

# The reason to up-take crop insurance in Rwanda from farmer's perspectives

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**Abstract** - Agriculture is a risky enterprise due to its cyclical nature, risk of loss from fires and natural disasters. As a result, it becomes imperative for the farmer to purchase insurance in order to prevent total loss of farm property, yield or revenue through a fall in agricultural prices or other disasters. Despite, the potential of agriculture insurance in Rwanda still levels of uptake in Rwandan farming sector remains low. This study was initiated with the aims to examine the influence of institutional factors on uptake of agriculture insurance in Nyagatare District, Rwanda. A multi stage sampling techniques were employed to select respondents. The data collected included both primary and secondary. The primary data were collected from 240 maize farmers using structured questionnaires. The study used the logit model to determine institutional factors influencing uptake of agriculture insurance in the study area. The institutional factors that influence the uptake of agriculture insurance in the study area were access to agricultural loans, information on insurance, kind of insurance knowledge and cooperative membership. It is recommended that government and other stakeholders' efforts should be directed towards policies and programmes that will further enhance institutional factors such as access to agricultural loans, information on insurance, kind of insurance knowledge and cooperative membership that increase farmers' uptake of agricultural insurance.

**Key words:** Insurance, logit regression, Smallholder farmers

## I. INTRODUCTION

Agriculture production and farm incomes in Rwanda are frequently affected by natural disasters such as droughts, floods, pests and diseases. Susceptibility of agriculture to these disasters is compounded by the outbreak of epidemics and man-made disasters such as fire, sale of spurious seeds, fertilizers and pesticides, price crashes, scrupulous middlemen. All these events severely affect farmers through loss in production and farm income, and they are beyond the control of the farmers, this further affect the country's food security (MINAGRI, 2014). Agricultural risks are common risks likely to occur simultaneously, and therefore may significantly affect welfare in developing countries (NISR, 2015). Majority of farmers in the country who rely in agriculture have been prone to recurrence drought, the most important threat to agricultural production causing severe impacts on farmer's livelihoods due to loss in crops and reduced incomes for farmers (Shiferaw *et al.*, 2014). Input costs and price fluctuations add on production risks that farmers are faced with. One of the best solutions that producers can use to mitigate their risks is crop insurance (Seyed *et al.*, 2010). Unfortunately, the adoption and use of agriculture insurance Rwanda still at low level while the climate change conditions increase its level day per day.

## II. METHODOLOGY

### *Study Area*

The study was done in the Eastern province of Rwanda. The eastern province is the largest, the most populous and the least densely populated of Rwanda's five provinces. It has seven districts including Bugesera, Gatsibo, Kayanza, Ngoma, Kirehe, Nyagatare and Rwamagana. Eastern province was preferred to be used in this study because it is ranked the first province affected severe drought that leads to loss of crops and animals

### *Research design*

The study adopted a cross sectional and descriptive research design. Mixed methods approach in an attempt to examine the institutional factors that determine uptake of agriculture insurance in Rwanda was also used. The mixed methods approach engross the use of both quantitative and qualitative methods for the purpose of achieving triangulation and increasing the reliability of the results.

### *Targeted population*

The target population for this study was farmers in one province of the Eastern. The study population however was farmers carrying out cultivation on plots of land which are less than 2.0 ha (less than 5 acres). Out of 650 farmers in Eastern province a total of 240 farmers in all respective districts was interviewed. These individuals provided information by filling in the questionnaires.

### *Sampling techniques*

Multistage sampling techniques were employed to select respondents in the study area. In the first stage purposive sampling was used to select respondents with key information including employees in charge of agriculture insurance in different companies including UAP, Acre Africa Ltd, , Banks, and stratified sampling was used to divide the sample household farmers into strata of insurance users and non-users and finally simple random sampling technique was used in the sampling of the districts because all of them are going to be sampled. The list of total household heads in the selected sectors was obtained from the sector office and insurance companies.

### *Data collection Instruments*

This study was use structured interviews, to collect the quanti-

tative and qualitative data required. The questionnaire was contained information related to institutional factors. The questionnaire was used because it was specific for the respondents to explain the exact information without giving rumors for unnecessary and irrelevant information for the study topic.

*Data analysis*

Logit regression analysis was used to estimate factors that are independently associated with uptake of agricultural insurance. The independent variables had p-values of less than 0.05 in their relationship with the dependent variable in bivariate analysis.

*Model Specification*

A binary logit model was employed to assess the factors affecting crop insurance decision making among smallholder farmers. The logit model was preferred owing to the fact that the dependent variable is separate in nature.

According to Hensher and Green (2009), the logistic distribution is better in applied research over the probit model because of computational complexity arising from lack of a closed form for the normal cumulative density function on which the probit model is based. With awareness as the dependent variable, farmers who were aware were and assigned the value of Y = 1 and 0 otherwise. The logistic model in this study is presented as follow:

$$P = \frac{e^z}{1 + e^z} \dots\dots\dots (1)$$

Referred to many studies used a logistic model, a similar equation was used to specify the dependent and independent variables. In this study, the following general specification of the

logistic model is presentment as follow:

$$Z = \ln\left(\frac{p}{1-p}\right)^2 = Y = \beta_0 X_1^{\beta_1} X_2^{\beta_2} X_3^{\beta_3} X_4^{\beta_4} X_5^{\beta_5} X_6^{\beta_6} X_7^{\beta_7} X_8^{\beta_8} \dots (2)$$

Where:

$\beta_0$  = Constant

$\beta_1$ - $\beta_7$ =Parameters to be estimated

Y= Crop insurance (1 for insured, 0 otherwise)

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \beta_7 \ln X_7 + \beta_8 \ln X_8 + \varepsilon \dots\dots\dots (2)$$

Where:

Y = Insurance

$\beta_0$ =Constant

$\beta_1$ - $\beta_8$ = Parameters to be estimated

X1 = Distance to market,

X2 = Distance to banks,

X3 = Access to Agricultural loans

X4= Information on use of insurance

X5=Levels of aware ness and knowledge

X6= Cooperative membership

X7=Perception of farmers on crop Insurance

X8=Level of understanding

Ln=Natural logarithm

$\varepsilon$ = Error term

**III. RESULTS AND DISCUSSION**

Results from the logit model revealed that access to agricultural loans, information on insurance and cooperative membership were the institutional and policy factors influencing small holder farmers to uptake agriculture insurance and were statistically significant at 5% level of significance.

Results showed that access to agricultural loans influenced positively small holder famers to uptake crop insurance. Access to bank credits increased the paid premium of farmers as required by the insurers and boosts the power of purchasing of the farm tools and equipments and enhances the farmers' cash flow in their daily business. Credit is also an important extra source of income for households usually serving as an additional income to finance farm investments (and/or household consumption expenses) and our findings are similar to the results of Ellis (2016), Ghana who found that farmers without access to credit were less willing to purchase insurance. Another possible explanation for is that access to credit improves the financial situation of the farmer and it enables access to required resources if accessed at the beginning of the

season (Cai et al., 2009).

Results from the study also indicated that information on insurance influenced farmers to uptake crop insurance. This means that agricultural households that owned source of information tools like a radio, television and other mass media tools were more likely to uptake agriculture insurance than those who did not and our findings relay on the results of (Khanal, 2013) reported that farmers receive useful information through radio programs and adopt new technologies these results are also supported by the findings of (Mather, Boughton, & Jayne, 2011) who reported that radio programs provide farmers with information on market prices increase both the probability of participation in the market and the extent of participation (Khanal, 2013; Mather et al., 2011) and (Rashidpour, 2013).

Explanation for this result may be a repeated production shocks experienced by the household, which may prompt it to devise a 'safe' mechanism of taking insurance as the crop depends on weather conditions and these findings are coherent

with the results of (Akinola, 2014) who argued that since farmers would be knowledgeable about agricultural insurance they will be able to pay and to understand insurance procedures, types of insurance, policies and risk management mechanism of agricultural insurance. However access to information may also result in non-adoption or uptake of such technology.

Results from logit model showed that the cooperative membership influenced small holder farmers to uptake crop insurance and was statistically significant. Cooperative membership participation is the key only way that government chan-

nels all improved access to inputs, information, increase bargaining power and reduce transaction costs for better factor and product prices as well as increasing access to farming and market information, it also allows producers to reach economies of scale by bulking. Joining cooperatives helps farmers to sell the product and to access farm input easily and increase their revenues which will facilitate them to afford their crop insurance for the next farming season and this is a government policy to group farmers into farming cooperatives and these results are similar to the findings of (Rashidpour, 2013).

**Table 1: Institutional factors influencing farmers to uptake crop insurance**

<b>Uptake of Agriculture Insurance</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>Z</b>	<b>P&gt; z </b>
Distance to markets	-0.106	0.321	-0.33	0.740
Distance to banks	0.693	0.465	1.49	0.136
Access to agricultural loans	2.440	0.849	2.87	0.004*
Information on use of insurance	1.166	0.551	2.12	0.034*
Levels of awareness and knowledge	2.944	0.798	3.69	0.000*
Cooperative membership	2.252	0.426	5.29	0.000*
Perception of farmers on crop Insurance	-5.305	1746.736	0.00	0.998
Level of understanding	-11.042	3493.471	0.00	0.997
<b>_cons</b>	<b>5.679</b>	<b>1.489</b>	<b>3.81</b>	<b>0.000</b>

Logit regression; Number of Obs=236; LR chi2 (6) =256.98, Prob > chi2 =0.0000;  
Log likelihood = -33.43 and Pseudo R<sup>2</sup>=0.79

#### IV. CONCLUSION AND RECOMMENDATIONS

The results of the study concluded that key institutional factors that influenced the uptake of agriculture insurance in Rwanda were access to agricultural loans, information on insurance, kind of insurance knowledge and cooperative membership. Therefore the study recommends that, insurers should cooperate with banks or similar institutions that provide agricultural finance, this can enhance the production capacity of farmers and higher production translates to high agricultural income which can enhance to insurance uptake. The study recommends that more awareness programmes should be created among farmers through conducting agricul-

ture meetings and policies that promote access to agricultural technology information should be encouraged and improve communication between insurers and farmers for effective insurance delivery and uptake, by way of holding frequent farm visits, meetings, workshops, or field days.

The study also recommends that farmer organisations should be promoted to increase the uptake of agriculture insurance through sensitising and mobilizing farmers in community based organisations and strengthening policies aiming to promote cooperatives.

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