European Journal of Agriculture and Forestry Research
Vol.4, No.2, pp.24-37, May 2016
Published by European Centre for Research Training and Development UK (www.eajournals.org)

DETERMINATION OF THE EFFECT OF AGRO-INPUTS UTILIZATION ON YIELD AND INCOME OF COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT RICE FARMERS IN CROSS RIVER STATE, NIGERIA

Bassey, Jimmy Ijogu

Department of Agricultural Extension and Rural Sociology, University of Calabar, Nigeria

ABSTRACT: *This study determined the effect of agro-inputs utilization on yield and income of community-based Natural Resource Management Programme (CBNRMP) Rice Farmers in Cross River State, Nigeria. The specific objectives of the study were to: assess the socio-economic characteristics of rice farmers under CBNRMP, identify the agro-inputs made available to rice farmers through their service providers, etc. Data were obtained from primary and secondary sources for the purpose of this study. The results revealed that 70% of the respondents were males, 40% of the respondents were within the age range of 41-51years. Majority (90%) of the respondents were married, 85% of the respondents have formal education and majority of the respondents belong to farmers' cooperatives. The t-test analysis of the effects of agro-inputs utilization on yield and income of CBNRMP rice farmers were significant. Increased government supports for mobilization of rice farmers for participation and sustained provision of agro-inputs were therefore recommended.*

KEYWORDS: Agro-Inputs, Utilization, Yield, Income

INTRODUCTION

For over a decade, there have been wise spread violence and youth disturbances in the Niger Delta Region of Nigeria. The Niger Delta is the richest part of Nigeria in terms of natural resource; the area has large oil and gas deposits as well as extensive forests, good agricultural land and abundant fish resources. Despite the tremendous natural and human resource base, the regions potential for sustainable development remains unfulfilled and its future has been threatened by environmental degradation and deteriorating economic conditions that have not been adequately addressed (Adesope, 2000; Ismail, 1994). As a result, poverty is widespread in the Niger Delta States and there is a very high degree of household food insecurity among the rural population.

The implication of all these is that the Niger Delta region needs serious attention to meet up with the development challenges in the country (Njemanze, 2000). According to Meshack-Hart (1999) the development of the Niger Delta have been so watered down that they remained almost at the bottom of the ladder of development in Nigeria.

The Nigerian Government awareness of the Niger Delta plight requested all the oil companies to develop agriculture within area of their concession. Consequently, oil companies, well aware of local development needs and aspirations have promoted throughout the years, projects aimed at the socio-economic well-being and also at protecting the environment of the region (Ogunlade, Oladele and Ogunsola, 2009). The Shell Petroleum Development Company (SPDC) after an appraisal of the situation of the host communities provided agricultural extension services to farmers in its areas of operation.

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

The main thrust of the agricultural extension services is to empower farmers towards sustainable agricultural development (Omagbeni, 1998). The host rural communities of shell in Rivers, Bayelsa, Imo, Abia, Akwa Ibom and Cross River State have benefited from SPDC programmes of health, education, rural water supply, electricity, agriculture, women and youth development. The women and youth through this programme are trained on different vocational skills acquisition programme (Ogunlade, Oladele and Ogunsola, 2009). Other Oil Companies such as Chevron, Texaco, Nigerian Agip Oil Company (NAOC), etc. are equally involved in development initiatives aimed at promoting the wellbeing of local communities. The major aim of these programmes by these oil companies is for improvement in the standard of living of the rural poor of the Niger Delta area.

The Federal Government of Nigeria in a bid to overcome the high level of youths restiveness in Niger Delta Region established the Community-based Natural Resource Management Programme (CBNRMP) in partnership with International Fund for Agricultural Development (IFAD) with benefiting states providing counterpart funding. The IFAD/FGN/ Community-based Natural Resource Management Programme was established in 2005 and was implemented in nine (9) states that constitute the Niger Delta region. The Niger Delta States are Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers States (IFAD/FGN/CBNRMP, 2005). In Cross River State CBNRMP started in 2007.

The aim of the Community-based Natural Resource Management Programme is to improve the livelihoods and living conditions of the communities in the Niger Delta States by supporting a range of activities that will strengthen the capacity of the poor to plan, implement and manage their own development as well as institutionalize policies and processes that will make public resources and service providers more relevant and responsive to the poor (IFAD/FGN/CBNRMP, 2005).

CBNRMP was proposed to run for eight years with programme year 1 and 2 devoted to capacity building and training. Two years extension was granted from 2014 to 2016. In Cross River State the progrmame is expected to improve the living condition of at least 45,000 rural poor in the state. The programmes was implemented using two basic components namely; institutional strengthening involving capacity building/training, linkages at Community, Local Government, State and Federal levels and Community Development intervention which has three sub-components namely, small-scale rural infrastructural development, sustainable livelihoods development and natural resource management. Under the programme a total of 230hectares of swamp rice farms were brought under cultivating using FARO 44, FARO 52, FARO 57 and Nerica 4, etc rice varieties. According to Agricultural Production Survey (APs) report of 2009, Cross River State is home to 66,350hectares of Fadama flood plains suitable for swamp rice production.

Statement of Problem

Interest in the development of Nigeria Delta region is not new, there is growing concern, as the problems of rural under-development are increasing even in the face of efforts to develop rural areas in Cross River State, thus, causing the gap between rural-urban to continue to widen (Ebong, 2006). Despite, the numerous agencies in Cross River State embarking on agricultural extension services on agronomic practices aim at improving the yield and income of rice farmers, they do not seem to have yielded desirable results as the rural population remains poor, malnourished and still faced with low rice productivity. However, Ekpo, 2004, observed that

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

any rural agricultural activities that can sustain improvement in the standard of living of the rural dwellers through increases in output and incomes will reduce rural misery.

Objectives of the Study

The main objective of this study was to determine the effect of agro-inputs utilization on the yield and income of Community-based Natural Resource Management Rice Farmers in Cross River, Nigeria. The specific objectives are to: assess the socio-economic characteristics of rice farmers under CBNRMP, identify the agro-inputs made available to rice farmers through their service providers, analyze the effect of agro-inputs utilization on yield of rice farmers, and analyze the effect of agro-inputs utilization on income of CBNRMP rice farmers.

The study is propelled by the desire to determine the effect of agro-inputs utilization on the yield and income of rice farmers under CBNRMP. Apart from adding to the existing literature on agro-inputs utilization by rice farmers in Cross River State and the country as a whole, it will help policy makers to determine the effectiveness of extension services of CBNRMP with a view to redirecting and reinforcing agricultural projects for Niger Delta region for optimal performance. In order to achieve the analysis of the objectives on yield and income, there were hypothesized as follows:

HO: There is no significant difference between rice yield of beneficiaries and non-beneficiaries of CBNRMP.

HO: There is no significant difference between the income of beneficiaries and non-beneficiaries of CBNRMP.

LITERATURE/THEORETICAL UNDERPINNING

IFAD/FGN/Community- based Natural Resource Management Programme is demand driven where the beneficiaries are at the driver's seat. However, rice farmer's participation and adoption of CBNRMP agro-inputs package involve agro-inputs regime based on agronomic practices. According to Ekong (2008), apart from the individual's intrinsic inertia, the major factor that affects the adoption of any new production package (innovation) is the characteristics of the innovation itself. These characteristics include relative advantage, cost, complexity, visibility, divisibility and compatibility.

Innovation refers to an idea, practice, object, agric production package, or fact perceived as new by an individual (Signh and Mishra, 2007). Agwu, (2004), stated that a farmer is more inclined to accept (and participate in) a recommended practice if the practice is profitable by brining good return to investment, has relevance for his labour use, community values and crop situation. Other factors that influence adoption of agricultural production package are farm size, value of the farm products, farming experience and availability of farm credit (Bose, et al., 2012).

METHODOLOGY

The study was carried out in Cross River State, one of the Niger Delta States. It is made up of 18 Local Government Areas divided into three Agricultural Zones namely, Calabar Ikom and

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

Ogoja. . According to the National Population Census conducted in 2006, the state has an estimated population of 2,888,966 persons (National Population Commission, 2006). The state is bounded in the North by Benue State, in the South by Akwa Ibom State and the Atlantic Ocean, in the East by Cameroon Republic, West by Ebonyi and Abia States. Cross River State lies within longitude $7^0 50^1$ and 28^1 east of the Meridian and Latitude of $5^0 32^1$ and $4^0 27^1$, North of the equator (Cross River State Ministry of Lands and Surveys, (2010).

The State is characterized by two distinctive seasons – the dry which last from November to the middle of April and the wet which starts from the middle of April to October. The state is endowed with abundant Fadama flood plains suitable for swamp rice cultivation and dry season farming especially of vegetables. Other crops grown in the study area include yams, cassava, cocoyam, maize, rice, vegetable, citrus, bush mango, oil palm, cocoa, etc. Livestock such as poultry, sheep, goat, etc are kept in all the rural communities which survive by scavenging around the homestead and nearby bush (Bassey, 2016).

A two stage sampling method was adopted for this study. A total of 115 rice farmers participated in the programme. This constitutes the population of study. Stage one, simple random technique was used to select 60 participating rice farmers from the list of beneficiaries compiled by Cross River State Project office of IFAD/FGN/NDDC community-based Natural Resource Management Programme. Stage two, simple random sampling technique was also used to select 60 rice farmers that are yet to benefit from the CBNRMP agro-inputs package. Data for this study were obtained from primary and secondary sources. The primary data were obtained through the use of an interview schedule. Secondary data were obtained from published reports. The structured interview schedules were use as a guide for soliciting responses from the 120 rice farmers.

Method of Data Analysis

Descriptive statistical tools such as mean, frequency and percentages were adopted to formulate descriptive analyses for socio-economic data and agro-inputs made available to rice farmer through their service providers. Apart from the use of descriptive statistics, the study employed t-test statistics because of its suitability and applicability in assessing effects by comparing responses from beneficiaries and non-beneficiaries of the programme. The model is stated as:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S^2_1}{n_1} + \frac{S^2_2}{n_2}}}$$

$n_1 + n_2 - 2$ = degree of freedom

where

t = t – test statistic

$\bar{X}_1$ = Mean value of rice famers beneficiaries of CBNRMP

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

$\overline{X}_2$ = Mean value of rice farmers non-beneficiaries of CBNRMP

S_1^2 = Variance of beneficiaries

S_2^2 = Variance of non-beneficiaries

n_1 = sample size of beneficiaries

n_2 = sample size of non-beneficiaries

RESULTS/FINDINGS

The section gives the highlight of research outcomes covering the socio-economic variables of the respondents, agro-inputs made available to respondents, effects of agro-inputs utilization on yield of rice farmers as well as effects of agro-inputs utilization on income of rice farmers in the study area.

Socio- economic Characteristics of Respondents

The socio-economic profiles of the respondents are presented in Table 1. Table 1 reveals that 70% of the respondents were males, while only 30% were females. This shows that men dominate rice cultivation in the study area. Table 1 further show that 40% of the respondents were within the age range of 41-50% years, while 26.66% were between 31-40 years, 24.17% were within the age range 51-60years and 9.17% were between 21-30 years. With respect to marital status, 90% were married, while 10% were single as at the time of data collection.

Table 1 also depicts the distribution of respondents based on household size. It shows that 33.33% of the respondents have household size of 11-15 persons, 31.67% have 6-10 persons , 17.50% have 1-5 persons, 9.17% have 16-20 persons while , 8.33% have 21persons and above. Eighty-two percent had different levels of formal education. Members of farmers' cooperatives accounted for 40%, 34.17% are members of age groups, 16.66 % are members of social clubs, while 9.17% are members of market unions. The findings further indicate the distribution of respondent with respect to their nature of rice farming. That is whether they are full time rice farmers or combine rice farming with other jobs. It reveals that 82.50% of the respondents were part time rice farmers, while 17.50% were full time rice farmers.

Table 1: Socio-economic Characteristics of Respondent

Variable	Frequency	Percentage (%)
Gender		
Male	84	70.00
Female	36	30.00
Total	**120**	**100**
Age (Years		
21-30	11	9.17
31-40	32	26.66
41-50	48	40.00
51-60	29	24.17
Total	**120**	**100**
Marital Status		
Single	12	10.00

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

Married	108	90.00
Total	**120**	**100**
Household size		
1-5	21	17.50
6-10	38	31.67
11-15	40	33.33
16-20	11	9.17
21 and above	10	8.33
Total	**120**	**100**
Level of Education		
Informal	18	15.00
Primary school	58	48.33
Secondary school	30	25.00
Tertiary school	14	11.67
Total	**120**	**100**
Membership of local organizations		
Farmers' cooperatives	48	40.00
Social clubs	20	16.66
Market unions	11	9.17
Age groups	41	34.17
Total	**120**	**100**
Nature of Rice Farming		
Part time	99	82.50
Full time	21	17.50
Total	**120**	**100**

Source: Field survey, 2014

Agro-Inputs Made Available to Respondents.

Benefiting rice farmers under CBNRMP have access and utilization of agro-inputs through service providers who are agro-inputs dealers. However, rice farmers that are non-beneficiaries can as well accessed their agro-inputs from open market or through agro-inputs dealers. Table 2 reveals that 40% of the respondents accessed and utilized Faro 44 rice variety as their planting material, 25.83% are planting SIPPI rice variety, 24.17% were using Faro 52 as planting material, while 5.83% and 4.17% were cultivating rice using FARO 57 and Nerica 4 respectively. Also, Table 2 shows that 50% of respondents are the beneficiaries of CBNRMP accessed and utilized herbicides (Glyphosate and Orizo-plus), while the non-beneficiaries were unable to accessed and utilized the glyphosate and orizo-plus (pre-emergence and Post-emergence herbicides respectively. The same pattern of responses were recorded for fertilizers access and utilization as 50% of the respondents which constitute the beneficiaries of CBNRMP accessed N.P.K (15: 15:15) and Urea fertilizers.

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

Table 2: Agro-Inputs Made Available to Respondents

Variable	Frequency	Percentage
Improved seeds		
Faro 44	48	40.00
Faro 57	7	5.83
SIPPI	31	25.83
Faro 52	29	24.17
Nerica 4	5	4.17
Total	**120**	**100**
Herbicides		
Glyphosate	60	50.00
Orizo-plus	60	50.00
Total	**120**	**100**
Insecticides		
Cypermethrin	60	100
Fungicides	0	0.00
Total	60	100
Fertilizers		
N.P.K (15:15:15)	60	50.00
Urea	60	50.00
Total	**120**	**100**

Source: Field Survey, 2014.

Effect of Agro-inputs Utilization on Yield of CBNRMP Rice Farmers

The level of significance of the mean yield diversity was tested by applying t-test statistics and the result presented in Table 3. Table 3 reveals that, the mean yield of beneficiaries of CBNRMP was 6.0 with variance of 2.39, while that of non-beneficiaries was 3.31 with variance of 2.13. Table 3 reveals t-calculated value of 9.61 greater than the table value or critical value of 1.645. Therefore, reject the hypothesis of no significant variation in the rice yield between beneficiaries and non-beneficiaries of CBNRMP.

Table 3: Result of T-test Analysis of Effect of Agro-inputs Utilization on Rice Farmers Yield

Variable	n	$\bar{X}$	S^2	t-cal
Beneficiaries of CBNRMP	60	6.0	2.39	9.61
Non-beneficiaries of CBNRMP	60	3.31	2.13	

df = 118, Critical t-value = 1.645 at 0.05 level of significance.

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

Effects of Agro-Inputs Utilization on Income of CBNRMP Rice Farmers

Table 4 reveals that the mean income of beneficiaries of CBNRMP was three hundred and ninety thousand, eight hundred and forty naira (₦390,840.00), while that of non-beneficiaries was two hundred and fifteen thousand, three hundred and ninety-nine naira (₦215,399). The t-calculated value was 9.87 far greater than the table or critical value of 1.645 at 0.05level of significance. Therefore, the hypothesis of no significant variation in mean income between beneficiaries and non-beneficiaries was rejected.

Table 4: Result of T-test Analysis of Effects of Agro-Inputs Utilization on Rice Farmers Income.

Variable	n	$\bar{X}$	S^2	t-cal
Beneficiaries of CBNRMP	60	390,840	9,931,953,558	9.87
Non-beneficiaries of CBNRMP	60	215,399	9,040,346,458	

df = 118, Critical t-value = 1.645 at 0.05 level of significance.

DISCUSSION

The result of the assessment of socio-economic variables indicates that the majority of the respondents (70%) were males. This shows that men dominate rice cultivation in the study area. It also shows that the majority (40%) of the respondents fell within the age range of 41-50years. This forms the cream of the productive work force. Also, the assessment of the socio-economic variables shows that majority (90%) were married. With respect to household size,, 33.33% constituting majority have household size of 11-15 persons. The household size of 11-15persons has some implication on the amount of labour available to the household for agricultural activities.

Eighty-five percent of the respondents have formal education. The inference from this is that, educational attainment is expected to affect positively the productivity of farmers as educated rice farmers are more likely to adopt modern agricultural practices (Binswanger, 1989). The socio-economic variables distribution also shows that majority of the respondents are members of local organizations with preference for farmers' cooperatives and age groups. Also, some of the respondents are members of social clubs which are semi-formal in nature. This observation collaborate the findings of Okali, Enoch and Olawoye (2001) in the study of rural urban interaction in Southeastern part of Nigeria. They observed that social groups that enhance both economic and social relationship which exist in Urban centres are now found in rural areas, but not as formalizes as those in the urban centres. The implication of this observation is the important role of social groups in rural transformation in the rural areas and all the beneficiaries and non-beneficiaries selected for this study are members of rural communities in Cross River State.

Assessment of the socio-economic variables further shows the distribution of respondents based on their type of rice farming. It reveals that 82.50% of respondents were part-time rice farmers combining rice farming with other jobs or source of revenue.

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

Agro-inputs made available to the beneficiaries are improved seeds, Faro 44 which accounted for majority (40%). This is because Faro 44 has high market demand, in response to the market demand rice farmers have preference for Faro 44. Based on the respondent's response, non-beneficiaries have no access to adequate supply of herbicides as under their traditional method; herbicides application is not given serious attention. This was equally the case in fertilizers utilization. Under CBNRMP fertilizers utilization has a package based on the recommended rate per hectare. The t-test analysis of the effects of agro-inputs utilization on the yield and income of rice farmers revealed a significant variation in the mean yield and income between beneficiaries and non-beneficiaries. This implies that agro-inputs utilization as a package under CBNRMP impact on the yield and income of beneficiaries.

IMPLICATION TO RESEARCH AND PRACTICE

Apart from adding to the existing literature on agro-inputs utilization and development of the rice value chain in Cross River State and the country as a whole, analysis of the effect of agro-inputs utilization by rice farmers will help policy makers to determine the most effective approach and utilization of agro-inputs. The study is relevant in this period as efforts are being geared toward the development of rice value by the Federal Government of Nigeria. Also, there are plans to put a partial ban on rice importation into the country, Nigeria. Therefore, any research outcomes that will contribute to the development of rice value chain and by so doing enhance rice farmers capacity to produced more, is a welcome development.

There is a deliberate arrangement to bring the outcome of this research to the door steps of rice farmers given enabling environment and partnerships. Farmers that want to make it big in rice farming will be mobilize to take advantage of this research outcome.

CONCLUSION

The main objective of this study was to determine the effect of agro-inputs utilization on yield and income of Community-based Natural Resource Management Rice Farmers in Cross River State, Nigeria. Assessment of socio-economic variables reveals that 70% of respondents are males, 40% are within the age range of 41-50years, majority are married which accounted for 90%, 33.33% of respondents have household size of 11-15 persons. Majority (85%) have formal education. Respondents have preference for membership of local organizations such as farmers, cooperative, while some belong to age groups and social clubs. Also, the study revealed that rice cultivation is majorly part-time by rice farmers.

Beneficiaries of CBNRMP have access and utilization of improved rice seeds (FARO 44) as 40% accounted for this. Herbicides utilization consisting of glyphosate and orizo-plus are accessed as a packaged by beneficiaries, also, insecticides and fertilizers. Non-beneficiaries have difficulty in accessing herbicides, insecticides and fertilizers in the recommended rate per hectare, hence, poor utilization leading to low yield and income of non-beneficiaries.

T-test analysis of the effects of agro-inputs utilization on yield and income of rice farmers reveals t-calculated values of 9.61 and 9.87 respectively, greater than their tabulated or critical values. Meaning that, agro-inputs utilization increased the yield and income of beneficiaries. Therefore, adequate agro-inputs utilization by rice farmers be promoted as to enhance their productivity. Is further recommended that, government should ensure the availability of supporting farm equipment that can enhance rice farmers capacity to produce more, subsequent

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

and on-going agricultural programme relating to rice value chain, adequate mobilization/ sensitization be made for optimal participation by rice farmers. More women be given serious attention for participation in order to maintain gender balance. This is because when you empowered a man you have succeeded in empowering one person. However, empowering a women mean empowering the family.

Future research

Several factors may be responsible for some rice farmers not participating in CBNRMP and therefore need to be investigated. Also, there is need for future research to look into the area of dominance of males in CBNRMP, this is necessary as to encourage more females' participation in government intervention programmes. This will lead to determination of the influence of socio-economic characteristics on participation and utilization of rice agro-inputs by rice farmers in the state and the country as a whole. It will also be necessary for future research to investigate other technological packages that are introduced alongside the agro-inputs utilization package.

REFERENCES

Adesope, M. O. (2000). Youth restiveness in the Niger Delta and implication for rural development. The case of Odi Local Government Area of Bayelsa State, Nigeria. *Journal of Technology and Education in Nigeria,* 5 (11), 16-18.

Agricultural Production Survey, (2009). *Fadama Plains in Nigeria.* FMARD, Abuja, Nigeria, pp. 12-20.

Agwu, A. E. (2004).Factors Influencing Adoption of Improved Cowpea Production Technologies in Nigeria. *Journal of International Agricultural and Extension Education.* 11 (1), 81-88.

Bassey, J. I. (2016). Analysis of Impact of rural electrification on agro-based and non-agro based enterprises in riverside rural communities in Cross River State. *International Journal of Innovative Research and Development,* 5 (5), 267-276.

Binswanger, H. P. (1989). *Brazilian Policies that encourage deforestation of the Amazon environment Government Development Working paper 16.* The World Bank, Washington, D. C.

Bose, A. A., Abdu, Z., Idi, S. and Adlu, F. (2012). An assessment of Agricultural Technology Packages Adoption Among Farmers in Hawal L.G.A. Borno State, Nigeria. *Savannah Journal of Agriculture* 7 (1), 93-102.

Cross River State Ministry of Lands and Surveys (2010). *Cross River State Geographical Information System.* Government Press, Calabar, Nigeria, pp. 5-18

Ebong, M. O.(2006).*Mobilization of resources for rural development in Nigeria*. Ma Bass Publishers, Calabar, Nigeria, pp. 45-59.

Ekong, E. E. (2008). *An Introduction to Rural Sociology*. Dove Educational Publishers, Uyo, Nigeria, pp. 257-284.

Ekpo, A. H. (2006). The dialectics of rural development: Theory and evidence. *In Mobilization of resources for rural development in Nigeria* (Ed,. Ebong, M. O.) Wusen Press, Calabar, Nigeria, pp. 34-48.

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

International Fund for Agricultural Development/Federal Government of Nigeria/ Nigeria Community-based Natural Resource Management Programme (2005). *Working Paper 1*. FMARD , Abuja, Nigeria, pp. 2-18.

Ismail, A. H. (1994). Capital limitations, environmental movements might interfere with expansion plans. *Oil and Gas Journal*, May, pp. 60-68.

Meshack-Hart, E. E. (1999). The Panacea for Niger Delta Palaver. *Ibani Herald* 4 (10), 5.

National Population Commission (2006). *List of Nigerians States by Landmass and Population density.* National Population Commission, Abuja, Nigeria, pp. 25-68.

Njemanze, C. (2000) Killing the golden goose. *The Comet*, 1(292), 7-9.

Ogunlade, I., Oladele, O. I. and Ogunsola, M. B.(2009).Impact of Green River Project on livelihood of farmers in River State, Nigeria. *Journal Hum. Ecol*, 26 (2), 81-84.

Okali, D., Enoch, O. and Olawoye, J. E. (2001).*The case of Aba and its regions, South Eastern Nigeria Rural-Urban interaction and livelihoods strategies*. International Institute for Environment and Development,. London, pp. 65-86.

Omagbemi, O. (1998), Private sector involvement in extension: The Shell Petroleum Development Company of Nigeria. Proceedings of the 4th Annual Conference of Agricultural Extension Society of Nigeria. Ilorin, pp. 94-97.

Singh, B. B. and Mishra, O. P. (2007). *Diffusion and Adoption of Agricultural Innovations.* Willey and Sons, New York, pp 5-9.

APPENDIX

Field Data on Yield and Income Rice Beneficiaries of CBNRMP in Abi L.G.A, Cross River State, Nigeria

	Yield (MT)			Income (₦)		
S/N	X_1	$X_1 - \overline{X_1}$	$(X_r\overline{X_1})2$	X_1	$X_1 - \overline{X_1}$	$(X_1 - \overline{X_1})^2$
1	4.10	-1.9	-3.61	260,000	-130,840	-17,119,105,600
2	5.00	-1	-1	325,000	-65,840	-4,334,905,600
3	6.10	0.1	0.01	396,500	5,660	32,035,600
4	4.00	-2	-4	260,000	-130,840	-17,119,105,600
5	5.00	-1	-1	325,000	-65,840	-4,334,905,600
6	4.40	-1.6	-2.56	286,000	-104,840	-10,991,425,600
7	8.00	2	4	520,000	129,160	16,682,305,600
8	7.20	1.20	1.44	468,000	77,160	5,953,665,600
9	6.00	0	0	390,000	-840.00	-705,600
10	8.30	2.3	5.30	539,500	148,660	22,099,795,600
11	4.20	-1.3	3.24	273,000	-117,840	13,886,265,600
12	5.00	-1	-1	325,000	-65,840	-4,334,905,600
13	5.00	-1	-1	325,000	-65,840	-4,334,905,600
14	6.00	0	0	390,000	-840.00	-705,600
15	8.00	2	4	520,000	129,160	16,682,305,600
16	4.00	-2	-4	260,000	-130,840	-17,119,105,600
17	6.00	0	0	390,000	-840.00	-705,600
18	5.00	-1	-1	325,000	-65,840	-4,334,905,600
19	4.00	-2	-4	260,000	-130,840	-17,119,105,600
20	6.00	0	0	390,000	-840.00	-705,600
21	8.00	2	4	520,000	129,160	16,682,305,600
22	8.00	2	4	520,000	129,160	16,682,305,600

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

23	8.00	2	4	520,000	129,160	16,682,305,600
24	6.00	0	0	390,000	-840.00	-705,600
25	8.00	2	4	520,000	129,160	16,682,305,600
26	8.00	2	4	520,000	129,160	16,682,305,600
27	4.00	-2	-4	260,000	-130,840	-17,119,105,600
28	6.00	0	0	390,000	-840.00	-705,600
29	4.00	-2	-4	260,000	-130,840	-17,119,105,600
30	5.00	-1	-1	325,000	-65,840	-4,334,905,600
31	6.01	0.01	0.000	390,650	-190.00	-36,100
32	5.10	-0.9	0.81	331,500	-59,340	-3,521,235,600
33	7.00	1	1	455,000	64,160	4,116,505,600
34	3.40	-2.6	-6.76	221,000	-169,840	-28,845,605,600
35	6.00	0	0	390,000	-840.00	-705,600
36	5.00	-1	-1	325,000	-65,840	-4,334,905,600
37	8.10	2.1	4.41	526,500	135,660	18,403,635,600
38	4.00	-2	-4	260,000	-130,840	-17,119,105,600
39	6.00	0	0	390,000	-840.00	-705,600
40	9.00	3	9	585,000	194,160	37,698,105,600
41	5.20	-0.8	-0.64	338,000	-52,840	-2,792,065,600
42	4.40	-1.6	-2.54	286,000	-104,840	-10,991,425,600
43	5.00	-1	-1	325,000	-65,840	4,334,905,600
44	6.00	0	0	390,000	-840.00	-705,600
45	8.01	2.01	4.0	520,650	129,810	16,850,636,100
46	5.02	-0.98	-0.96	326,300	-64,540	-4,165,411,600
47	5.04	-0.96	-0.90	327,600	-63,240	-3,999,297,600
48	6.00	0	0	390,000	-840.00	-705,600
49	6.00	0	0	390,000	-840.00	-705,600
50	8.00	2	4	520,000	129,160	16,682,305,600
51	7.10	1.1	1.21	461,500	70,660	4,992,835,600
52	8.00	2	4	520,000	129,160	16,682,305,600
53	9.01	3.01	9.10	585,650	195,810	38,341,556,100
54	4.04	-1.96	-3.84	262,600	-128,240	-16,445,497,600
55	4.00	-2	-4	260,000	-130,840	-17,119,105,600
56	5.00	-1	-1	325,000	-65,840	-4,334,905,600
57	6.10	0.1	0.01	396,500	5.660	32,035,600
58	7.00	1	1	455,000	64,160	4,116,505,600
59	8.00	2	4	520,000	129,160	16,682,305,600
60	8.04	2.04	4.2	522,600	131,760	17,360,697,600
	X=6.0		143.54	390,840		595,917,213,500

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

Field Data on Yield and Income of Non-beneficiaries of CBNRMP in Abi L.G.A, Cross River State, Nigeria

S/N	Yield (MT) X_1	$X_1 - X_1$	$(X_rX_1)2$	Income (₦) X_1	$X_1 - X_1$	$(X_1 - X_1)^2$
1	3.50	0.19	0.036	227,500	12,101	146,434,201
2	2.80	-0.51	-0.26	182,000	-33,399	-1,115,493,201
3	2.00	-1.31	-1.72	130,000	-85,399	-7,292,989,201
4	4.00	0.69	0.48	260,000	44,601	1,989,249,201
5	3.20	-0.11	-0.012	208,000	-7,399	-54,745,201
6	3.40	0.09	0.0081	221,000	5,601	31,371,201
7	2.01	-1.3	-1.69	130,650	-84,749	-7,182,393,001
8	2.40	-0.91	-0.83	156,000	-59,399	-3,528,241,201
9	2.00	-1.31	-1.72	130,000	-85,399	-7,292,989,201
10	6.00	2.69	7.24	390,000	147,601	30,485,509,201
11	8.00	4.69	22.00	520,000	304,601	92,781,769,201
12	3.10	-0.21	-0.044	201,500	-13,899	-193,182,201
13	3.00	-0.31	-0.096	195,000	-20,399	-416,119,201
14	2.00	-1.31	-1.72	130,000	-85,399	-7,292,989,201
15	2.40	-0.91	0.83	156,000	-59,399	-3,528,241,201
16	2.50	-0.81	-0.66	162,500	-52,899	-2,798,304,201
17	5.00	1.69	2.86	325,000	109,601	12,012,379,201
18	4.01	0.7	0.49	260,650	45,251	2,047,653,001
19	4.20	0.89	0.79	273,000	57,601	3,317,895,201
20	2.80	-0.51	-0.26	182,000	-33,399	-1,115,493,201
21	3.10	-0.21	-0.044	201,500	-13,899	-193,182,201
22	2.60	-0.71	-0.50	169,000	-46,399	-2,152,867,201
23	2.42	-0.89	-0.79	157,300	-58,099	-3,375,493,801
24	2.80	-0.51	-0.26	182,000	-33,399	-1,115,493,201
25	3.00	-0.31	-0.096	195,000	-20,399	-416,119,201
26	3.00	-0.31	-0.096	195,000	-20,399	-416,119,201
27	4.00	0.69	0.48	260,000	44,601	1,989,249,201
28	2.20	-1.11	-1.23	143,000	-72,399	-524,115,201
29	1.80	-1.51	-2.28	117,000	-98,399	-9,652,363,201
30	2.85	-0.46	-0.21	185,250	-30,149	908,962,201
31	2.48	-0.83	-0.69	161,200	-54,199	-2,937,531,601
32	3.01	-0.3	-0.09	195,650	-19,749	-390,023,001
33	4.10	0.79	0.62	266,500	51,101	2,611,312,201
34	2.46	-0.85	-0.72	159,900	-55,499	-3,080,139,001
35	2.10	-1.21	-1.46	136,500	-78,899	-6,225,052,201
36	4.60	1.29	1.66	299,000	83,601	6,989,127,201
37	3.28	-0.03	0.0009	213,200	-2,199	-4,835,601
38	2.14	-1.17	-1.37	139,100	-76,299	-5,821,537,407
39	2.00	-1.31	-1.72	130,000	-85,399	-7,292,989,201
40	2.80	-0.51	-0.26	182,000	-33,399	1,115,493,201
41	2.10	-1.21	-1.46	136,500	-78,899	-6,225,052,201

ISSN 2054-6319 (Print), ISSN 2054-6327(online)

42	2.20	-1.11	-1.23	143,000	-72,399	-5,241,615,201
43	2.35	-0.96	-0.92	152,750	-62,649	-3,924,897,201
44	4.68	1.37	1.88	304,200	88,801	7,885,617,201
45	4.30	0.99	0.98	279,500	64,101	4,108,938,201
46	8.00	4.69	21.99	520,000	304,601	92,781,769,201
47	6.00	2.69	7.24	390,000	174,601	30,485,509,201
48	8.10	4.79	22.94	526,500	311,101	96,783,832,201
49	2.10	-1.21	-1.46	136,500	-78,899	-6,225,052,201
50	2.80	-0.51	-0.26	182,000	-33,399	-1,115,493,201
51	2.46	-0.85	-0.72	159900	-55,499	-3,080,139,001
52	2.46	-0.81	-0.66	162,500	-52,899	-2,798,304,201
53	2.50	-0.51	-0.26	182,000	-33,399	1,115,493,201
54	2.80	-1.13	-1.28	141,700	-73,699	5,431,542,601
55	2.18	-0.41	-0.17	188,500	-26,899	-723,556,201
56	2.90	-0.46	-0.21	185,250	-30,149	-908,962,201
57	2.85	-1.26	-1.59	133,250	-82,149	-6,748,458,201
58	2.05	0.79	0.62	266,500	51,101	2,611,312,201
59	4.10	1.89	3.57	338,000	122,601	15,031,005,201
60	5.20	0.79	0.62	266,500	51,101	2,611,312,201
	4.10		128.38	X_2=215,399	X_2=3.31	542,420,787,466

Mean (X) = ΣX

Variance (S^2) = $\frac{(X - X)^2}{n}$

Therefore, the effect of agro-inputs utilization on the yield of CBNRMP Rice Farmers.

$$t = \frac{6.0 - 3.31}{\sqrt{\frac{2.39}{60} + \frac{2.13}{60}}} = \frac{2.69}{0.28} = 9.61$$

df = $n_1 + n_2 - 2$ = 118

t – Table value = 1.645 at 0.05 level of significance.

The effect of agro-inputs utilization on the income of CBNRMP Rice Farmers

$$t = \frac{390,840 - 215,399}{\sqrt{165,532,559 + 150,672,441}} = \frac{175,441}{17,782.20}$$

t = 9.87

T- table value = 1.645 at 0.5 level of significance

ISSN 2054-6319 (Print), ISSN 2054-6327(online)