RISK PERCEPTION AMONG FARM HOUSEHOLDS IN NORTH CENTRAL REGION OF NIGERIA: A LOWER PARTIAL MOMENT APPROACH

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ABSTRACT

This study investigated the perception of production and price risk by farm households and the factors that influence their level of perception in North Central Nigeria. The study attempted to capture the opinion of farmers about the quantity of crops they expect to harvest at the end of the season, and the prices they also expect for each of the crop cultivated. It was confirmed that the households do have an opinion for the quantity of crops outputs cultivated and also for the price they expect at the end of every season. The study established that farm households do give negative allowances regarding the quantity expected of a crop for a particular land cultivated, this is also true for prices expected. In other words farm households were found to be aware of the possibility that the final output they get from their farming activity may not commensurate with the inputs invested and so therefore expect less than what should be the potential. Furthermore, it was discovered that household crop specific risk perception varies within the region. Majority of the farm households perceived higher price risks for sorghum, rice, and yam crops.

Keywords: Perception, Price Risk, Production Risk, Farm household

INTRODUCTION

Farm households operate an uncertain production function (Ellis, 1993); the certainty of any production exercise is only ascertained after harvest. Furthermore, the uncertainty faced by the farm household is not only limited to the production of crops only but include the price expected for the produce at the market (Bwala, 2014). Therefore, farm households contend with both price and production risks at the stage of deciding which crop to cultivate: While not ruling out the prevalence of institutional, health, personal and financial risks completely; however, these are not focus of this study. Furthermore, how much of which resource to allocate to which enterprise makes the exercise even more complex (Dury, *et al.*, 2010). Nevertheless, the farm household may have opinion about the performance of each crop enterprise it cultivates; these opinion on crop performances guide the households in decision making regarding what to cultivate and at what level, and consequently how much of what resource to allocate (Dixon *et. al,* 2001). The opinion of the

household on the performance of each of the crop enterprises can be viewed as the level of certainty it has on the production function of that particular enterprise (Samuel and Acquah, 2012). Hence, in other words, the level of certainty ascribed to a crop enterprise can be termed the perception of risk associated to that enterprise by the farm household; however, the level of certainty is of course subjective.

The perception farm households' have towards the risk associated with their source of livelihood plays a significant role in the level of welfare they can attained. This is because the decision to cultivate a particular crop and their participation in the markets is determined by the type and level of perception they have concerning the particular crop. Furthermore, the decision to whether or not participate in a farm or market related trend could mean a gain or loss of income to the household; which is vital to its welfare. Therefore, having better understanding of the level of risk perceived by farm households regarding crops cultivated and the price expected will inform and direct policy in developmental projects. It is on this premise this study investigated the perception of farm households within the context of risk associated with their livelihood strategy. This study investigated farm households' perception of the risk associated with the production and marketing of maize, rice, sorghum and yam crops.

MATERIALS AND METHODS

Data used for analysis were collected in a survey using questionnaires. The survey covered five states in the North Central region of Nigeria; these include Kaduna, Kogi, Nasarawa, Niger and Abuja (the Federal Capital Territory). Multistage random sampling was employed to first of all select the states, the Local Governments and finally the communities from which the households were sampled. The Local Governments/ Area Councils include Kagarko, Jaba, Lokoja, Kotonkarfe, Toto, Karu, Paikoro, Katcha, Kuje and Kwali. One hundred and twenty (120) samples were drawn from each state. The data consists of a total of six hundred samples, comprising four hundred and sixty (460), two hundred and twenty three (223), three hundred and twenty three (323) and three hundred and twenty nine (329) households cultivating maize, rice, sorghum and yam crops respectively.

Lower partial moments being a downside measure of risk is an ideal tool that closely captures the perception of risk akin to the conventional notion of risk (as the chance of an undesirable event happening) serves as an appropriate shortfall measure (Brogan and Stidham, 2005, Albrecht and Maurer, 2002). Furthermore, Lower Partial Moments (LPM) are coherent measures of downside risk taking into account only negative deviations from the target value. Among the characteristics of the LPMs are that, they satisfy the axioms of sub-additivity, positive homogeneity, monotonocity and translation invariance (Acerbi et al., 2001, Cheng et al., 2004, Peracci and Tanase, 2008). LPMs are also additively decomposable, which allows for the measurement of vulnerability at both the individual/household level and aggregates for population groups. Finally, they are interpretable as well as being consistent with the ordering of distributions derived from stochastic dominance rules and utility maximization of risk averse households. Therefore, the explicit assumption of a risk aversion parameter is not necessary with LPMs because of the aforementioned consistency attribute (Bawa and Lindenberg, 1977). In that regard Nawrocki (1991) submitted that LPMs of order above zero imply stronger local risk aversion in the lower part of the

domain while local risk neutrality is obtained above the target value.

Following Bawa (1975), Fishburn (1977) and Ernst and Michael (2006) the risk perception of the farm households in this study is quantified using the general formula of Lower Partial Moment (LPM) as depicted in equation (1). Equations 2, 3 and 4 measure the short fall probability (which is closely related to value-at-risk), shortfall expectation and shortfall variance respectively.

$$LPM_n(Z) = \int_{-\infty}^{Z} (Z-x)^n f(x)dx \qquad 1$$

$(n \geq 0)$

where: $Z \equiv$ target variable from which deviations are measured (below which a loss is incurred), $x \equiv$ outcome of the probability distribution, $f(\cdot) \equiv$ density function.

$$LPM_0(Z) = \int_{-\infty}^{z} (z-x)^0 f(x)dx = F(z) \qquad 2$$

$$LPM_1(Z) = \int_{-\infty}^{z} (z-x)^1 f(x)dx = E[z-x|x \triangleleft z]F(z) \qquad 3$$

$$LPM_2(Z) = \int_{-\infty}^{z} (z-x)^2 f(x)dx = E[(z-x)^2|x \triangleleft z]F(z) \qquad 4$$

LPM $\equiv$ lower partial moment

x $\equiv$ random variable or expected value of incomen

n $\equiv$ order of moment

f(x)dx $\equiv$ probability density function

Irrespective of the order of moments, the estimation for the LPM of order *i* followed Schubert (1996) equation 5.

$$LPM_i = \frac{1}{\sqrt{2\pi}\sigma} \int_{-\infty}^{x} (z-x)^i \cdot e^{\frac{-(u-\mu)^2}{2\sigma^2}} dx \qquad 5$$

Factors influencing the perception of risk among the farm households

To further isolate the possible cause of variation in the degree of risk perceived among the farm households, an ordinary least square (OLS) multiple regression model was estimated. The regression model is as presented in equation 6.

$$Rsk_{perc} = f(exphh, eduhh, famsz, frmsz, gndhh) \qquad 6$$

Where;
$Rsk_{perc} \equiv$ risk perception (LPM_0)
$exphh \equiv$ experience of household head
$eduhh \equiv$ education level of household head
$famsz \equiv$ family size
$frmsz \equiv$ farm size
$gndhh \equiv$ gender of household head

The explanatory variables in the model are expected to have the following causal relationship with the explained variable.

The number of years the farm household have been involved in the farming business was assumed to have contributed to the level of experience acquired; hence it was deemed appropriate to served as a proxy. Furthermore it was also assumed that the number of years invested on the farm is positively related with the experience of the household. Consequently the greater exhithe experience, the better the decision making ability bited by the farmer regarding the concerned enterprise. The ability to process information and arrive at a sound judgement increases with education *ceteris paribus*; hence it was further assumed in this study that farm households that are educated will tend to better perceive risk and take management strategies than those who are not or less edu-

cated. The variable for education was captured as number of years spent acquiring education. The family size variable was also assumed to have a positive relationship with the level of perception. This is because farm household heads who have more responsibility in terms of number of dependents to care for and further coupled with the fact that farmers are mostly risk averse; perception of risk will tend to increase with larger family size due to the aforementioned responsibilities.

In attempting to capture the risk perception of the farm household regarding the production function or price of crops cultivated, questions were formulated following Luigi *et al.* (2001); the questions used to elicit the opinion of the household head regarding the trend of price and production risk include asking the household to recall previous harvest quantities and based on the recalls form an opinion about the future harvest or price as the case may be. Manski (2004) used a module in a similar context were the respondent was asked the likelihood of the variable of interest getting lower than a certain level. In the same vein Hardeker (1997) asked respondents to assess the likelihood of the variable's value falling within an interval. The estimation executed for the risk and regression analyses were programmed in STATA and SPSS respectively.

RESULTS AND DISCUSSION
Farm household production risk perception
Table 1 presents the probability of loss as perceived by the farm households regarding production activity in terms of quantity for the three cereals and tuber crops under study. The table shows majority of maize farmers (51.3%) have probability of loss between 0.70 and 0.89, while the second

largest group had probability of loss between 0.50 to 0.69 expected crop harvest. The table also reveals that about 40% of the maize farmers have less than 69% chance of obtaining their target quantity based on their assessment of the production environment. The trend also goes for sorghum, yam and rice, these enterprises have majority of the farmers with probability of loss within the same range (0.70 - 0.89).

Considering the mean probability of loss, it appears that yam had the highest probability of loss followed by rice; maize farmers had the lowest mean perception of risk. The result presented in Table 1 (probability of loss) can be taken as the representation of the confidence or rather the possibility of the farmers realizing the quantity of crops they are supposed to have harvested if there were no risk situations hindering the actualization of the expected crop quantities or prices. Hence for a probability of loss of 0.69, the farmer has a 69 percent chance of obtaining the quantity of crop per given inputs. Taking into cognizance the difficulty in harmonizing and relating the risk perceived by farm households for each of the crop cultivated and relating it per hectare.

Regarding expected loss in crop output, majority of the farmers had loss expectation of less than 500kg per hectare. Expected loss in output for maize and yam cultivators above 500kg per hectare are higher compared to other crops (Table 2), while the least expected loss in comparison with the other crops is evident in yam enterprise.

The implication of the observations entails that majority of the farmers perceived operating within a risky environment, more especially, yam and rice enterprises are suggested to be riskier than maize and sorghum crop enterprises based on the probability of loss

(LPM0). However, the mean "expected loss" (LPM1) suggests that larger losses are suffered by sorghum and rice farmers. The risk perception of the farmers regarding specific crop enterprise will impact on their decision making concerning resource allocation to the respective enterprise albeit the whole farming exercise. Smale and Heisey (1993) and Smale et al. (1994) attributed decreased adoption of hybrid seed and lower application of fertilizer for same to risk perception of farmers in Malawi. In essence, the risk perceptions of the farmers regarding the crop enterprises will definitely influence their activity choice. Therefore, it might not be a surprise to observe that fewer farmers endeavour to cultivate yam and rice due to the risk perception accorded to the cultivation of the crops. The implication of the finding is that farmers perceive the presence of risk in all crop enterprises, and the perception is in varying degree.

Farm households price risk perception
Table 3 shows the price risk perceptions of the farmers according to the probability of price loss (LPM0); it indicates majority of the farmers have price probability of loss above 0.89 for sorghum, yam and rice respectively.

Table 1: Distribution of Production Risk Perception among Farmers

Probability of loss (LPM0)

Risk Measure	Crop producers in percent			
Probability	Maize	Sorghum	Yam	Rice
Less than 0.09	6.70	5.90	2.80	2.20
0.10 - 0.29	1.50	3.70	3.60	10.80
0.30 - 0.49	11.70	13.00	2.20	13.00
0.50 - 0.69	20.20	19.20	26.10	-
0.70 - 0.89	51.30	25.40	19.70	19.70
Above 0.89	8.50	32.80	45.60	54.30
Mean LPM0	0.63	0.72	0.85	0.80
Standard Deviation	0.01	0.016	0.16	0.02

SOURCE: FIELD SURVEY 2010/2011

Table 2: Distribution of Expected Lose in Crop Quantity Among Farm Households

LPM1 Expected loss (per hectare)

Crop quantity (Kg)	Crop producers in percent			
	Maize	Sorghum	Yam	Rice
Less than 500	85.2	86.6	58.9	82.8
501 – 1730	14.3	9.8	21.5	11.9
1731 – 2961	0.5	2.6	9.3	3.8
2962 – 4191	-	0.7	4.5	1.0
4192 – 5422	-	-	1.7	0.5
Above 5422	-	0.3	4.1	-
Mean LPM1	427.21	909.37	206.5	614.86
Standard Deviation	31.00	69.87	13.80	45.00

SOURCE: FIELD SURVEY 2010/2011

Table 3: Distribution of Price Risk Perception Among Farm Households

LPM_0 Probability of lose

Risk measure	Crop producers in percent			
Probability	Maize	Sorghum	Yam	Rice
Less than 0.09	9.00	8.70	3.10	2.70
0.10 - 0.29	23.20	1.60	2.00	3.60
0.30 - 0.49	17.00	9.30	14.00	14.80
0.50 - 0.69	-	18.90	-	7.20
0.70 - 0.89	39.10	21.10	27.70	18.40
Above 0.89	11.60	40.40	53.20	53.40
Mean LPM0	0.63	0.75	0.88	0.86
Standard Deviation	0.01	0.02	0.01	0.02

SOURCE: FIELD SURVEY 2010/2011

For the maize crop, most of the farmers are within the range of 0.70 and 0.89, it was observed however, that a good number of the farmers have probability of loss below 0.49; which indicates that farmers who engage in the cultivation of maize perceive lower price risk. In contrast, yam (53.2) and rice (53.4) farmers are seen to perceive higher price risk prevailing in the market. The mean probability of price loss further confirms the perception of higher price risk for yam and rice cultivators in the area. Sorghum is seen to have a mean price probability of lose (0.75) just above that of maize (0.63). The LPM_0 for price suggests that most of the farmers perceive high risk for the respective crops this perception of course will impact on the allocation of resources for expanding farming activities. In a study by Rudulf and Herman (2009) in Cameroon, shortfall probability of 0.80, 0.85 and 0.91 for sorghum, millet and rice was reported among poor farmers respectively; they also reported shortfall probability of 0.10, 0.37 and 0.50 across the whole population.

The expected loss as depicted in Table 4 shows the cultivators of maize (55%) suffer expected loss above N5800 per hectare to be in the majority, this is also true for yam (75%) and rice (47%) cultivators. The expected loss for sorghum is the lowest among the crop enterprises with a majority (over 70%) of the farmers having losses between N1800 and N4800 per hectare. The mean loss values portray yam farmers to suffer the largest loss in prices to the tune of N7647, while maize farmers lost N5547 per hectare in prices. Table 4 show yam farmers perceive more loss above N5831 in expected crop price compared to the other enterprises followed by maize, rice and sorghum respectively. From the result, it was deduced that over 50% of sorghum farmers had expected loses between N1846 and N3839 per hectare suggesting that lower risk was perceived by the sorghum cultivators.

Risk perception does not only provide a means of understanding how farmers view their working environment and subsequently the allocation of resources to enterprises, but it also forms a basis upon which policy can understand farmers' need and enhance the way information is used to address these needs. From the result it is obvious that some crop enterprise that had high short fall

probability had lower expected loss than enterprises having low short fall probability; This is because even though an enterprise may have a low probability of loss (risk), the impact of the risk may be higher than that of an enterprise that has a high shortfall probability.

Table 4: Distribution Of Expected Lose in Monetary Terms Among Farm Households

LPM1 Expected loss (per hectare)				
Value (N)	Crop producers in percent			
	Maize	Sorghum	Yam	Rice
less than 850	5.00	9.90	3.10	2.70
850 – 1846	4.10	9.90	2.00	4.50
1847 – 2843	9.40	28.30	0.30	5.40
2844 – 3840	6.10	30.70	9.80	11.20
3841 – 4837	10.70	15.80	5.90	9.40
4838 – 5834	9.40	4.70	3.40	19.70
Above 5834	55.20	0.60	75.60	47.10
Mean LPM1	5547	2843	7647	5507
Standard Deviation	107	73.39	159	144

SOURCE: FIELD SURVEY 2010/2011

Due to the fact that farmers are central to any transformation/development in agriculture through their decisions with reference to technology used and mix, therefore their perception of risk is more important to intervention policies than objective risk measures as estimated by the researcher; this is because it is the farm households' subjective view of the presence and magnitude of risk that will invariably influence the decision on what portfolio choice to adopt and how much resource is committed to that portfolio.

The perception of price and production risks was further categorized according to states and the mean presented in Table 5. From the observations, farmers in Kaduna perceive higher price and production risks compared to other locations in the region. For rice crop, farm households in Niger appear to have higher price and production risk followed by Kaduna. The result seem to suggest the perception of both price and production risk by farm households for the respective crops to be within the same range, even though price risk perception is higher than production risk and vice versa across the states and crops respectively. The intuition for this observation is that, the risk surrounding the production of a crop could be transferred to its price as well in that the availability/scarcity of the crop is a major determinant of how high/low the price of a crop could change. Hence the variation in crop price reflects the instability in the supply of that crop in the market.

Concerning sorghum crop, farm households in Niger appear to perceive higher risk followed by those in Kaduna. In the case of yam crop, the farm households in Nasarawa and Niger seemed to perceive higher price and production risks.

Table 5: Mean Crop Risk Perception Across States in the Region

	Maize		Rice		Sorghum		Yam	
LPM	LMP0q	LMP0p	LMP0q	LMP0p	LMP0q	LMP0p	LMP0q	LMP0p
Abuja	0.43 (0.023)	0.45 (0.025)	0.13 (0.027)	0.14 (0.029)	0.22 (0.029)	0.22 (0.028)	0.27 (0.031)	0.32 (0.036)
Kaduna	0.67 (0.162)	0.60 (0.156)	0.38 (0.250)	0.37 (0.244)	0.41 (0.226)	0.41 (0.243)	0.43 (0.266)	0.40 (0.252)
Kogi	0.45 (0.177)	0.40 (0.222)	0.16 (0.187)	0.14 (0.175)	0.21 (0.181)	0.21 (0.193)	0.39 (0.226)	0.40 (0.220)
Nasarawa	0.41 (0.193)	0.44 (0.193)	0.20 (0.202)	0.19 (0.190)	0.23 (0.194)	0.25 (0.219)	0.57 (0.223)	0.57 (0.218)
Niger	0.40 (0.225)	0.44 (0.216)	0.59 (0.243)	0.62 (0.238)	0.70 (0.250)	0.70 (0.189)	0.58 (0.250)	0.64 (0.189)

Values in parenthesis are standard errors; LPM_q = production risk perception, LPM_p = price risk perception

Factors determining the perception of risk among farm households

The perception of risk and the reaction that emanates from the farmer is subjective depending on certain characteristics peculiar to the individual involved. Risk is prevalent in agriculture and therefore independent of the farmer's attitude; whether or not it is perceived. There are socioeconomic factors that may be responsible for the degree of awareness among farmers. Maggie and Obi (2012) identified Socio economic factors such as age, gender, education, location, and information access to have significant relationship with sources of risk. Patrice *et al.* (2010) also reported that socioeconomic factors specific to farmers contribute to defining their degree of risk perception. These factors may contribute positively or negatively to the degree an individual perceives the risk environment. In this section, an ordinary least square regression model was estimated with the aim of understanding the factors responsible for the variation in the degree of perception among the farmers. The perception of production risk among the farmers as presented in Table 6 for the various crop enterprises show that for maize crop family size contributes to the explanation of the degree of variation for the perception of risk among the farm households; this is also true for the yam enterprise. However, the signs for the coefficients are at odds for the two crops; meaning that, for the maize enterprise, larger households perceive less risk than small households:

Whereas for the yam enterprise, the sign indicates that large sized households perceive higher risk than small size households, corroborating the submission of Lien *et al.* (2006) where they suggested that farmers' risk perception will vary according to specialization.

Second variable of interest is farm size, this coefficient is consistently significant and positive for all the crop enterprises which implies that the perception of risk by the farm households increases with the scale of production; the larger the scale the higher the production risk perceived. The farm households' perception of price risk as pre-

sented in Table 7 shows the coefficient for family size for all the crop enterprises to be significant and positive (with maize enterprise been an exception), similar to that obtained for the production risk perception, the sign for the price risk perception for maize enterprise is also negative; suggesting the decline in degree of perception with lower family size.

Table 6: Factors Determining Level of Production Risk Perception Among Farmers

	Maize	Rice	Yam	Sorghum
Variable				
Constant	0.22 *	0.19 **	0.07	0.25 *
	(2.68)	(1.84)	(0.59)	(2.29)
Experience	0.05	-0.05	-0.01	0.03
	(0.76)	(-0.90)	(-0.23)	(0.55)
Family size	-0.22 ***	0.09	0.14 *	0.11
	(-3.76)	(1.61)	(2.12)	(1.57)
Education	-0.01	-0.03	0.04	-0.06
	(-0.21)	(-0.68)	(0.81)	(-1.19)
Farm size	0.49 ***	0.54***	0.55 ***	0.60 ***
	(9.63)	(10.89)	(10.78)	(8.88)
Gender	0.05	-0.03	0.06	-0.07
	(1.02)	(-0.56)	(1.27)	(-1.41)
F Value	21.70	28.40	23	23.88
R^2	25	31	31	32

SOURCE: FIELD SURVEY 2010/2011; Values in brackets are standard errors *, **, *** significant at 1%, 5% and 10% respectively.

Table 7: Factors Determining Level of Price Risk Perception Among Farmers

	Maize	Rice	Yam	Sorghum
Variable				
Constant	0.13	0.30 **	0.04	0.19*
	(1.24)	(2.62)	(0.29)	(1.73)
Experience	0.08	-0.05	-0.03	0.03
	(1.33)	(-0.91)	(-0.57)	(0.52)
Family size	-0.13 *	0.14 *	0.22 **	0.13*
	(-2.13)	(2.34)	(3.25)	(1.94)
Education	-0.02	-0.01	0.05	-0.05
	(-0.36)	(-0.15)	(1.02)	(-1.03)
Farm size	0.37***	0.52 ***	0.49***	0.56***
	(6.79)	(10.42)	(9.36)	(8.15)
Gender	0.09***	-0.09*	0.08	-0.04
	(1.68)	(-1.87)	(1.55)	(-0.81)
F Value	11.50	29	20.30	29
R^2	14	32	29	20.7

SOURCE: FIELD SURVEY 2010/2011; Values in brackets are standard errors *, **, *** significant at 1%, 5% and 10% respectively.

The coefficient for the farm size also indicates the increased perception of price risk among farmers with larger farms. Boggesse *et al.* (1985) reported a positive relationship between size of farms and input cost risk perception. Furthermore, the coefficient for household head's gender for maize enterprise show the likelihood for the perception of price risk among male household heads to be higher; while for rice, it is the contrast. The trend for the effect of farm size on the perception of price risk is the same as observed for the production risk. The perception of price risk among the farmers increases with increase in farm size. This result is logical in the sense that farmers with larger investment prospect tend to be conscious of the possibility of losses in an enterprise more than small holder farmers. Hence from this analysis, it can be asserted that the main factors influencing the perception of risk among farm household's in North Central Nigeria are farm size, gender and family size. In that regard, the results showed majority of the maize farmers (51.3%) have probability of loss between 0.69 and 0.88. Furthermore, about 40% of the maize farmers were found to have less than 60% chance of obtaining their target quantity based on their assessment of the production environment. The trend was the same for sorghum, yam and rice; majority of the farmers have probability of loss within the same range. Findings also reveal that majority of the farmers have loss expectation (in terms of quantity) of less than 500kg per hectare regarding crop output.

For yam and rice cultivators, output expected losses were found to be above 850kg, this quantity is high compared to the other crops. Furthermore, price probability of loss above 0.89 was estimated for yam and rice respectively. It was also discovered that majority of sorghum cultivators perceive price probability of lose within the range 0.69 – 0.89. For maize producers, the range is between 0.69 and 0.88. It was observed however, that a good number of the farmers have probability of loss below 0.48. In comparison, sorghum was found to have a mean price probability of lose (0.75) above that of maize (0.63). Majority of the maize producers (55%) found to suffer expected loss above N5800 per hectare were in the majority, this is also true for yam (75%) and rice (47%) cultivators. The expected loss for sorghum is the lowest among the crop enterprises with majority (over 70%) of the farmers having losses between N1800 and N4800 per hectare respectively. Finally significant socioeconomic factors identified to influence the level and variations of risk perception among the farmers are farm size, family size and gender of the household head.

CONCLUSION AND RECOMMENDATIONS

The perception of risk by farmers and the factors responsible for the level of perception are important considerations for agricultural development. This is because the rate of adoption or success of any improved farm technology or development program depends to a large extent on the level of risk inherent in these technologies and as perceived by farmers; if the perception is high, then it should be expected that the rate of adoption will basically be low all things being equal. It is the assertion of this study that the perception of production and price risks by farm households is varied across the region; where farm households in the region perceived higher risks in some crops in contrast to other households. Based on the findings, this study recommends that farmer education on risk management strategy be emphasize through extension. Furthermore, im-

provement in the availability and affordability of farm inputs accompanied by seasonal weather forecast information will aid farm households plan activities thereby boosting their confidence. Policy should take cognizance of farm household risk perception, this is because the information will enhance the understanding of farm household behavior as well as facilitate in the planning of agrarian development projects.

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