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Adoption of Livestock Insurance among Dairy Farmers at Chitwan, Nepal

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ABSTRACT

Natural calamities, disease and pest, and unpredictable weather possess a high risk in livestock farming and cost a heavy loss to the farmers. Livestock insurance is one of the important strategies to reduce the risks related to livestock production. To assess the adoption process and impact of livestock insurance on dairy farmers, a study was conducted at Chitwan district among the 98 farmers (insured and non-insured) sampled using stratified random sampling. Descriptive statistics were used to analyze the socio-economic and demographic variables of insurer and non-insured farmers. Probit model regression was used to analyze the impact of different variables on adoption of livestock insurance. In addition, t-test was also done to compare the numeric mean value of the variables of two categories of respondent, insured and non-insured. The Probit model results revealed that the age, gender, income from livestock, awareness about insurance and awareness of subsidy on insurance have a significant (p<.05) effect on the adoption of livestock insurance. The result of Chi-square test suggests that members of a farmers group/cooperatives, subsidy, loan and members of community agents have a significant (p<.05) effect on the adoption of the livestock insurance. The study underscores the need for a strategic policy to promote livestock insurance in Chitwan district. Both the government and non-life insurance companies must prioritize enhancing farmer awareness and understanding through targeted advertising and training to establish credibility and reliability. These findings will be helpful for the improvement of different livestock insurance policy and programs implemented by different government bodies and insurance companies.

Keywords: Adoption, constraints, impact, livestock insurance, risk

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INTRODUCTION

Agriculture in Nepal possess multiple peril due to biotic and abiotic factors making this sector more prone to risk (Subedi and Dhakal, 2018). Asymmetric climate condition, increasing disease and pest infestation, natural calamities are directly threatening the farmers. Farmers in the third world countries not only have climate challenges but also the techno-economic shock due to which people in under developed countries are shifting their interest from agri-livestock to other businesses. Despite of being the major sector of GDP contribution in Nepal the risk management in the agriculture is insignificant. Although, agri-insurance sector is one of the heavily subsidies and priorities product of government of Nepal the adoption of agricultural insurance is minimal as much as it can be around 0.68% due to shortage of distribution, extension channels, knowledge and perception of the farmers. Almost half of the population of Nepal directly involved in agriculture sector; in contrast to which people area facing economic loss more than its threshold level making this industry highly vulnerable to shift towards commercialization from traditional practices.
Natural disaster risks have increased in Nepal over the past three decades, making it ahigh-risk area. Their homes were damaged, their way of life was disrupted, and they suffered significant losses. Disease outbreaks are a significant barrier for farmers engaged in who raise animal husbandry (Newar et. al, 2008).

People are constantly seeking safety, whether it be for their life or their possessions. People today are more exposed to uncertainty as a result of the rapid economic and industrial development that has occurred, therefore they are eager to have both physicalandfinancial security. Consumers are not risk-averse and favor predictableconsumption over unsafe use. This just means that risk should be taken into account when making decisions rather than being completely avoided. From the perspective ofan agricultural producer, insurance is a way for them to shift their risk to an insurance provider in exchange for a premium payment. A company that offers insurance is referred to as an insurer, insurance carrier, insurance company, or underwriter. An insured or a policyholder is a person or thing that purchases insurance.

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One of the emerging solutions to transfer agriculture and climate risk is insurance. This study aim to explore the factors of adoption of livestock insurance by milk producing farmers in Chitwan district along with the satisfaction level of dairy farmers from livestock insurance and factor associated with hindrances of adoption of the insurance.

MATERIALS AND METHODS

Study area and sample size and data collection techniques

Chitwan districts of Bagmati Province Nepal was selected purposively for this study because of availability of the highest number of commercial dairy farmers available in this area. On top of that, Chitwan is one of the highest cattle insurance policies issued district with 1, 02,997 policies (MoALD, 2022).

The primary information was collected by using the pre-tested household survey with the farmers. Also seven key informant interview survey in each local government and three focused group discussion were performed to collect more information for this study. All total 98 samples were selected for this study using stratified random sampling. . Among total farmers interviewed 49 of them were insured cattle farmers and 49 of them were non-insured who were equally distributed among the 7 municipalities of the Chitwan district. The KoBo collect toolbox software was used to collect data and MS excel was used for processing of the raw data and analyzed using SPSS. No animal were hard during this study.

Identification of determinants factors affecting decision to adopt livestock insurance

To identify factors affecting farmer's decision to adopt livestock insurance in the study area a probit regression model was used. Literature review on probit model was done to determine the factor affecting the adoption of livestock insurance (Subedi et. al, 2018). The probit model is used when a choice is to be made between two alternatives; in this study, decision to either adopt (or not adopt) livestock insurance. This statistical model defines a relationship between probability values and explanatory variables, ensuring that the probability values stay within the range of 0 and 1. This model is also adopted by Fadare et al, (2014) to study adoption of improved agricultural insurance. Different independent variable and

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their statistical description used in this model are given in Table 1.

The following model was used to identify factors affecting adoption of the livestock insurance in the study area.

$$Pr(\text{adopting livestock insurance} = 1) = f(b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + b_{15}X_{15} + b_{16}X_{16} + b_{17}X_{17} + b_{18}X_{18})$$

Where,

Pr = Probability score of adopting livestock insurance
X_1= Gender of the household head (Dummy)
X_2= Age of the household head (in years)
X_3= Number of schooling years of the household head (in years)
X_4= Cattle farming experience (in years)
X_5= Major occupation of the household (Dummy)
X_6= number of family members involved in agriculture
X_7= LSU (livestock standard unit)
X_8= Land holdings (Continuous)
X_9= Credit access (dummy)
X_{10}= Membership of organization (Dummy)
X_{11}= Any agricultural or livestock related training (Dummy)
X_{12}= Number of trainings received
X_{13}= Knowledge on livestock insurance
X_{14}= Knowledge on livestock insurance subsidy
X_{15}= Knowledge on livestock insurance plan policies
X_{16}= Farm productivity
X_{17}= Number of times farm visit of agricultural technician in a year (number)
X_{18}= Grants (dummy)
$b_1, b_2 \ldots b_{18}$ = Probit coefficient, b_0 = Regression coefficient

Hindrances associated with livestock insurance adoption

Indexing/Scaling technique was applied to construct an index for prioritizing the hindrances. Indexing has been used in several studies (Sapkota et al., 2018; Subediet al., 2019). The scaling techniques provide the direction and

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extremity attitude of the respondents towards any proposition. Based on responded frequencies, weighted indexes were calculated for the analysis of farmer's perception on the extent ofproblems/hindrances. Farmer's perception to the different production problems/hindrances was ranked by using five-point scales. The formula used to determine the index for intensity of various problems/hindrances is:

$$I_{prob} = \Sigma \, Sifi/N$$

Where, I_{prob} = index value for severity or intensity of problem

Σ = summation

Si = scale value at i^{th} intensity

Fi = frequency of the i^{th} severity

N = total no. of the respondents

Where, I_{prob} = index, 0< | <1

+ indicates positive sign; - indicates negative sign.

Table 1. Statistical description of different variables used in the probit regression model

Variables	Description	Value	Expected sign
Age	Age of the household head	Years (in number)	+/-
Gender	Gender of the household head	Male =1, otherwise =0	+/-
Education	Number of schooling years	Years (in number)	+/-
Typology			
HH income	Household overall income	Annual income of the family (NRs.)	+
Income_Liv	Total income from the livestock sector	Annual income from the livestock sector (NRs.)	+
Aw_insu	Awareness of the household head on livestock insurance	Aware of livestock insurance policy (yes =1, otherwise =0)	+
Aw_sub/loan	Awareness of the household head on the loan and subsidy scheme provided by government	Subsidy/loan received (Yes=1, otherwise =0)	+

An Unpaired t-test were performed to compare farm income of insured and non-insured cattle farmers. In addition, chi-square test were also performed to check

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the effect of farmer's involvement in group has any effect on buying cattle insurance.

RESULTS AND DISCUSSION

Socio-economic and demographic characteristics of the household

Livestock insurance is a very innovative and new risk management tool available to the farmers who need the conscious effort of the household head to decide to adopt or not. Age, education and experience of a head play an important role in farming. In our study the average age of the household head (HH) was 48.54 years with the majority of the HH age ranges from age 20 to 85 years in the study area. The schooling year of the household head was found to range from 0 (No formal education) up to Ph.D., which means the household head of the study area ranges from illiterate to highly educated. The mean dependency ratio in our study area was 16% meaning that 16 people out of 100 are dependent. It was revealed that age and number of educations doesn't have any significant impact in the adoption of livestock insurance (p = .76 & p = .13).

The average landholding in the study area was 0.57 hectares with the mean land holding of 0.1 ha in animal rearing. It was observed that male HH (68%) dominates the number of female HH (32%)The majority of men involvement suggests that the livestock industry is labor-intensive, with men typically serving as the family's leader (Akinola, 2014). This is might due to the patriarchal nature of Nepalese society, which has been practiced for long years. It was found that out of total sampled household heads, 16% of the household heads have agriculture as their primary occupation while, 64% of the people are engaged in livestock production sector which shows the importance of livestock in study area. The household with business, services and others as primary occupations are 8 %, 3% and 5 % respectively. Out of total household income, the main source of income from dairy production is 64 %, and 16 % comes from crop production and 20 % comes from other occupations.

Impact of economic variables with the adoption of crop insurance

Income is one of the major encouraging factors for the livestock insurance because farmers need to pay some amount as premium to the insurance company. It was found that the total household income from the livestock was found

NEPALESE JOURNAL OF AGRICULTURAL SCIENCES,
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significant (p <.006) in the adoption of livestock insurance in study area of Chitwan district. In terms of involvement of farmers in group, it was found that 21% respondents were involved in cooperative/farmer groups of membership and all of them have insured their livestock. Study reveals that the farmers' institutional involvement has significant effect in adoption of insurance (p < .001).

Table 2. Factors affecting adoption of the livestock insurance in Chitwan district

Variables	Coefficients	P > |z|	Standard error	dy/dx[b]	S.E[b]
Age	0.056*	0.026	0.025	0.021	0.009
Gender	-1.068*	0.054	0.553	-0.369	0.159
Education	1.186	0.102	0.726	0.446	0.245
Respondent typology	0.393	0.387	0.454	0.149	0.170
Major Source of Household	2.022***	0.001	0.615	0.687	0.146
Income from Livestock	0.440**	0.014	0.179	0.167	0.067
Awareness on Insurance	1.383*	0.030	0.638	0.508	0.191
Awareness on Subsidy Loan Scheme	2.606***	0.000	0.657	0.783	0.105

*** 1% level of significance; ** 5% level of significance, * 10% level of significance. [b]Marginal change in probability evaluated at the sample means.

Summary statistics	
Number of Observation	98
Log Likelihood	-22.75
LR Chi-Squared (8)	73.54*** Prob>chi^2 =0.000
Pseudo R^2	0.62
Predicted Probability	0.00
Goodness of fit	Pearson Chi^2 (77) = 70.45. Prob>chi^2 =0.69
Area under ROC curve	0.96

Study showed that there is a 54% increase in the likelihood that a responder will purchase livestock insurance if they are members of groups or cooperatives (Devkota et al., 2021). It was found that the insured farmers were significantly involved in taking mandatory loan and subsidy from the government (p<.001).

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Factors affecting adoption of livestock insurance

A probit model regression was run to see the effect of different socioeconomic factors on the adoption of livestock insurance. The total of 9 variables were selected for the probit model in study based on pretest results. It was found that the age (p<.05) and gender (p<.01) are two of the important factors that significantly effect on the adoption of the insurance among the social factors. The gender shows negative significance means female where less adaptive for the livestock insurance compare to the male while, education showed positive significant (p<.1) effecting our study area which contradicts the findings of Kwadzo *et al*. (2013). Likewise, major source of household income (p<.01) and income from livestock (p<.05) have significant effect on the adoption of livestock insurance.

Awareness on insurance (p<.05) and insurance subsidy scheme (p<.01) have positive and significant in adoption of livestock insurance which is because of increase in their knowledge and perception towards the importance of the insurance. The probability of insurance adoption increases with the increase in awareness about the insurance (Aina and Omonona, 2012; Babalola, 2014). Awareness helped farmers to realize the need for insurance and understand the procedures of insurance.

Half of the total respondent were those people who have bought insurance for their dairy livestock, the motivation behind investing in an insurance plan was recorded and ranked using preference ranking method, from the analysis it was revealed that the risk coverage of the insurance was the number one motivation for the farmers (4.7). The satisfactory insurance policy and high premium return were given the equal importance with weighted value of 3.43. The good service of the insurance company was ranked last with the weighted mean value of 1.4.

Assessment of constraints associated with the adoption of livestock insurance in Chitwan district

The preference ranking of farmers on constraints for taking insurance revealed that one of the major reasons for farmers to not insured their livestock was people were unable to understand the product (Shrestha, 2024), as it is very new to Nepal. In addition to that, high premium cost rank second among all with the weighted value of 0.62 (Ortmann & Mohammed, 2005) followed by the delay in the claim

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process of the insurance which is similar to the findings of (Subedi & Kattle, 2021).

Lengthy process of insurance and low payout are two major factors ranked in 4th level a similar finding from (Thapa and Bam, 2020). Among all the reasons insurance company asking for too many documents ranks last with the weighted value of 0.45 in the study area. While in a study at Nawalparasi district, it was found that the reasons for not adopting the insurance of livestock was distrust in the scheme/agency (100%), insufficient awareness (46.66%), limited ability to pay premiums (20%), complicated documentation procedures (13.3%), and delays in claim settlements (6.7%) (Ghimire et al., 2016).

Table 3. Hindrances associated with the adoption of livestock insurance in the study area

S.N.	Constraints	Index Value	Rank
1.	Farmers don't understand the product	0.71	I
2.	High premium cost	0.62	II
3.	Delay in providing claim amount	0.61	III
4.	Lengthy process of enrollment	0.57	IV
5.	Insurance company ask too many documents	0.45	V

I = least serious, II = little serious III = moderately serious IV = Serious V = most serious

It was found that 12 % of insured farmers were strongly satisfied with the premium amount followed by 34 percentage of farmers, moderately satisfied with the premium amount to be paid. Moreover, higher percentage that is 48 percentage were neutral towards the premium amount to be paid while only 6 percentage were dissatisfied with the premium amount to be paid for the insurance company. Furthermore, under two conditions, farmers were asked if they would begin or continue to purchase the premium plan. The first condition was if the premium were twice of now where 58% farmers answered yes while 42% farmers answered negative. For another condition that is if the premium amount were half of now, 76 % farmers agreed to continue the plan which align to the findings of (Devkota et al. 2021) while 24% farmers didn't agree.

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Each insured farmers were asked about their feelings after investment in insurance plan and asked them to categorize their feelings among five options. The result shows that 68% of insured farmers felt good after making investment in insurance plan; 12% of insured farmers were averagely satisfied and 20% of insured farmers were completely satisfied after investing in the insurance plan. Insured farmers were asked if they made claim for compensation during investing on the insurance plan and the following result were obtained. Only 16% of farmers had made the claim for compensation while 84% of farmers didn't. From the farmers who made claim for compensation, it was known that the average amount to make the claim for compensation was NRs. 73,688 and average amount received as compensation was NRs. 87,250. The average period taken by the company to pay back the compensation was 68 days. Moreover, about 63% of farmers who made claim for compensation found it difficult to receive the compensation for loss among them half of respondent said it was very hard or hard to receive the compensation while half of respondent said the difficulty was normal or easy, a similar finding was reported by Ghimre et al. (2016). With increased knowledge of insurance, the likelihood of adopting an insurance policy rises (Akinola, 2014). A chi-square test was done to assess the awareness level of farmers who are involved in livestock insurance and those who were not. It was found that the insured farmers were aware of the insurance and the subsidy provided by the government ($p < .001$). Government subsidy (80%) is one of the motivating factors for people to insure their livestock and crops, it was asked that if the government lift off the subsidy would they even get the insurance of their livestock, and the result shows that the already insured farmers are willing to insure their animals ($p < .001$). Implementing livestock insurance as a risk management tactic is therefore highly influenced by awareness (Devkota et al., 2021).

CONCLUSION

The study looked at why dairy farmers in Chitwan do or don't get livestock insurance for their animals. It found that things like how old they are, how much education they have, how much money they make, and how much they know about insurance all affect if they get insurance for their animals or not. Farmers who are older, have more education, make more money from their animals, and know more about insurance are more likely to get it. In the study, it was found that the total land holding of the respondent, crop cultivation land and land for animal rearing has the significant effect on the insurance as explained by the probit regression.

The study also found that farmers who have support from institutions, like getting loans or help with paying for insurance, are more likely to get insurance. Farmers who already have insurance are more involved with these kinds of support than those who don't have insurance. It was also found that farmers think about risks, like diseases and problems with having babies, when they decide if they want insurance or not. And how they feel about the insurance, like if they're happy with the rules, how easy it is to get money if something happens to their animals, and how much they have to pay, affects if they want to get insurance.

The study gives suggestions to help make insurance better for farmers. It says that making sure farmers know about insurance, helping them get support from institutions, and fixing problems with how claims are settled and how much they have to pay could make more farmers want to get insurance. By doing these things, more farmers might get insurance, making the dairy farming business stronger.

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