

# Adaptability of Crop Insurance as a Risk Mitigation Mechanism by the Farmers of Assam – An Analysis of Modified National Agricultural Insurance Scheme (MNAIS)

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**Abstract**—Crop insurance schemes have failed to address the insecurities of the farmers and risk in agricultural production. It is indeed a matter of concern that even after a decade of the implementation of crop insurance schemes in Assam; the farmers are yet to reap the benefits from the scheme. The present study aims to address the adaptability constraints faced by the farmers under MNAIS. In this study with the participation of the insured and uninsured farmers, attempts have been made to find out some key factors that influence the participation of the farmers of Kamrup (R) and Dhubri district in adopting the crop insurance scheme. LOGIT model was used in the study. The level of education, income and distance from financial institutions were some of the important variable that has an impact on purchase of insurance. Probability of insurance was significantly higher for those who have access to non farm income. Expeditious settlement, crop cutting experiments, lack of cooperation from the officials, insurance units and insurance illiteracy were some of the major problems faced by the farmers in MNAI scheme.

**Index Terms**—crop insurance, MNAIS, factors influencing crop insurance participation

helps maintain certain dignity of the farmers. As agricultural income is an important factor in national income, crop insurance also has an effect on the prosperity of the country [3]. Though the government of India had been making efforts to introduce crop insurance in the country from time to time, it was very unfortunate that the state of Assam and other North-Eastern states could not reap the benefits from it despite the farmers were leave devastated every year due to chronic floods. Nevertheless the need to provide a safety net to the farmers was always felt [4]. It was only with the NAIS in 1999, in Assam, that crop insurance was available to the farmers for major crops for all seasons. However the scheme was full of lacunas and needed further improvements and modifications which resulted in the implementation of the MNAIS in 2010. The MNAIS however was implemented in two districts only, i.e., the Kamrup (Rural) and the Dhubri district. The main of this paper is to identify the factors and the constraints faced by the farmers in adoption of the crop insurance policy, a demand side analysis.

## I. INTRODUCTION

Uncertainty of crop yield is one of the basic risks, which every farmer has to face. The overwhelming majorities of the farmers are poor and have extremely limited means and resources. Farmers are therefore, unable to bear the risk of crop failure, especially when they are of a disastrous nature. Various methods have been adopted for helping farmers to compensate, at least partially, for loss of their crops through natural calamities [1].

Crop insurance hence is hugely beneficial to the farmers as it cushions the shock of disastrous crop loss by assuring farmers a minimum level of protection [2]. It

## II. METHODOLOGY

The study uses both primary and secondary data extensively. The secondary data has been collected from the published documents of Directorate of Agriculture, Govt of Assam, Agricultural Insurance Company Ltd(AICL), Regional office, Statistical handbook of Assam (2015) and Economic survey Assam 2014-2015.

In order to fulfill the objective, a field survey was conducted among the farmers of the two districts. The sample size was determined by using the **Taro Yamane's (1973)** formulae for sample size determination. The sample size was worked out to be 432 farmers. The farmers were further divided into two categories, Insured farmers and Uninsured farmers. The sample comprised of 282 uninsured farmers selected randomly from 4 blocks from each district. Two blocks were selected from each

division based on the riskiness of the area as classified by State Disaster Management Authority. Farmers were selected both from high and low risk areas. In the present study, Palashbari, Rangia, Salmara and Bilasipara were considered as high risk areas while Hajo, Kamalpur, Dabitola and Agomani were considered as low risk areas. A total of 150 insured farmers selected randomly from the list of insured farmers obtained from the lead bank office (United Co-Operation Bank, Guwahati Regional Branch). The insured farmers were further categorized as loanee farmers (119) and non-loanee farmers (31). The data was collected through a field survey with the help of interview schedules, focus group discussion and pilot survey. Separate interview schedules were used to collect data from the insured and uninsured farmers. Logit model was undertaken to study the factors that influence the purchase of insurance.

### III. RESULTS AND DISCUSSION

#### A. Factors Influencing the Purchase of Crop Insurance among the Insured Farmers

In order to identify the factors that influence the purchase of crop insurance among the insured farmers, LOGIT model of the following type was used [5].

$$Li = \ln \left( \frac{Pi}{1-Pi} \right) = Zi = \beta 1 + \beta 2 Xi$$

In its functional form the model is presented as:

$$Yi = \beta 1 + \beta 2 HH + \beta 3 OCCUP\_P - \beta 4 ACC\_OFF + \beta 5 EDU + \beta 6 FARM\_EXP - \beta 7 DISTANCE\_FI - \beta 8 AGE + \beta 9 TOTAL\_CE + \beta 10 TOTAL\_LAND + Ui$$

The dependent variable **Y** is a dummy variable and takes the value 1 if the farmer is a loanee farmer, i.e., under compulsory coverage and 0 if the farmer is a non loanee farmer, i.e., voluntary coverage. Out of the explanatory variables, the dummy variables are head of the household (HH), taking the value 1 if male and 0 if female; primary occupation of the household (OCCUP\_P), takes the value 1 if agriculture and 0 otherwise; access to off farm income (ACC\_OFF), takes the value 1 if yes and 0 otherwise. The quantitative variables are number of years of formal education (EDU), years of farming experience (FARM\_EXP), distance of the nearest financial institution (DISTANCE\_FI), age (AGE), total consumption expenditure (TOTAL\_CE), and total land holdings (TOTAL\_LAND).

The estimates from LOGIT model is presented in Table I. The table suggests that the probability of participation in crop insurance among the insured farmers is significantly higher for those who have access to non farm income. This suggests a positive relation between access to non farm income and crop insurance participation. It might be that the access to non-farm income acts as collateral towards the loan taken by the farmers. As the farmers will be in a better position to pay off his debts in the event of a crop failure and hence will not become a defaulter. Again education (EDU) has also a positive influence in crop insurance participation. This is very obvious, as educated farmers are expected to have better knowledge about the scheme. Education increases the awareness of the farmers and hence has a positive influence on the purchase of crop insurance. However the

distance from financial institution (DISTANT\_FI) of the farmers has a negative influence on the crop insurance participation. This is because more the distance of the financial institution, lesser is the farmers' accessibility to credit and other financial facilities and hence this reduces the chances of the farmers to be included in the crop insurance program. And finally, an increase in the total landholding (TOTAL\_LAND) has a positive influence in crop insurance participation. An increase in the landholding will imply more area under cultivation and as such more capital requirement. Higher landholding makes the farmers more vulnerable to risk in cultivation. This therefore induces the farmers to purchase crop insurance. This might increase the credit need of the farmer and also the risk involved in cultivation is spread across a larger area. Hence the chances of the farmers to be participating in the crop insurance scheme will increase with an increase in landholding [6].

TABLE I. LOGIT MODEL ANALYSIS FOR FACTORS INFLUENCING PURCHASE OF INSURANCE AMONG THE INSURED FARMERS

Mc-Fadden R-square 0.67  
 Log Likelihood = -14.78969  
 Likelihood Ratio Test: Chi square (9) = 122.808 [0.000]  
 Whites test of heteroscedasticity has been done and corrected using QML standard errors  
 Mean VIF = 1.73

	Coefficients	Standars errors
Constant	-164.412	1086.28
HH_H	-2.288802	2.21659
OCCUP	-0.565911	1.17957
ACCESS_OFF	4.16227**	2.02732
EDU	0.955078**	0.3820
FARM_EXP	-8.28526	72.6541
DISTANCE_FI	-4.61707***	1.24917
AGE	8.30231	72.4836
TOTAL_CE	0.00098	0.003
TOTAL_LAND	0.438395**	0.214484

\*, \*\* & \*\*\* indicates significance at 10, 5 and 1 percent respectively  
 Source: primary data

#### B. Problems Faced by the Insured Farmers under the MNAIS

Though many precautions have taken to remove the inconveniences in insuring the crops by the farmers, yet some of the inherited problems with the product design, have lead to a non - satisfying experience among the farmers. Some of the major problems identified were discussed below.

##### 1) Expeditious settlement of claims

Delays in settlement of claims create dissatisfaction among insured farmers. Delays in settlement of claims are as old as crop insurance schemes. The design of crop insurance schemes involves the participation of several agencies, such as insurance companies, financial institutions and Central and State government agencies. Unless each agency fulfils its roles and obligations in a timely and systematic manner, there is bound to be delay, as it happens again and again at many places.

##### 2) Crop Cutting Experiments (CCE)

Farmers often do not have faith on the CCE's being conducted. There have been instances where the crop cutting experiments have not been conducted as planned.

The farmers have argued that the estimated yield by the CCEs do not reflect the actual yield. In instances they claim that the CCE estimates of crop yield were manipulated in the interest of the implementing agencies. Hence they demand a fair and regular CCE in every season.

3) *Lack of cooperation from officials*

Another important issue is the lack of cooperation from the officials. The farmers have an issue with dealing with the bank and government officials as there is sometimes unduly delay in settlement of claims and issuing of notifications. The farmers often complain that their queries are neglected. They also do not find a particular designated individual in the bank branches to deal with their queries on crop insurance.

4) *Insurance unit*

The area approach often does not work in the interest of the individuals. Since these are large administrative units, considerable differences in yield and level of impact of natural calamities arise. Even in the case of occurrence of a natural disaster, each individual is affected with different magnitude. And this is not reflected under the area approach.

5) *Lack of measures for awareness and insurance literacy among farmers*

For loanee farmers, the premium is deducted at the time of loan disbursement and claim settlements being credited to the farmers loan account. In most of the cases, an illiterate or poorly educated farmer is hardly aware of the existence of the scheme, let alone its benefits.

C. *Suggestions Made by Insured Farmers for Improving Crop Insurance*

The suggestions put forwarded by the farmer is presented in Table II. It is seen from the table that nearly 57 percent of the farmers suggest quick settlement of claims to be made in order to improve the performance of MNAIS. In addition to the rest of the suggestions nearly 30 and 32 percent farmers suggest improvement in the conduct of CCE and issuance of timely crop condition report from the government respectively for better performance of the scheme.

TABLE II. SUGGESTIONS MADE BY INSURED FARMERS TO IMPROVE THE SCHEME

Perception	Respondent
Reduce premium rate	6.67
Quick settlement of claims	56.67
Gram panchayat as unit of loss assessment	1.67
Insurance service at door step	1.67
CCE's in presence if villages	3.01
Adhoc payments of claims	13.38
Timely crop condition report from the government	31.67
Revenue report to the farmers	13.38

D. *Farmers' Awareness and Reasons for Not Availing Insurance by the Uninsured Farmers*

As suggested by the Table III given below, most of the farmers were unaware the crop insurance. It was as high as 91.11 percent in Dhubri and 88.24 percent in Kamrup (R).

TABLE III. FARMER'S AWARENESS ABOUT CROP INSURANCE (IN %)

Districts	Aware	unaware
Dhubri	8.89	91.11
Kamrup ( R )	11.76	88.24

Source: primary data

TABLE IV. RESPONSE OF UNINSURED FARMERS FOR NOT AVAILING CROP INSURANCE

Sl no	Reasons	percentage	
		Dhubri	Kamrup ( R )
1	Cannot afford premium	22.22	3.92
2	Low compensation	6.67	0.00
3	Complex claim settlement procedure	6.67	0.98
4	Disbelieve insurance companies	1.13	27.46
5	People around do not buy	3.33	22.55
6	Do not know where to buy	58.89	45.10
7	Les likely to gain during loss	1.13	0.00

As shown in the Table IV, the basic reason for not availing insurance by the farmers is that they don't know from where to purchase the scheme, followed by reasons like disbelieving insurance companies and unaffordable premiums.

E. *Measures to Deal with Loss Compensation of the Uninsured Farmers*

The uninsured farmers have their own measures to deal with losses [7]. About 40.10 percent of the farmers resort to sale of fixed assets. 20.31 percent of the farmers borrow from friends and relatives followed by sale of livestock (10.42 percent) and nearly 15.63 percent look forward to government aid/relief. (Table V).

TABLE V. RESPONSE OF UNINSURED FARMERS ON THE LOSS COMPENSATION MEASURES

Sl no	Response	Response percentage
1	Sale of fixed assets	40.10
2	Borrow from friends and relatives	20.31
3	Government aid/relief	15.63
4	Sale of livestock	10.42
5	Bank loan	7.81
6	Borrow from money lender	4.69
7	Hypothecation of house/ jewellery	1.01

F. *Factors That Affect the Purchase of Insurance among Farmers*

In order to identify the factors that influence the purchase of crop insurance, a logit model was run on the total sample of 432 insured as well as uninsured farmers. The variables are

$$Li = \ln \left( \frac{Pi}{1-Pi} \right) = Zi = \beta1 + \beta2Xi$$

In its functional form the model is presented as:  
**INSURED** =  $\beta1$  +  $\beta2$  HH +  $\beta3$  OCC -  $\beta4$  ACC\_OFF +  $\beta5$  EDU +  $\beta6$  FARM\_EXP -  $\beta7$  DIS\_FI -  $\beta8$  AGE +  $\beta9$  AWARE +  $\beta10$  CONS\_EXP +  $\beta11$  T\_LAND +  $\beta12$  SIZE\_HLD +  $\beta13$  EXT\_IRRI +  $Ui$

The dependent variable  
**INSURED** = 1 if the farmer is insured  
 = 0, if uninsured

The dependent variable **INSURED** is a binary variable. It takes the value 1 if the farmer is insured under crop insurance scheme and 0 if he is not insured under the crop



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