

# CATTLE FARMERS' AWARENESS IN ADOPTION OF RISK MANAGEMENT STRATEGIES IN NAMIBIA: A CASE STUDY FROM THE OMAHEKE AND OTJOZONDJUPA REGIONS

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## ABSTRACT

A sample survey of 269 questionnaires was administered to commercial and communal cattle farmers in the two regions of Namibia, (the Omaheke and the Otjozondjupa) to identify factors which affect the adoption of livestock insurance. About 205 questionnaires were collected and the 64 questionnaires were regarded as irregular responses or not returned. A computer software programme was used to generate a logit model. This model was used to test the alternative risk management strategies used by farmers in the two regions. In addition, this research took into account the off-farm investment and farm enterprise diversification. The Logit model produced results that are statistically significant and negative estimated coefficient of the household characteristics. This implies that the Namibian livestock industry growth can be achieved with improved education, experience and support from other income as way of diversifying risk strategy. However, the positive relationship of variables FTHEFT and PROD implies the sector is suffering from continuous risk of theft and requires quality production to get market access. This necessitates the need for policy makers and insurers to design programme to educate farmers so that they can adopt proper risk management tools and thereby increase their participation in insurance. The low level of education of many farmers in the study area may have negatively influenced the decision to purchase livestock insurance in addition to other factors.

**Keywords:** risk management strategies, Logit model and Namibia livestock industry

## 1. INTRODUCTION

Natural disasters such as floods and bushfires can have a major impact on the management and financial viability of rural properties, as well as major implications for animal welfare. Landholders have a responsibility to ensure that management and property development plans recognise the risks and incorporate the strategies that are necessary to ensure the safety of all persons, livestock and any residential dwellings, and the security of the plants and equipment in the event of such natural disasters. The cyclical nature of production is a characteristic of livestock farming which is primarily caused by climatic conditions such as flooding and drought. However, human-made disasters such as theft and arson present other risks to livestock farmers. To lessen the loss of livestock productivity, it is important to increase insurance awareness campaigns for farmers. Insurance awareness campaigns will help farmers realise the need for livestock insurance and will increase the number of farmers that take out insurance as a means of risk management. Risk assessment and risk reduction strategies need to be considered by Namibian livestock farmers, regardless of the size of their properties. The following are basic elements that assist in developing an awareness of the range of risks and issues (Bowler, 2007). In Namibia cattle farming is the main agricultural production sector and it has an annual estimated value of N\$900 million, of which about N\$400 million is contributed by exporting weaners. The total number of cattle in 2006 was estimated to be 2.3 million (Meat Board of Namibia, 2007).

The objective of this study is to assess the appropriateness of insurance as a risk-management tool for farmers in communal and commercial areas. The research includes a literature study of

the principles, opportunities and problems of risk-sharing strategies in Namibia. Secondly, an empirical study of farmers' perceptions of risk and risk management was carried out by administering questionnaires among a large sample of livestock farmers. Since livestock production is the backbone of Namibia's economy, it is vital for farmers to gain awareness of the importance of insurance. Therefore, this study makes a contribution to improving farmers' know-how regarding risk assessment in their farming activities. Therefore, the main objectives of this paper are to examine factors that influence livestock insurance adoption by livestock farmers in Namibia's Omaheke and Otjozondjupa regions, and to draw some policy implications from the results.

## 2. METHODOLOGY AND DATA

A structured questionnaire was used to identify factors that affect farmers' use of insurance. Semi-structured interviews were conducted with farmers at their respective farms. Information on livestock production characteristics in the smallholder farming systems was obtained from communal and commercial farms in Omaheke and Otjozondjupa. The Omaheke and Otjozondjupa regions are the two major producers of livestock in Namibia. Hangra (2009) shows in his study that communal and commercial farmers in Omaheke registered with the Meat Board of Namibia are estimated to be 5727 and 390, respectively. A number of farmers from Otjozondjupa were unable to register and, upon enquiry, the researcher learnt that the number of farmers would nevertheless be lower than those from Omaheke. A total of 269 questionnaires were distributed to the farmers in these regions. Of this, 42 questionnaires were collected from commercial farmers and about 163 were collected from communal farmers. The remaining 64 questionnaires were either not returned or were regarded as being irregular in terms of the responses. The following household characteristics were included: sex; age; level of training/education attained; farming experience; and the size of the household.

The respondents were chosen on the basis that they were involved in livestock farming in these two regions and because they were "typical" of a group or represented diverse perspectives of livestock farming (Leedy and Armrod, 2000). District interviews were conducted with students residing in these regions. This proved to be a cost-effective way of collecting data. The estimated farmer population data was supplied by agricultural extension officers or village heads and was used as the sampling frames.

## 3. RESULTS AND DISCUSSIONS

### 3.1 Descriptive Analysis

Table 1 shows the diversification of risk, non-farm income and insurance awareness. The research revealed that 95.2% of commercial and 98.2% of communal farmers in the Omaheke and Otjozondjupa regions have no insurance cover for their livestock. They use non-farm income and diversify their farm activities as a means of risk management. Furthermore, the study revealed that 71.4% of the commercial farmers and 92% of the communal farmers in the sample have off-farm income to support their farming enterprise.

The survey results indicate that farmers in Namibia might not insure their livestock. 26.2% of the commercial farmers revealed that they cannot afford to pay insurance premiums, and 27% revealed that they do not see the importance of insuring livestock. Similarly, results from communal farmers show that 17.2% cannot afford insurance and 82.8% do not see the need for it.

**Table 1: Percentage of response to different questions.**

Description	Commercial farmers			Communal farmers		
	Yes	No	No resp.	Yes	No	No resp.
Do you have other non-farm income?	71.4	23.8	4.8	92	6.7	1.2
Do you think insurance is important?	57.1	42.9		93.2	6.8	
Do you have insurance?		95.2	4.8		98.2	1.8
Do you diversify your risk?	33.3	54.8	11.9			

**Table 2: Summary statistics of reasons for not insuring livestock.**

Why did not insure?"	Commercial farmers			Communal farmers		
	Frequency	Percent	Percent	Frequency	Percent	Percent
I could not afford	11	26.2	28.9	28	17.2	17.2
I do not see the importance	27	64.3	71.1	135	82.8	82.8
Total	38	90.5	100	163	100	100
System missing	4	9.5				
Total	42	100				

**Table 3: Summary description of type of farming.**

Type of farmers	Commercial farmers			Communal farmers		
	Frequency	Percent	Percent	Frequency	Percent	Percent
Livestock	29	69.1	76.2	82	50.3	50.3
Mixed farming	13	30.9	23.8	81	49.7	49.7
<b>Total</b>	<b>42</b>	<b>100</b>	<b>100</b>	<b>163</b>	<b>100</b>	<b>100</b>

Table 2 shows that the main reasons why farmers prefer not to insure their livestock. Significantly, 64% of commercial farmers do not see the importance of insuring. This implies that the livestock farmers' awareness of insurance benefits is very poor in the study area (the Omaheke and Otjozondjupa regions).

The result of the study shows that 69% and 50.3% respondents of commercial and communal farmers farming only with livestock. This shows that commercial farmers focus mainly on increasing productivity through specialising. On the other hand, communal farmers responded that they are equally engaged in both livestock and mixed enterprise activities (almost 50%). This implies that the communal farmers try to diversify their farming activities. This could be due to poor resource ownership and a preference to diversify risk and gain the advantage of multiple income streams.

The responses to the idea of diversifying enterprises indicate that about 16.7% of commercial farmers regard profit as the main motive for farming; 9.5% of farmers indicated that they diversify in order to avoid risk; and 4.8% indicated that they diversify to create jobs for their families. On the other hand, communal farmers revealed that about 14% diversify with the expectation of creating jobs; 12.3% do so to avoid risk and 11.7% are motivated by potential profit (see Table 4).

**Table 4: Summary of reasons for diversifying farming enterprises.**

	Commercial farmers			Communal farmers		
	Frequency	Percent	Percent	Frequency	Percent	Percent
To get better profit	7	16.7	53.8	19	11.7	23.5
To avoid risk	4	9.5	30.8	20	12.3	24.7
To create a job	2	4.8	15.4	23	14.1	28.4
<b>Total</b>	<b>13</b>	<b>31</b>	<b>100</b>	<b>19</b>	<b>11.7</b>	<b>23.5</b>
System missing	29	69		81	49.7	100
	42	100		82	50.3	
				163	100	

**Table 5: Summary result of raking for importance of livestock insurance.**

	Commercial farmers		Communal farmers	
	Frequency	Percent	Frequency	Percent
Yes	24	57.1	150	92
No	18	42.9	11	6.7
Total	42	100	161	98.8
Missing System			2	1.2
			163	100

**Table 6: Summary result of degree of livestock insurance importance.**

	Commercial farmers		Communal farmers	
	Frequency	Percent	Frequency	Percent
Very important	16	38.1	139	85.3
Important	7	16.7	11	6.7
Not important	1	2.4	3	1.8
Total	24	57.1	153	93.9
Missing system	18	42.9	10	6.1
	42	100	163	100

Tables 5 and 6 illustrate communal and commercial farmers' perceptions of insurance. The research found that the livestock farmers' perceptions of insurance were positive, which is 92% of the communal farmers responded positively for the question "Did you see insurance is important?" and 57% commercial farmers believed insurance is important (see Table 5). When the respondents were asked how important insurance is to their livestock, 85% of communal farmers and 38% of commercial farmers said it was very important (see Table 5). This implies that the insurance companies in Namibia do not give much weight to advocating livestock insurance; this might be due the nature of the farms or because farming enterprises sometimes manipulate the insurance system.

### 3.1 Model

In explaining a model's dependent variable ( $Y_i$ ) (where one represents the farm enterprise that is diversified to minimise risk and zero represents not being diversified), different regression methods can be used. Some of the methods make use of discriminant analysis, the linear probability model and logit and probit analysis.

In this study, the following independent variables were considered:

- Gender of the head of the household; age of the head of household;
- Years of farming experience; education level; family size; off-farm income;
- Awareness of insurance; frequency of theft; safety; productivity; and
- Frequency of sales; value of sales; credit; risk character profile of a person (captured by asking his/her prescription when starting a new technique).

This study follows the general modelling of Mohammed and Ortmann (2005) to the test the relationship between dependent and exploratory variables. The model was constructed as follows:

$$\ln \left( \frac{pi}{1-pi} \right) = \beta_0 + \beta_1 \text{Gender} + \beta_2 \text{Age} + \beta_3 \text{EXPLVi} + \beta_4 \text{EDUi} + \beta_5 \text{FSIZE} + \beta_6 \text{OFFi} + \beta_7 \text{INFOi} + \beta_8 \text{FTHIEFT} + \beta_9 \text{SAFETY} + \beta_{10} \text{PROD} + \beta_{11} \text{FSale} + \beta_{12} \text{Vsales} + \beta_{13} \text{CREDIT} + \beta_{14} \text{Ntech} + \beta_{15} \text{Dummy}$$

Where:  $(pi/1-pi)$  is the probability of insurance awareness; Gender of the household; Age of the household;  $EXPi$  is the farming experience,  $EDU$  is the educational level;  $Fsize$  is the number of family members in the house;  $OFFi$  is the off-farm income;  $INFOi$  is the awareness of insurance;  $Ftheft$  is the frequency of theft;  $SAFETY$  is a need for safe production;  $PROD$  is a need to increase productivity;  $Fsale$  is frequency of sales;  $Vsale$  is a value of sales last season; and  $CREDIT$  is the outstanding amount on the loan.

### 3.2 Results From Logit Model

A Chi-square test was used to test the equality of the standard deviation of a population to a specified value. This test can be either a two-sided test or a one-sided test. The two-sided version tests against the alternative, namely that the true standard deviation is either less than or greater than the specified value. The one-sided version only tests in one direction. Choosing to use a two-sided or one-sided test is determined by the problem (Snedecor *et al.*, 1989).

The Chi-square, which tests the joint significance of the explanatory variables in this study, is statistically significant at the level of 5% (Table 9). The estimated model correctly classified

93% of the respondents. The success rate for predicting enterprises' adoption of diversification or non-diversification is 60% and 98%, respectively.

On the basis of results obtained and shown in Table 9, the techniques described in the methodology section were applied and factors affecting diversification as a means of risk management are reported in this section. Variables NSTOCK, EXPLV, SAFETY, HOWIMP and NTECH are not significant (see Table 9). All other variables were found to be statistically significant at the specified level of significance.

**Table 8: Logit model results for livestock risk management adoption in Namibia (n = 200).**

Variables	Coefficient estimate	Standard error	Wald	t-stat	Significance
Gender	7.667	3.808	4.073	0.162**	0.0436
Age	-0.0654	0.0291	5.074	-0.197**	0.0243
EXPLV	-0.0212	0.0536	0.157	0.692***	0.0001
EDU	-1.003	0.598	2.809	-0.101*	0.093
FSIZE	0.594	0.268	4.931	0.192**	0.0264
OINCOME	3.77	1.511	6.22	0.231**	0.0126
INFO	0.883	1.58	0.312	0.001*	0.5763
FTHEFT	1.338	0.838	2.553	0.083*	0.1001
SAFETY	0.0314	0.893	0.0012	0.0001	0.971
PROD	4.015	1.929	4.33	0.172**	0.0374
FSALE	-3.792	1.485	6.519	-0.239*	0.0107
Vsales	0.0005	0.0003	3.469	0.1358*	0.0629
CREDIT	-4.256	1.74	5.989	-0.224***	0.0629
Ntech	-1.725	1.409	1.498	-0.001	0.2209
Dummy	-12.833	6.72	3.65	-0.1442*	0.0562
Model Chi-square	36.49*** on 20 degree of freedom				
Correct prediction (Percent)					
Overall					93%
Diversification					60%
Non-diversified					98%

Note: \*, \*\* and \*\*\* indicate statistical significance at 10 %, 5 % and 1 %, respectively.

The positive estimated coefficient sign for the variables (Dummy, GENDER, PROD, OINCOME, VSALE, FTHEFT, and WSALE) indicates that the greater the values of these variables, the higher the tendency for farmers to diversify their enterprises. The negative sign for the remaining variables indicates that the greater the value of these variables, the lower the probability of diversified enterprises.

The positive sign of the FSIZE was as hypothesised. It indicates that family members are dependents on the farm. Responsibility and creativity increases as the farmer wants either to avoid risk or to obtain better income for the family. This makes it necessary for the family to diversify its enterprise, especially with communal farmers.

The formal education level (EDU) has a negative coefficient estimate, indicating that, *ceteris paribus*, the probability of diversifying risk decreases as the farmer's level of formal education increases; this implies that farmers prefer to specialise in the specific enterprise to maximise output. Bullock *et al.* (1994) and Vandever (2001) found education was negatively related to a farmer's willingness to take risk. However, Mohammed and Ortmann (2005) found education was positively related to farmers' willingness to take risk.

The gender of the farmer was found to be positive and significant at a 5% level, whereas age was found to be negative and significant. This implies that female farmers are risk averse. Moreover, as the farmer matures, specialisation is most likely to become more commercialised.

The negative estimate coefficient for age implied that diversification is due to tangible decision-making. It appears, therefore, that older and more experienced farmers are less willing to diversify their enterprises. Farmers with such characteristics might have acquired enough knowledge through time to deal with income and risk without diversification. Results from the

studies by Jarvie and Nieuwoudt (1988) and Vandev eer (2001), however, indicate that younger farmers, or those with less experience, were less likely to diversify their enterprises.

Off-farm income (OINCOME) has a negative coefficient estimate, implying that the more farmers engage in off-farm activities, the less probability there is of diversifying their enterprises. This may be due to time constraints and being too busy. The off-farm income is also a good cash injection to the livestock farming enterprise, especially for the emerging commercial farmers. They support their farms through their other income streams. The off-farm income helps many farm households because it diversifies risk. The negative estimate coefficient for this variable implies that farmers engage in off-farm activities.

FSALES shows a significant and negative estimated coefficient. This implies that there is a high frequency of livestock sales. This serves as a good proxy for good market opportunity for the livestock farmers. On the other hand, frequency of theft (FTHEFT) shows a positive estimated coefficient. This implies that as the risk of theft gets higher, farmers prefer to diversify. CREDIT indicates negative and significant values, showing that farmers focus on one enterprise to get more return in order to increase the payment/debt commitment to the debtors.

Lastly, the puzzling result of the estimated coefficients on PROD and VSALE shows significant levels, and positively influences diversification. Perhaps insured and non-insured category data was not found for this study. This might jeopardise the result of this variable, or might suggest that a specific study is needed on the impact of productivity and the value of the livestock relationship with respect to risk management strategies.

### 3. CONCLUSIONS AND POLICY IMPLICATIONS

It was very surprising that none of the surveyed livestock farmers insured their livestock. As indicated in Table 1, farmers were aware of the importance of insurance. However, when they were asked why did not insure their livestock, 64.3% of the commercial farmers and 82.8% of the communal farmers said they did not see the importance of insurance. About 26.27% of commercial farmers and 17.2% of communal farmers said that insurance premiums are too expensive. This implies that the insurers need to increase awareness campaigns for farmers on the role of livestock insurance. It requires the combined efforts of all stakeholders, namely, governments, civic society organisations and the private sector. Furthermore, it is important to ask the question: how can livestock farming in Namibia make a significant contribution to the viability of farming systems in the country, and subsequently achieve the Millennium Development Goals? How can this be achieved while minimising the farmers' risk? Is it impossible to support the farming industry? Good risk assessment and risk reduction strategies must be considered by Namibian livestock farmers in the Omaheke and Otjozondjupa regions, regardless of the size of their properties.

The statistically significant and negative estimated coefficient of the household characteristics at the specified significance level (such as family size, educational qualification, age and off farm-income) implies that the Namibian livestock industry growth was achieved with improved education, experience and support from other income as a strategy for diversifying risk. However, the positive relationship of FTHEFT and PROD implies that the sector is suffering from continuous risk of theft and requires quality production to gain market access. Therefore, farmers need to follow effective risk management systems to achieve the required profit rate.

The negative statistical estimation of education attainment plays a role in creating insurance awareness, and implies that farmers prefer to diversify their enterprise as a risk management tool rather than buying insurance. On the other hand, there is a positive correlation of information regarding insurance (which is captured by asking, "How is insurance important to you?") among the livestock farmers in the Omaheke and Otjozondjupa regions. The answer to the latter question reveals that policy-makers and insurers need to design a programme to better educate farmers so that they can assess risk management tools and thereby increase their uptake of insurance. The low level of education of many farmers in the study area may have negatively influenced the decision to purchase livestock insurance. Other factors, such as not knowing about the provision of insurance, the premium being too expensive etc. would also have contributed. The insurance companies in Namibia should intensify their advertising efforts

and inform farmers of the importance of insurance in the agricultural industry. Currently, livestock farmers seem to follow diversification activities as alternative risk management strategies.

While the results of this study are encouraging, there remains considerable scope for refining and deepening the research.

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