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National Animal Production Research Institute
Ahmadu Bello University
P.M.B 1096, Shika-Zaria,
Kaduna State, Nigeria.
Email:japr@napri.gov.ng Url:journals.napri.gov.ng

ANALYSIS OF RISK SOURCES AND MANAGEMENT STRATEGIES OF POULTRY FARMERS IN KADUNA STATE, NIGERIA

[*1]Binuyo, G. and [2]Abdulrahman, S.

*[*1]Department of Agricultural Extension and Management, Federal College of Forestry, Jos, Plateau State, Nigeria.*

[2]Department of Agricultural Economics, Faculty of Agriculture, Ahmadu Bello University, Zaria, Kaduna State, Nigeria.

[*]Corresponding Author: arsan4u@gmail.com +2348036535223

ABSTRACT

This study was carried out to analyze risk perception and management strategies of poultry farmers Kaduna State. Primary data were collected in a multistage sampling procedure were obtained from 413 poultry farmers. Descriptive statistics, factor analysis and Tobit regression models were employed for the analysis. It was found that Disease outbreak ($\bar{x}$=4.58), rise in cost of poultry inputs ($\bar{x}$=4.44) and low market demand was ($\bar{x}$= 3.98) were the highest level of risk sources. The study further revealed that diversifying into off-farm income ($\bar{x}$ = 4.51), and weather forecast ($\bar{x}$ = 4.37) and Formation of cooperatives to attract bank loan ($\bar{x}$ = 3.94) were the most pronounced agricultural risk mitigating strategies adopted. The determinants of agricultural risk mitigating strategy were age, flock size and experience all significant at 1 percent LOS. These variables were positively related to the number of agricultural risks mitigating strategies adopted with exception of age which has inverse relationship with mitigating strategies. the farmers experienced different types of risk, however, the farmers adopted different types of management strategies against the agricultural risk encountered. Moreover, there's passably, dissension between deliberation of sources of risk and management strategies, mainly due to deprived socio-economic background. In view of this, it is recommended that government and non-governmental organization should focus on investments on infrastructure to enables the farmers to manage risks better and enhancing the production of poultry to mitigate food insecurity.

Keywords: Risk sources, Management strategies, Poultry

INTRODUCTION

Agriculture (crops, livestock and fisheries) is an important and critical sector in Nigeria, accounting for 25.16% percent of GDP and employing more than 72 percent of the labour force (NBS, 2019). The main sources of livelihood for the rural population are agriculture and non-farm activities that directly or indirectly depend on agriculture. the agricultural sector provides a livelihood for the bulk of the rural population and provides up to 70% active labour force, supplies raw materials required by the industrial sector and generate foreign exchange through export (Abdulrahman *et al*., 2018). Some three-quarters of the rural population consists of landless labourers and marginal farmers with less than 0.2 hectare of land (NBS, 2019). However, the poor, who depends on agriculture for sustenance and livelihood are currently faced with a couple of challenges such as risks, been vulnerable to poverty, struggles in gaining their daily subsistence given unfavorable economic, environmental, and political conditions, lack of paved roads, and lack of public and private transportation which make accessibility to most

rural towns very difficult (Oppong-Yeboah, 2015).

Risk is inherent in Nigerian agricultural subsector and uncertain condition such as flood, pest and diseases, theft. Others are common or aggregate risks that are covariate, such as drought, epidemic and economy-wide shocks, affecting everyone in the locality or community (Jaffee and Howard, 2010). Agricultural production is highly conditional on weather variability and environmental changes as the dual are stochastic events with known and unknown probability distributions respectively which both result in welfare losses beyond the control of the farmers (Abdulrahman *et al*., 2017). However, more production can be obtained through better farm management against these risks (Mendola, 2005).

Due to assortment of numerous challenges in Nigeria and Kaduna State in particular, poverty and food security issues are major challenge to farmer's livelihood. Consequently, poultry farmers in the state face different types of risks such as political, social, natural and environmental. They prefer to utilize the available modern technological approaches of production which make them satisfied. Though spent a huge capital to manage the risk and increase to meet the food security issues and sustainable agriculture (Adeoti and Sinh, 2009).

The Nigerian poultry industry is estimated at ₦80 billion ($600 million) and is comprised of approximately 165 million birds, which produced 650,000 MT of eggs and 290,000 MT of poultry meat in 2013. From a market size perspective, Nigeria's egg production is the largest in Africa (South Africa is the next largest at 540,000 MT of eggs) and it has the 2nd largest chicken population after South Africa's 200 million birds (Sahel, 2015). Considering the diverse species of poultry reared in Nigeria, chickens, guinea fowls, pigeons, ducks, turkeys, and more recently ostriches are among the common species reared in Nigeria. Those that are of commercial or economic importance given the trade in poultry, however, are chicken, guinea fowls and turkeys, amongst which the chicken predominate (Chinwendu et al. 2012) argue that poultry birds are good sources of protein either used as eggs or meat. They further explained that the production of poultry birds is relatively cost effective, thus, making it possible for low income farmers to start up the business. More so, the return on poultry investment is relatively high compared to other livestock production and the high level of acceptability of the poultry meat across diverse ethnic backgrounds and religious beliefs broadens the market share and makes the business very viable. In addition to the benefits created by the poultry meat.

The Nigerian poultry sector experiences many problems such as a rise in the poultry of feed, avian influenza, floods, fire-out break, inadequate credit with the global financial crisis. The poultry sector is characterized by a low level of production specialization, (FOA, 2006, Bello 2011). These factors bring about uncertainty in poultry production; thus, affecting the supply of poultry products in the markets (Bello 2011). The events of a number of periods of poultry uncertainty and movement (volatility) have caused companies to fall into bankruptcy, farmers leaving the business, farmers falling into semi-permanent poverty traps and consumers to face spiralling costs for food and consequently, decline in the growth of the poultry sector (Adeyemo and Onikoyi, 2012).

A large number of poultry farmers in Nigeria produce under conditions that are exposed to the vagaries of nature and limited infrastructure like storage facilities and power (Chinwendu *et al*. 2012). Nigerian farmers are increasingly faced with risk factors such as droughts, floods, diseases, pests, windstorms, accidents, fire, theft, damage and several other unplanned events whose occurrence cannot be readily predicted and therefore, poses serious threat to the success of farming enterprise in Nigeria (Eleri *et al*., 2012). A general lack of accurate information on the risks sources and mitigation

strategies in the livestock sector, combined with insufficient veterinary and breeding services, non-existent or inadequate regulations concerning production, commerce and animal health control are also other important obstacles to the mitigation of risks in poultry production (FAO, 2008).

Risk management is an imperative part of small holder production decisions. Resultantly, they need capital to manage the risks and to compensate their production loss. Poultry farmers generally express their risk mitigation in form of risk avoidance, risk acceptance, risk transfer and risk reduction. It also implies that poultry farmers adopt strategies that allow to control or minimize the risk perceived within the firm (Mbiki and Song, 2017)

As obtains, there appears to be insufficiency on information on how communities cope with agricultural risk in order to advert their vulnerability to poverty status. Knowing how households respond to risks is of critical importance since it reveals what the poor can do to help themselves in these circumstances. In addition, little is known of the limitation of these practices farmers employ to cope with risk and the relative importance in affecting household welfare across different settings remains poorly documented, and also the areas that need intervention by policy makers to mitigate household's vulnerability is largely unknown (Oppong-Yeboah, 2015).

METHODOLOGY

Study area

Kaduna state lies in the north western part of the country's geopolitical zones. The state lies between latitudes 11°32 and 09°02 N and longitudes 08°50 and 06°15 E (KDSG, 1996). The projected population growth rate for 2019 at 3.2 growth rate is 8377520. The mean annual rainfall shows a marked decrease from South to North (1,524mm to 635) which favours crop and livestock production (Kaduna state government, 2010). Involvement in small, medium and large – scale livestock production such as rearing of chickens, ducks, goats, sheep and pigs as well as marketing of their products are predominant in the State. The National Animal Production Research Institute located in Zaria, is a major source of the parent stocks of poultry. Kaduna is known for her agrarian status and the numerous poultry commercial enterprises, some of which have either formal or informal status, such as NIYYA farms limited, Saminaka resorts. Household and poultry keeping data across the six geopolitical zones in Nigeria showed that number of households keeping subsistence poultry in Kaduna is 340,768 (NBS, 2006).

Poultry production in Kaduna State and Nigeria at large amounts up to 454 billion tones of meat and 3.8 million eggs per year, with a standing population of 180 million birds. About 80 million chicken are raised in extensive systems, 60 million in semi-intensive systems and the remaining 40 million in intensive systems (Food and Agriculture Organization, 2018)

Sampling Technique and Sampling Size

A multistage sampling procedure was employed in the selection of the poultry farmers. In the first stage, a purposive sampling was used to select four (Kaduna South, Kaduna North, Sabon Gari and Zaria) Local Government Areas in Kaduna State, based on the number of registered poultry farmers in the State. In the second stage, four districts each were randomly selected through the use of card method. The districts involved in poultry production were purposively selected from Kaduna south and Kaduna north: Ungwan Rimi, Ungwan Sarki and Ungwan Liman; Television, Barnawa, Kakuri (Kurmin Gwari), Kurmin mashi and Tudun Wada; Sabon gari, Tudun Jukwu, Tudun Wada and Chikaji; Kugu Dutsen Abba, Wuchichiri, Tudun saibu and Kofar Galadima were the districts selected. In the third stage, all the farmers' cooperative groups in the villages selected were listed. From each of the villages, 40 percent of the farmers' cooperative groups were selected randomly using ballot techniques

thus giving a total of 48 farmers' cooperative groups. The last stage involves using a Taro and Yamme's formula for calculating sample size based on the assumption of 5% expected margins of error, 95% confidence interval and applying the finite population correction factor. The formula was expressed as follows:

$$n_0 = \frac{N}{1+N(e^2)} \qquad (1)$$

Where: n_0 is the sample size without considering the finite population correction factor; e = 0.05; N = total number of observations. Therefore, a total of 413 poultry farmers were randomly selected using the card method and interviewed.

Analytical technique:

Factor analysis

Factor analysis was used to analyzed risk sources and risk management strategies. The model for factor analysis reveals variations and co-variation among variables (continuous) observed in a set and described as under.

$$Y_{ip} = V_p + \lambda_{p1}\eta_{i1} + \lambda_{p2}\eta_{i2} + \cdots + \lambda_{pk}\eta_{ik} + \cdots \lambda_{pm}\eta_{im} + \varepsilon_{ip} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Whereas, Vj designates constant, λjk denotes factor loading,

ηi1k denotes factor values (Environmental and Market, Institutional and social factors for risk sources and risk management strategies factors are economic, Information and development, social and Market monitoring and evaluation) and εij specifies residual mean values zero and relationships with factor is zero. Factor scores quality; (correlation between ηı and ηi) means determinacy of factors Further the risk sources and risk strategies was distributed in several factors according to rotated component matrix Table or orthogonal varimax rotation Table. Standardized factor scores for each farmer was save to derive regression. Kaiser-Mayer-Olkin (KMO), Cronbach's alpha technique and communalities techniques will apply to decide the correlation and reliability of the data for factor analysis.

Tobit Regression Analysis

The econometric model used for analyzing determinant of risk management strategies is Tobit regression and is defined as:

$$Yi^* = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + e \qquad (3)$$

i = 1, 2… 7

Where:

Yi* = risk management strategies.

X_1 = Age in years, X_2 = flock size in numbers, X_3 = House-hold size in numbers, X_4 = Education in years, X_5 = Farmers experience in years of poultry farming, X_6 = Extension contact in number of visit, X_7 = access to credit (access=1, 0=otherwise) and X_8 = Credit in naira, α = Constant, β_1 – β_9 = regression coefficients, e = error term.

RESULT AND DISCUSSION

Farmers Risk sources

Table 1 exhibits mean and standard deviation for each risk source, which was estimated from the farmer's perception. The sources of risk are given in descending order as consequences to the poultry farmers. Disease outbreak was appraised on the top having mean value 4.58 for poultry farmers. Having a standard deviation of less than 1, stated that poultry farmers are harmonized to accept it as the highest risk source (Chen *et al*., 2015). However, (Khaliq *et al*., 2014; Usman *et al*., 2012) also indicated that diseases are the main constraints to increase poultry production. Rise in the cost of different inputs at required time is a challenge for the poultry farmers in the study area. These findings also coincide with (Bergfjord, 2009). Rise in cost of poultry inputs was the 2nd imperative risk source with a mean value of 4.44. Various researches in agriculture have revealed that input price risk influences production (Ahmed, 2011).

Table 1: Factor Loading of Risk Sources

			Factors			
Risk sources	**Mean**	**SD**	**1**	**2**	**3**	**Communality**
Rise in cost of inputs	4.44	0.49	0.023	0.315	0.167	0.565
Disease outbreak	4.58	0.89	0.719	-0.417	0.266	0.467
Inadequate family labour	3.19	0.57	0.439	0.443	0.091	0.373
Inadequate storage facilities	3.72	0.76	0.649	0.444	0.020	0.345
Low market demand	3.98	0.79	0.859	0.353	0.018	0.774
Natural disaster (flooding)	3.72	0.71	0.789	-0.008	0.023	0.856
Inadequate extension services	3.62	0.65	0.042	-0.016	0.128	0.712
Weather condition	3.15	0.68	0.678	0.041	0.147	0.545
Theft and pilfering	3.45	0.73	0.011	0.022	0.777	0.817
Government policy change	3.56	0.75	0.143	0.896	0.048	0.780
Epileptic power supply	3.54	0.72	0.027	0.762	0.025	0.655
Lack of loans to farmers	3.52	0.87	0.045	0.685	0.049	0.477
High cost of land	3.12	0.73	0.074	-0.067	0.321	0.677

Note: Factor loading >0.5 are highlighted in bold. The name of factors for 1, 2 and 3 are Environmental and Market, Institutional and social respectively.

The mean value for low market demand was 3.98 and it was ranked as 3rd important risk source, these results are in line with (Almadani, 2014; Sarwar and Saeed, 2013). The next important risk source was natural disasters and inadequate storage facilities having mean value 3.72; these results are similar with the findings by (Mardaneh and Keshtkar, 2013) that natural calamities (flooding) damaged the infrastructure in Iran. Furthermore, government policy change (3.56), lack of electricity power supply (3.54) and lack of loans to farmers (3.52) were also found as risk sources. Likewise, changes in government and agricultural policies was an important effective risk source relating to farmers (Lien *et al*., 2006). Likewise, (Goodwin, 2015) conducted a study and analyzed the agriculture policies and exposed positive and negative impact of policies on agriculture sector.

Hereafter, five factors were confined through factor analysis for the risk sources using principle component extraction method. The eigenvalues of these five factors were >1 with a total variance 68.94%. In social science variance $\geq$ 59.85 is presumed sufficient (Ahsan, 2011). Table 1 portrays the three factors and their relevant loading items (having value>0.50). The names of factors from 1 to 3 are given as: environmental and market, institutional and social respectively. Factor 1 was named as environmental and marketing had high loading factors on disease outbreak, inadequate storage facilities, low market demand, natural disaster (flooding) and weather condition. Factor 2 was Institutional consisting of changes in

government policy, epileptic power supply and lack of loan to farmers. While factor 3 named as social was Theft and pilfering. In the existing study factor analysis values of factor loading higher than 0.40 are reflected as significant (Flaten *et al*., 2005).

All the alpha coefficient in bold text was higher than 0.5 the conventional cut off point and explained variance of 73%, there was an indication that the underlying construct of this factor was adequately reflected by these statements. However, all the alpha value of un-bold text which was less than 0.5 the conventional cut off point, it implied that the statements used did not significantly contribute to the variance of the underlying factor. Thus, these statement items were not used for any further analysis. Communalities which shows how much of the variance (i.e. the communality value which should be more than 0.5 to be considered for further analysis. Only population growth variable is removed from further steps factor analysis) in the variables has been accounted for by the extracted factors. The analysis on risk sources is depicted in Table 1. Disease outbreak, inadequate storage facilities, low market demand, natural disaster (flooding) and unfavourable weather condition were loaded on environmental and market.

Disease outbreak had factor value of (0.719), This result is expected given the prevalence of widespread diseases (avian influenza and Gumboro) in poultry production. The outbreak of this disease led to the destruction of over 258,676 of poultry chickens (Saidu, 2008). The problem of diseases due to weather condition was indicated by all the farmers. During the rainy season, most common problems experienced by farmers include chronic respiratory diseases and *Coccidiosis* while too much heat during dry season also causes heat stress. Endemic diseases such as new castle and *Gumboro* are problems to poultry farmers, which however require reliable vaccines which are not often available. This finding is in line with Lawal et al. (2009), who reported that new castle and *Gumboro* disease are the major problems to poultry farmers in the study area.

Inadequate storage facilities had a factor value of (0.649) and low market demand (0.859) factors have influenced most smallholder producers to sell their produce almost immediately after harvest in order to ease congestion, leading them to sell their produce at lower price. Markets for agricultural inputs and outputs are often missing and unreliable for smallholder farmers, which makes the acquisition of agricultural resources difficult and the supply of market services also becomes limited. The consequent effect of poor storage and bad road conditions which are often impassable during the rainy season also does not help matters. This situation confirms the farmers' heavy reliance on middlemen who come and procure the commodity from the farm, albeit at a lower price than what the market is offering. This finding is in line with Makoni *et al*. (2014). Opined that lack of infrastructural facilities prompt farmers to rely heavily on middlemen.

Government policy change (0.896), Lack of electricity power supply (0.762) and lack of loan to poultry farmers (0.685) were loaded on institutional factor. These are factors that are beyond the control of the farmers and plays a crucial role in virtually all farming activities. Government and private sectors should focus on the price of inputs and outputs in agriculture sector, especially in poultry farming. Although, the Nigerian government has tried loan schemes and policies through mainly banks for decades right from the 1970s, but this has often met with failure due to many factors bordering on lack of proper implementation over the years (Jabbar *et al*., 2002). Good loans for maximum animal productivity are lacking and access roads are not there to facilitate smooth movement of animal products from farm to market. In Nigeria government incentives are rare and

even there are available implementation is usually poor. In the developed world, farmers and animal industry workers have access to modern technology such as telecommunication facilities and affordable internet. This helps in addressing emergencies on the farm such as giving an emergency call to a veterinarian to visit the farm or advertising their animal products online to reach a world-wide market. But most developing countries lack adequate, affordable and reliable infrastructure services such as transportation and telecommunications (World Bank, 2012)

Risk Management Strategies

Perception of risk management strategies were organized under ten foremost variables. Table 2 depicts that farmer's confirmed diversification into off-farm income as the leading strategy for risk management having mean value 4.51. In various earlier studies, findings divulged that farmers' purchasing power is diminishing and are suffering financially. For that reason, off-farm income is a significant way for risk management to overcome these issues (Lien *et al*., 2006). Income diversification is used as coping strategy of farmers against various risk (Ping *et al*., 2016).

Weather forecast were mentioned as risk management strategies with same mean value 4.37. Majority of farmers form cooperative association to attract loan had a mean value of 3.94. this enable the farmers to enjoy the assumed benefits accrued to co-operative societies through pooling of resources together for a better expansion, efficiency and effective management of resources. This finding is in line with Tangermann (2011) and Ekong (2003) asserts that credit is a very strong factor that is needed to acquire or develop any enterprise; its availability could determine the extent of production capacity. According to Tijani *et al* (2006), access to credit provides the farmer with a means of expanding and improving his farm. It also determines the ease with which he adopts new practices and technologies in his enterprise.

Moreover, up-to date market information with mean value 3.94 was also reported an important risk management strategy. Improve market facility with mean value 3.87 was another risk management strategy. The next strategy keeping farm record 3.77 was reported. Spreading sales and Market monitoring (input and output price) having same mean values (3.74) were the next strategies for risk management carried out by the poultry farmers. Others risk management strategies were, adopt new technology (3.69) planning of expenditures (3.67), removal of middleman influence (3.64) respectively.

For risk management strategies factor analysis was applied. Further four factors were assimilated with eigenvalue above 1 and accumulating total variance of 68.04% (Table 2). These four factors explain 64% of variance with significant Bartlett's test of sphericity. The KMO value was 0.934 for the risk management strategies. (Table 2). This finding is in line with Von Pock, (2007) who suggested that KMO $\geq$0.50 is acceptable. Hence, in this study the values attained were more than 0.80, indicating that arrangement of correlation was pretty compact for factor analysis. Bartlett's test is another indication of the strength of the relationship among variables. The Bartlett's Test of Sphericity is significant (0.000). That is, highly significance at 1% probability level. Bartlett's test of sphericity and χ^2 for the analysis was 2782.341, which is substantially acceptable.

The strategies generally act to reduce variability of poultry farming business were economic, Information and development, social and Market monitoring and evaluation. Diversifying into off-farm income had factor value of (0.814), improve market facility (0.648) and keeping farm record (0.879) were loaded on economic factor. Table 2 depicts that farmer's confirmed diversifying into off-

farm income as the leading strategy for risk management having mean value 4.51 with a loading of 0.814. In various earlier studies, findings showed that farmers' purchasing power is diminishing and are suffering financially. Income diversification is used as coping strategy of farmers against various risk (Ping et al., 2016). Pandey et al., (1998) indicated in their studies that crop diversification was an important coping strategy against the risk in agriculture sector.

Spreading Sales (0.728) and Adopt new technology (0.771) were loaded for Information and development with a mean value of 3.74 and 3.69 respectively. Farmers try to take advantage of periods when supply is low and the demand is high so as to get good price, thereby maximizing profit. However, planning of expenditures and Boycott of middleman are loaded on social factor, while Weather forecast, Up-to date market information and Market monitoring were loaded on Market monitoring and evaluation were also positively quantified by the farmers as a risk management strategy.

Determinant of Risk Management Strategies

The result of the Tobit regression analysis presented in Table 3 shows the DECOMP based fit measure of 0.456. This indicated that about 46% variation in risk management strategies adopted by poultry explained variations in the specified explanatory variables. The Likelihood ratio (LR) of 127.567 was significant at 1 percent, suggesting that the model has good explanatory power on the changes in management strategies of farmers. This ratio exceeds the critical chi square values at 1 percent level of significance. The log likelihood ratio value represents the value that maximizes the joint densities in the estimated model. The Prob > chi^2 was statistically significant at 1 percent level of probability. The probability of obtaining this chi-square statistic shows the effect of the predictor variables on specified alpha level. This implies that at least one of the regression coefficients in the model is not equal to zero (Table 3).

Age was found to have an inverse relationship with risk management strategies and significant at 1 percent level. Thus, as the age of the farmer increases, the tendency to adopt agricultural risk management strategies decreases. This finding is in line with a priori expectation with Bayard *et al.,* (2007) who opined that older farmers have more experience in farming and are better able to assess the characteristics of modern technology than younger farmers. Flock size has direct relationship with management strategies adopted by the farmers and is significant at 1 percent level. This implies that as the flock size increases, the farmers tend to adopt more risk management strategies. This is in line with the a-prior expectation. The reason is that the large-scale farmers are usually high capital base farmers and, therefore, can easily purchase and use improved inputs and practices than small-scale farmers thus, increasing the adoption of risk management strategies.

Experience in poultry production has direct relationship with management strategies adopted by the farmers and is significant at 1 percent level, suggesting that an experience farmer adopt more agricultural risk management strategies than non-educated farmers. The result divulges that more experienced farmers had a mental ability to distinguished credit management as an imperative strategy. These findings can be compared with previous studies (Chen Tong, Qing Ping, Zou Jun, Muhammad Javed Sheikh, 2015).

Table 2. Factor Loading of Risk Management Strategies

Risk management strategies	Mean	SD	Factors 1	2	3	4	Communality
Diversification into off-farm	4.51	0.61	0.814	0.081	0.180	0.078	0.416
Weather forecast	4.37	0.79	-0.062	0.016	0.010	0.890	0.908
Formation of cooperatives to attract bank loan	3.94	0.71	0.940	0.001	-0.057	-0.008	0.915
Up-to date market information	3.89	0.61	-0.015	0.006	-0.029	0.818	0.923
Improve market facility	3.87	0.82	0.648	0.022	0.369	-0.030	0.567
Keeping farm record	3.77	0.96	0.879	0.004	-0.053	-0.010	0.626
Spreading Sales	3.74	0.76	0.048	0.728	0.010	-0.021	0.750
Market monitoring	3.71	0.53	-0.103	0.007	-0.031	0.725	0.617
Adopt new technology	3.69	0.97	0.194	0.771	0.030	-0.062	0.433
Planning of expenditures	3.67	0.96	0.380	0.054	0.605	0.007	0.818
Boycott of middleman	3.64	0.63	0.371	0.133	0.763	0.025	0.816
On farm storage	3.42	0.98	0.062	0.168	0.039	-0.002	0.855
Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.934							
Bartlett's Test of Sphericity	2782.341***						

Note: Factor loading >0.50 are shown in bold. The names of risk management strategies factors are economic, Information and development, social and Market monitoring and evaluation as 1, 2,3 and 4 respectively.

Table 3: Determinant of Risk Management Strategies

Variables	Coefficient	Standard error	b/St.Er.
Age	-0.109	0.017	-6.240***
flock size	0.003	0.001	3.067***
Household size	0.006	0.010	0.557 ns
Education	0.534	0.648	0.824 ns
Farming experience	0.013	0.002	6.774***
Extension contact	-0.210	0.291	-0.722 ns
Access to credit	0.003	0.006	0.500 ns
Sigma	0.071	0.005	13.157***
Diagnostic Variables			
Observations	413		
LR chi2	198.345		
Prob> chi2	0		
Log likelihood	127.567		
Decomp based fit measure	0.456		

Note *** p<0.01 and ns = not significant

CONCLUSION AND RECOMMENDATIONS

In conclusion, the farmers experienced different types of risk, however, the farmers adopted different types of coping strategies against the agricultural risk encountered. Moreover, there's passably, dissension between deliberation of sources of risk and management strategies, mainly due to deprived socio-economic background. Yet, farm and farmers' characteristics perceptibly influenced the perception of risk sources and management strategies. Socioeconomic characteristics such as age, farming experience and flock size were the main determinants of agricultural risk-coping strategies, meaning that adequate attention should be given to these variables. In view of this, it is recommended that government and non-governmental organization should focus on investments on infrastructure to enables the farmers to manage risks better and enhancing the production of poultry to mitigate food insecurity.

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