Socio-Economic Factors Influencing Agricultural Insurance in Rice Production in Kano State, Nigeria

Muhammad Aminu Usman, and Hamisu Dodo

Abstract—Agricultural insurance is very important in developed countries and its potential benefits are now being appreciated worldwide. It is widely acknowledged to be an important instrument for improving productivity by reducing the risks and uncertainties associated with crop and livestock production. Thus making an improvement in the contribution of agriculture to the National economy. The broad objective of the study was to identify the socio-economic factors influencing farmers willingness to continue to insure their rice production. This study tested the hypothesis that there is no relationship between the farmers’ willingness to continue insuring their rice production and their selected socio-economic factors. The primary data for the study were collected from field survey using a questionnaire administered to 120 rice farmers “participants” in the agricultural insurance scheme drawn from three local government areas. The analytical tool used was logit model. The socio-economic factors found to influence farmers’ willingness to continue taking insurance were formal education and farm size.

Keywords—Insurance, NAIS, rice, socio-economic factors, willingness.

I. INTRODUCTION

Agricultural production in Nigeria, like in any other country in the world, is characterized by risks and uncertainties. The farmer in his day to day activities is faced with a lot of adverse elements many of which he has no control over. These seriously affect the scale of agricultural production considerably, it is imperative to reduce the impact of these risks and uncertainties to the barest acceptable minimum. The need, therefore for a mechanism that functions specifically to keep the farmer in business cannot be over emphasized, and hence the need for an agricultural insurance (Aina and Omonona, 2012).

Agricultural insurance in its widest sense is defined as the stabilization of income, employment, prices and supplies of agricultural products by means of regular and deliberate savings and accumulation of funds in small instalments by many in favourable time period to defend some or a few of the participants in bad time period (NAIS, 1989).

Agriculture, unlike many other investment activities is exposed to a wide variety of risks and uncertainties such as inclement weather conditions, pest and diseases, flood, drought and fire-out break. The impact of such natural hazards on agricultural production have been considerable as most farmers are being rendered hopeless or chased out of business (Olubiyo, Hill and Webster, 2009).

Insurance is one of the farm management strategies used against risks and uncertainties in agricultural production. It has long been identified as one of the logical options whenever an economic activity is subject to knowledge imperfection that is no more than a risk, and a means of stabilizing farm income (oyekole, 2002). The occurrence of a natural hazard like bad whether condition can lead to poor yield in crop production, and hence low farm income. Agricultural insurance eliminates this chance element by ensuring farmers that suffered losses through any unforeseen changes in nature would be compensated partly or fully. It also brings security, stability of income, and a safeguard for the farmers (Ray, 2001).

Since agricultural insurance policy in Nigeria has been in operation for twenty six years now (1987-2013), this study seek to investigate the socio-economic factors influencing agricultural insurance in rice production in Nigeria taking Kano state as the area of this study. it examined the hypothesis that there is no relationship between the farmers’ willingness to continue to insure their rice production and their selected socio-economic factors.

II. METHODOLOGY

This study was conducted in Burkure, Dawakin kudu and Kura local government areas of Kano state. The choice of these areas was essentially on the basis of their potentials for rice production. Kano State which was the area of this study occupies a major position in the agricultural economy of Northern Nigeria. It is located between latitudes (10°N and 12°N), and longitude (9°E and 8°E) of the prime meridian.

In this research, rice producers "participants" in agricultural insurance scheme (NAIS) were purposively identified and simple random sampling technique was used to select the sample for the study. To identify rice farmers participant in the insurance scheme, a pre-survey was conducted in all the three local government areas with the assistance of the staff of Kano State agricultural and rural
development authority (KNARDA) and a staff of Nigerian agricultural insurance company (NAIC), Kano Office in which 400,300 and 500 rice farmers "participant" in the scheme were identified in Bunkure, Dawakin-Kudu and Kura respectively to constitute the sampling frame. Based on 10% proportionate selection, 40,30 and 50 rice farmers participants in the scheme were randomly selected using simple random sampling technique. This gives a total of one hundred and twenty farmers (120) to constitute the sample size.

III. DATA COLLECTION

In order to test the hypothesis and achieve the objective of the study, a primary data based on 2012/2013 cropping session were generated from field survey by administering structured questionnaire to the selected rice farmers participants in the Nigerian agricultural insurance scheme. Information used for generating the primary data included age, level of education (years of formal education), farm size, years of experience in farming and number of contacts with extension agents in a season.

IV. METHOD OF DATA ANALYSIS

To analyse the data for this study, logit model was used. This model is based on the cumulative probability function and is useful where an individual is willing to test a qualitative character. The model is computationally simple and transparent but is based on assumptions that may be violated if some of the alternatives from which choice is to be made are close substitute (Maddala, 1983).

The specification of the general form requires the variables to be explained (dependent variable) 'Y' hypothesized a function of say "K" independent variable. The model assumes the probability (P) for ith units having the characteristics (Xi) to choose alternative one is given by:

\[
P_i = F(Z_i) = 1 \div 1 + \exp(-\alpha - \beta x) \quad \text{..........(1)}
\]

where, \( e \) = base of natural logarithm \( (e=2.718) \),
\( Z_i = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 \) and
\( Z_i = \) cumulative logistic distribution

we obtain an equation to be estimated by rewriting the equation (1) above

\[
(1 + \exp(-Z_i)) P_i = 1
\]

then \( \exp(Z_i) = \frac{P_i}{1 - P_i} \)
and \( \exp(Z_i) = \frac{P_i}{1 - P_i} \)

and taking the logarithm of both sides

\[
Z_i = \log\left(\frac{P_i}{1 - P_i}\right)
\]

thus, \( \log\left(\frac{P_i}{1 - P_i}\right) = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 \)

where, \( \log\left(\frac{P_i}{1 - P_i}\right) = \) odd of choice of in willingness to continue to insure

\[
\begin{cases}
1 & \text{if willing to continue to insure} \\
0 & \text{if otherwise}
\end{cases}
\]

bo = intercept
\( b_1 \cdots b_5 = \) coefficient of explanatory variable
\( X_1 = \) age of rice farmers in year
\( X_2 = \) level of education (years of formal education)
\( X_3 = \) farm size in hectares of rice cultivated by rice farmers.
\( X_4 = \) years of experience in rice farming.
\( X_5 = \) Number of contacts with extension agents in a season.

V. RESULTS

The summary statistics for the logit model are given in table 1 below. The likelihood ratio test was high indicating the overall significance of the model in indentifying the socio-economic factors influencing the willingness of the farmers to continue insuring their rice production. About 76.1% of the farmers participating in rice insurance scheme were identified by the model as willing to continue taking rice insurance cover. The model chi-square was 9.8. The high-2log likelihood test indicates the goodness of fit of the model and significant at 10% level of probability.

The empirical results of the logit model are given in table 2 below. The parameter estimates of the model were evaluated at 5% and 10% levels of significance. Two out of the five independent variables included in the model were found to be significant. These included years of formal education (X2) which was significant at 10% level, and farm size in hectares (X3) significant at 5% level of probability. The signs of both the significant parameters estimates were consistent with "a prior" expectations.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood ratio</td>
<td>56.14</td>
</tr>
<tr>
<td>Percentage of farmers correctly Classified</td>
<td>76.1</td>
</tr>
<tr>
<td>Model chi-square</td>
<td>9.8</td>
</tr>
</tbody>
</table>
### TABLE II

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>T-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of farmers in year (Xi)</td>
<td>-0.0638</td>
<td>-1.3375</td>
</tr>
<tr>
<td></td>
<td>(0.0477)</td>
<td></td>
</tr>
<tr>
<td>Years of formal education (X_2)</td>
<td>0.1533</td>
<td>1.7540***</td>
</tr>
<tr>
<td></td>
<td>(0.0874)</td>
<td></td>
</tr>
<tr>
<td>Farm size in hectares (X_3)</td>
<td>0.3662</td>
<td>2.4060**</td>
</tr>
<tr>
<td></td>
<td>(0.1522)</td>
<td></td>
</tr>
<tr>
<td>Year of experience in rice farming (X_4)</td>
<td>0.0973</td>
<td>0.9701</td>
</tr>
<tr>
<td></td>
<td>(0.1003)</td>
<td></td>
</tr>
<tr>
<td>Number of contact with extension agent in a season (X_5)</td>
<td>0.1629</td>
<td>0.5736</td>
</tr>
<tr>
<td></td>
<td>(0.2840)</td>
<td></td>
</tr>
<tr>
<td>Intercept estimate</td>
<td>-0.4678</td>
<td>-0.2739</td>
</tr>
<tr>
<td></td>
<td>(1.7077)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Survey Data, 2013

**Significant at 5% level, ***Significant at 10% level. Figures in parenthesis are the standard error.

### VI. DISCUSSION

The analysis shows that two factors (years of formal education and farm size) were significantly related with the farmers’ willingness to continue to insure their rice farms.

Formal schooling enhances the farmers' entrepreneurial ability, defined as the ability to perceive, interpret and respond to new events in the context of risk (Agada, 1997). Farmers who possessed formal education are expected to perceive agricultural innovation. Therefore, farmers with formal education have a better understanding of the benefits of an insurance, and this greatly influence their willingness to continue insuring their rice farms.

Farm size influenced the likelihood of farmer to insure his rice production. As the farm size increases, a lot of capital is needed from land preparations to harvesting, threshing, bagging and transportation. All labour requirements cannot be provided alone by the family members. It requires fertilizers and chemicals to control the most common rice disease (Blast) which causes an economic damage in the rice field. Again, there is need to check flood. Considering the level of investment and the nature of agricultural production which is unpredictable, one may be forced to insure his rice crop so as to continue in farming business should there be any of the natural disasters.

### VII. CONCLUSION AND RECOMMENDATION

It can be concluded that formal schooling and farm size were the socio-economic factors that influence farmers' willingness to continue taking rice insurance cover.

However, it is recommended that adult education classes should be opened in many places to enable some of the farmers who did not attend formal schools to avail themselves of such opportunities of acquiring formal education, and government should make more land available to rice farmers because of its influence in the decision to continue taking rice insurance.

### REFERENCES


http://dx.doi.org/10.15242/IICBE.C1014147