Outram Island, Inglis Island, South Button Island, North Button Island, Middle Button Island, Sir Hugh Rose Island, John Lawrence Island and Neil Island. This archipelago is situated in the Eastern most region of Andaman Islands group.

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In India, coral reefs are distributed in Andaman and Nicobar Islands, Lakshadweep Islands, Gulf of Mannar and Gulf of Kachchh, and in patches off Malwan on west and Gopalpur on east coast. Indian coral reefs together with shelves, lagoon and submerged banks have a fishery potential of 0.2 billion tones per year or about 10% of the total production [2]. The reef of corals of the Andaman Islands belongs to Indo-west Pacific faunal province. The Andaman are just northwest of the central area of greatest marine biodiversity, referred to as the 'Coral Triangle', an area enclosing the Philippines, central and eastern Indonesia, and northern and eastern Papua New Guinea [3]. Coral reef ecosystems are the most diverse and complex aquatic communities. Although they are diverse as a whole this diversity is not evenly distributed among habitat types within the reef. For a keystone species, the corals, diversity was found to be greatest on reef slopes, mid-level on crests and lowest on reef flats in a study in the region [4]. Coral reefs are among the most valuable yet most threatened of the world's ecosystems. Reefs provide subsistence food for a number of native populations, and also serve as major tourist draws [5]. However, this precious resource is in decline around the world as a result of a number of anthropogenic related factors such as global warming, overfishing, pollution, and even tourism [6]. The most important environmental factors determining the dominant morphologies of coral are light and wave energy, with sedimentation, temperature, plankton availability, and the frequency of mortality caused by a number of factors such as grazing, storms, and tidal exposure also playing a part [7]. It is now widely appreciated that ecosystem functioning is dictated to a large degree by biodiversity and the community structure that result from factors such as the richness and evenness of the diversity. Diversity at all levels, including infra-specific or genetic diversity that characterize populations of a species, species diversity that characterize communities, and in turn community diversity that characterize an ecosystem, all play a major role in this. The present study was undertaken to inventories the scleractinian corals in Ritchie's Archipelago.

II. Materials and Methods

Eleven Islands out of Thirteen Islands of Ritchie's Archipelago were surveyed during August, 2009 to November, 2011 (Table-1 & Fig-1).

Table 1 : Coordinates of Suryed Areas

Sl. No.	Name of the Islands	Latitude	Longitude
1.	Sir William Peel	N-12°03.865'	E-93°07.239'
2.	Nicolson	N-12°06.231'	E-92°57.267'
3.	Wilson	N-12°06.539'	E-92°59.267'
4.	Henry Lawrence	N-12°12.598'	E-93°03.883'
5.	Havelock	N-11°53.274'	E-93°01.439
6.	Outram	N-12°12.346'	E-93°06.475'
7.	Inglis	N-12°08.586'	E-93°06.651'
8.	South Button	N-12°13.243'	E-93°01.200'
9.	Sir Hugh Rose	N-11°46.924'	E-93°04.599'
10.	John Lawrence	N-12°00.112'	E-93°00.608'
11.	Neil	N-11°50.165'	E-93°01.846'

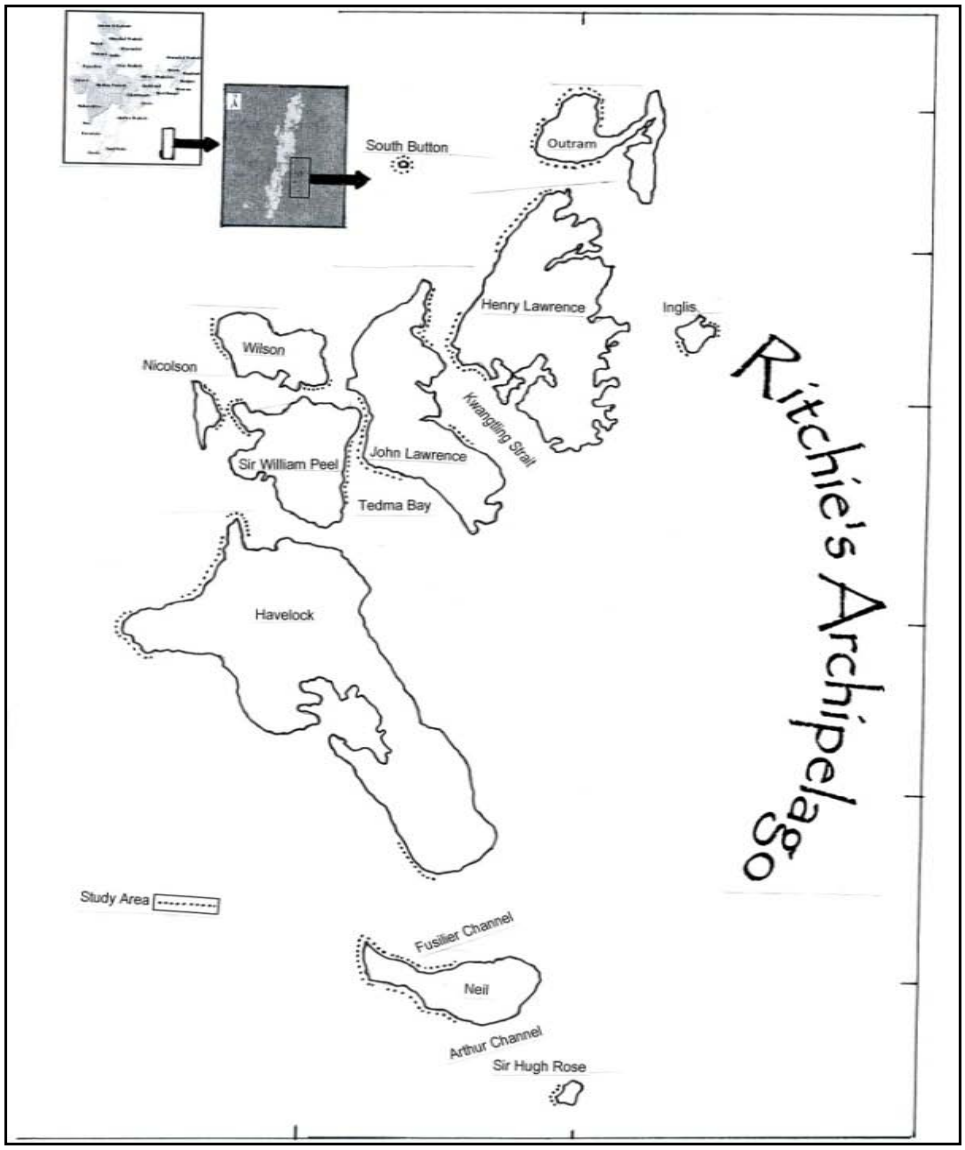

Fig 1 : Map showing the location of 11 Islands of Ritchie's Archipelago.

Each island was surveyed primarily using "Manta tow" study method [8, 9] followed by Line Intercept Transect Method [10] and Quadrate methods [11] to investigate the diversity of the scleractinian corals. For the purpose of this study each location and depth combination was considered an individual "site".

Data were collected by Self Contained Underwater Breathing Apparatus (SCUBA) diving and snorkeling during the above said study period. Belt transect method was applied to get the data of the diverse scleractinian corals. Each quadrate was photographed with a housed digital camera (Sony - Cyber shot, Model-T900, marine pack, 12.1 megapixels) oriented toward the start of transect. When possible, the entire quadrate was photographed in a single image. Occurrence of coral species in each quadrate was recorded. Individual photo quadrates were identified in conjunction with Veron [12] Wallace [13] and labeled according to the Islands.

Species diversity was calculated following Shannon- Weaver diversity index formula described below [14].

$$H^{-} = -\sum pi \log_e pi$$

Where, pi = Proportion of number of individual of a particular species and total number of individual of all the species, H^{-} = diversity of a theoretically infinite population.

Similarity Index is the simple measure of the extent to which two habitats species in common. It has been formulated below [15].

$$S = (2C/a + b) \times 100$$

Where 'C' = Number of species common at any two stations, 'a' = number of species of one station and 'b' = number of species at the other station.

III. Results

On the basis of this extensive study in Ritchie's Archipelago, one hundred and sixty eight scleractinian corals (Table-2) were identified from the eleven islands in different frequency.

Table 2 : Diversity and distribution of Scleractinian Corals along surveyed areas of Ritchie's Archipelago

SL. NO.	Family	Species	Name of Islands of Ritchie's Archipelago										
			PL	NCN	WN	HNL	HL	OM	IN	SB	SHR	JNL	NL
1.	Acroporidae	*Acropora aspera* (Dana, 1846)	-	-	+	+	+	+	+	+	+	+	+
2.		*Acropora microphthlma* (Verrill, 1859)	-	+	-	+	+	+	-	+	+	-	+
3.		*Acropora robusta* (Dana, 1846)	+	+	+	+	+	+	+	+	+	-	+
4.		*Acropora humilis* (Dana, 1846)	-	+	-	+	+	+	+	+	+	+	+
5.		*Acropora natalensis* (Riegl, 1995)	-	-	-	-	+	-	-	-	-	-	-
6.		*Acropora chesterfieldensis* (Veron & Wallace, 1984)	-	-	+	-	+	+	-	+	-	-	-
7.		*Acropora schmitti*(Wells, 1950)	-	-	-	-	+	-	-	+	-	-	-
8.		*Acropora cerealis* (Dana, 1846)	+	-	-	-	+	-	-	+	-	+	-
9.		*Acropora ocellata* (Klunzinger, 1879)	-	-	-	-	-	+	-	-	+	-	+
10.		*Acropora microclados* (Ehrenberg, 1834)	-	-	-	-	+	-	+	+	-	-	-
11.		*Acropora subglabra* (Brook, 1891)	+	-	-	-	+	-	+	+	-	-	-
12.		*Acropora nasuta* (Dana, 1846)	-	-	-	+	+	-	-	+	-	-	+
13.		*Acropora papillare* (Latypov, 1992)	-	-	-	-	-	+	-	+	-	-	-
14.		*Acropora clathrata* (Brook, 1892)	-	-	-	-	+	-	-	-	-	-	+
15.		*Acropora pulchra* (Brook, 1891)	-	+	+	-	+	+	-	+	-	-	-

16.	1846)	+	+	-	+	+	+	+	+	+	+	+
17.	*Acropora loripes* (Brook, 1892)	-	-	+	-	-	-	-	-	-	-	-
18.	*Acropora monticulosa* (Bruggemann,1879)	+	+	+	+	+	+	+	+	+	+	+
19.	*Acropora rudis* (Rehberg, 1892)	+	-	-	-	+	-	-	-	-	-	+
20.	*Acropora nobilis* (Dana, 1846)	+	-	-	+	+	-	+	+	-	+	+
21.	*Acropora forskali* (Ehrenberg, 1834)	-	-	-	-	+	-	-	-	-	-	+
22.	*Acropora plantaginea* (Lamarck, 1816)	-	+	-	-	+	-	-	-	-	-	-
23.	*Acropora abrotanoides* (Lamarck, 1816)	-	-	-	-	+	+	-	+	-	-	+
24.	*Acropora cythera* (Dana, 1846)	+	-	+	-	+	+	+	+	+	+	+
25.	*Acropora valida* (Dana,1846)	+	-	+	-	+	+	-	+	-	-	+
26.	*Acropora hyacinthus* (Dana, 1846)	+	-	+	+	+		+	+	-	+	+
27.	*Acropora gemmifera* (Brook, 1892)	+	-	-	+	+	+	+	+	-	+	+
28.	*Acropora bruggamnni* (Brook, 1893)	-	-	-	-	-	-	-	+	-	-	-
29.	*Acropora spicifera* (Dana, 1846)	-	-	-	-	+	+	-	-	-	-	+
30.	*Acropora dendrum* (Bassett-Smith, 1890)	-	-	-	+	-	-	-	-	-	-	-
31.	*Acropora bifurcata* (Nemanzo, 1967)	-	-	+	-	+	+	-	-	-	-	+
32.	*Acropora vaughani* (Wells, 1954)	-	+	-	-	-	-	-	+	-	-	+
33.	*Acropora grandis* (Brook, 1892)	+	-	+	-	+	+	-	+	+	-	+
34.	*Acropora inermis* (Brook, 1891)	-	-	-	-	-	-	-	-	-	+	-
35.	*Acropora austera* (Dana, 1846)	-	-	-	-	+	-	+	-	-	-	+
36.	*Acropora tanegasshimensis* (Veron, 1990)	-	-	-	-	-	-	-	-	-	-	+
37.	*Acropora palmerae* (Wells, 1954)	-	+	-	-	+	-	-	+	-	-	+
38.	*Acropora florida* (Dana, 1846)	-	-	-	-	-	+	+	+	+	-	+
39.	*Acropora polystoma* (Brook, 1891)	-	-	-	-	-	-	-	-	-	-	+
40.	*Acropora subulata* (Dana, 1846)	-	-	-	-	+	-	-	-	-	-	+
41.	*Acropora sekiseiensis* (Veron, 1990)	-	-	-	-	-	-	-	-	-	-	+
42.	*Acropora kimbeensis*(Wallace, 1999)	-	-	-	-	-	-	-	-	-	-	+
43.	*Acropora millepora* (Ehrenberg, 1834)	+	+	-	-	+	+	+	+	-	-	-
44.	*Acropora selago* (Studer, 1878)	-	-	-	-	-	-	-	+	-	-	-
45.	*Acropora divaricata* (Dana, 1846)	-	-	-	-	+	-	+	-	-	+	-

46.		*Acropora wallaceae* (Veron, 1990)	-	-	-	-	+	-	-	-	-	-	+
47.		*Acropora samoensis* (Brook, 189*1)*	-	-	-	-	-	-	-	-	-	+	+
48.		*Acropora efflorescens* (Dana, 1846)	-	+	-	-	-	-	-	-	-	-	-
49.		*Acropora digitifera* (Dana, 1846)	-	-	-	-	+	-	-	-	-	-	+
50.		*Acropora palifera* (Lamarck, 1816)	-	-	-	+	+	+	+	+	+	-	+
51.		*Montipora hemispherica* (Veron, 2000)	-	-	-	-	-	-	-	-	-	+	-
52.		*Montipora capitata* (Dana, 1846)	-	+	-	-	+	-	-	-	-	-	-
53.		*Montipora hispida* (Dana, 1846)	+	-	-	-	-	+	-	+	-	-	+
54.		*Montipora digita* (Dana, 1846)		+	-	-	+	+	-	-	-	-	+
55.		*Montipora peltiformis*(Bernard, 1897)	+	-	+	+	+	-	+	-	+	+	+
56.		*Montipora grisea* (Bernard, 1897)	-	-	-	-	-	-	-	-	-	-	+
57.		*Montipora meandrina* (Ehrenberg, 1834)	-	-	-	-	-	+	-	-	-	-	-
58.		*Montipora tuberculosa* (Lamarck, 1816)	-	+	-	-	+	-	+	-	-	-	-
59.		*Montipora varrucosa* (Lamarck, 1816)	-	-	-	-	+	+	-	-	-	-	-
60.		*Montipora mollis*(Bernard, 1897)	-	-	-	-	+	-	-	-	-	-	-
61.		*Montipora informis* (Bernard, 1897)	-	-	-	-	+	-	+	+	+	+	+
62.		*Montipora monasteriata* (Forskal, 1775)	-	-	-	-	-	-	-	-	-	-	+
63.		*Montipora undata* (Bernard, 1897)	-	-	-	-	-	-	+	-	-	-	-
64.		*Montipora aequituberculata*(Bernard, 1897)	+	+	+	+	+	+	-	+	+	+	+
65.		*Montipora danae* (Milne Edwards and haime, 1851)	-	-	-	-	-	-	-	-	-	-	+
66.		*Astreopora myriophthalma* (Lamarck, 1816)	-	-	-	+	+	+	-	+	+	-	+
67.		*Astreopora ocellata* (Bernard, 1896)	-	-	-	-	-	-	-	-	-	-	-
68.	Pocilloporidae	*Pocillopora damicornis* (Linnaeus,1758)	+	+	+	+	+	+	+	+	+	+	+
69.		*Pocillopora varrucosa* (Ellis & Solander, 1786)	+	+	+	+	+	-	+	+	+	+	+
70.		*Pocillora meandrina* (Dana, 1846)	-	-	-	-	-	-	-	-	-	-	+
71.		*Pocillopora ligualata* (Dana, 1846)	-	-	-	-	-	-	-	-	-	-	+
72.		*Seriatopora hystrix* (Dana, 1846)	+	+	+	+	+	+	-	+	+	+	+
73.		*Seriatopora stellata* (Quelch, 1886)	-	+	-	-	+	-	-	-	-	-	+
74.		*Stylophora pistillata* (Esper,1797)	-	-	+	+	+	-	-	-	-	-	+

75.	Oculinidae	*Galaxea astreata* (Lamarck,1816)	-	+	+	-	+	-	-	-	-	-	+
76.		*Galaxea cryptoramosa* (Veron, 2002)	-	-	-	-	-	-	-	-	-	-	+
77.		*Galaxea fascicularis* (Linnaeus,1767)	+	+	+	+	+	+	+	+	+	-	+
78.	Siderastrea	*Pseudosiderastrea tayami* (Yaba & Sugiyama,1935)	-	-	-	-	+	-	-	+	+	-	+
79.		*Psammocora digita* (Milne Edwards & Haime, 1851)	-	-	-	-	+	-	-	-	-	-	-
80.		*Psammocora contigua* (Esper, 1797)	+	-	+	-	+	-	+	+	-	+	+
81.	Agariciidae	*Pachyseris gemmae* (Nemenzo,1955)	+	+	-	+	+	+	-	+	-	-	+
82.		*Pachyseris speciosa* (Dana,1846)	+	+	-	-	+	-	-	+	+	+	+
83.		*Pachyseris rugosa* (Lamarck, 1801)	+	-	-	-	+	+	-	-	-	-	+
84.		*Pavona duerdeni* (Vaughan, 1907)	+	-	-	-	+	-	-	+	+	-	-
85.		*Pavona minuta* (Wells, 1954)	+	-	-	-	+	-	-	+	-	-	+
86.		*Pavona danai* (Milne Edwards & Haime, 1860)	-	-	-	-	-	-	-	-	-	+	-
87.	Fungiidae	*Ctenactis echinata* (Pallas,1766)	+	+	+	+	+	+	+	+	+	+	+
88.		*Ctenactis crassa* (Dana, 1846)	+	-	+	-	+	-	-	+	-	+	-
89.		*Diaseris distorta* (Michelin, 1843)	+	-	-	+	+	-	-	-	-	-	-
90.		*Cycloseris tenuis* (Dana, 1846)	-	-	-	-	+	-	-	-	-	-	-
91.		*Fungia danai (*Milne Edwards & Haime, 1851)	-	-	+	-	+	+	-	+	-	+	+
92.		*Fungia fungites* (Linnaeus, 1758)	-	-	-	+	+	+	+	+	-	+	+
93.		*Fungia paumotensis* (Stutchbury,1833)	-	+	-	+	+	-	-	+	+	+	+
94.		*Fungia concinna* (Verrill, 1864)	+	-	+	-	+	+	-	+	-	-	-
95.		*Fungia corona* (Doderlein, 1901)	+	-	-	+	+	-	-	+	-	-	-
96.		*Fungia scabra* (Doderlein, 1901)	-	+	-	+	+	-	+	-	+	-	-
97.		*Fungia spinosa*(Klunzinger, 1879)	+	-	-	-	-	+	-	-	-	-	-
98.		*Fungia granolusa* (Klunzinger, 1879)	-	-	+	+	+	-	-	-	-	-	-
99.		*Fungia klunzingeri* (Doderlein, 1901)	+	-	-	+	+	+	-	-	-	-	-
100.		*Fungia horrida* (Dana, 1846)	+	+	-	-	+	-	+	+	-	+	+
101.		*Fungia moluccensis* (Stutchbury, 1833)	-	-	-	-	+	-	-	-	-	-	-
102.		*Fungia repanda* (Dana, 1846)	-	-	+	-	-	+	+	-	-	+	-
103.		*Herpolitha limax* (Houttuyn, 1772)	-	-	+	+	+	-	-	+	-	-	+
104.		*Herpolitha weberi* (Horst, 1921)	-	-	-	-	+	-	-	-	-	-	-
105.		*Lithophyllon lobata* (Horst, 1921)	-	-	-	-	+	+	-	-	-	-	+

106.		*Lithophyllon undulatum* (Rehberg,1892)	-	-	-	-	+	+	-	+	-	-	+
107.	Merulinidae	*Hydnophora microconos* (Lamarck,1816)	+	+	+	+	+	-	+	+	+	+	+
108.		*Hydnophora grandis* (Gardiner, 1904)	+	-	-	-	+	+	-	+	-	+	+
109.		*Hydnophora exesa* (Pallas, 1766)	+	+	+	-	+	+	-	-	-	-	-
110.		*Hydnophora rigida* (Dana, 1816)	+	-	-	-	+	-	-	-	-	+	+
111.		*Merulina scabricula* (Dana, 1846)	-	-	-	+	+	+	-	+	-	-	+
112.		*Merulina ampliata* (Ellis & Solander, 1786)	+	-	+	+	+	+	-	+	+	-	+
113.	Mussidae	*Symphyllia radians* (Milne Edwards & Haime, 1849)	+	-	+	'	+	+	'	+	'	'	+
114.		*Symphyllia hassi* (Pillai and Scheer, 1776)	-	-	-	+	+	-	-	-	-	-	-
115.		*Symphyllia agaricia* (Milne Edwards and Haime, 1849)	-	-	-	-	+	+	-	-	-	+	+
116.		*Symphyllia valenciennsis* (Milne Edwards & Haime, 1849)	-	-	-	-	+	-	-	-	-	-	-
117.		*Symphyllia recta* (Dana, 1846)	+	+	+	+	+	+	+	+	+	+	+
118.		*Lobophyllia pachysepta* (Chevalier, 1975)	-	-	-	-	-	-	-	-	-	+	-
119.		*Lobophyllia hemprichi* (Ehrenberg, 1834)	-	-	+	+	+	+	+	+	+	+	+
120.	Faviidae	*Favia pallida* (Dana,1846)	+	+	+	+	+	+	+	+	+	-	+
121.		*Favia favus* (Forskal, 1775)	-	-	+	-	+	-	-	-	-	-	+
122.		*Favia maxima* (Veron and Pichon, 1977)	+	+	-	-	+	+	-	-	-	+	-
123.		*Favia lizardensis* (Veron and Pichon, 1977)	-	-	-	-	-	-	-	-	-	+	+
124.		*Favia matthaii* (Vaughan, 1918)	+	+	+	+	+	+	+	+	+	+	+
125.		*Leptastrea transversa* (Klunzinger, 1879)	-	-	-	-	-	-	-	-	-	-	+
126.		*Leptastrea purpurea* (Dana, 1846)	+	-	-	-	-	+	+	-	-	-	-
127.		*Favites abdita* (Ellis and Solander, 1786)	+	-	+	-	+	+	+	+	+	+	+
128.		*Favites pentagona* (Esper,1794)	-	-	+	-	+	+	-	+	+	+	+
129.		*Favites complanata* (Ehrenberg, 1834)	+	+	-	+	+	+	+	+	+	+	+
130.		*Favites halicora* (Ehrenberg, 1834)	+	+	+	+	+	+	+	+	+	+	+
131.		*Favites flexuosa* (Dana, 1846)	-	-	-	+	-	-	-	-	-	-	-
132.		*Barabattoi amicorum* (Milne Edwards and Haime, 1850)	-	-	-	-	-	-	-	-	-	-	+
133.		*Barabattoi laddi (Wells, 1954)*	-	-	-	-	-	+	-	-	-	-	-
134.		*Leptoria phrygia* (Ellis and Solander, 1786)	-	+	-	-	+	-	+	+	-	-	+
135.		*Leptoria irregularis* (Veron, 1990)	-	+	-	+	-	+	+	+	+	+	+

136.		*Platygyra pini* (Chevalier, 1975)	+	-	+	-	+	+	+	+	-	+	+
137.		*Platygyra verweyi* (Wijsmann-Best, 1976)	-	-	-	-	+	+	-	-	-	+	-
138.		*Platygyra daedaea* (Ellis and Solander, 1786)	-	-	-	-	-	-	-	-	-	-	+
139.		*Platygyra sinensis* (Milne Edwards and Haime, 1849)	-	-	-	-	+	+	-	+	-	-	+
140.		*Platygyra lamellina* (Ehrenberg, 1834)	+	+	+	+	+	+	+	+	-	+	+
141.		*Oulophyllia crispa* (Lamarck, 1816)	-	-	-	-	-	-	-	-	-	+	-
142.		*Diploastrea heliopora* (Lamarck, 1816)	-	-	-	-	+	+	-	+	+	+	-
143.		*Echinophora fruticulosa* (Ehrenberg, 1834)	-	-	-	-	-	+	-	+	-	+	-
144.		*Echinophora gemmacea* (Lamarck, 1816)	-	-	-	-	-	-	-	-	-	-	+
145.		*Echinophora lamellosa* (Esper, 1795)	+	-	+	-	+	-	-	-	-	-	+
146.		*Goniastrea australensis* (Milne Edwards and Haime, 1857)	-	-	-	-	-	+	-	-	-	-	+
147.		*Goniastrea retiformis* (Lamarck, 1816)	+	+	+	+	+	-	+	+	+	+	+
148.		*Goniastrea minuta* (Veron, 2000)	+	-	+	+	+	+	-	-	-	+	+
149.		*Goniastrea pectinata* (Ehrenberg, 1834)	-	-	-	-	+	-	-	-	-	-	-
150.		*Goniastrea edwardsi* (Chevalier,1971)	+	-	+	+	+	+	+	+	+	+	+
151.	Pectiniidae	*Pectinia laetuca* (Pallas, 1766)	+	-	-	-	+	-	-	+	-	-	+
152.		*Pectinia paeonia* (Dana, 1846)	+	-	-	+	-	-	-	-	-	+	+
153.		*Echinophyllia aspera* (Ellis and Solander, 1788)	-	-	-	-	-	+	-	-	-	+	+
154.		*Oxypora crassispinosa* (Nemenzo, 1979)	+	+	-	-	+	+	+	+	-	+	+
155.	Poritidae	*Porites solida* (Forskal, 1775)	+	+	+	+	-	+	+	+	+	+	+
156.		*Porites lobata* (Dana, 1846)	+	+	+	+	+	+	+	+	-	+	+
157.		*Porites lutea* (Milne Edwards & Haime, 1860)	+	-	-	-	+	-	+	-	-	-	+
158.		*Porites cylindrica* (Dana, 1846)	+	+	+	+	+	+	-	+	-	+	+
159.		*Porites annae* (Crossland, 1952)	-	-	-	+	+	-	+	+	-	-	-
160.		*Porites ankeli* (Scheer and Pillai, 1974)	-	-	-	-	+	-	-	-	-	-	-
161.		*Porites murrayensis* (Vaughan, 1918)	-	-	-	-	+	-	-	-	-	-	-
162.		*Porites rus* (Forskal, 1775)	+	+	+	-	-	+	-	+	-	+	+
163.		*Goniopora tenuidens* (Quelch, 1886)	-	-	-	-	+	+	-	-	-	-	+
164.		*Goniopora columna* (Dana, 1846)	-	-		-	+	+	-	-	-	-	-

165.	Euphyllidae	*Euphyllia glabrescens* (Chamisso & Eysenhardt, 1821)	+	-	+	-	+	+	-	+	-	-	+
166.		*Physogyra lichtensteini* (Milne Edwards & Haime, 1857)	+	-	-	-	-	-	-	-	-	-	-
167.	Dendrophylliidae	*Turbinaria stellulata* (Lamarck, 1816)	-	-	-	-	+	-	-	-	-	-	-
168.		*Tubastrea micranthus* (Ehrenberg, 1834)	-	-	-	-	+	-	-	-	-	-	-
Total Number of Individual Colony of Species			65	44	49	50	121	78	48	82	38	61	108
Shannon –Weaver Index ($\bar{H}$) of each Island			5.585	5.115	5.173	5.243	6.556	5.758	6.013	6.059	4.718	5.366	6.169

*Since Pi is the proportion of a given category, its maximum value is 1 and its minimum approaches 0. For any base, the log of 1 is 0 and the log of any value between 0 and 1 is a negative number. By reversing the sign, the index becomes positive and is easier to understand.

[PL-Sir William Peel, NCN- Nicolson, WN- Wilson, HNL- Henry Lawrence, HL- Havelock, OM-Outram, IN- Inglis, SB-South Button, SHR- Sir Hugh Rose, JNL- John Lawrence, NL- Neil]

Among them corals in Sir William Peel-65 species, Nicolson-44 species, Wilson-49 species, Henry Lawrence-50 species, Havelock-121 species, Outram-78 species, Inglis-48 species, South Button-82 species, Sir Hugh Rose- 38 species, John Lawrence- 61 species and, Neil- 108 species were noticed (Table-2). From the graphical presentation (Fig-2), it can be said that the highest number of species was observed in Havelock Island whereas Sir Hugh Rose Island reported less number of species.

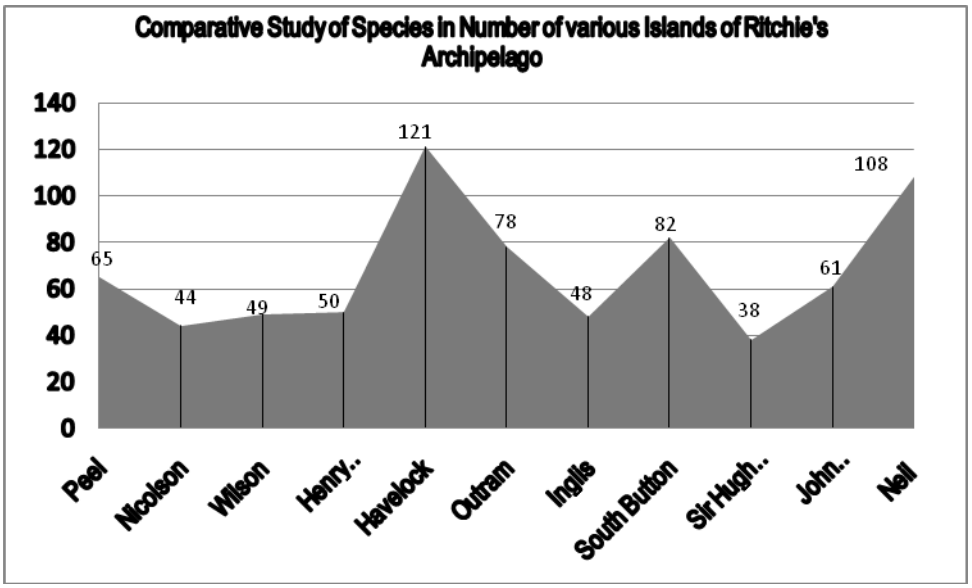

Fig 2 : Number of Species in Each Island

The species diversity (H') ranged from 4.178 to 6.556 in Sir Hugh Rose Island and Havelock Island respectively (Table-2). However moderately high values of species diversity was recorded in Sir William Peel-5.585, Nicholson- 5.115, Wilson- 5.173, Henry Lawrence- 5.243, Outram- 5.758, Inglis-6.013, South Button- 6.059, John Lawrence- 5.366 and Neil- 6.169 Islands (Fig-3).

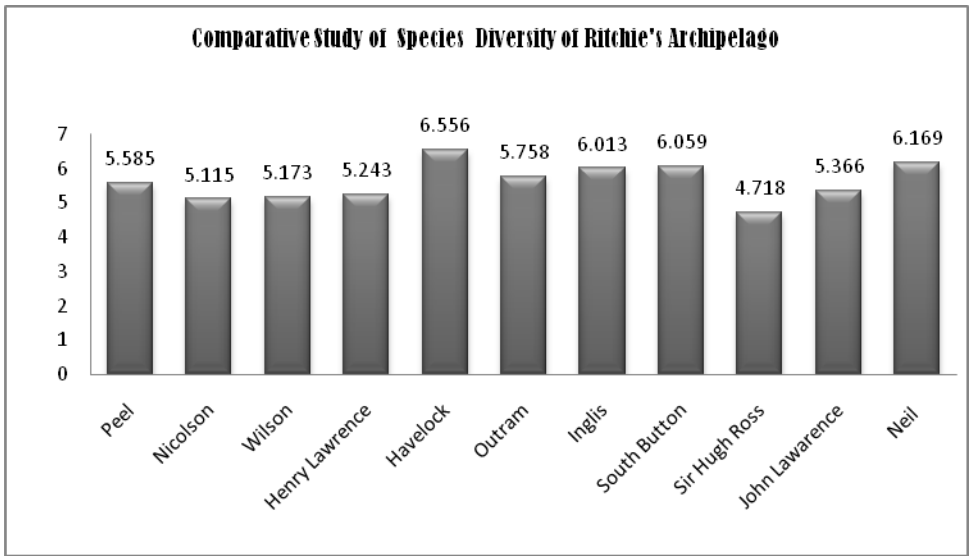

Fig 3 : Graphical Presentation of Species Diversity

Similarity Index (S) has been calculated between the islands and the values are depicted in Table-3. The maximum similarity index value (73.89%) was observed for between Havelock and South Button Island, and the lowest similarity index value (29.41%) was observed for significantly wide range of distribution of scleractinian corals between Havelock Island and Wilson Island (Fig-4). Most of the islands, the similarity index of scleractinian corals varied between 40 and 60%. Very few values are observed in between the range of 20-40% while moderately high similarity index values were observed with the range of 60-80%.

Table 3 : Species similarity index percentage between islands.

Name of Islands→ ↓	Nicolson	Wilson	Henry Lawrence	Havelock	Outram	Inglis	South Button	Sir Hugh Ross	John Lawrence	Neil
Peel	49.54	63.15	53.91	61.29	55.94	51.32	62.58	40.77	55.55	57.8
Nicolson		45.16	55.31	47.27	45.9	54.34	52.38	51.21	45.71	46.05
Wilson			54.54	29.41	50.39	47.42	56.48	48.27	52.72	52.22
Henry Lawrence				52.63	48.43	57.14	56.06	61.36	52.25	51.89
Havelock					62.31	49.7	73.89	41.5	50.54	35.8
Outram						56.03	67.5	44.82	57.36	62.36
Inglis							60	58.13	56.88	47.43
South Button								53.33	61.53	68.42
Sir Hugh Ross									52.52	47.94
John Lawrence										55.62

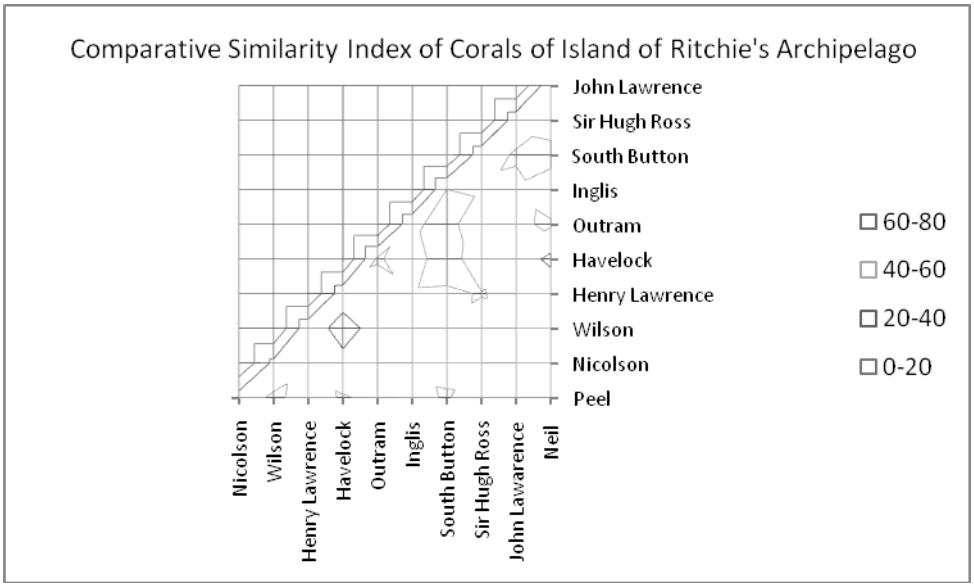

Figure 4 : Comparative Similarity Index of Scleractinian Corals according to Islands

IV. Discussion

The most species-rich marine communities probably occur on coral reefs, a habitat in which many groups of organisms reach their greatest diversity. The diversity of scleractinian corals with their comparative distribution are presented in this paper. Within the continuum of spatial scale three levels are often discussed to taxonomic diversity: within habitat (alpha), between habitat (beta), and regional (gamma) diversity [16, 17, 18]. Differences in taxonomic composition and diversity among regions can be explained in part by present day condition. Thus, habitat area clearly plays a role with about 85% of the world area of reefs lying in the Indo-Pacific, compared with only 15% in the Atlantic [19]. Beta diversity indicates the degree of difference in species composition between sites [16]. In this paper the degree of scleractinian coral diversity was made among the eleven islands of Ritchie's Archipelago to draw a quantitative analysis. Species may be poor competitors because of inherent traits such as small polyps, small size, and short life span, or because of local environmental constraints [20]. Previously no such documentation was made regarding this archipelago to state the scleractinian corals diversity. Only Rao & Sastry [21] showed a number of 50 scleractinian coral from three Button Island, i.e. North Button, Middle Button and South Button. However, the present study included only South Button Island among those three. Through the result of extensive survey it can be said that the Islands of Ritchie's Archipelago have diverse number of scleractinian corals species in its all the islands. This diverse coral species for any given ecosystem, a biodiversity inventory per se is important. Equally, if not more important, is to understand their role in ecosystem processes. Though the islands have various species diversity index value, the scleractinian diversity of those islands is very optimum or great in status. The maximum species diversity value is 6.556 and minimum value is 4.718. Each of the surveyed islands of Ritchie's Archipelago is the representative of saturated marine biodiversity areas with good scleractinian coral composition. Though the total number of individual species of scleractinian corals of Inglis Island is less than Peel, Wilson, Henry Lawrence, John Lawrence and Outram Islands, inspite of that the species diversity of corals is much more than the those islands [Inglis (6.013) > Peel (5.585), Wilson (5.173), Henry Lawrence (5.243), John Lawrence (5.366), Outram (5.758)]. The islands also have great deal of similarity in their species composition which can be seen through the result of similarity index. These islands are interlinked with each other in respect of scleractinian corals diversity from 29.41% to 73.89%. This similarity of scleractinian coral diversity is high in Havelock and South Button Islands, whereas lowest similarity of coral diversity was observed between Havelock and Wilson Islands. The environment characteristics of each study site account for some of the differences between sites in species composition. The characteristics of physical environment overshadow the influence of differences in biodiversity of the functioning of the coral reefs, as long as the representatives of each of the performers of key ecological roles are present. In order to conserve the coral reefs of Ritchie's Archipelago, an adequate awareness among societies are required which helps to protect marine biodiversity.

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Degree of Homogeneity of Plant Life in Tehsil Takht-E-Nasrati, Pakistan

By Musharaf Khan , Farrukh Hussain & Shahana Musharaf
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Abstract - The present investigation explains the homogeneity of plant life on the basis of frequency classes during 2009-2010 in Tehsil Takht-e-Nasrati, District Karak, Pakistan. The result shows that no homogeneity in the region among the phases and seasons. The value of frequency class is high (9) of class B and low in E (1) in phases 1 during spring season. In summer class C has high value (4.75) while it is low in A. (1). The value of class A is high (14.8) in winter. In phase 2 the class B has high value during spring (9.86) and summer (7.29) while the value of class A is high (8.86) in winter. In phase 3 and 4 the class B has high value throughout all season as compare to other classes. So the equation of homogeneity will be in phase 1; A < B > C > D > E., A < B < C > D < E., A < B < C < D > E.; in phase 2; A > B < C < D < E., A > B < C < D > E., A < B < C < D > E.; In Phase 3; A > B < C < D < E., A > B < C < D > E., A > B < C < D > E. and in Phase 4 ; A > B < C < D < E., A > B < C < D < E., A > B < C < D > E. in spring, summer and winter respectively. The heterogeneity of plant life shows that the area is under heavy biotic pressure owing to consumers and soil erosion.

Keywords : *Abundance distribution, Frequency classes, heterogeneity, Consumers, Takht-e-Nasrati.*

GJSFR-D Classification : *FOR Code: 060705*

Strictly as per the compliance and regulations of :

Degree of Homogeneity of Plant Life in Tehsil Takht-E-Nasrati, Pakistan

Musharaf Khan [α σ], Farrukh Hussain [α] & Shahana Musharaf [ρ]

Abstract - The present investigation explains the homogeneity of plant life on the basis of frequency classes during 2009-2010 in Tehsil Takht-e-Nasrati, District Karak, Pakistan. The result shows that no homogeneity in the region among the phases and seasons. The value of frequency class is high (9) of class B and low in E (1) in phases 1 during spring season. In summer class C has high value (4.75) while it is low in A. (1). The value of class A is high (14.8) in winter. In phase 2 the class B has high value during spring (9.86) and summer (7.29) while the value of class A is high (8.86) in winter. In phase 3 and 4 the class B has high value throughout all season as compare to other classes. So the equation of homogeneity will be in phase 1; A < B > C > D > E., A < B < C > D < E., A < B < C < D > E.; in phase 2; A > B < C < D < E., A > B < C < D > E., A < B < C < D > E.; In Phase 3; A > B < C < D < E., A > B < C < D > E., A > B < C < D > E. and in Phase 4 ; A > B < C < D < E., A > B < C < D < E., A > B < C < D > E. in spring, summer and winter respectively. The heterogeneity of plant life shows that the area is under heavy biotic pressure owing to consumers and soil erosion.

Keywords : Abundance distribution, Frequency classes, heterogeneity, Consumers, Takht-e-Nasrati.

I. Introduction

The homogeneity of community distribution presents precious information regarding development, competition and predation and life history of plant. It is accepted that human activities and man's way of life have altered the global cycles of plant life resulting in numerous environmental changes. Degree of homogeneity: Abundance distribution explains the presence of plant availability in area and different seasons. Raunkiærian (1934) postulated that mature homogeneous plant life could be documented by means of this model. Plants give the pattern on which communities and ecosystems are gathered and on which food webs are arranged. So, considerate the reasons that find out plant division and abundance is central for our perceptive of natural balance at large. Consumers, as key components of mainly ecology and constant representatives of plant spoil, include vast prospective to primarily change plant homogeneity. Different worker have done their effort in the field of ecology such as Stokes, et al., (2004); Rand, (2002); Behera & Roy (2005); Li et al., (2007); Gairola et al., (2008);Hussain & Durrani (2008); Santos et al., (2008); Zhu et al., (2010); Ahmad et al., (2010 & 2011); Khan et al., (2011); Shaheen et al., (2011). Consequently, the amplified levels of consumer may harm the ecosystem, and could affect the plant life of the region. As part of the necessary background to the detailed studies on the frequency classes of plant life in a Takht-e-Nasrati in Pakistan, this describes and compares the preliminary results on the background homogeneity levels of different community in different phase and seasons. In this study, particular attention was paid to the systematic characteristics of the frequency classes to determined homogeneity of plat life in the area. A little work was done on the area in different fields i.e. Khan, (2004 & 2007); Khan et al., (2011). No work was done on the homogeneity of the plant life in the research area. It is very unique method to determine the interaction of plant life with one another, consumers, biodiversity and conservation.

II. Material and Methods

a) Research Area

The Tehsil Takht-e- Nasrati is situated at 32.47o to 33.28o North and 70.30 o to 71.30o East. The research area is bounded by Tehsil Karak on the North East, District Mianwali on the East, District Lakki Marwat on the South West and Tribal area Adjoining District Bannu on the West (Fig.1). The total area of Tehsil is about 613.66 square Km. Majority of the area consists rigged dry hills and rough field areas i.e. 323.97 square Km. Agriculture land is about 289.7 square Km. The major income source of the area is agriculture, which is rain depended. Although the hills are dry residual exposes yet they contain precious minerals like coal, gypsum, uranium and gas etc. Takht-e- Nasrati is situated at 340 m above the sea level. The area is located in semi-arid climatic region, having hot summer and very cold winter. The rainfall is scanty and uncertain. Winter rains are generally of long duration and of low intensity. Summer monsoon rains are torrential in heavy shore intensity. In the year 2001 - 2010, 121.6 mm of rainfall per 10 year was recorded on District level (Table 1). June and July are the hottest months, where as December and January are the coldest months. In the year 2001 - 2010 the mean maximum temperature was 39.5 C o, in the month of the June, where as the mean minimum temperature was as low as 4.26 C o, in the month of January, recorded on District level (Table. 1).

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The climate and weathers are also influenced by wind. In hottest months especially June swivel winds are developed on the plain area an after noon due to local heating and convectional uprising. Sometimes strong, dry and hot winds with huge dust enter the area from different sides (Khan et al., 2011).

Table 1 : Climatic data of Tehsil Takht-e-Nasrati for the year 2001-2010

Months	Temperature (C°)		Humidity (%)		Rainfall (mm)	Soil Temperature (C°) Average	Wind speed (Km Per Hour)
	Max	Min	Max	Min			
January	19.18	4.26	75.80	35.24	27.43	7.03	2.9
February	21.69	7.29	77.39	42.23	37.72	9.14	3.2
March	28.20	12.06	75.38	35.23	37.17	13.89	3.5
April	34.74	17.94	66.12	29.42	36.54	19.02	5.2
May	38.32	22.33	59.66	30.73	31.6	21.87	5.4
June	39.50	25.9	59.96	32.89	74.24	25.78	5.5
July	38.44	25.76	73.33	38.76	121.6	26.77	5.2
August	36.66	25.29	75.68	42.61	108.3	26.37	4.1
September	35.47	21.95	77.21	39.29	61.58	23.49	3.7
October	32.33	16.79	71.55	35.51	15.13	20.09	3.5
November	26.71	10.01	71.56	36.66	5.80	14.10	3.2
December	21.93	5.67	75.20	35.90	15.38	8.96	3.1
Mean	31.1	16.27	71.57	36.21	47.71	18.04	4.04

III. Experimental Protocol

a) Collection and Identification of plants

Four distinct microhabitats such as Phase 1, Phase 2, Phase 3 and Phase 4 at altitude of 340-399 m., 400-499 m., 500-599 m. and 600-700 m. were described respectively based on physiognomic features. The study was conducted by frequently surveying in winter, spring and summer during 2009 to 2010. Plants species were collected, preferably in duplicate or triplicate form. They were pressed, dried, preserved and mounted on herbarium sheets for identification. Plants were identified with the help of available literature and voucher specimens have been deposited in herbarium, Department of Botany, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.

b) Quadrats Methods

Based on species area curve, the suitable size of the quardrat for trees, shrubs and herbs were determined, which were 10X10m, 5X5m and 1X1m respectively. Combinations of systematic and random quadrats were used as it gives better results. Thus, at lower altitude quadrats were laid systematically while in hilly sites they were laid randomly. The distances between the two adjacent stands were approximately 100 meters.

c) Degree of Homogeneity

The degree of homogeneity in vegetation was determined by classifying plants into various frequency classes by applying Raunkiaerian (1934) law of frequency as follows:

Table 2 : Raunkiaerian (1934) law of frequency classes

Frequency Class	Range
1	01-20
2	21-40
3	41-60
4	61-80
5	81-100

The normal distribution of the frequency percentage derived from such classification is expressed as A>B>C=D<E. and this has been termed as Raunkiaer's law of frequency.

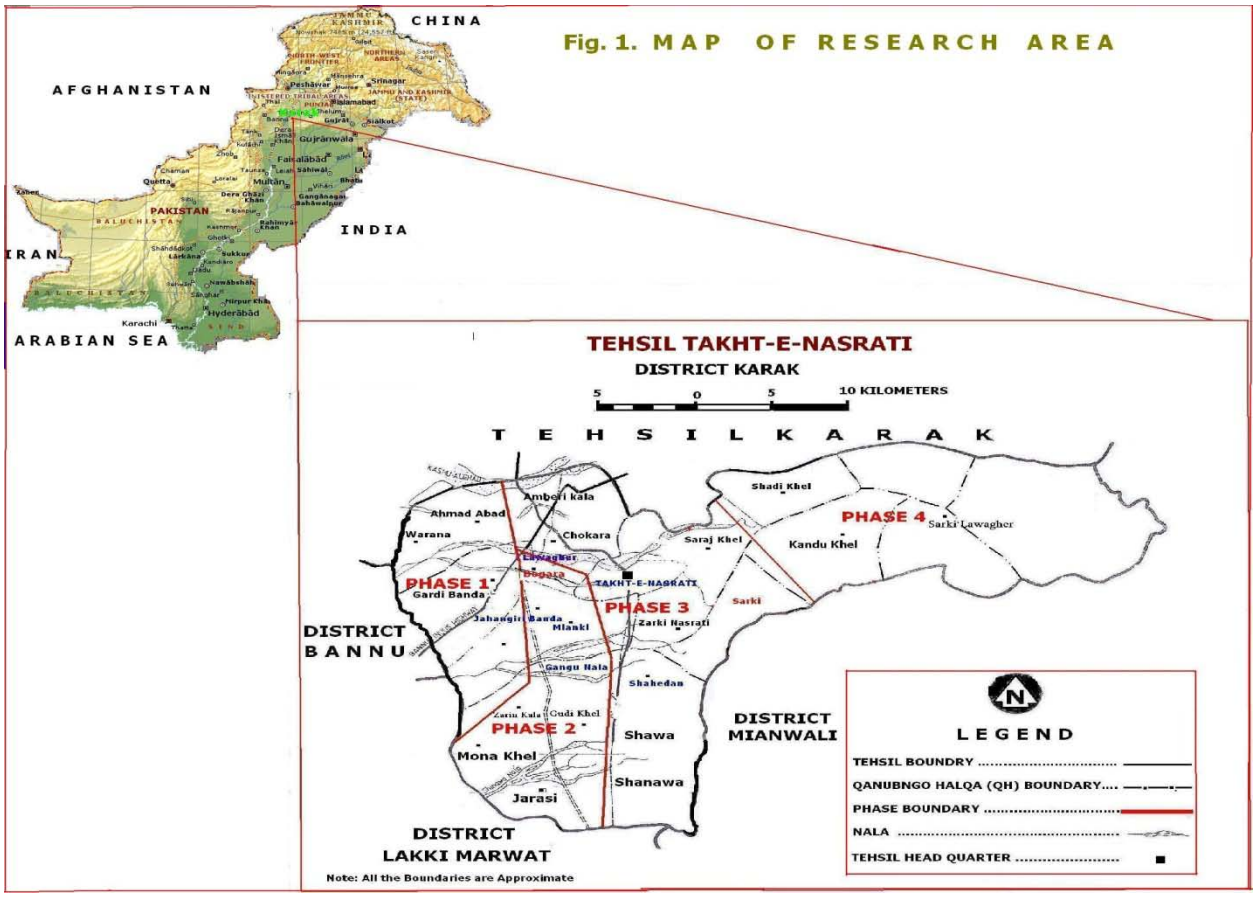


Fig. 1 : Map of Tehsil Takht-e-Nasrati

d) Frequency

It is a percentage of sampling plots in which a given species occurs. The frequency was measured in each stand for each specimen through following formula.

$$F = \frac{NQ}{TQ}$$

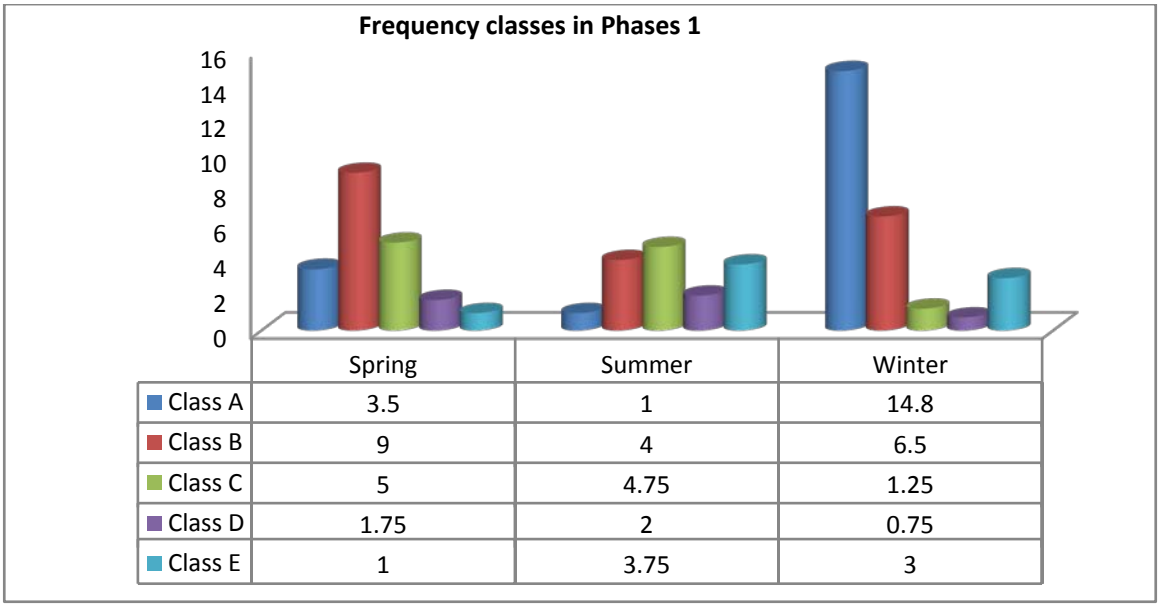
F=Frequency

NQ=Number of quadrats in which a species occur

TQ= Total number of quadrats

IV. Result and Discussion

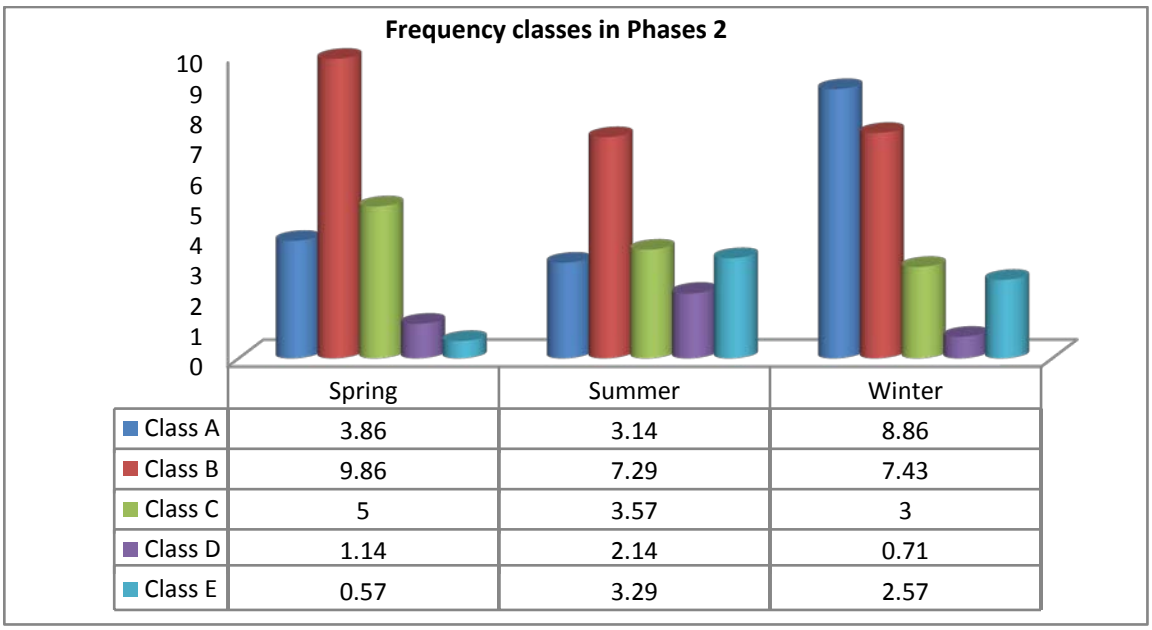
In phases 1 the value is high of class B and low in E as compare to other classes in spring so the equation of homogeneity will be A < B > C > D > E. In summer class C has high value while it is low in A; A < B < C > D < E. The value of class A is high in winter so equation takes form as A < B < C < D > E. (Fig.2). Our result is similar only in winter with that of Raunkiærian (1934) law of frequency. It means that in winter the plant become mature and the grazing and herbivory become low due farming. While in other seasons the grazing rate and herbivory is very high. The mean value showed that the area is under biotic pressure i.e. grazing and uprooting of plants species in the area. The area is rain depended and high grazing pressure so the plant availability also affected (Khan et al., 2011).



	Spring	Summer	Winter
Class A	3.5	1	14.8
Class B	9	4	6.5
Class C	5	4.75	1.25
Class D	1.75	2	0.75
Class E	1	3.75	3

Fig. 2 : Frequency classes in phase 1

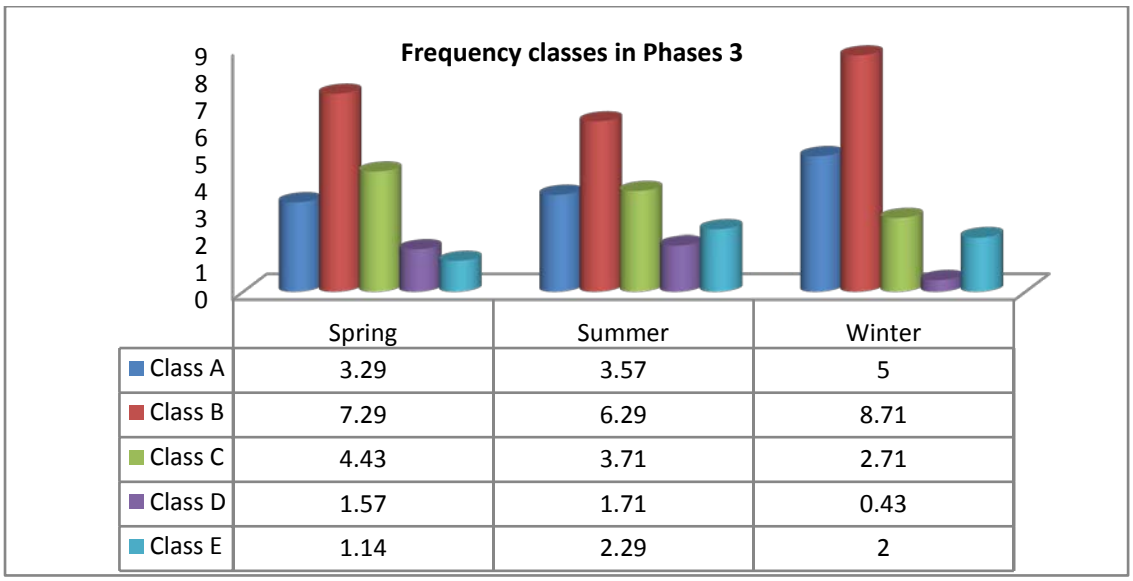
In phase 2 the class B has high value (9.86, 7.29) in spring and summer while the value of class A is high (8.86) in winter. Therefore, following equations may be derived A > B < C < D < E, A > B < C < D > E and A < B < C < D > E in spring, summer and winter respectively (Fig.3). In phase 2, the winter value is similar with that of Raunkiærian (1934) law of frequency while other values are different. The area is sandy, therefore, the plant grow in the area have more low frequency class in winter due to cultivation and stopping of grazing in the area. People used plant for fuel and for food in spring and summer. Therefore, the plant appearance became low as compare to winter. Our result is similar with that of Khan et al., (2011).



	Spring	Summer	Winter
Class A	3.86	3.14	8.86
Class B	9.86	7.29	7.43
Class C	5	3.57	3
Class D	1.14	2.14	0.71
Class E	0.57	3.29	2.57

Fig. 3 : Frequency classes in phase 2

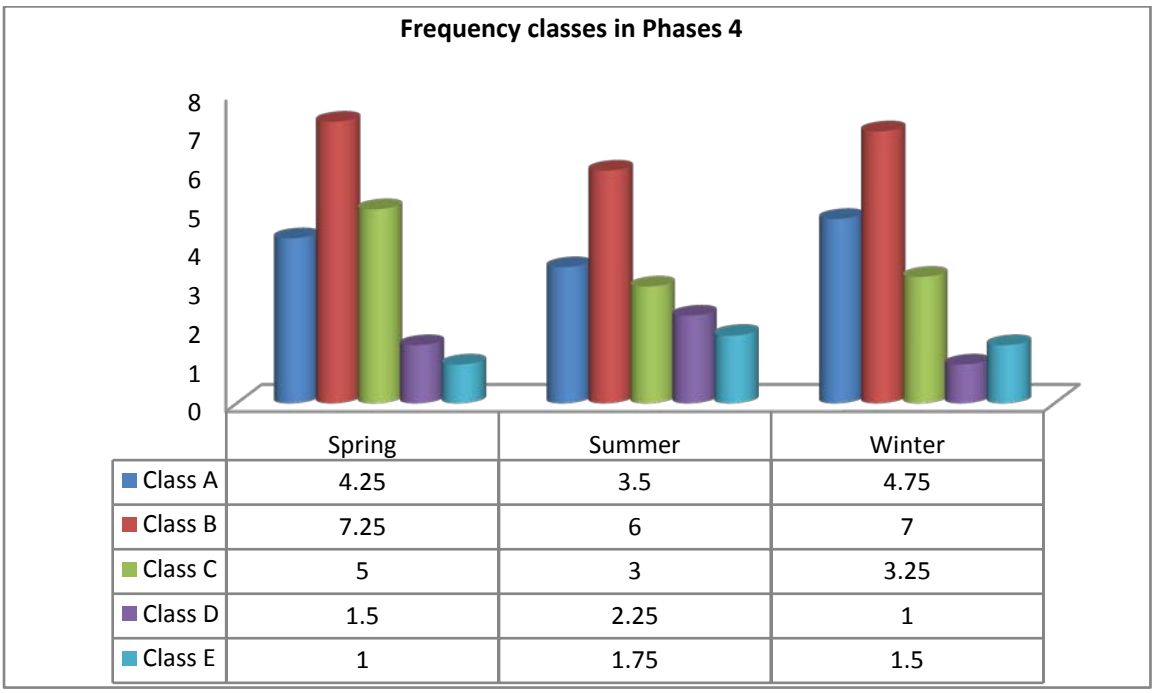
In phase 3 the class B has high value in all season as compare to other classes so following equations are obtain in spring, summer and winter A > B < C < D < E, A > B < C < D > E and A > B < C < D > E respectively (Fig.4). In this phase all equations are different from Raunkiærian (1934) law of frequency. The area is composed of hilly area and people used them as natural grass lands. Therefore, the frequency class of B is more than A. The consumer feeds plants with roots while in summer they also some time eat a nonpalatable plant due to unavailability of plant. The area is unprotected so the people also cut plants for fuel purposes and for economy view point.



	Spring	Summer	Winter
Class A	3.29	3.57	5
Class B	7.29	6.29	8.71
Class C	4.43	3.71	2.71
Class D	1.57	1.71	0.43
Class E	1.14	2.29	2

Fig. 4 : Frequency classes in phase 3

The value of class B is high in all seasons in phase 4. The equation derived for spring, summer and winter are A > B < C < D < E, A > B < C < D < E and A > B < C < D > E respectively (Fig.5). The people of the area are very poor. Therefore, most of the people depend on plant species. The equations of the frequency classes are similar with that of Raunkiærian (1934) law of frequency because the area is also under biotic pressure. On hills the plant are either absent or present with small quantity because hills are composed of sand and wind and water bring upper superficial portion with plants from these hills.



	Spring	Summer	Winter
Class A	4.25	3.5	4.75
Class B	7.25	6	7
Class C	5	3	3.25
Class D	1.5	2.25	1
Class E	1	1.75	1.5

Fig. 5 : Frequency classes in phase 4

Comparison between plain and hilly area, it was found that the distribution of plant rate was high in plain area. There seems no homogeneity in both areas. The low rate of frequency classes in hilly area, it means that plant variety was less due to the considering them as a natural grass land and consumer lost variety of palatable plant species in the area. The area is under heavy biotic pressure (Khan et al., 2011). The distribution of plant species are also affected with area position.

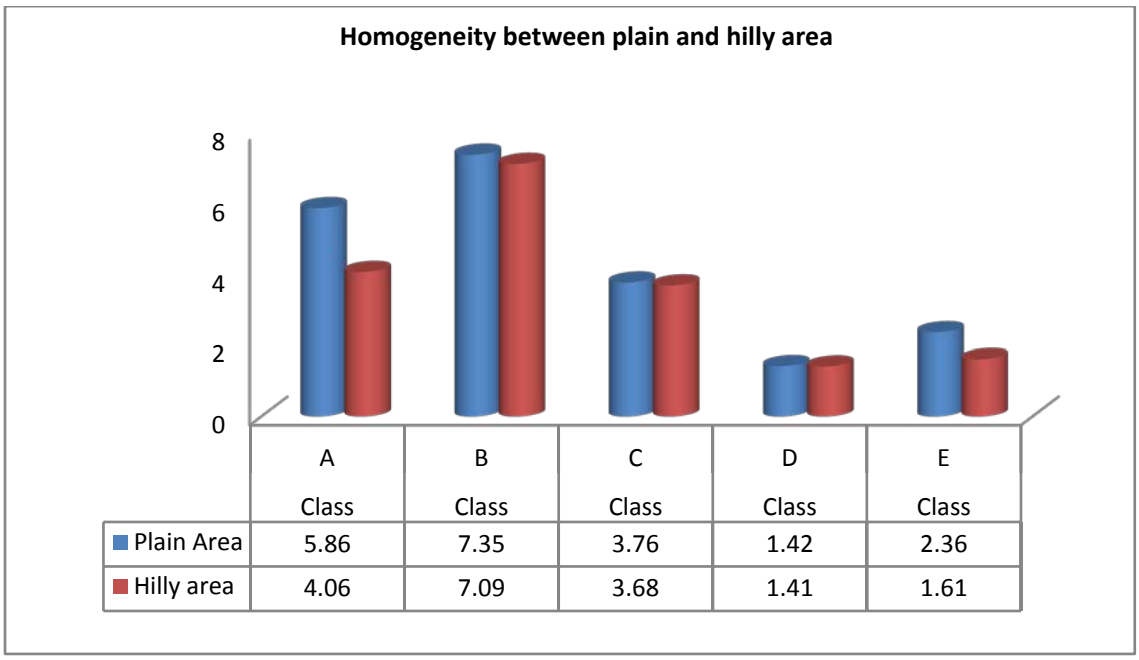


Fig. 6 : Homogeneity between plain and hilly area

In plain and hilly area, the highest value was found 7.35 and 7.09 in class B respectively while in hilly area the value was found 7.09. Frequency class's distribution is crucial and an important machination of plant life study and analysis of a species population structure. Comparison of community succession of frequency classes provides data on conscription, development, transience and plant life in the area. Frequency distribution of a plant species normally is the size of the present individuals from which all supposition about population dynamics should be consequential. Homogeneity of a plant life with respect to a frequency classes in an area is a necessary prerequisite for reliable determination. Sample homogeneity is of particular importance in communities and plant life analysis. Homogeneity (or the distribution of a particular plant life) of a region can easily be determined by law of frequency classes.

On soil having high Nitrogen content are found Malva neglecta, Chenopodium album etc, as occurring near human dueling, on compost heaps and in back yards. The most important factors disturbing the Flora of area are light, temperature, humidity, soil conditions, topography, elevation from sea level, rain fall and other forms of precipitation (Khan, 2004 and Khan et al., 2011). The medicinal plants like Withania coagulans, Aloe vera and Peganum hermala are very common in the area. The fruit of Zizyphus spp is transported to other parts of the country. Mostly of the Xerophytes such as Temarix aphylla, Calotropis procera, Zizyphus spp. and Acacia nilotica are found on road sides while Capparis decidua and Salvadora oleoides are commonly found in Grave-yards Aloe vera is also very common in Grave-yards (Khan et al., 2011).

Fig.7 : View of Southern Bogara vegetation

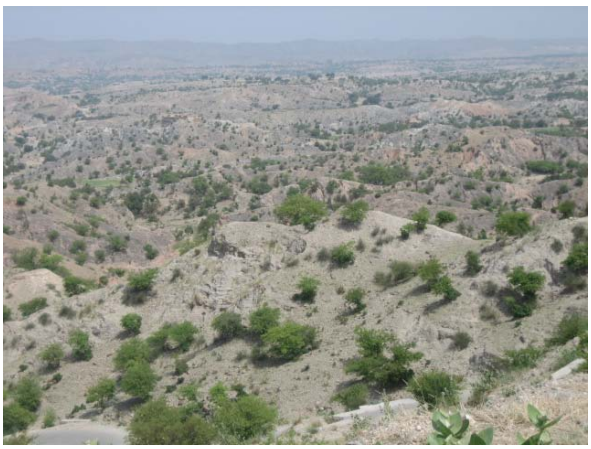


Fig.8 : View of Shadi Khel vegetation

Fig. 9 : View of Kandu Khel vegetation

Fig. 10 : Consumer pressure on hilly area

Fig. 11 : View of Shadi Khel vegetation

Fig. 12 : View of Warana vegetation

Fig.13 : View of Ahmad Abad vegetation

Fig. 14 : View of protected area

Fig.15 : Soil erosion through water

Fig.16 : View of Amberi Kala Vegetation

Fig.17 : View of Takhte Nasrati vegetation

Fig. 18 : Cutting and view of Saraj Khel vegetation

V. Conclusion

The range of homogeneity helps us skillfully in evaluating the biodiversity and conservation of entire habitat and plant life. This study pointed out that the climatic environment of region has privileged conscription of area and the frequency was changed with the change of seasons and altitude. Plant ecologists have commonly been conscious that vegetation show a discrepancy over a broad variety of particular scales and area and have build up methods for studying the degree of vegetation deviation.

VI. Acknowledgment

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Perceptions of Environmental Effects of Pesticides Use in Vegetable Production by Farmers in Ogbomoso, Nigeria

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Abstract - Farmers' pest management practices, awareness and their perception about the effects of pesticides' use on the environment were discussed in this study. Data were collected from the vegetable farmers who operate along the banks of the rivers, streams and dams at the outskirts of the city. A purposive sampling technique was used to collect data from 128 vegetable farmers who use pesticides in vegetable production. Interview schedule was used to obtain data from the farmers. Frequency, means, percentages were used to describe the data and Chi – square was employed to test the relationships between some selected farmers' characteristics and their perception. Findings revealed that a wide variety of pesticides were used by the farmers. A high level of awareness on the risks associated with the use of pesticides was found among the respondents. However, majority (85%) of the farmers did not use protective clothes when applying pesticides. Farmers showed favourable attitudes about the risk of pesticide usage. Farmers' age, education and contacts with extension agent had positive and significant associations with perceived effects of pesticides use on the environment. The intensification of extension services to educate farmers on safe use of pesticides in vegetable production is recommended.

Keywords : *Pesticides; vegetable farmers; perception; safe use; environment.*

GJSFR-D Classification : *FOR Code: 070306, 059999*

Strictly as per the compliance and regulations of :

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I. Introduction

Vegetable farmers use a wide range of pesticides at different levels to reduce losses from pests and diseases. However, despite the contribution of pesticides to agricultural production, evidences in the last few decades have shown that they could also be detrimental to human health and the ecosystem (Tadesse and Asferachew, 2008).

Pesticides have substantially contributed to the controlling of pests and increasing crop yields in meeting the food demand of escalating population and control of vector-borne diseases. Exposure to pesticides is one of the most important occupational risks among farmers in developing countries (Konradsen et al., 2003; Coronado et al. 2004). One of the major factors of pesticide contamination or poisoning in developing countries is the unsafe use or misuse of pesticides. Past research have identified elements of unsafe use of pesticides as; lack of attention to safety precautions, environmental hazards, and information about first aid and antidotes given by the label, the use of faulty and proper maintenance of spraying equipment, and lack of the use of protective gear and appropriate clothing during handling of pesticides (Damalas et al., 2006 Ajayi and Akinnifesi, 2008; Sosan and Akingbohungbe, 2009).

In view of the adverse environmental effects from the unsafe pesticide use, lack of awareness of the adverse health consequences of pesticides by some farmers; it therefore becomes imperative to identify farmers' pest management practices in vegetable cultivation by investigating farmers' awareness and perceptions about the effects of pesticides use on the environment.

II. Objectives

The general objective of the study is to assess the pesticide management practices and perception of environmental effects of pesticides among vegetable farmers in Ogbomso, Oyo state. The specific objectives are to:

(i) identify pesticide utilization practices of the farmers in the study area

(ii) examine farmers' perception of environmental effects of the pesticides

(iii) determine the relationship between farmers' perception and their socio-economic characteristics

III. Methodology

Ogbomoso is a big city in Oyo state and is made up of two local Government Areas (LGAs) namely: Ogbomoso north and Ogbomoso south. The study area is located within longitude 8^0 07'N and latitude 4^0 14' E with a mean annual temperature of 26 ^{0}C, lowest temperature 24.3 ^{0}C while the highest temperature 28.7 ^{0}C. Mean annual rainfall is 1,247 mm, long wet in middle March – July, heavy rain and high humidity period, short dry in August and short wet between September and October.

Vegetables produced in Ogbomoso include leafy vegetables such as amaranthus, spinach, cochorus, okra, tomatoes, and pepper among others. The two LGAs were purposively selected for the study because of the intensive cultivation of dry season

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vegetables along the banks of the rivers and streams both within and outskirts of the city. Four leading vegetables like *amaranthus* spp; *celosia* spp; okra and *Corchorus olitorius* commonly produced in dry seasons were selected for detailed investigation. .Two groups of vegetable farmers from each of the two LGAs who applied pesticides to their crops were purposively selected. A list registered vegetable farmers obtained from the Oyo State Agricultural Development Programme (OYSADEP) was used to randomly select 128 farmers for the study. Interview schedule and questionnaires were used to obtain information on the extent of use of pesticides, farmers' knowledge of pesticides, and their perceptions about the pesticides' effects on the environment.

IV. Results and Discussion

The mean age of the farmers was 46.5 years with majority (54.7%) within age range of 46- 55 years. Most of the farmers had one form of education or another with majority (60.2%) having primary education. Ninety - three percent of the farmers were males while 7% were females. Majority (67.2%) of the farmers had been farming between the periods of 16 – 25 years with mean of 23.4 years. The mean farm size of the farmers was 1.6 ha. and 77.3% of the farmers inherited the farm lands on which they cultivate. Seventy – seven percent of the respondents had contact with the extension agents while 38.8% indicated non-contact with extension agent. The pesticides commonly used by the farmers were identified as Apron plus (93.8%) followed by Sevin used by 80.5% of the farmers. Other pesticides were Cypermethrin (73.4%), atrazine (19.5%), fusillade (59.4%)primextra (51.6%) and thiodan (19.5%). This is an indication that pesticides play an important role in the control of pests and increasing crop yields (Mahantesh, 2009). Sixty - two percent of the farmers used pesticides to control weeds while majority (81.3%) of the vegetable farmers used pesticides to control insects and most (93.8%) farmers used pesticides for fungi and mould control. Only 6.3% used pesticides to control rodents. This implies that farmers cultivating vegetables in the study area used pesticides at different levels. Farmers' perception of pesticides' effects on the environment include, soil destruction (54.7%), harming beneficial insects (28.1%); decrease biodiversity (61.7%) and contribute to air pollution (48.1%). About 70% of the farmers were of the opinion that pesticides pollute streams, rivers and wells while majority (80.5%) perceived that harmful side effects of pesticides on non-target animals, birds and earthworms. The study revealed that vegetable cultivating farmers in the study area were aware of various issues related to misuse of pesticides. About 74% of the farmers were aware of using banned pesticides as misuse while 85% of them had knowledge of pesticides misuse as failure to wear protective devices. Storage of pesticides in family bedroom is another misuse indicated by 26.6% of the farmers while the majority (96.1%) regarded improper disposal of pesticides containers as a misuse. The use of pesticides containers for domestic purposes was regarded as a misuse by 40.6% of the farmers and 61.7% were aware that using outdoor pesticides for household door pests. Almost 90% of the farmers had knowledge of using leaking equipment as misuse of pesticides and only 35.3% of the farmers indicated re – entry into the sprayed field as a misuse (Table 3). This high level of knowledge about pesticides' hazards which the end users of pesticides have is important for the prevention of acute poisoning (Hong Zhang, 2007).

Results in table 4 reveal that the vegetable farmers were favourably disposed toward the risk of pesticides usage to the environment. This could be seen in their level of agreement with most of the items used to measure their attitude toward the risks posed to the environment by pesticides. This favourable attitude is likely to make them more responsive to training on proper management regarding public health risks and environmental hazards.

Chi-square results show that age variable had significant association with farmers' perception. This means that old farmers are likely to perceive the environmental hazards of pesticides than the young farmers due to accumulated knowledge and experience of farming systems (Bonabana, 2002). Education also had significant influence on farmers' perception. This might be due to the ability of the literate farmers to read and follow the instructions on pesticides containers. Understanding such instructions might prevent them from misuse of pesticides such as, mixing of pesticides near different water bodies and improper disposal of pesticides containers. Farming experience was also found to have significant influence on farmers' perception. The reason for this may be due to the information on pesticides hazards which the experienced farmers might have gathered in the past years. However household size had no significant relationship with farmers' perception. A plausible reason for this may be that women and children were not involved in the sprayed activities due to their physiological vulnerability. Extension contact also had significant influence on farmers' perception and this may be due the information received from the extension agents on the environmental effects of pesticides.

V. Conclusion

The study clearly shows that farmers in the study area were quite aware of the risks associated with use of pesticides and its effects on the environment. Hence, their favourable attitude towards the risks of pesticides usage. The significant influence of extension contact on farmers' perception is indicative that extension systems must be strengthened to increase farmers' knowledge and understanding the effects of pesticides on the environment.

Table 1 : Distribution of Respondents According to Personal Characteristics n = 128

Characteristics	**Frequency**	**Percentage**
Age (Years)		
25 – 35	18	14.1
36 – 45	30	23.4
46 – 55	70	54.7
> 55	10	7.8
Total	**128**	**100**
Education		
No formal education	16	12.5
Adult Education	31	24.2
Primary education	77	60.2
Secondary education	4	3.1
Total	**128**	**100**
Sex		
Male	119	93.0
Female	9	7.0
Total	**128**	**100**
Farming experience (years)		
5 – 15	24	18.7
16 – 25	86	67.2
26 – 35	12	9.4
> 35	6	4.7
Total	**128**	**100**
Farm size (Ha)	**Frequency**	**Percentage**
0.5 –2	116	90.6
2.5 – 4	8	6.3
> 4	4	3.1
Total	**128**	**100**
Land ownership status		
Inheritance	99	77.3
Leasehold	19	14.9
Rent	10	7.8
Total	**128**	**100**

Contact with Extension Agent		
Contact	98	76.6
Non-contact	30	23.4
Total	**128**	**100**

Pesticides used by farmers in the study area n = 128

Pesticides used by farmers	*Frequency	Percentage
Apron plus	120	93.8
Atrazine	25	19.5
cypermethrin	94	73.4
Sevin	103	80.5
Thiodan	25	19.5
Fusilade	76	59.4
Primextra	66	51.6

** Multiple responses*

Pesticides practices of farmers n = 128

Purpose of pesticides application	*Frequency	Percentage
Weed control	62	48.4
Insect pest control	104	81.3
Rodent control	8	6.3
Fungi/mould control	120	93.8

** Multiple responses*

Farmers' perception of pesticides effects on the environment n = 128

Items	*Frequency	Percentage
Destroy soil by reducing its quality	70	54.7
Harming beneficial insects (bees)	36	28.1
Decrease biodiversity	79	61.7
Contribute to air pollution	77	48.1
Pollute streams, rivers & wells.	89	69.5
Harmful side effects on non-target organisms (birds, animals earthworms).	103	80.5

** Multiple responses*

Farmers' knowledge about misuse of pesticides n = 128

Items	*Frequency	Percentage
Using of banned agricultural pesticides	95	74.2
Failure to wear protective clothes/equipment	109	85.2
Storage of pesticides in family bedroom	34	26.6
Improper disposal of pesticides containers	123	96.1
Using pesticides containers for domestic purposes	52	40.6
Use outdoor pesticides for household door pests	79	61.7
Use of leaking equipment	115	89.8
Re – entry into the sprayed field	49	35.3

** Multiple responses*

Table 4 : Attitude of respondents towards the risk of pesticide usage n = 128

Statement	Means	Standard deviation
Pesticides will not only reach the target organisms but will also kill other organisms (e.g. beneficial insects, birds, earthworms, fish) in or around the crop fields	4.38	0.889
Pesticides cause loss of biodiversity, deaths of wild life, and death of farm animals.	3.70	0.999
Soil, air and water bodies can easily be contaminated with these poisonous chemicals.	4.19	0.801
The unavoidable destruction of beneficial insects and spiders interferes with natural pest control.	3.15	.878
Pesticides usage causes resurgence of pest population after removing natural enemies.	4.37	.904
Farmers' exposure to pesticides can cause dizziness, reduce coordination and ability to think.	4.11	.806
Natural resources can be degraded when water runoff enter streams or leach into groundwater.	3.55	.895
Pesticides residue in food could not result in death	4. 12	1.062
A major factor of pesticide contamination or poisoning is not the unsafe use or misuse of pesticides	2.67	1.124
Spraying for weeds during the hottest part of the day when herbicide drift or volatilization can damage other garden plants, including our neighbour's.	3.64	1.379

Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree = 2, Strongly Disagree = 1. Any mean score ≤ 3 suggests disagreement with the it em statement. Any mean score ≥ 3 suggests agreement with the item statement.

Results of Chi-square showing associations between farmers' perception and the selected farmers' characteristics N = 128

Variable	X^2- value	df	p - value	Decision
Age	72.734	28	.003	Significant
Education	54.906	5	.000	Significant
Farming experience	131.641	28	.000	Significant
Household size	64.578	16	.104	Non-significant
Contact with extension agent	81.344	21	.000	Significant

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21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. **Think technically:** Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be

sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page

- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to

shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.
- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic

principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.

- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

Administration Rules Listed Before Submitting Your Research Paper to Global Journals Inc. (US)

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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