OLAWUYI SEYI

Ladoke Akintola University of Technology, Nigeria

OLAWUYI TOSIN

Ladoke Akintola University of Technology, Nigeria

RISK MANAGEMENT STRATEGIES ADOPTION OF FARMING HOUSEHOLDS IN KWARA STATE OF NIGERIA: A PRAGMATIC APPROACH

Abstract:

Risk is an unavoidable element in the business of agriculture especially with the prevalent issue of climate change which hitherto affects production. Production can vary widely from year to year due to unforeseen weather and market conditions, causing wide swings in commodity prices. But risk, while inevitable, is often manageable. Risk management involves choosing among alternatives for reducing risks that threaten the economic success of production process and well-being of the households; hence, determinants of risk management strategies adoption among farming households in Kwara State of Nigeria was investigated.

Multistage sampling technique was used to select 122 farming households used for the study. Data collected through a well-structured questionnaire was analyzed through descriptive statistics such as frequency counts, percentages and mean values while inferential statistics such as Tobit regression was used to test the formulated hypothesis.

The result revealed a mean age of 49.25 years while the average household size was estimated at approximately 12 persons; also, the average years of formal education was estimated at 6.31 years. 92.62% of the respondents engaged primarily in farming while majority are faced with production risks. The prevalent risk management strategies adopted are: obtaining credit facilities from social organizations, irrigation practices, borrowing from friends, use of family labour and distress sales of assets. And, determinants of risk management strategies adoption are: years of formal education (p<0.1), household size (p<0.1), social organization membership (p<0.01) and outcomes (p<0.05). This study concludes that human capital (proxied by years of formal education) and social capital endowment (proxied by social organization membership) have a strong influence on the adoption of risk management strategies.

Keywords:

Risk Management Strategies, Adoption, Farming Households, Tobit, Nigeria

JEL Classification: A12

Introduction

Risk management strategies in agriculture vary with farm characteristics and the risk environment. Farmers' risk perceptions, risk attitudes as well as the available resource base, influence their decisions and actions. Farm size, age, innovativeness and risk aversion determine the choice of risk management strategy by farmers. The identification of the sources of risk is important because it helps to choose the appropriate management strategy. The array of risk management strategies available to farm operators includes crop diversification, distress sales, loan, controlling cash flow, production contracting, forward pricing, and acquiring crop and revenue insurance (Dennis *et al.*, 2000).

Risk is also regarded as a central issue that affects many different aspects of people's livelihoods in the developing world. It affects whether people can maintain assets and endowments, how these assets are transformed into incomes via activities and how these incomes and earnings are translated into broader development outcomes. In rural area, risk is present in all management decisions of agricultural systems as a result of price, yield and resource uncertainty. The existence of such risks has been found to alter household behaviour in ways that at first glance seem suboptimal and highly vulnerable to low frequency. Indeed, farmers take their decisions in a risky environment so that the consequences of these decisions are often not known with certainty until long after those decisions occur. As a result, outcomes may be better or worse than expected (Alderman, 2008).

Risk management is, in general, finding the combination of activities most preferred by an individual farmer to achieve the desired level of return and an acceptable level of risk. Risk management strategies reduce risk within the farming operation (e.g. diversification or vertical integration), transfer a share of risk outside the farm (e.g. production contracting or hedging), or build the farm's capacity to bear risk (e.g., maintaining cash reserves or evening out cash flow). Using risk management does not necessarily avoid risk altogether, but instead balances risk and return consistent with a farm operator's capacity to withstand a wide range of outcomes. Although farms vary widely with respect to enterprise mix, financial situation, and other business and household characteristics, many sources of risk are common to all farmers, ranging from price and yield risk to personal injury or poor health. But even when facing the same risks, farms vary in their ability to weather shocks. For example, in an area where drought has lowered yields, falling prices resulting from large worldwide production could have devastating consequences for local farm incomes (Dennis *et al.*, 2000).

However, the economic performance of the agricultural sector is usually uncertain due to its biological nature in addition to relying mainly on rain fed agriculture and livestock rearing under natural conditions. This type of production is inherently risky because of variability of rainfall, animal mortality due to livestock diseases and fluctuations in output prices. The environment in most of low income countries is characterized by crop diseases, flooding, illness of household members and crime. All these create uncertainty (Capitanio, 2008). As a result of a combination of many factors, many farmers face many risks and uncertainties which arise from natural, economic and socio-political environments. A number of studies show that farmers are risk averse; they manage risk by preferring enterprises that provide satisfactory levels of security even if at the expense of higher income; they diversify into a number of activities to spread risk;

they also prefer to use established techniques of production, and to be self sufficient in food requirement through increased food production (Nyikal and Kosura, 2005).

Risk plays an important role in farmer decision making and therefore affects agricultural productivity and thus growth and development. Lack of institutional innovations like crop insurance and affordable credit in developing countries to shift part of the risks from the private to the public sector makes risk management an important part of smallholder production decisions (Besley, 1995). Private sector provided insurance products have not developed due to problems of moral hazard and adverse selection (Hazell and Norton, 2003). An increasing number of smallholder farmers now derive part of their income from non-farm sources. As much as 40-45 % of household income by 1997 was derived from non-farm sources in sub-Saharan Africa (Reardon, 1997).

Agricultural risks are prevalent throughout the world and they are particularly burdensome to small-scale farmers in developing countries. Production activities of these farmers are characterized by scattered small land holdings (Encyclopedia Britannica, 2004). Agricultural risks are especially important if they result in income and consumption fluctuations. Fluctuations in consumption usually imply relatively high levels of transient poverty. High income risk may also be a cause of persistent poverty. This is likely when insurance and credit markets are absent or incomplete as it is the case for developing countries. The failure to cope with income risk is not only reflected in household consumption fluctuations but affect nutrition, health and education and contribute to inefficient and unequal intra-household allocations (Dercon, 2002). Understanding the relationship between farm characteristics, farmers' risk attitude and risk perception and their use of risk management strategies is important for two reasons. First, the literature reveals that most producers are averse to risk when faced with risky outcomes. Someone who is risk averse is willing to accept a lower average return for lower uncertainty. This means that strategies cannot be evaluated solely in terms of average or expected return, but that risk must also be considered. Second, knowledge of small-scale producer's attitudes to risk and their risk management strategies is important in determining strategies and formulating policies for agricultural development (Harwood *et al.*, 1999).

Problem Statement

Smallholder farmers face many risks in their farming activities; for example, in the past, the country has recorded drought, crop and animal diseases and pests as well as fluctuations in prices of both farm produce and inputs. As a result, there has been variability in household income. Risk hinders farmers from pursuing their farming as a business. The risk situation is complicated by the fact that they operate in an environment with weak markets. They do not have access to sufficient support institutions that can help them cope with risks. Risks have negative implications to agricultural productivity and farmers' income, in that it affects the types of investments which farmers make. Ultimately, it affects the level of farm output and economic growth. Nigerian agriculture is commonly known to be in crisis, the greatest failure is that food production has not kept pace with population growth, the rate of growth of Nigeria's food production is 2.5 percent per annum in recent years, while food demand has been growing at the rate of more than 3.5 percent per annum due to high rate of population growth of 2.83 percent (Kolawole and Ojo, 2007). This is obvious as agriculture is the mainstay of Nigeria's economy contributing about 42% to total GDP and employing about 77% of the working population

(Adeolu and Taiwo, 2004). Understanding risk is a starting point to help producers make good management choices in situations where adversity and loss are possibilities, information on the risk management strategies adoption employed by farming households represent important contribution to existing body of the knowledge. Hence, the need for this study as it examined the various dimensions of risks faced by the farming households in the study area, the risks management strategies adopted as well as the determinants of risk management strategies adoption among farming households. And, the study hypothesized that there is no significant relationship between households' specific socio-economic and human capital development characteristics and adoption of risk management strategies.

Empirical Evidence on Agricultural Risks and Management Strategies

In an empirical analysis of Dutch livestock farmers' risk perception and risk management decision, Hardaker *et al.*, (2004) found that in general, price and production risks were perceived as important sources of risk. Salimonu and Falusi (2009) in their study on "Sources of risk and management strategies" classified market failure, price fluctuation, drought, pest and diseases attack and erratic rainfall are the most important sources of risk facing by food crop farmers in Osun State, Nigeria. Results from Tru and Cheong (2009) show that, in general, price and production risks were perceived as the most important risk in Vietnamese Catfish Farming. Okunmadewa (2003) in his study on risk and vulnerability assessment identified some types of risk in Nigeria to include natural risk, environmental risk, gender risk, conflict and crime risks. Others are labour market risk, life events risk and macroeconomic risks. The risk management strategies used in Nigeria includes prevention, mitigation and coping strategies. Prevention strategies seek to reduce the probability of welfare reducing risk through activities such as education, immunization, irrigation and extension services.

Mitigation strategies seeks to decrease the impact of a future welfare reducing risk through activities such as insurance policy, crop diversification, mixed farming, storage programme and price support, while coping strategies relieve the impact once the risk (the event) has occurred. Examples of coping strategies include sales of assets, reducing consumption, taking children out of school and borrowing (Olaniyan *et al.,* 2008). Key risk management arrangements in Nigeria as identified by Adubi *et al.*, (2002) include informal, (social network and informal savings groups) and formal private (public education and social safety net). Granted that different risk management strategies and arrangements exist in Nigeria, there however exist gaps in knowledge with respect to how Nigerians in the rural areas manage risk. Alayande (2003) identified rural Nigerians (especially farming households) as the most vulnerable in terms of shocks to their well-being. This study however failed to unmask farming households' extent of vulnerability to shocks or risks and management of such risks.

Type and sources of risks in Agriculture

Ellis (1988) identified four types of risks: natural hazards (weather, pests and diseases), market fluctuations (of output prices), social uncertainty (due to differences over control of resources) and state actions and wars. According to Hardaker *et al.,* (2004), three major types of risk in farming can be identified; yield, price and transaction risks. Hazell and Norton (2003) reported that the types of risks farmers face depend on the type of farming

system, climate change and policy as well as the institutional environment. Some risks are unique to agriculture, such as the risk of unfavorable weather and climatic conditions caused by climate change which significantly reduce yields within a given year. Other risks, such as the price or institutional risks, while common to all businesses, reflect an added economic cost to the producer; if the farmer's benefit-cost tradeoff favours mitigation; then, he or she will attempt to lower the possibility of adverse effects (Harwood *et al.*, 1999).

Production or Yield Risk

Production or yield risk occurs because agriculture is affected by many uncontrollable events that are often related to weather, including excessive or insufficient rainfall, extreme temperatures, hail, insects and diseases. Technology plays a key role in production risk in farming. The rapid introduction of new crop varieties and production techniques often offers the potential for improved efficiency, but may at times yield poor results, particularly in short term. In contrast, the threat of obsolescence exists with certain practices (for example, using machinery for which parts are no longer available), which create another and different kind of risk (Harwood *et al.*, 1999). This is the risk associated with changes in the prices of output or inputs which may occur when the farmer has made a commitment to produce. Farmers are exposed to unpredictable competitive markets for inputs and outputs. It includes risks that result from unpredictable exchange rates (Hardaker *et al.,* 2004).

Price or Market Risk

Price and yield risks are not independent, they are related. High transportation and marketing costs in developing countries isolate local rural markets from national and international markets. Since yield fluctuations are correlated within a small area, local prices determined by local production and demand are volatile, and for an individual farmer are negatively correlated to their production; the farmers therefore face yield and price risks that are correlated depending on the level of regional market integration. Thus, price uncertainty generally leads to inefficient resource allocation (Dorward *et al.*, 2007).

Institutional Risk

Institutions are mechanisms that are used to structure human interactions in the presence of uncertainty. They help to reduce uncertainty and risk in human exchange; this includes political risk, which is the risk associated with unfavorable policy changes. An example is changes in tax or credit policy and restriction on the use of a certain pesticide that alters the cost of production. Also under institutional risk is transaction risk which results from opportunistic behaviour and the reliability of transacting partners. It is represented by the losses incurred as a result of the failure in: (a) enforcing exclusive property rights, (b) enforcing required attributes, (c) completing the intended transaction or (d) protecting transaction benefits from third party predation (Dorward *et al.*, 2007). Other risks include: human or personal risks (this is the disruptive change that may result from such events as death, divorce, injury, or the poor health of a principal in the firm), asset risk (involves theft, fire, or other loss or damage to equipment, buildings, and livestock) and financial risk (results from the way the firm's capital is financed (Hardaker *et al.,* 2004).

Materials and Methods

The Study Area

The study was conducted in Kwara State, Nigeria; specifically, Asa Local Government Area (LGA). Its' headquarters is in Afon town with an area of 1,286 km² and a population of 126,435. It shares boundaries with Ilorin-west, Ilorin-south, Offa, Oyun, Moro (LGAs) of Kwara State. The Local Government comprises of three (3) districts which is further divided into seventeen (17) political wards. The area is blessed with vast arable land which makes farming the prevalent occupation of most people in the LGA. This rural population comprises of peasant farmers who cannot afford the capital involvement of mechanized farming. And, the inhabitants are predominantly yorubas.

Sampling procedure and sample size

A multi-stage sampling technique was used to select the representative farming households for the study. The first stage involved purposive selection of Asa LGA because of its rurality, fund and time as well as the predominance of farmers in the area. The second stage involved random selection of ten (10) villages from the identified villages in the study area. Then, strictly proportionate to size sampling technique was used to select 125 registered farming households from the available registered farming households listing information available in the Agricultural Development Program (ADP) zone office in the area. Hence, 125 registered farming households made up the sample size for this study, but responses from 122 respondents were found useful for the analysis due to incomplete response.

Data collection

Primary data was obtained from structured questionnaire which was administered to the selected respondent through one on one interview. The data collected includes: household socio-economic characteristics, farming activities, risks faced by households, risk management strategies employed and the household expenditure pattern, among others.

Data analytical techniques

Descriptive statistics such as frequency counts, percentages and mean values were used to describe selected socio-economic characteristics of the respondents while inferential statistics such as Tobit regression model was used to test the formulated hypothesis and estimate the adoption of risk management strategies of farming households in the area of study.

Tobit Model Specification

$Y_i^* = \beta X_i + e_i$

$Y_i^* = 0$, if $Y_i = 0$

$Y_i^* = Y_i$ if $0 < Y \leq 1$ where:

Y_i^* is the observed dependent variable (Risk management strategies proxied by its' index);

β is a vector of unknown parameters; X_i is the vector of independent variables; where

i = 1, 2.................................n; and the hypothesized explanatory variables are:

X_1 = age of the farmers (years), X_2 = age squared (years) to capture the life cycle hypothesis, X_3 = years of formal education (years), X_4 = primary occupation (farming = 1, 0, Otherwise), X_5 = household size (actual), X_6 = no of working members(actual), X_7 = social capital endowment (Yes =1, 0, otherwise), X_8 = outcomes, X_9 = monthly expenditure (₦), e_i is a disturbance term assumed to be independent and normally distributed with zero mean and constant variance σ.

Results and Discussion

Selected socio-economic characteristics of the sampled respondents

The result revealed that majority (81.97%) of the respondents are male while the remaining 18.03% account for the female counterpart; this suggests that male are dominant among the sample respondents. It was also shown that 28.7% of the respondents each fall within the age group of 41-50 and 51-60 years respectively while the mean age was estimated at 49.25 years; this suggests that the respondents are in their active and productive age. It was also shown that majority (95.08%) of the respondents are married while the 4.92% account for the single counterpart. The average years of formal education was estimated at 6.31 years which implies that majority of the respondents had elementary education level.

Farming which account for about 92.62% is the predominant occupation while majority (73.77%) engaged in food crops farming. Other primary occupation activities identified are: livestock farming, food processing, civil service and artisanship; the estimated mean years of experience in primary occupation was found to be 33.04 years. The findings also showed that half (50.82%) of the respondents have their farm size within 2.1-5 ha, 29.52% operates above 5ha while only 19.68% have access to farm size which is less or equal to 2ha; the mean farm size was estimated as 3.25ha which suggests that only few of the respondents did not have access to a relative large area of farmland. It was further revealed that 9.02% of the respondents have household size ranging between 1-6 members, 43.46% have between 7-12 members, while 40.17% have between 13-20 members and 7.38% of the respondent have above 20 members. The estimated average household size was 12.06 persons; which suggests that there exist about 120 persons in every 10 households. This is relatively large compared to the national average.

In the same vein, the estimated average number of household working members was approximately 3.6 persons which suggests that about 25% of household members have income generating activities; this could have a negative impact on the household considering the prevalent large household size in the study area. Also, majority (75.41%) of the respondents claimed membership of social group(s). Furthermore, the result showed that 0.82% did not encounter any risk, 69.93% specified weather related risk type as a result of climate change, 45.08% specified production related risk type, 25.41% specified as market related risk while 49.18% specified financial risk. About 59.84% of the respondents took to loans from social organizations as risk coping and mitigating strategies, 38.52% employed irrigation and 42.62% borrowed from friends; other strategies employed are: use of herbicides, family labour, fertilizer use, planting of resistant varieties as well as distress sales; based on this finding, it is worthy to note that

these strategies were adopted by the respondents as both ex-ante and ex-post risk management strategies depending on their economic power.

The respondents also specified the production risks management and mitigation strategies employed; it was shown that 48.36% adopted cultural practices, 22.13% adopted self-insurance and 61.48% adopted family labour supply while 40.98% adopted sales of perishable proceeds at a subsidized price. Any risk management strategies adopted is expected to yield some notable outcomes; based on this, it was revealed that only 36.07% of the respondents claimed not to observe any significant outcome with the risk management strategies employed, 50.0% claimed to observe an increase in production, 20.49% claimed increase in the quantity available for consumption, while 17.21% claimed increase in disposable income. The expenditure analysis of the respondents showed an estimated monthly mean expenditure of ₦21,013; this suggests that the monthly expenses was relatively minimal considering the prevalent meager income in the rural area and the observed large household size in the study area.

Table 1: Socio-economic characteristics and risks information of the respondents

Variable	Frequency	Variable	Frequency
Gender		**Number of children schooling**	
Male	100 (81.97)	1-5	95 (77.86)
Female	22 (18.03)	6-10	25 (20.5)
Age group (years)		Above 10	2 (1.64)
≤ 30	8 (6.6)	Mean (4.47)	
31-40	25 (20.5)	**Number of working members**	
41-50	35 (28.7)	≤ 2	37 (30.33)
51-60	35 (28.7)	3-4	73 (59.83)
> 60	19 (15.5)	Above 4	12 (9.84)
Mean (49.25)		Mean (3.55)	
Marital status		**Social organization members**	
Single	6 (4.92)	No	30 (24.59)
Married	116 (95.08)	Yes	92 (75.41)
Years of formal education (years)		***Type of risk faced**	
0	48 (39.34)	None	1 (0.82)
1-6	36 (29.51)	Weather	78 (63.93)
7-12	31 (25.41)	Production	55 (45.08)
Above 12	7 (5.74)	Market	31 (25.41)
Mean (6.31)		Financial	60 (49.18)
Primary occupation		***Risks coping strategies**	
Non-Farming	9 (7.38)	Loan	73 (59.84)

Farming	113 (92.62)	Use of herbicides	12 (9.83)
Primary occupation activities		Irrigation	47 (38.52)
Crop farming	90 (73.77)	Family labour supply	17 (13.93)
Livestock farming	13 (10.66)	Borrowing from friends	52 (42.62)
Food crops processing	10 (8.2)	Fertilizer use	6 (4.92)
Civil service	5 (4.09)	Planting of resistance varieties	3 (2.38)
Artisanship	04 (3.28)	Distress sales	12 (9.84)
Years of experience in primary occupation		***Production risk mgt strategies**	
		Cultural practice	59 (48.36)
1-10	4 (3.28)	Self insurance	27 (22.13)
11-20	26 (21.39)	Family labour supply	75 (61.48)
21-30	34 (27.87)	Subsidizing perishable goods	50 (40.98)
31-40	36 (29.51)	***Outcome of the mgt strategies**	
Above 40	22 (18.08)	Not significant	44 (36.07)
Mean (33.04 years)		Increased yield	61 (50.0)
Farm size (ha)		Increased consumption	41 (33.61)
$\leq$ 2	24 (19.68)	Increased disposable income	67 (54.92)
2.1-4	62 (50.82)	**Expenditure /month (₦)**	
Above 4	36 (29.52)	$\leq$ 10000	21 (17.22)
Mean (6.61)		10001 – 20000	41 (33.62)
Household size		20001 – 30000	45 (36.9)
$\leq$ 6	11 (9.02)	Above 30000	15 (12.3)
7-12	53 (43.46)	Mean (21,013.44)	
13-20	49 (40.17)	**Total**	**122 (100.0)**
Above 20	9 (7.38)		
Mean (12.06)			
Total	**122 (100.0)**		

Figures in parenthesis are percentage values,   * - multiple response

Source: Field survey, 2014

Tobit estimates of the adoption of risk management strategies

The empirical estimation of the tobit regression model as shown in Table 2 revealed a log-likelihood of -74.5598 and pseudo R^2 of 0.3802 which suggest that fitted model is good. Years spent in school which is a proxy for human capital development was found to have a positive and significant (p<0.1) relationship with adoption of risk management strategies which suggest that a unit increase in years spent in school will bring about 45% increase in adoption of risk management strategies because as expected, education exposes individuals to have a better, privilege and useful information on how to mitigate and manage any potential risks. In the same vein, household size has

a positive and significant (p<0.1) relationship with risk management strategies which suggests that a unit increase in household size will bring about 28% increase in adoption of risk management strategies; this is because of the expected responsibility of the household head to ensure food security and well-being of the households.

On the other hand, social capital endowment proxied by social organization (group) membership has a negative but significant (p<0.01) relationship with risk management strategies adoption which suggests that a unit increase in social organization membership will bring about 7.5% decrease in adoption of risk management strategies; this does not conform with a-priori expectation as a result of the direction of movement (negativity) of the coefficient because there is shortfall in the expected benefits from being a member of social group(s) despite their involvement in social organization but this finding further suggests that the social capital endowment in the study area is 'the missing link'. The outcomes of risk management strategies adopted is also significant (p<0.05) but have an inverse relationship with adoption of risk management strategies employed; which implies that a unit increase in outcome of risk employed will bring about decrease in adoption of risk management strategies by 2.9; this also negates a-priori expectation because the visible outcome from adopting one or more risk management strategies does not correspond with their over-bloated level of expectations from risk management strategies employed; this could also be attributed to 'the missing link' as pointed out earlier.

Table 2: Tobit regression estimates

Adoption of risk management Strategies	Coefficient	Std. error	t-value	P>| t|
Constant	2.6545	1.8177	1.46	0.147
Age	-0.4167	0.7277	-0.57	0.568
Years of formal education	0.4563	0.2358	1.94***	0.055
Primary occupation	-0.1088	0.4231	-0.26	0.797
Household size	0.2797	0.1412	1.98***	0.130
Number of working members	-0.2438	0.8686	-0.28	0.779
Social organization	-0.7573	0.2509	-3.02*	0.003
Outcomes	-2.9110	0.1400	-2.08**	0.040
Expenditure	0.0002	0.0001	1.20	0.233

Log-likelihood = -74.998, LR-chi^2 = 98.54,

Prob>chi^2 (8) = 0.0008, Pseudo R^2 = 0.3802

* ** *** - significant at 1%, 5% and 10% probability levels respectively

Source: Field survey, 2014

Conclusion and Recommendation

The study concludes that most of the respondents are still in their active age with elementary educational status. Majority of the risks being faced with are climate change related risks, production risks as well as financial risks. Most of the respondents take to credit facilities from social organization, irrigation practices, borrowing from friends, family labour supply and distress sales among others, as risk management, mitigation and or coping strategies employed. Human capital development, household size, social capital endowment as well as the outcome from strategies employed have strong influence on the adoption of risk management strategies. Hence, the null hypothesis is not accepted while the alternative hypothesis is hereby accepted.

Based on the findings of this study, the following recommendations are of significant importance to policy making:
- Adequate funding of basic education for all should be given utmost attention by the government.
- Social organization membership should be encouraged for the purpose of access to credit and proper usage of such so as to derive maximum and expected benefits of being a member of social group.
- Birth control strategies and campaign should be given paramount attention by the government and NGOs because of the observed large household size in the study area.

Suggestion for further study

It was identified from the study that there exists risks facing the agrarian population; these are predominantly climate change induced risks as well as production and financial risks. Both ex-ante and ex-post risk management strategies were employed; but significant percentage of the respondents still claimed not to observe any significant outcome thereby necessitated the call for the social capital endowment in the study area which is 'the missing link'. Despite the existence of social group, the respondents seem not to do well from the expected flow of information from these groups; hence, there is need to fill the gap on the level of benefits derived from social group membership so as to know if the benefits derived from social groups influence the risk management strategies employed by the rural households, being the food basket of the nation because food is essential to keep the world at peace.

REFERENCES

Adeolu, B.A and Taiwo, A. (2004). The Impact of National Fadama Facility in Alleviating Rural Poverty and Enhancing Agricultural Development in South-Western Nigeria. *Journal of Social Science*; 9(3): 157-161.

Adubi, A.F., Ogumike, F. and Agba, A. (2002). Major Sources and Levels of Risks in Nigeria. Consultant Report for the World Bank/NPC Social Risk Assessment Exercise.

Alayande, B.A. (2003). Determinants of Vulnerability to Poverty in Nigeria: A Probit Analysis Consultant Report for World Bank/NPC Social Risk Assessment Exercise.

Alderman, H. (2008). "Managing risks to increase efficiency and reduce poverty" Background Paper for the World Development Report, World Bank.

Besley, T. (1995). Savings, credit and insurance. In J. Behrman and T.N. Srinivasan (Eds.). Handbook of Development Economics. Volume 3, Amsterdam: North-Holland.

Capitanio, F. (2008). Risk management through insurance and environmental externalities from agricultural input use: An Italian Case Study. Paper Prepared for the 109th EAAE Seminar, Virtebo, Italy; November 20th–21st, 2008.

Dennis, A., Judith, E., Sommer, M.R. and Cynthia, R. (2000). "Farmers sharpen tools to confront business". Economic research service, U.S. Department of Agriculture.

Dercon, S. (2002). "Income Risk, Coping Strategies, and Safety Nets". *World Bank Research Observer*; Vol. 17 (2): 141-166.

Dorward, A., Kydd, J., Morrison, J. and Poulton, C. (2007). Institutions, Markets and Economic Coordination: Linking Development Policy to Theory and Praxis. *Development and Change*; 36 (1): 1–25.

Ellis, F. (1998). Household Strategies and Rural Livelihood Diversification. *Journal of Development Studies*; 35(1): 1-38.

Encyclopedia Britannica, (2004). Nigeria Encyclopedia Britannica premium Service. Externalities from Agricultural Input Use.

Hardaker, J., Huirne, R., Anderson J., and Lien, G. (2004). Coping with risk in Agriculture. Cambridge: CABI.

Harwood, J., Richard, H., Keith, C., Janet, P. and Agapi, S. (1999). Managing Risk in Farming: Concepts, Research, and Analysis. Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 774.

Hazell, P. and Norton, R. (2003). Mathematical Programming for Economic Analysis in Agriculture. New York: Macmillan.

Kolawale, O. and Ojo, S.O (2007). Economic efficiency of small scale food crop production in Nigeria. *Journal for Social* Sciences; 14(2): 123-130.

Nyikal, R.A and Kosura, W.A. (2005). Risk Preference and Optimal Enterprise Combinations in Kahuro Division; Muranga District, Kenya. *Agricultural Economics*; 32(2): 131.

Okunmadewa, F.Y. (2003). "Nigeria: Risk and Vulnerability Assessment - An Overview." A paper presented at Chelsea Hotel, Abuja.

Olaniyan, O., Oyeranti, G., Bankole, A. and Oni, O.A (2008). "Evaluation of Risk Management Agencies in Nigeria." A Final Research Report Submitted to the prepared for the 109th EAAE Seminar. Virtebo, Italy, November 20-21st, 2008.

Reardon, T. (1997). Using Evidence of Household Income Diversification to Inform Study of the Rural Nonfarm Labor Market in Africa. *World Development*; 25(5): 735-748.

Salimonu, K.K and Falusi, A.O (2009). "Sources of risk and management strategies among food Crop farmers in Osun State, Nigeria". *African Journal of Food, Agriculture, Nutrition and Development*; Vol. 9 (7): 1591-1605

Tru, C.L and Cheong, F. (2009). "Measuring Risk Levels and Efficacy of Risk Management Strategies in Vietnamese Catfish Farming" World Academy of Science, Engineering and Technology, 57.