

Diagnostic Analysis of Variables of Non-Adoption of Rice Technology by Farmers in Anambra State: Socio-Economic Approach

Dr. Juliana Ukonze¹, Dr. Joseph Onuoha^{2*}, Antonia Iheji¹, Edward Alademarine⁴

1. Department of Vocational Teacher Education, University of Nigeria, Nsukka.

2. Department of Social Science Education, University of Nigeria, Nsukka.

3. University of Education, Ijebu-Ode

*Email of the corresponding author: joseph.onuoha@unn.edu.ng

Abstract

The study focused on socio-economic diagnostic approach of variables of non-adoption of rice technologies by farmers in Anambra state. A sample size of 420 respondents made up of 372 registered contact farmers and 50 extension agents were involved in the study. A 20 item instrument called Socio-economic Diagnostic Approach Questionnaire (SEDAQ) was used for data collection. The variables of interest were finance, land, and Education. The data collected were analyzed using weighted mean and rank order to answer the research questions. The study found out that 8 elements in finance, 7 elements in land and 5 elements in education could cause non-adoption of rice technologies by farmers. It was also found that two elements of finance one of land and one of education ranked highest in their magnitude of effects. It was therefore recommended that the government of Anambra state should implement the findings of this study with reference to the elements of finance, land and education with highest magnitude of effect on non adoption of rice technology by farmers in order to achieve her objectives of boosting rice production.

Key words: Socio-Economic, Diagnostic analysis, Non-adopters, rice technology, farmers.

1. Introduction

There are many cereal grains eaten by people of Anambra State, Nigeria. These include rice (*Oryza spp*), maize (*Zea Mays*), Sorghum (*Sorghum bicolor*), Wheat (*Triticum Aeslirum*) and Millet (*Eleusine corocana*). Most of them are imported from outside the state on large scale except rice, since the prevalent adaptation and climatic factors are favorable for its production. Rice *Oryza Spp* is the seed of monocot plants which has different species such as *oryza sativa*, *barthii*, *glabemma*, *latifolia*, *longistaminata*, *punctata*, and *rufigogon*. The most suitable species of *Oryza* that is widely grown in Anambra State, Nigeria is *Oryza Sativa*. Rice has nutritional, industrial and economic importance. Nutritionally, rice is eaten as food in various forms for the provision of fast and instant energy, good bowel movement, stabilizing blood sugar levels and providing essential source of phosphorus, iron and vitamin B to human body. Rice constitute raw material to the industry for the manufacture of products like starch, animal feed, ceiling boards for houses, wine among others. The rice bran is used in compounding feed for fish, poultry and other farm animal such as pig. Ismail (2004) found out that rice grain has high oil content which can be used for soap making. The oil could serve as a carrier for insecticides and as an anticorrosive and rust resistant lubricant. Lu (1999) identified rice hull as by-product of processed rice used as roughages for cattle and other ruminants, chicken litter in poultry keeping, which could be plough into the soil to improve the nutrient, filter and filler for building materials. Gove (1993) pointed out that rice straw could be used in mulching vegetable beds.

Economically, rice production provides occupation for youths in the state who are interested in growing rice. It is a major source of income for rice farmers and their family members, the state as famers pay their taxes and other related fees, and education and social attractions for students and young farmers for excursion.

Rice production in Anambra state is mainly in the hands of subsistent aged farmers. Observations revealed that out of school youths are not interested in stereo-typing the activities of their parents in rice production, but are likely to favour a change to technological production of rice. This technology must be the one that works conveniently. Government on their part is interested in introducing the technology that will help to boost farmers' production in order to increase their income (2) entice youths into rice production so that they can take up carriers in rice production for which the environment is highly favored for its growth so that they can replace their parents in future.

To achieve the above objectives, the government introduced rice production technology to the farmers through the Agricultural Development Programme (ADPs). Technology in the submission of Quick (1995) involves new machines, equipments and ways of doing things that are based on modern knowledge about science. Technology in rice production is therefore, that modern body of knowledge applied in the various aspects of rice production such as varieties, spacing/planting distance, tools/equipment, fertilizer requirement and its

appropriate application. The rice production technologies as contained in ADP's rice production manual of (2006) are the rice production Technology pack, R-box project and swamp rice production and fish farming initiative. The extension agents according to Nkematu (2005) introduced these technologies to rice farmers at the production communities like Ngbakwu, Omor, Odekpe, Achala, Anaku, Ifite Ongwari using appropriate teaching method. Nnanwube (2005) stated that in 2010 ADP registered a total of 1860 rice farmers (contact rice farmers) in the above communities that were implementing technologies recommended by ADP's rice production, by 2011 planting season only 322 registered contact farmers were observed to be adopting the introduction of rice technologies. This indicated that out of 1860 registered contact rice farmers that embraced the recommended technologies in rice production, 1538 had withdrawn from the adoption of the rice technology.

This situation resulted into increased importation of Rice, and high rate of unemployment of out of school youths in the state. The government is skill interested in improving rice production in the state but is highly constrain with the strategies to adopt to improve the observed situation.

The researchers therefore became interested in finding out reasons for the farmers withdrawal from adoption and strategies for improvement. A pilot study therefore was carried out by the researchers to identify the general variables responsible for non-adoption of these rice production technologies by the farmers in the state. 40 registered contact rice farmers that withdrew from adoption variable developed from literature with a discrete response option of yes/no were administered on the respondents. Percentage was used to compute the responses with a cutoff point of 50%. The variables (problem) that score above 50% were as follows finance 73%, land 70% and education 61%. The variables problems were general in nature and therefore require further diagnostic analysis for clearer understanding and decision making.

Diagnose as stated in Webster (2012) is to analyze the cause or nature of problem while analysis by the same author is an examination of a complex, its elements and their relationship. Diagnostic analysis according to Ruscon in Ndom (2003) is a careful way of examing a system of events to discover the nature of an existing problem. Diagnostic analysis guided the research in using weighted means of the elements to make judgment on the magnitude of their effect on non adoption of technologies in rice production. The elements were prioritized based on the severity of their effects to indicate the relative significance on non adoption of technologies by farmers.

2. Purpose of the Study

The purpose of the study therefore is to determine the socio-economic analysis of variables of non-adoption of rice technology by farmers in Anambra State. Specifically the study sought to:

1. Determine the magnitude of effect of the element of finance, land and education on non adoption of ADP's rice production technologies by farmers in Anambra State
2. Find out the hierarchy of effect of elements of finance, land and education variables on non-adoption of ADP's rice production technology among farmers in Anambra State

3. Methodology

The study made use of survey research and co relational designs. The study was carried out in Anambra State made up of four Agricultural zones namely Aguata, Awka, Anambra and Onitsha. The rice growing communities in these zones are Achala, Anaku, Ifite Ongwari, Mgbakwu, Odekpe and Omor which are endowed with land suitable for growing cereal crops such as rice and maize.

The population for the study was one thousand eight hundred and sixty (1860) registered contact rice farmers obtained from ADP Headquarter Awka 20% of contact rice farmers were sampled given a sample size of 372 while the population of the extension agents was small and manageable therefore the entire population was involved in data collection.

A 20 items questionnaire developed from literature on the variables of adoption finance (8items), land (7items) and education (5items) was used for data collection, each item has a response option of strongly agree (4), agree (3), disagree (2) and strongly disagree (1) respectively. The instrument was face validated by three experts one each from the departments of vocational teacher education, Agric extension and Agric Economics all from University of Nigeria Nsukka.

Cronbach alpha method was used to determine the internal consistency of the questionnaire items. The coefficient obtained were 0.89 for finance, 0.80 for land and 0.77 for education respectively

Three research assistants were employed to assist in data collection. Based on the nature of the respondents, they were instructed on what to do when collecting the data especially helping farmers overcome language problem of understanding the questionnaire items. 422 copies were administered on the respondent at their various location; 420 copies were retrieved from them representing 99% return rate.

Mean and Rank order were used to answer the research questions. With reference to the study, the data collected on elements of non-adoption variables were analyzed and the elements with weighted mean below 2.50

were regarded as elements that could cause non adoption of rice technologies while any element with a mean of 2.50 and above showed that the respondent agreed that the elements cause non-adoption of rice technologies. Standard deviation was used to determine how close or otherwise are the responses of the respondent are to one another and to the mean.

4. Results

The findings are presented using the research questions.

4.1 Research Question 1: What is the magnitude of effects of the elements of finance variable on non adoption of ADP's rice production technologies by farmers in Anambra State? The data for answering research question 1 are presented in table 1.

Table 1 showed that, the mean values of the elements of finance ranged from 2.72 to 3.41. This revealed that each element had some magnitude of effect on finance as a non adoption variable. Item 1 ranked first, indicating that it has the highest effect on non adopters of rice technology, item 5 ranked 2nd, item 3 ranked 3rd indicating order of magnitude of effect in descending order while item 8 ranked the least in its effects on adoption. The standard deviation of the items ranged from 0.67 to 1.03. This indicated that the respondents were very close to the mean in their responses. Therefore, the values of the standard deviation added some validity to the mean values.

4.2 Research Question 2: What is the magnitude of effects of the elements of land variable on non adoption of ADP's rice production technologies by farmers in Anambra State? The data for answering research question 2 are presented in table 2 below.

Table 2 revealed that, the mean ratings of the responses of the respondents on the elements of land variable range from 2.67 to 3.31. . This revealed that each element had some magnitude of effect on land as a non adoption variable. Item 2 ranked first, indicating that it has the highest effect on non adopters of rice technology, item 7 ranked 2nd, item 1 ranked 3rd indicating the order of magnitude of effect in descending order while item 3 ranked the least in its effects on adoption.

The standard deviation of the items ranged from 0.66 to 0.99. This is an indication that the respondents were very close to the mean in their responses. Therefore, the values of the standard deviation added some validity to the values of the means.

4.3 Research Question 3: What is the magnitude of effects of the elements of education variable on non adoption of ADP's rice production technologies by farmers in Anambra State? The data for answering research question 3 are presented in table 3

Table 3 showed that, the mean value of the responses of the respondents on the effect of the elements of education on non adoption ranged from 2.70 to 3.24. This revealed that each element had some effect on education as non adoption variable. . This revealed that each element had some magnitude of effect on education as a non adoption variable. Item 5 ranked first, indicating that it has the highest effect on non adopters of rice technology, item 2 ranked 2nd, item 1 ranked 3rd indicating the order of magnitude of effect in descending order while item 3 ranked the least in its effects on adoption.

4.4 Research Question 4: What is the hierarchy of effect of elements of finance, land and education variables on non adoption of ADP's rice production technologies among farmers in Anambra state.

Table 4 revealed that, the mean value of the elements of Finance, Land, and Education variables ranged from 2.67 to 3.41. Item 1 ranked 1st in the pulled ranks, indicating that it has the highest effect on non adoption of rice technology, item 10 ranked 2nd, item 20 ranked 3rd indicating the order of magnitude of effect in descending order while item 11 ranked the least in its effects on adoption.

5. Discussion of findings

The result of the study in table I revealed that elements of finance variable that had the greatest efforts on non adoption of ADP's rice production technology in Anambra State is absence of affordable collaterals does not allow farmers to obtain loan from banks for acquiring rice farming technologies; followed by High interest on loans prevent farmers from borrowing enough money needed for adoption of new technologies. These findings were in agreement with the findings of Awgu and Afieroho (2004) who on a study on the influence of personal and institutional factors on adoption of improved pond management practices among fish farmer at Delta State, where it was found out that demand for assets as collaterals is a factor tha impedes farmers access to credit facilities. These findings are in conformity with the findings of Mohammed (2003) who in a study on provision of credit services to small holder farmers in Zanzibar reported that the farmers inability to repay on schedule could be a hindrance to issuing loan to intended borrowers as a result of high interest rate.

It was found out from the study that element of land variable such as cost of acquiring suitable land for rice production in the community is very high had the highest effect on non-absorption of rice production technology followed by the element that land transfer is not easy because of land inheritance. These findings are

in consonances with the findings of Negatu (2002) in a study of effects of land tenure system on Agricultural production at Ethiopia, where it was found out that cost of buying land is very high indicative that it can hinder adoption of technologies. These findings are also in agreement with the findings of German and Falchamps (2005) in a study on the influence of land tenure on agricultural productivity at North west zone of Niger State, where it was found out that tenure transfer incites farmers not to adopt technologies prone to agriculture.

The study found out that the element of Education variables that has the highest impact on non-adoption of ADP's rice production technology among farmers in Anambra state as indicated in table 3 is Farmers are not made to learn progressively through small plot adoption techniques followed by no farmer education clinic in their area of consultation, no frequent follow up on the farmers adopting the technologies to improve their implementation. These findings of Obinna and Hanod (1999) in a study on evaluation of small plot Adoption technology as a technology transfer strategy at Nigeria, found out that power extension work was the major weakness reported by the farmers. These findings are also in agreement with the findings of Marsh, Pannel and Linder (2005) who pointed out that inadequate training and visit system reduced the quality of extension contacts with farmers which hinder acquisition of skill and adoption of technologies. The variables whose elements have highest effect on adoption of rice technology by farmers by rank are finance, land and education (table 4). This findings is in consonance with the findings of Awgu and Anyaeche 2006 in a study on adoption of improved cassava varieties in Nnewi South LGA of Anambra State Nigeria where it was found out that the constraints on adoption of improved variety of cassava in order of magnitude are finance, land and education. The findings is also in agreement with the view of Madhu (2000) who pointed out that some of the reasons for farmer's inability to adopt some farming practice in Kenya include lack of fund, non availability of large hectares of land and inadequate labour. The findings of the authors cited above helped to give credence to the findings of the study.

6. Conclusion

The government is concern about boasting rice production through the farmers and therefore introduced rice technologies due to certain factors. This study is interested in diagnosing these factors in order to obtain elements of high magnitude of effect for implementation towards solving the problems of non-adoption.

The study provided information to the government on the elements on the magnitude of effects of the elements finance, land and Education for implementation towards solving the problems of non-adoption. It is therefore recommended that the government of Anambra state should implement the findings of this study with reference to the elements of finance, land and education with highest magnitude of effects on non adoption of rice technologies by farmers in order to achieve her objective of boasting the rice production.

References

- Agwu, A. C. & Anyaeche, C. L. 2006. Adoption of improved cassava varieties in rural communities in Anambra State, Nigeria. *African Journal of Biotechnology* 5 (24). Retrieved on 16th Dec. on line at <http://www.academicjournals.org/AJB>
- Agwu, A. C. & Afieroho, E. O. 2007. Influence of personnel and institutional factors on Adoption of improved pond management practices among fish farmers in Isoro Local Government Area, Delta State. *Nigerian Journal of animal production* 34(1): Nigerian society for Animal Production
- Agwu, A. C. & Afieroho, E. O 2007. Influence of personnel and institutional factors on Adopters of improved pond management practices among fish farmers in Isoro Local Government Area, Delta State. *Nigerian Journal of Animal Production* 34(1). Nigerian Society for Animal Production.
- Ismail, S. 2004, New Rice Technique Praise up to 25 Percent loss Water Usage. Retrieved on Sept. 3rd 2012 from <http://www.worldbank.org/htm/cigar/press/pross0599.htm/>.
- Lu, B. R 1999 Taxonomy of the genus *oryzae* poacea: Historical Perspective and Current Status. /RRI *Research notes* 24(3), philipins: Los Banos
- Gove, P. B, 1993 Webster's 3rd *New International Dictionary*. USA: The Marian Webster Inc. Massachusetts.en.wikipedia.org/wiki/Webster%27s dictionary
- Madhu, G 2000 *An Impact Evaluation*. The Kenyan Experience Washington D. C. W0rld Bank
- Marsh, S. P., Pannell, D. J and Linder, K. R. 2005, The Adoption of Lupuu in Western Australians Did Extension made Difference? CLWA Papers on Agricultural Extension and Adoption and Diffusion of Innovation in Agriculture. Retrieved on Jan. 5th(2012) from <http://www.cresalinity.com.ciu/newsletter/dpapa985a.htm>
- Ngatu, W. 2002 *Land Tenure and food Production*. The Case of Adamantly- Jidokombokhu: Woreda in East Shewa Zone Ethiopia. Food Production and Natuers Recourses management, proceedings. IDR/Adidis Abaaba, University.
- Ndomi, B. M. 2003 Identification and Stocashastic analysis of variables of attrition of Voc. Teacher in Post Primary schools in North Eastern Nigeria. An Unpublished Ph.D Thesis Submitted to the Department of

- Vocational Teacher Education. University of Nigeria, Nsukka.
 Mohamed, K. 2003 Access to Formal and Quasi Formal Credit by Small Holder Farmers A Case Study of Zanziba. Research Report No 036: Mkuti na Njoa. <http://www.repog.or.t2/content/blogcategory/24/52/>
 Nnanwube, M (2005) Anambra State Agricultural Project, July 2005 Awka, Nigeria
 Nkematu, J. A. 2006 Anambra State Agricultural Project (ASADEP), Monthly Report on special Rice Project, July 2006 Awka, Nigeria.
 Obinne, C. P. O. & Hanodu, A. C. (1999) Evaluation of Small Plot Adoption Technology is a Technology Strategy in Northern Zone of Benue State. Journal of Agricultural Extension. 3, 91-96.

Table 1: Mean ratings and rank order of the responses of respondents on the magnitude of effect of elements of finance on non adoption of rice production technologies among farmers.

N = 420

S/No	Elements of Finance Variable	\bar{X}	SD	Rank
1	Absence of affordable collaterals does not allow them to obtain loan from banks for acquiring rice farming technologies.	3.41	0.67	1 st
2	Government's encouragement on rice production is not accompany with money that is required for the adoption of technologies in rice production.	2.95	0.74	5 th
3	Loans to farmers arrived late which does not favour farmer's rice farming production.	3.17	0.73	3 rd
4	Farmer's inability to repay loan on schedule makes it difficult for lenders to give loan to willing farmers.	2.92	0.82	5 th
5	High interest on loans prevents farmers from borrowing enough money needed for adoption of new technologies.	3.19	0.68	2 th
6	Absence of valid farm records and valuation of past income and assets hinders farmers from obtaining loan from banks for rice production	2.84	0.80	7 th
7	Response to house hold expenses such as school fees, hospital bills and other social activities do not allow the farmers to save enough money for the adoption of technologies.	3.11	0.76	4 th
8	Farmers that do not belong to cooperative societies could not get loan from the association for rice production.	2.72	0.81	8 th

Table 2: Mean ratings and rank order of the responses of respondents on the magnitude of effect of elements of land on non adoption of rice production technologies among farmers. N = 420

S/No	Elements of Land Variable	\bar{X}	SD	Rank
1	Farmers could not get enough area of land for rice production hence cannot adopt the technologies easily.	3.06	0.88	3 rd
2	Cost of acquiring land in the community is very high	3.31	0.77	1 st
3	Alternative uses of land for crops other than rice causes land scarcity for large scale rice production	2.67	0.96	7 th
4	Soil erosion reduces the size of land for large scale rice production and for ease of adoption of technologies	2.86	0.74	6 th
5	Land use policy of the government for large scale farming discourages adoption of technologies in rice production.	3.00	0.76	5 th
6	Farmers are not always sure of securing land for rice growing in the next season because tenure security is not guaranteed in their locality.	3.01	0.81	4 th
7	.Land transfer is not easy because of land inheritance practice.	3.20	0.66	2 nd

Table 3: Mean ratings and rank order of the responses of respondents on the magnitude of effect of elements of Education on non adoption of rice production technologies among farmers. N=420

S/No	Elements of Education Variable	\bar{X}	SD	Rank
1	There is no frequent follow up on the farmers adopting the technologies to improve their implementation.	2.91	0.69	3 rd
2	There is no farmer education clinic in my area for consultation.	3.02	0.73	2 nd
3	The extension agents do not teach the farmers anything new from what they have already known in rice production.	2.70	0.92	5 th
4	Meeting of cooperative societies do not always focus on training the farmers on how to grow rice.	2.79	0.85	4 th
5	Farmers are not made to learn progressively through small plot adoption techniques.	3.24	0.73	1 st

Table 4: Rank Order of the Elements of Finance, Land and Education on the hierarchy of Effects of Finance, Land and Education on Non Adoption of ADP's Rice Production Technology by Farmers

S/No	Rank Order of the Elements of Finance, Land, and Education,	\bar{X}	Rank Within elements	Rank within Variable	Remarks
1	Absence of collateral by farmers does not allow them to obtain loan for acquiring rice farming techniques.	3.41	1 st	1 st	Finance
2	Government's encouragement on rice production does not go with money that is required for the adoption of technologies in rice production.	2.95	5 th	12 th	Finance
3	Loans to farmers arrived late which does not favour farmer's rice farming production.	3.17	3 rd	6 th	Finance
4	Farmer's inability to repay loan on schedule makes it difficult for lenders to give loan to willing farmers.	2.95	5 th	12 th	Finance
5	High interest on loans prevents farmers from borrowing enough money needed for adoption of new technologies.	3.19	2 nd	5 th	Finance
6	Absence of valid farm records and valuation of past income and assets hinders farmers from obtaining loan from banks for rice production	2.84	7 th	16 th	Finance
7	Response to house hold expenses such as school fees, hospital bills and other social activities do not allow the farmers to save enough money for the adoption of technologies.	3.11	4 th	7 th	Finance
8	Farmers that do not belong to cooperative societies could not get loan from the association for rice production.	2.72	8 th	18 th	Finance
9	Farmers could not get enough area of land for rice production hence cannot adopt the technologies easily.	3.06	3 rd	8 th	Land
10	Cost of acquiring land in the community is very high	3.31	1 st	2 nd	Land
11	Alternative uses of land for crops other than rice causes land scarcity for large scale rice production	2.67	7 th	20 th	Land
12	Soil erosion reduces the size of land for large scale rice production and for ease of adoption of technologies	2.86	6 th	15 th	Land
13	Land use policy of the government for large scale farming discourages adoption of technologies in rice production.	3.00	5 th	11 th	Land
14	Farmers are not always sure of securing land for rice growing in the next season because tenure security is not guaranteed in their locality.	3.01	4 th	10 th	Land
15	.Land transfer is not easy because of land inheritance practice.	3.20	2 nd	4 th	Land
16	There is no frequent follow up on the farmers adopting the technologies to improve their implementation.	2.91	3 rd	14 th	Education
17	There is no farmer education clinic in my area for consultation.	3.02	2 nd	9 th	Education
18	The extension agents do not teach the farmers anything new from what they have already known in rice production.	2.70	5 th	19 th	Education
19	Meeting of cooperative societies do not always focus on training the farmers on how to grow rice.	2.79	4 th	17 th	Education
20	Farmers are not made to learn progressively through small plot adoption techniques.	3.24	1 st	3 rd	Education

This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage:

<http://www.iiste.org>

CALL FOR PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** <http://www.iiste.org/Journals/>

The IISTE editorial team promises to review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

