THE RELATIONSHIP BEWEEN SOCIO-ECONOMIC VARIABLES AND ADPTION RATE OF RICE FARMERS IN THE AWGU AGRICULTURAL ZONE, ENUGU STATE

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Abstract

The study examined the relationship between socio-economic characteristics and adoption rate of farmers in Awgu Agricultural Zone of Enugu State. One hundred and eighty two rice farmers were interviewed in 1998 to determine the level of adoption of eight selected technologies prescribed for rice production. Only three of the technologies namely fertilizer use, use of improved varieties and prescribed planting distance are widely adopted. Some of the determinants found to influence adoption positively and significantly are income realized from rice, farm size, education and farming experience. Age, gender and marital status were negatively related to adoption. It is recommended that extension should target non-adopters instead of use of contact farmers selected on the basis of socio-economic class. It is also suggested that persuasive and advisory transfer of technology and provision of some of the technologies should be pursued as a strategy to increase adoption.

1.0 Introduction

The increasing demand for rice as a staple food in Nigeria especially in urban centres has continued to increase (Igbokwe, 1999). Consumption level increased from 3.0kg/year/caput in 1970 to 11.0kg/year/caput in 1980 (Obiechina and Otti, 1985). The increase in demand, to a certain degree, has been matched by increases in production. For example, production rose from 105,000 metric tonnes in 1980 to 2.5 million metric tonnes in 1990 representing a mean increase of 228 % per year over 10 years and to 3.5 million metric tonnes in 1992 (CBN, 1994). On the other hand, there is evidence to show that the area harvested for rice decreased from 322,000ha in 1987/88 to 242,000ha in 1988/89 and to 165,000 in 1989/90 representing decreases of 24.8% and 31.8% over the periods (F.O.S., 1996).

In spite of the decreases in area under rice, production did not decrease proportionately. Within the same period production was 529,000 metric tonnes, 487,000 metric tonnes. and 445,000 metric tonnes. showing decreases of 7.9% and 8.6% (F.O.S., 1996). In the old Anambra State (including Enugu and Ebonyi States) which is one of the four largest producers in Nigeria, similar decreases in area under rice production were recorded. Could this situation be explained by increase in production intensity which is a consequence of adoption of new production technologies?

In the 1960s up to 1980s, price depression of rice brought about by over subsidized imports and over-valued naira helped to accelerate demand for rice without sufficient incentives for increasing local production. Consequently, imports rose from 20% of total consumption during the 1960s to 50% some 20 years later (I.I.T.A., 1992). The growth in import continued until a ban came into place in 1985.

Since then a number of steps have been taken to create enabling environment for increasing local production. The establishment of the state-wide Agricultural Development Progammes {ADPs} was

one of such steps and they are charged with the transfer of farm innovations to farmers through fortnightly visits by extension agents. The introduction of the Structural Adjustment Programme {SAP} {1986-93} was intended to reverse some of the adverse developments in the agricultural sector {Delgado, 1988} and induce the adoption of improved farm practices by raising returns to farmers. What rice production technologies disseminated by the ADP have been adopted by farmers? What factors affect the adoption of these technologies? The objective, therefore, was to explore the relationships between socio-economic variables and the adoption of rice production technologies

2.0 Methodology

The study was carried out in the lowlands of the Awgu Agricultural Zone which form the beginning point of the Cross River plains from the eastern foot of the Udi Hills at Awgu, Enugu State. The soil type ranges from sandy clay to clay in most locations. It is slightly acidic {pH ranges from 4.8-6.47 and shows evidence of poor drainage signified by prominent mottlings with ground water table not exceeding 150cm from the surface in most cases{see, Ude,1982}. Rainfall is adequate and ranges from 1,100mm to 1,400mm with a not too distinct bimodal pattern. Given the above conditions smallholder swamp rice production in the heavy soils and yam, cassava, okra and upland rice production predominate in the area.

In 1998, two communities, Oduma and Mpu out of the four located in the area and in which rice farming is dominant, were purposively selected. One village each was selected from the two communities and 20 rice-growing households were randomly selected from a list compiled in each village, giving a total of 40 households.

A total of 182 adults within the 40 households were interviewed using semi-structured interview schedule between July and December 1998. Further, gender age disaggregated focus group discussions were held with four groups of adult male and female and young male and female. Data on yield were based on local units of bags of dry paddy weighing 45kg per bag (Murphy *et al.*, 1991) and included returns from various plots harvested within the year. Price of paddy was derived from the 1998 market price of N400.00 per 45-50kg bag of paddy (there were variations among bags found in rural areas, and the largest ones were reportedly used by middle-men traders to purchase produce from unsuspecting farmers).

Using a Likert-type scale of 1-6 the classical adoption model was adopted to determine adoption score as follows: 1-unaware, 2- aware, 3- interest, 4- evaluation, 5- trial and 6- adoption. The number of respondents at each stage was multiplied by the scale and the values added to obtain the total adoption score for each technology. The mean adoption score was computed by dividing each adoption score by the number of respondents and the grand mean obtained by adding the means and dividing by the number of technologies studied. Other characteristics were treated as follows; farm size- in hectares; rice farming experience- in years; tenurial status- a dummy variable with 1 = tenant status, 2 = owner cultivator, and 3 = tenant/owner cultivator; age – measured in years; level of education – years of schooling; income – naira equivalent of 1998 rice yield; gender – a dummy variable with 1 = male and 2 = female; household size – number of people per household; and marital status – a dummy variable with 1 = single, 2 = married and 3 = widowed.

Mean scores and percentages were used for presenting data while Pearson's Product Moment Correlation Coefficient (r) was used to show relationship between adoption and socio-economic variables at 0.05 level of significance.

3.0 Findings and Discussion

3.1 Household and agricultural conditions

The average household size is six (6) with about 30.0% consisting of 5-8 members. Most households (70%) are headed by male and they are within the age bracket of 30-40 years. The farming population is, therefore, relatively young. Out of the 182 adult members in the households 58.3% are male made up of both married and unmarried adults.

Crop production is the primary occupation of all households with small ruminants and chickens reared extensively, mainly as a source of security. Land holding per household ranges between 2-3 ha but this is often supplemented with rented land especially on the richer clay loam areas found suitable for growing rice. Crop production consists of staple food crop (yam, cassava, cocoyam, vegetable) production in crop mixtures and crop (rice –*Oryza sativa*, groundnut –*Arachis hypogea* and okra –*Hibiscus esculentum*) production in both monocrop and mixtures. Staple food crops are grown and maintained as household farm enterprises where every member is expected to contribute labour while cash crop production is an individual enterprise for adult members of the households. Of the three cash crops grown, rice is the dominant crop and is grown as a sole crop, in sequence following okra, in yam-based mixtures and in other crop-based mixtures such as cocoyam. Farm labour is provided for various tasks by household members and hired labour.

3.2 Adoption of production technologies

Out of the of eight technologies listed, only three namely, planting of improved varieties, use of chemical fertilizers and use of prescribed planting distance with mean adoption scores of 5.96, 6.0 and 3.04, respectively out of a maximum of 6.0 are widely adopted (Table 1). Most of the farmers could not give varietal names of the improved varieties they grow but are certain that they are high yielding and labelled "rice agric" meaning varieties obtained from agricultural agencies of other farmers. This could not be verified because most farmers conserve their own planting materials and sometimes purchase from or exchange with other farmers based on observed and desirable characteristics. In addition, some varieties have local names that are often derived from performance growth characteristics or the earliest source of the variety. Indigenous varieties are non-existent in the area but some older rice varieties known by such local names as "1416" and "Kpuru-kpuru" (meaning short, fat grains) are still grown especially by older farmers.

Although fertilizers are widely adopted only a few farmers know the name of the fertilizer they use but while agreeing that it increased rice yield, they are unable to estimate how much it would increase yield in a normal year. Application of compound fertilizer post-planting is common but top-dressing is almost unknown except in a few cases where farmers are very literate and could afford the high cost of Urea.

Table 1:

Adoption Scores of Selected Rice Production Technologies in Awgu Plains

Adoption level	Prescribed planting distance	Use of improved varieties	Use of fertilizer	Seed treatment	Soil testing	Use of pesticides	Use of herbicides	Use of fungicides
unaware	52 (52)*	0 (0)	0 (0)	96 (96)	153(153)	15 (15)	92 (92)	85 (85)
Aware	90 (45)	4 (2)	0 (0)	76 (38)	56 (28)	318 (159)	172 (86)	156 (78)
Interest	60 (20)	0 (0)	0 (0)	63 (21)	3 (1)	9 (3)	6 (2)	36 (12)
Evaluation	0 (0)	0 (0)	0 (0)	8 (2)	0 (0)	8 (2)	0 (0)	4 (1)
Trial	185 (370)	0 (0)	0 (0)	15 (3)	0 (0)	5 (1)	10 (2)	5 (1)
Adoption	168 (28)	1080(180)	1092(182)	132 (22)	0 (0)	12 (2)	0 (0)	30 (5)
Total adoption score	555	1084	1092	390	214	367	280	316
Mean adoption score	3.04	5.96	6.00	2.14	1.18	2.02	1.54	1.74
Grand mean				2.95				

*Figures in parenthesis represent number of respondents

There is low level of adoption of the remaining six practices, namely; seed treatment (2.14), soil testing, (1.18), use of pesticides (2.01), use of herbicides (1.54) and use of fungicides (1.74). Their adoption scores are below the grand mean score of 2.95.

In all, only three of the technologies, namely; use of improved varieties, fertilizer application and prescribed planting distance are widely adopted. The finding is in agreement with the results from similar studies by Okoro (1991), Obinne (1989), Igbokwe (1985) and Green (1973). It could be deduced that extension tends to emphasize physical farm inputs to the disadvantage of technologies that do not perceptibly demonstrate their impact on yield increase. Secondly, farmers will internalise what is presented to them and utilize those technologies whose impact can be easily demonstrated, and are available and accessible at affordable cost. Thus, technologies like planting distance, seed treatment, soil testing and use of agro-chemicals may not offer much attraction to farmers to adopt.

3.3 Relationship of socio-economic variables and adoption

Nine variables, namely, level of education, income realized from rice, farm size, rice farming experience, gender, age, household size, marital status and tenurial status were tested for their relationship with adoption of rice production technologies sing Pearson's correlation coefficient (Table2). Level of education (0.4000), income (r = 0.96), farm size (r = 0.82), farming experience (r = 0.59) and tenurial status (r = 0.28) are positively correlated with adoption at 0.05 level while gender, age and marital status are negatively and significantly correlated with adoption. Income and farm size show the most direct relationship with adoption of rice production technologies.

Table 2:

Summary Of Correlation Coefficient Values Of The Relationship Between Adoption And Selected Variables

Socio-economic variable	Correlation Coefficient (r)
Level of education	0.4000*
Income realized from rice	0.9599*
Farm size	0.8215*
Rice Farming experience	0.5924*
Gender	-0.3240
Age	-0.2289
Household Size	0.0140
Marital Status	-0.1650
Tenurial Status	0.2780*

* Significantly at 0.05 level.

This finding is in agreement with the report of Atala *et al.* (1992), Onyenweaku and Mbuba (1991) and Igbokwe (1985). The high positive relationship between income and adoption could be attributed to profitability of the improved varieties of rice adopted by farmers. The relationship between farm size and adoption could be attributed to the adoption of sequential cropping system in which more land is made available for rice production after harvest of short-term maturing crops such as *Hibiscus esculentum* often planted and harvested shortly before the commencement of rainy season. The negative relationship between age and adoption could derive from the rigours involved in rice farming operations. Possible explanation for the negative relationship between gender and marital status and adoption is that rice has assumed a cash crop status and is no longer grown as a family farm enterprise. Every adult member of the household attempts to grow rice independent of the family farm. Thus adoption of any technology is an individual decision made by the entrepreneur.

4.0 Conclusion

Out of the eight technologies studied only two, namely, fertilizer use and use of improved varieties are adopted in the study area. Both technologies have direct impact on yield and could be described as having been extended to farmers over many years. The major factors influencing adoption are income, farm size and farming experience. The higher the income the greater the tendency to invest in innovations and this ultimately results in higher income, increased farm size and greater experience. Although a majority of the farmers are aware of the other technologies, they did not adopt them widely. This may be attributed to lack of access, costs and/or outright lack of interest.

On the basis of the findings, the following are recommended:

- extension contacts should target farmers who have not adopted the prescribed technologies instead of the present strategy of visiting selected contact farmers based on socio-economic classification; and
- farm inputs should be made easily accessible to farmers and the skills relevant to their use imparted to them persuasively; this becomes very urgent in view of the endemic army worm, gall midge and stem borer attacks in the area.

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