Determinants of Adoption of NRCRI Cocoyam Production Packages among Small-Holder Women Farmers in Enugu State

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Abstract
This study employed a log-linear model derived from the Semi-log functional form as the econometric model specified and the best fit for explaining adoption rate of NRCRI Cocoyam Production packages among women in the study area. A multi-stage random sampling technique was used to select 120 cocoyam farmers (Females) in the state in 2008. The study found farm size and membership of cooperative society to be positively and significantly related to rate of adoption at 5.0% level of probability. Farming experience coefficient also had a positive relationship with rate of adoption and was significant at 1.0%. Household Size was significant and negatively related to rate of adoption rate at 10.0%. No significant relationship was found between adoption rate and marital status, age, education and extension contact. The results call for policies aimed at redistribution of land by making more land available to the women farmers, encouraging the experienced farmers for increased adoption of cocoyam packages and programmes through the cooperative societies, which will motivate farmers to invest in and increased adoption of these packages.

Key Words: Adoption Rate, NRCRI Cocoyam production Packages and Enugu State

Introduction

Cocoyam (*Xanthosoma* sp., *Colocasia* sp.) is an important staple cultivated in the south-eastern and south-western parts of Nigeria (Ojiako *et al*., 2007). It is also an important food security crop in Nigeria and variously grown by resource poor farmers, mostly women, who intercrop cocoyam with yam, maize, plantain, banana, vegetables and rice (Ikwelle *et al*., 2003). Currently, Nigeria is the world's largest producer of cocoyam. The average production figure for Nigeria is 5,068,000mt which accounts for about 37% of total world output of cocoyam (FAO, 2007).

Rogers (1995) demonstrates that adoption of technologies depends on their characteristics: compatibility with the existing values and norms, complexity, observability, trialability, and relative advantage. This definition pertains to technologies in a variety of disciplines, and may be as relevant in other fields as it is in agricultural related technologies. Earlier studies by Dorp and Rulkens (1993), Agwu and Anyaeche (2007), Springer et al. (2002), Kimenju et al. (2005) and Nwawuisi, et al (2007) show that farmers decision to use particular crop cultivars were influenced by a number of reasons, some of which are market-driven or socio-culturally based. The objective of this paper therefore is the unveiling of factors that determined adoption of NRCRI Cocoyam Packages among women farmers in Enugu State of South-Eastern Nigeria.

Methodology

The study was conducted in Enugu State of the South-Eastern Nigeria using the multi-stage purposive random sampling technique. In the first stage, 2 LGA's were randomly selected in the state. In the second stage, 6 communities were randomly selected from each LGA. In the third stage, 10 women cocoyam farmers were purposively randomly selected in each community giving a sampling frame of 120 respondents for the study. In order to determine the socio-economic characteristics of the farmers, questions were asked with respect to age, household size, level of education, farming experience and farm size. Percentages were used to describe the socio-economic characteristics of the farmers. The functional forms of multiple regressions were tried. Statistical and econometric criteria such as values of R^2, F-Ratio, number and level of significant of the best fit equation, based on the value R^2 (coefficient of multiple determination), F-ratio and the conformity of the signs of the coefficient with apriori expectations. Adoption rate (AR) was measured as a percentage of the 10 production packages (plant population, minisett technology, weed control, fertilizer application, stand geometry, compatible crop mixtures, mounding/ridging, pest control methods, early planting and mulching), this was used as the dependent variable with values ranging from 0-100% The log-linear model derived from the

Semi-log functional form was the econometric model specified and the best fit for explaining adoption rate in the study. The model is described thus:

AR=f (AGE, MAST, HHS, EDU, EXT, EXP, HA and COOP).

Where;

AGE = Age of farmer, MAST=Marital status, HHS =Household size, EDU =Educational level in years, EXT=Number of extension contacts, EXP=Farming experience in years, HA=Farm Size in ha and COOP=Membership of cooperatives (dummy variable; 1=member, 0=otherwise).

Results and Discussions

The data in Table I show that majority (58.4%) of the respondents in the State were less than 51years of age. The average age of the respondents was 48years, indicating that most of the respondents were young and in their most productive years. Age is said to be a primary latent characteristic in adoption decisions. (Bonabana-Wabbi, 2002; Nwaru, 2004; Nwawuisi et al., 2007; Agwu and Afieroho, 2007) found out that the ability of a farmer to break risk, be innovative decreases with age.

Table 1. Distribution of Respondents according to Socio-Economic Characteristics in Enugu State.

Variable	Percentage	Mean
Age		
18-28	6.7	
29-39	21.7	
40-50	30.0	
51-61	30.0	
> 61	11.6	48.0
Household Size		
1-5	40.0	
6-10	58.3	
11-15	1.7	
> 15	0.0	6.0
Level of Education		
None	61.7	
1-6	21.7	
7-12	13.3	
13-18	1.7	
> 18	1.6	3.1
Farming Experience		
1-5	11.7	
6-10	5.0	
11-15	11.7	
16-20	11.7	
> 20	59.9	26.7
Farm Size		
0.01-0.05	0.0	
0.06-0.10	0.0	
0.20-0.60	8.5	
0.70-1.10	45.8	
> 1.10	45.7	1.6

Source: Field Data, 2008

A large percentage (60%) of the respondents had household size of 6-10 persons and 25.1% had household size of 1- 5 persons. The average household size of the respondents was 6 persons. Larger households are more likely to provide the labor that might be required as a result of adoption of these technologies. Effiong, (2005) and Idiong (2005) reported that a relatively large household size enhance the availability of labour.

Data in table 1 show that 61% of the farmers had no formal education. This show that majority of the farmers had high degree of illiteracy among them. The average educational level of the farmers was about 3years. Educated farmers are

expected to be more receptive to improved farming techniques, while farmers with low level of education or without education would be less receptive to improved farming techniques (Okoye, *et al*. 2004, Ajibefun and Aderinola, 2004).

The average farming experience for respondents was 26.7years. A farmer's experience can generate or erode confidence. With more experience, a farmer can become more or less averse to the risk implied by adopting a new technology; thus this variable can have a positive or negative effect on a farmer's decision to adopt an improved weed control technology.

The table also indicated that majority (91.5%) of the respondents had cocoyam holdings of more than 0.6ha. the average land size holding was 1.6ha. The result, indicate that cocoyam production in the study area is dominated by small-holder scale producers. Farm size affects adoption costs, risk perceptions, human capital, credit constraints, labor requirements, tenure arrangements and more. With small farms, it has been argued that large fixed costs become a constraint to technology adoption (Abara and Singh, 1993) especially if the technology is costly.

Determinants of adoption of NRCRI Cocoyam Packages among Women in Enugu State.

To ascertain the influence of some personal characteristics and institutional factors on adoption of NCRI cocoyam packages among women, regression analysis using the semi-logarithmic form was used.

Table 3 Estimates of Adoption rate of NRCRI Cocoyam Packages among Women in Enugu State

Variables	Coefficient	t-value
Constant term	-218.3854	-1.60
In MAST	66.7673	1.60
In AGE	1.2608	0.08
In HHS	-19.7682	-1.69*
In EDU	0.6840	0.12
In HA	25.7676	2.05**
In EXT	-2.3058	-0.34
In EXP	23.9205	5.28***
In COOP	15.3201	2.67**

Note:*, **, and * means significant at 10%, 5% and 1% respectively**
ln = represents the natural logarithm

R^2(coefficient of multiple determination) was 0.81, show that 81% variation in the dependent variable (adoption rate) is accounted for by the independent variables included in the model indicates goodness of fit.

The signs of the coefficients for farm size and membership of cooperative societies were positive and significant at 5% level. Farm size affects adoption costs, risk perceptions, human capital, credit constraints, labor requirements, tenure arrangements and more. With small farms, it has been argued that large fixed costs become a constraint to technology adoption (Abara and Singh, 1993). Sofranke, (1984) stated that adoption of innovation is membership of farmer association due to its group dynamic effects.

The coefficient for farming experience was positive relationship with adoption rate and highly significant at 1% level. With more experience, a farmer can become more or less averse to the risk implied by adopting a new technology.

The coefficient for household size was negative and significant at 10% level. Large house hold holdings which is largely synonymous with those who are married may be bedeviled with a lot of family responsibilities which may lead to decreased adoption of innovations.

Conclusion

The findings of this study show that decision to adopt the cocoyam packages is influenced by farm size, membership of cooperative societies, farming experience and household size. The results call for policies aimed at land reform to

make more land available to the women farmers, encouraging the experienced farmers for increased adoption of cocoyam packages. There is an urgent need to organize programmes especially through the cooperative societies, which will motivate farmers to invest in and increased adoption of these packages.

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