

AGRICULTURAL INSURANCE ISSUES AND FACTORS AFFECTING ITS ADOPTION: A CASE OF BANANA INSURANCE IN NEPAL

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ABSTRACT

Nepalese agriculture is highly dependent on weather conditions; therefore, managing the agricultural risk associated with the climate change is becoming a key challenge to the country. This study was carried out in 2015 and 2016 to assess key issues, challenges and practice of banana insurance in Chitwan district of the country. Census survey was applied for selecting the banana insurer households whereas simple random sampling was employed for selecting non-insurer farmers for collecting the data. A sample size consisting of 60 households (30 insurers and 30 non-insurers) were used for this study. Collected data were further validated through the focused group discussions and key informants survey. Windstorms was found as the major risk associated with banana production. Besides insurance, banana farmers used different indigenous risk management strategies such as staking, thinning, adjustment in planting time to avoid peak storm time, use of wind break plantation, earthing-up and use of wind resistant varieties. Lack of land entitlement of tenant farmers, inadequate monitoring and the presence of moral hazards in both supply and demand side were important issues to be resolved. The econometric analysis revealed that farmers awareness on claim settlement procedure ($p=0.007$), and group based approach of insurance intervention ($p=0.033$) were significantly contributing to the adoption of the insurance scheme. Therefore, improvement of current claim settlement procedure including awareness raising through farmers institutions are more likely to enhance adoption of existing agriculture insurance schemes among banana farmers.

Key words: climate change, agricultural risk, farmers group, insurance, awareness

BACKGROUND

An agricultural system in Nepal is highly vulnerable to any change in climate (GoN, 2004). Short-duration extreme weather events (such as hail, wind-storm, or heavy frost) can cause devastating direct damage to crops in the fields (Bryla-Tressler, 2011). Droughts, floods, storms, high humidity, high temperature and inundation are major threats to agriculture. Given the low development of the country with subsistence based, rain-fed dominant farming system, complex topography, and higher vulnerability of agriculture to climate change, managing agricultural risk associated with climate change has become a major challenge and priority for the country (Singh, 2011; MoE, 2010; World Bank, 2009).

Agricultural insurance is widely recognized as one of the key options to manage such climate and other risks to farm level production, infrastructure and income (Smit and Skinner, 2002; Warner et. al., 2013). Agricultural insurance schemes help to reduce the risks and vulnerabilities of poor rural smallholders and open their access to a range of financial services for improving their livelihoods. Crop insurance helps farmers to remain creditworthy even in years where there occur loss of major crop and to avoid falling into the poverty trap. More importantly, it may enable them to pursue riskier, but potentially much more profitable farming activities which usually center on the use of credit to purchase new production enhancing technology (IFAD & WFP, 2010; Ghimire 2013).

Agriculture and livestock insurance have gained importance in recent years in Nepal due to abrupt changes in climatic conditions resulting in large scale damage to the production system. The Ministry of Agricultural Development introduced a subsidy policy on the premium paid for crop and livestock insurance in June 2013. The government has made remarkable investment in the form of subsidy support on insurance premium paid by the farmers which was 50 percent in 2013/14 and later increased to 75 percent since 2014/15, and human resources

for facilitation of agricultural insurance services to the farmers (Ghimire et al., 2016a). The current agricultural insurance scheme covers many agricultural commodities such as paddy, vegetables, fruits, potato, livestock and poultry and many risks including climate change induced events, (flood, drought, landslide, windstorm, hail, snow, frost), disease, pests, fire, lightning, earthquake, and other emergency accidents that are likely to cause damage on agricultural production.

The Government of Nepal (through the Insurance Board) in January 2013 introduced crop and livestock insurance directives. The directive has made it mandatory to non-life insurance companies to offer agricultural insurance. Insurance companies are also encouraged to submit their schemes for approval by the Insurance Board. Due to this provision, seventeen out of out of 19 non-life insurance companies have offered agricultural insurance services (Ghimire et al., 2016a). Apart from this, farmers' Cooperatives and groups, and Credit Security program of the Agricultural Development Bank have also been implementing agricultural insurance schemes in various parts of the country with different modalities. Prior to these recent initiatives on agricultural insurance, insurance schemes particularly in livestock were also in operation as pilot projects in Nepal through the Small Farmer Cooperative Limited (SFCL) and the Community Livestock Development Programme (CLDP), under the technical and financial assistance of international development agencies.

Although agricultural insurance in Nepal came into effect formally since last few years, its scaling-up across regions and crops has been a challenge. The crop insurance program has been spreading slowly. Government of Nepal (GoN) has also made insurance of crops mandatory to provide grant in government support projects and programs. youth self-employment program. It is getting popular in different crops such as mushroom, cabbage, tomato, cauliflower, cucumber, banana, potato and rice. However, the coverage is still low. Banana farming is spreading in recent years in Nepal. It is one of the highly susceptible crop in Nepal to extreme environmental hazards mainly windstorm. Other risk factors for the crop include disease and pests. To prevent such losses, banana farmers are more attracted to insurance compared to other crop farmers. Therefore, banana insurance provides ideal case for in-depth understanding of underlying issues, limiting factors and existing practices of risk management strategies at the farm level. The output of the study will be helpful to devise appropriate agricultural insurance strategies and governance system helpful for its scaling-up.

METHODOLOGY

Banana insurance in Chitwan district of the country has been taken purposively for this study as the district is one of the main banana growing areas. The study employed combination of different tools/methods which includes the Desk Review, Focus Group Discussion (FGD), Household Survey and Stakeholder's Panel Workshop with experts relevant to agricultural insurance program implementation in Nepal. The stakeholder interaction workshop was carried out with the participation of researchers, extension officials, insurance companies, cooperatives and farmers engaged in insurance schemes as well as farmers who were not involved in agricultural insurance. The main objective of stakeholder workshop was to elicit expert knowledge and experiences of different stakeholders on implementation of agricultural insurance and validate the field empirical findings.

Similarly, focused group discussion was conducted involving 12 farmers (8 insurers and 4 non insurers) with the help of checklist to assess their views on agriculture insurance. A household level survey was conducted to study farmers' response to insurance schemes, indigenous risk minimizing tools/techniques/methods and determine factors affecting adoption of agricultural insurance among banana growers. There were many banana growers in Chitwan, but agricultural insurance was adopted by only 30 farmers at the time of this survey. Therefore, all the adopters were taken, along with 30 non insurer banana growing households randomly selected from the adjoining village which resulted in the sample of 60 growers. The data collected were analyzed using qualitative and empirical

methods.

Econometric analysis: Binary Logistic Regression

For binary dependent variable, a logistic regression has been used (Gujarati, 2004). In order to estimate the probability of a farmer having Insurance in banana crop, a logistic regression was used. It is a multivariate statistical tool with the help of which dichotomous dependent variables can be predicted from the dependent variables (Agresti and Finlay, 1986; Gujarati, 1999). It is based on the cumulative logistic probability function.

For a single independent variable X_i , the probability P_i of an event occurring can be written as:

$$P_i = (Y = i / X_i) = b_0 + b_1 X_1 + m \dots\dots\dots (i)$$

$$P_i = 1 / (1 + e^{-(b_0 + b_1 X_1)}) \dots\dots\dots (ii)$$

Where, b_0 and b_1 are coefficients to be estimated from the data, X_i is independent variable, Y is dependent variable, and e is the base of the natural logarithms.

Equation (ii) denotes the cumulative logistic distribution function for a single variable. If there is more than one independent variable the model could be written as

$$P_i = 1 / (1 + e^{-Z_i}) \dots\dots\dots (iii)$$

Where, Z_i is the linear combination of independent variables

$$Z_i = b_0 + b_1 X_1 + b_2 X_2 + \dots\dots\dots + b_n X_n \dots\dots\dots (iv)$$

Here the equation (iii) represents what is known as the cumulative logistic distribution function for n number of independent variables. If P_i is the probability of an event occurring, then the probability of an event not occurring is given by $1 - P_i$. Therefore,

$$1 - P_i = 1 / (1 + e^{Z_i}) \dots\dots\dots (v)$$

Therefore we can write,

$$P_i / (1 - P_i) = (1 + e^{Z_i}) / (1 + e^{-Z_i}) = e^{Z_i} \dots\dots\dots (vi)$$

If we take the natural log of the odds equation (vi), the following result is obtained which can be written as:

$$L_i = \ln (P_i / (1 - P_i)) = Z_i \dots\dots\dots (vii)$$

$$= b_1 + b_2 X_i$$

where L is the log of the odds ratio or logit.

The logistic regression model was run considering the dependent variable as adoption of agriculture insurance in Banana crop ('Yes' or 'No') against various explanatory variables to predict the probability of adoption on Agriculture Insurance. Here the Adoption of Agriculture Insurance in Banana crop was the dichotomous dependent variable. The explanatory variables tested in the model were perceived claim settlement procedure (1 easy, 2 difficult); Knowledge of Insurance from Group/Cooperative (1 for yes, 0 otherwise); Banana cultivated Area (Kattha); Total land (Kattha); education of the household head (1 for higher secondary and above, 0 otherwise); Economically active population (number); Knowledge about subsidy given on insurance premium by government (1 for yes, 0 otherwise).

RESULTS AND DISCUSSION

Current status of banana insurance in Chitwan

Banana is being grown since time immemorial in home yards for home consumption purpose (Gautam and Dhakal, 1994). Now farmers started to cultivate it in commercial scale. According to Banana Farms Promotion and Development Center, the Chitwan district is the leading bananas producing district earning NRs 150 million before 2010/11. Banana production in the district increased by a whopping 566 percent over the past decade (Hamal, 2014). In the year 2014/15, 1320 hectare of land has been used in commercial banana farming by 525 households in the district. During the survey period, only 30 farmers were involved in Agricultural insurance program covering 79 hectares of land. This number now has increased to 180 with value of NRs 14.5 crore (NRs 14.5 million) in the year 2016. Prudential Insurance, Nepal Insurance and Shikhar Insurance were the major insurance providers in the district covering 60%, 35% and 5% of insurance market (Personal Communication with Mr. Bishnu Hari Pant, Chairman of Banana Producers Association of Chitwan district, August 2016).

Major issues associated with implementation of agricultural insurance scheme

Banana farming was exposed to various risks in Chitwan district. Windstorms was reported as the major risk by more than 90 percent of the farmers both insurer and non-insurer in Chitwan district. Disease and insects rank second and third important sources of risk respectively (Figure 1). Word Bank (2009) reported heavy losses of banana due to wind in Chitwan and Nawalparasai district of Nepal. Majority of the banana growers in the study area had also experienced huge crop losses from the windstorms in the past and were more attracted towards current agricultural insurance schemes for preventing such losses. However, there was a problem for having insurance on crops grown in the leased land because insurance company demands land entitlement certificate (Lalpurja). Having inability to provide such documents, many farmers were not able to insure the crops despite their willingness. Similarly, the provisions like a mandatory requirement of a recommendation from VDC secretary for making claims on the losses is tedious to the farmers. Cases of incomplete claim settlements were found which affected farmers' decision to ensure their crops (Ghimire et al., 2016b). As a rational behavior, the farmers having newly established banana orchard (one to two years old) were not interested for purchasing insurance policy due to their perceived low minimum crop losses during the early years of crop plantation as compared to later productive stages.

Similarly, a standard plant density of 1400 plant per bigha was fixed in the study area in order to find the number of plant loss. Farmers generally tried to plant more dense and claim for number of damaged plants maintaining the standard density. Insurance companies had also the tendency of reporting less number of damaged plants (Ghimire et al., 2016b). Thus moral hazards were observed from both sides. Therefore, there is a need of developing controlling mechanism for such moral hazards. The current insurance scheme for crops is based on cost of crop production, which is mostly developed through DADO and with limited or no participation of farmers and insurance companies. The cost of production calculated during 2012/13 was still in operation though there was occurrence of many changes in price of the inputs, land rent and other cost items. Therefore, farmers expressed a need of updating it with participation of the concerned stakeholders (farmers, insurance companies, DADO and technical experts). Similarly, provision requiring land owner certificates for crop insurance also needs to be revised so that crops grown in the leased land could also be insured.

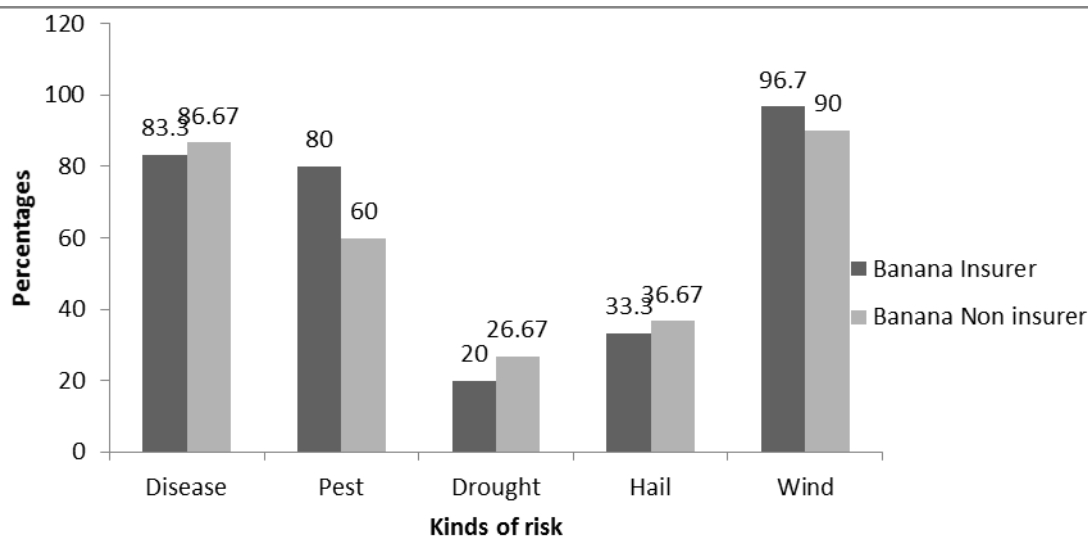


Figure 1: Type of risks to banana farmers in Chitwan district

(Source: Field survey, 2015)

Risk reduction and management strategies adopted by farmers in banana

Farmers in the study area were using different indigenous techniques for risk minimization from the climatic events such as growing of healthy saplings, variety change (shift to Malbhog from Green Banana eg. Harisal, JhapaliHariyo to William hybrid, G-9), use of bamboo staking (Teka), row planting to protect from wind, clean cultivation (removal of dead leaves, unwanted suckers), use of pesticides and insecticides and planting time adjustment to avoid storms (Ghimire et al., 2016b). Adoption of banana insurance was slowly gaining pace in the study area for minimizing the risks in banana farming. Besides insurance, use of pesticides/insecticides and staking were the important tools used for risk minimization by the farmers. The practices like adoption of earthing-up in banana crop were found higher in non-insurer farmers (43.34 percent) as compared to insurer farmers (23.3 percent) to protect bananas from the risk of wind. However, adoption of orchard management was higher in insurers as compared to non-insurers. Similarly, variety change was one of the options for climatic risk minimization and adopted by more than 50 percent of both insurer and non-insurer farmers. Farmers were slowly replacing the green variety with malbhog variety (eg. Harisal, Jhapali Hariyo to William hybrid, G-9) because of more susceptibility of the green varieties to wind. Similarly the insured farmers were found planting the wind breaks (perennial trees) and adjusting the planting time to escape fruiting time from March-April (Falgun/Chaitra) at which there is high chances of windstorm occurrence leading to heavy damage to banana crop (Table 1). Higher percentage of insured farmers were found having better knowledge and access to technology than non-insurer farmers. Therefore, these farmers were found practicing orchard management, planting wind breaks and adjusting planting times as compared non-insurers.

Sources of information

Table 2 shows the sources of information for the farmers about the agricultural insurance. Among different sources available, farmers group (banana production groups) was found to be the major source of information for majority (96.7 percent) of the insurer farmers and non-insurer (63.3 percent) farmers. District Agriculture Development Office (DADO) remained as another major source of information for insurer farmers, whereas, for non-insurer farmers, radio, TV were major source than DADO for the agriculture insurance related information. This may be due to regular contact of insurer farmers with the DADO office and its staff. Only 20 percent of the total farmers obtained agricultural insurance related information through the insurance agents indicating a need of active involvement of such agents further for information dissemination.

Table 1: Different risk reduction strategies used

Different risk reduction strategies	Banana insurer(n=30)		Banana non-insurer(n=30)	
	Frequency	Percentages	Frequency	Percentages
Crop insurance	30	100	0	0
Use of pesticides/insecticides	30	100	27	90
Staking	21	70	20	66.67
Orchard management	26	86.7	12	40
Use of compost/fertilizers	9	30	15	50
Earthing-up	7	23.3	13	43.34
Variety change	18	60	15	50
Planting wind breaks (Perennials trees)	5	16.7	NA	NA
Adjustment in planting times	11	36.7	NA	NA

(Source: Field survey, 2015)

Table 2: Different sources of information on insurance

Sources of information for crop insurance	Banana insurer(n=30)		Banana non-insurer (n=30)	
	Frequency	Percentages	Frequency	Percentages
Insurance agents	6	20	3	10
DADO	12	40	9	30
Newspaper	7	23.3	8	26.67
Radio	6	20	10	33.33
TV	6	20	12	40
Farmers group	29	96.7	19	63.34

(Source: Field survey, 2015)

Factor affecting adoption of Agriculture insurance in Banana

Logistic regression model was used to analyze the effect of different explanatory variables on adoption of agricultural insurance in banana farming. Adoption of Agriculture Insurance in Banana crop was taken as the dichotomous dependent variable. The explanatory variables tested in the model were perceived claim settlement procedure (1 for easy, 2 for difficult); Knowledge of insurance from Group/Cooperative (1 for yes, 0 otherwise); banana cultivated area (Kattha); Total land (Kattha); education of the household head (1 for higher secondary and above, 0 otherwise); Economically active population (number); Knowledge about subsidy given on insurance premium by government (1 for yes, 0 otherwise). R Square value shows about 46% variance covered by this model. Among the different explanatory variables, farmers knowledge on claim settlement procedure ($p=0.007$), and insurance scheme from groups and cooperative ($p=0.033$) were found to be the key factors for significantly contributing the adoption of the insurance. The odds ratio indicated that it is about 94 percent likely to have reduced adoption of agriculture insurance in banana if the farmers do not get information from organized institutions such as group and cooperatives compared to those who were getting information from such institutions. Similarly, it is more than 700 percent likely to have increased adoption of agricultural insurance in Banana if farmers feel easier claim settlement procedure and build their faith on insurance company compared farmers those who were finding difficulties in claim settlement procedure.

Table 3: Binary Logistic regression estimates predicting the effect of different explanatory variables on adoption of insurance scheme in Banana

Explanatory Variables	Odds Ratio	S.E	P-value
Perceived claim settlement procedure (1 easy, 2 difficulties)	8.017	.776	.007***
Knowledge of Insurance from Group/Cooperative (If yes 1, 0 otherwise)	.058	1.335	.033**
Banana cultivated Area (Kattha)	1.001	.002	.623
Total land (Kattha)	1.003	.012	.794
Education of the household head (1 higher secondary and above, 0 otherwise)	1.054	.839	.950
Economically active population (no)	1.306	.291	.359
Knowledge about subsidy given to premium by government (if yes 1, 0 otherwise)	.000	10541	.998
Constant	.186	1.442	.244
Log likelihood	46.26		
Cox & Snell R Square	.459		

Note: * Significant at 0.01, and ** significant at 0.05 ; S.E= Standard Errors**

Suggestion for improving the agricultural insurance

Various suggestions were received from both banana insurer and non-insurer farmers for improving the current agricultural insurance scheme (Table 3). More than 70 percent farmers (both insurer and non-insurer) suggested a need of making claim settlement procedure easy and quick than the existing. The result is also correlated with the study of Abdulmalik et al. (2013) in Nigeria which showed that the major challenge faced by farmers in the course of their participation in agricultural insurance was delay in indemnity payment. Only 20 percent insurer farmers suggested increasing the indemnity level, which shows that farmers were satisfied with the current level of indemnity. About 53 percent of insurer farmers and 46.67 per cent of non-insurer farmers suggested a need of organizing awareness raising programs on agricultural insurance to the farmers. About 34 percent of both insurer and non-insurer suggested for making documentation process easy because farmers feel tedious to fulfill all the documentation process in the existing scheme. Among insurers about 34 percent farmers suggested to design insurance products so that it covers more risk under the scheme.

Table 4: Suggestion for improving the agricultural insurance scheme

Different suggestion given	Banana insurer(n=30)		Banana non-insurer(n=30)	
	Frequency	Percentage	Frequency	Percentage
Reduce premium	4	13.3	8	26.67
Quick settlement of the claims	26	86.7	22	73.33
Insurance service at door step	12	40	15	50
Raise the indemnity level	6	20	3	10
Awareness program should be launched	16	53.3	14	46.67
Should improve the implementation mechanism	13	43.3	5	16.67
Documentation process should be easy	10	33.3	10	33.34
Cover more risk under schemes	10	33.3	NA	NA

(Source: Field survey, 2015)

CONCLUSION

Agricultural insurance is being practiced in Nepal largely through the governmental subsidy support and in partnership with the private sector (insurance companies) since last few years. Agricultural insurance being recently introduced, is growing but in a slow pace in Nepal. Banana farmers in Chitwan district are also increasingly attracted and adopting current insurance schemes to prevent the huge crop losses from the various risks. More than 90 percent farmer's major risk was found to be wind storms that was more likely to cause heavy damage to their crops during the month of Feb/Mar-June/July. Disease and pest are also other important risks after windstorm. Farmer's network was the major information source for banana insurance for the farmers. Banana Entrepreneur Association was the key institution of farmer playing key role in organizing farmers for banana farming and also involving them in crop insurance schemes. Farmer's knowledge on claim settlement procedure and insurance schemes were found to be the key factors for significantly contributing the adoption of the insurance scheme in banana crop. Therefore, it is suggested to develop easy and quick claim settlement procedures and implement awareness raising programs through institutional sources for enhancing making more interactive sharing on agricultural insurance and increasing its adoption among the farmers in Nepal. Some of the issues such as requirement of land entitlement certificate for crop insurance; and, slow and incomplete (in some cases) claim settlements for the crop losses were found to be the key factors for having limited participation of farmers on banana insurance and it needs to be improved for ensuring more participation of farmers on existing insurance scheme. Furthermore, it is found that newly established banana orchard (one to two years old) were not interested for purchasing insurance policy due to their belief that there would be minimum crop losses during the early years of crop plantation as compared to later productive years. However this factor was not considered due to unavailability of household level data during econometric analysis, so it is suggested to include this factor in future study. The current insurance schemes for crops are based on its cost of production which was not updated since its implementation. Therefore, there is a need of updating the cost of crop production calculation with changing time and participation of the concerned stakeholders.

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