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Smallholder Farmers' Willingness to Pay for Insurance Against Climate Variability Effects in Arid Land Areas of Kenya

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Abstract
The impacts of climate variability on societies around the world are increasingly evident. Kenya is one of the most vulnerable countries and economic sectors and livelihoods are already frequently experiencing the manifestations of the problem. Over the years, a range of risk management strategies has been used to reduce, or to assist farmers to absorb, some of these impact. Since insurance is potentially an important instrument to transfer part of the risk, this study assesses small holder farmers willingness to pay for selected crop insurance and examine factors that affect the maximum farmers are willing to pay for the selected crop insurance as a response to climate variability in Kenya. The data was collected from 392 sample households from Laikipia County in Kenya using close ended value elicitation format followed by open ended follow up questions. The study uses a Double bounded dichotomous choice model for data analysis. The mean willingness to pay values are found to be 58552.22 and 55923.38 KES per hectare with and without covariates respectively. The estimated willingness to pay for the study area was found to be KES 63930.79 per year. Occupation of household head and access to weather information had a positive effect on willingness to pay for crop insurance while access to extension services had a negative effect. Therefore, the study recommends provision of meteorological reports and alerts to farmers in understandable forms. There is a need for investment in the provision of up to date, relevant demand-driven extension services that provide localized response solutions depending on the agro ecological zone.
Keywords: Willingness to pay double bounded dichotomous choice, insurance, climate variability and agro-pastoralism.

1. Introduction

In the manufacturing sector today, human capital is still essential for most factories to carry out a variety of Agricultural insurance is one of the financial tools used to manage the various risks that may arise in agricultural production. The purchase of insurance policy on a farm eliminates the uncertainty regarding the financial loss in the event of climate variability. Insurance can be used to minimize financial consequences of many adverse events, it does not decrease the uncertainty for the individual farmer as to whether the event would occur nor does it alter the probability of occurrence, but it does reduce the probability of financial loss connected with the event (Danso-Abbeam *et al*., 2014). For a crop insurance program to be successful, some conditions must be fulfilled. First there must be acceptable level of demand among farmers for crop insurance, secondly the farmers must be capable to meet insurance policies and lastly the insurer must be capable and willing to pay the farmers' claims. This calls for stakeholders including the government and insurance companies to have a clear understanding of the needs of farmers that affect their willingness to participate and pay for crop insurance. This awareness of will help the policy makers to the structure the insurance policies according to the needs of the people (Zemp *et al*., 2015)

Insurance can be viewed as an economic device which helps an individual pay a small cost known as the premium to cover for a large uncertain financial loss that would exist if it were not for the insurance .It operates by transferring the risks associated with farming to a third party via payment of a premium that reflects the true long-term cost of the insurer assuming those risks. In other words, the insurance agency is able to pool the risks by accepting appropriate premiums from a large number of clients. Perception on the ownership of the property right over the resource in question may influence an individual's willingness to pay (Carson *et al*., 2001) and is influenced by individual tastes and preferences, income, attitudes and perceptions of the type of product as well as household demographic characteristics. This is computed by asking how much people are willing to pay for a non-market goods (WTP) or how much they are willing to give up having a specified non-market goods quality improvement happen (Freeman, 2003). WTP is a small fraction of income and may be influenced by recent experiences for example farmers are more likely to express high demand of insurance if the weather has been adverse in the recent period.

The Bali Action Plan calls upon policymakers to consider insurance as part of an adaptation strategy. Formal risk management mechanisms include: agricultural insurance, minimum support price system and futures markets (Hardaker *et al*., 2004). Insurance can be an efficient risk management tool to cover losses arising from yield variability (Roberts, 2005). It has been offered to farmers since the 1920s (Smith and Watts, 2010). It

involves insuring crops, livestock, forestry, aquaculture and green housing. Agricultural insurance is one method by which farmers can stabilize farm income, investment and guard against disastrous effect of losses due to natural hazards. Crop insurance not only stabilizes the farm income, but also helps the farmers to initiate production activity after a bad agricultural year. The major problem associated with insurance is the farmers' willingness to pay the premium. According to Hiwot and Ayalneh, (2014) willingness to pay (WTP) is the amount that must be taken away from the person's income while keeping his utility constant in the same manner, it is influenced by individual tastes and preferences, income attitudes and perceptions of the type of product as well as household, demographic characteristics

In both developed and developing countries full yield insurance scheme is provided and supported by public sector (Hazell *et al*., 2001). These programmes originate from government concern about catastrophic risks such as drought or to reduce incidences of loan defaults to banks. Apart from few exceptions, financial performance of public crop insurance has not been successful (Hazell, 1992). The study argues that public insurers are mandated to insure small farms which add to administration costs. In the same note, since insurers have little incentive to pursue sound insurance practices when assessing losses because they know government will automatically cover most losses, the insurer collude with farmers in filing exaggerated claims. In addition, government undermines public insurers for political reasons. Insurers have had to pay exaggerated losses in election years.

Agro-pastoralism in is a production system based on crop production and livestock rearing that is characterized by mobility in an ecologically fragile environment, high degree of flexibility and variability. Livestock represent the major stores of wealth that utilize mobilized environment characterized by highly variable water resources and transient forage. However, over the past three decades agro-pastoralism has been faced with enormous problems as a result of extremes of climate variability. The threat that climate variability poses to agro -pastoralism has necessitated the assessment of the potential effects of climate variability at various scales in the sector in order to reduce vulnerability and secure livelihoods of those who depend on them (Chipanshi *et al*., 2003). High population growth rate has caused negative effects on the socio-economic development and aggravated the poverty situation in the county. Increased pressure on available resources has often degenerated into conflicts between the pastoral community, large-scale ranching enterprises, smallholder farmers and wildlife. The effects of recurrent droughts, combined with the low productivity of small and uneconomical land holdings, have no doubt further aggravated the severity of land degradation, with repercussion on the livelihoods of many local communities in the county.

This paper contributes to literature by introducing the issue of insurance as an adaptation strategy to climate variability. It also focuses on comprehensive insurance unlike other studies which focus on index weather based insurance. The study also goes further to understand the factors that influence adoption of an insurance which facilitates coming up with relevant evidence-based policies regarding formal agricultural insurance while enhancing its uptake by farmers. Insurance providers will also benefit by understanding the factors hence being in a position to tailor their insurance schemes to the needs of the farmer.

2. 0. METHODOLOGY

2.1 The study area

The study area was Laikipia West Sub - County in Laikipia County which lies between latitudes 0°17'S and 0°45'N and longitudes 36°15'E and 37°20'E, occupying an area of approximately 9,666 km^2. The county extends from the western foot of Mount Kenya to the north-eastern base of the Aberdare Ranges. It stretches widely northwards and descends towards the Rift Valley in the northwest with spectacular complex of fault-line volcanic ridges and escarpments as shown in the map of the study area.

The altitude ranges between 1600-2300 m above sea level on a dry land and semi-arid plateau. The long rains occur in April-May, the continental or middle rains in August and November, and a pronounced dry season in January-March. The average annual rainfall varies from 400 mm to 750 mm across the district, with higher values observed at the foot of both Mt. Kenya and the Aberdare Range. The human population in the county was 399,227 persons based on the 2009 census. The growth rate was 3.9 percent between 1989 and 1999 as compared to the national average of 2.4 percent (Laikipia DDP, 2002-2008).

The area was chosen because of the fragile environment prone to fluctuations in climatic conditions. The effects of recurrent droughts, combined with the low productivity of small and uneconomical land holdings have aggravated the severity of land degradation, with repercussion on the livelihoods of many local communities. Farmers are trying to adjust in order to continue farming with the challenge of climate variability. The aim of the study is to know how the farmers have responded and the factors affecting their responses.

2.2 Analytical technique

WTP was analyzed using double bounded dichotomous choice contingent valuation model. The model involves the use of bid levels for insurance that forms the basis for calculating the mean WTP. This model has gone

through some stages in the proposition to improve efficiency in measuring willingness to pay for public goods; from single bounded to double bounded and multiple bound. An improvement of the contingent valuation in terms of efficiency is the double bounded contingent valuation where the subject is offered a second bid, higher or lower depending on the first response (Hanemann et al. 1986). This method showed an improved statistical efficiency (Hanemann et al. 1991). The origins of contingent valuation are the estimation of non-market goods, but it is now widely used to evaluate willingness to pay for new products. This method suits the case of insurance whose market is not fully developed in agriculture and the rural areas like Laikipia West Sub - County.The double-bounded contingent model is appropriate because it takes into consideration the two responses simultaneously.

The respondent was presented with an initial bid and then follow-up bids. The level of the second bid was higher than the initial bid if the response was positive and lower than the initial bid if the response was negative. The second bid plays an important role in placing an upper and lower bound on the respondents unobserved true WTP (Alberini and Cooper, 2000). There are four possible outcomes from the double-bounded dichotomous choice presented in interval yy, yn, ny and nn, where yy implies that both answers were "yes", WTP is higher than the upper bid, yn first answer was "yes" followed by "no" WTP is between the initial bid and the upper bid, ny a "no" answer followed by "yes" WTP is between the lower bid and the initial bid, and nn both answers are "no" WTP is between zero and the lower bid (Vanit and Schmidt, 2002). The probabilities of these outcomes are denoted as π^{yy}, π^{yn} π^{ny} and π^{nn}. The set of bids may be represented as B_1 for the initial bid, B_0 for the lower bid and B_2 for the upper bid. Building on dichotomous choice model, the probabilities of these four outcomes is expressed as follows: accepting the first bid the consumer WTP was greater than the bid. If the consumer rejected the first bid, then his/her WTP was less than the initial bid. The probabilities of those outcomes may be expressed as in equations 1 to 4 below.

$$\pi^{yy}(B_{i1}B_{i2}) = \Pr(B_{i1} \leq Max\ WTP \leq B_{i2}) = \Pr(B_{i2} \leq Max\ WTP) = 1 - G(B_{i2};\theta) \quad (1)$$

$$\pi^{yn}(B_{i1}B_{i2}) = \Pr(B_{i1} \leq Max\ WTP \leq B_{i2}) = G(B_{i2};\theta) - G(B_{i1};\theta) \quad (2)$$

$$\pi^{ny}(B_{i1}B_{i0}) = \Pr(B_{i1} > Max\ WTP \leq B_{i0}) = G(B_{i1};\theta) - G(B_{i0};\theta) \quad (3)$$

$$\pi^{nn}(B_{i1}B_{i0}) = \Pr(B_{i1} > Max\ WTP < B_{i0}) = \Pr(B_{i0} > Max\ WTP) = G(B_{i0};\theta) \quad (4)$$

Where $G(B,\theta)$ is the cumulative distribution factor (CDF), with parameter vector θ to be estimated (Hanemann *et al*., 1991). With a sample of N observations where B is;

The final model, selected to analyze the dependence of WTP on socio-economic characteristics, is as shown in equation 5 below.

$$L(\theta) = \sum_i^N \{ d_i^{yy}.\pi^{yy}(B_{i1}B_{i2}) + d_i^{yn}.\pi^{yn}(B_{i1}B_{i2}) + d_i^{ny}.\pi^{ny}(B_{i1}B_{i0}) + d_i^{nn}.\pi^{nn}(B_{i1}B_{i0}) \quad (5)$$

Where d_i^{yy}, d_i^{yn}, d_i^{ny} *and* d_i^{nn} are binary valued indicator variables, where $d_i^{yy} = 1$ for yes-yes response 0 otherwise, $d_i^{yn} = 1$ for yes-no response, otherwise 0; $d_i^{ny} = 1$ for no –yes response, otherwise 0; and $d_i^{nn} = 1$ for no- no response 0 otherwise.

Table 1: Definition of variables that are used in the double bounded model

Variables	Definition	Measurement	Expected sign
Dependent variable			
WTP	Farmers willingness to pay	1= Yes 0 = No	-
Explanatory Variables			
Age	Age of household head	Continuous	+/-
Credit	Access to credit for the use of adaptation strategies	1 = Yes 0= No	+
Gender	Gender of household head	1 = Male 0 = Female	+/-
Educ	Education level of household head	Years spend in school	+
Hhsize	Total number of members of the household	Continuous	+/-
Landsize	Size of land owned by the household	Continuous	+
Occup	Whether respondent mainly into farming or not	1 = Yes 0 = No	+/-
Exten	Number of visits received from any extension	Continuous	+
Dmkt	Distance to the main market	Continous	+/-
Grpmb	Membership to a group	1 = Yes 0 = No	+
Weathinf	Access to weather information	1= Yes 0 = N0	+
Ng'arua	Farmers living in Ng'arua	1= Yes 0 = N0	+/-
Olmoran	Farmers living in Olmoran		+/-

3. Results and Discussion

Table 2 presents results of household head's main occupation, gender and education level by category of willingness to pay. The main occupation of 66.39% of the households' heads who were willing to pay for crop insurance was farming as compared to 65.44% who were not willing. Farmers who exclusively depend on agriculture may have high experience in farming, hence aware of risk and uncertainties associated with climate variability. This makes them have knowledge on the different available alternatives to respond to climate change, therefore they are ready to pay for insurance because they depend exclusively on agriculture and are ready to invest in order to maximize the outcome. Shongwe *et al*. (2014) noted that when households are fully engaged in farming, they will have enough time to explore more adaptation options and focus all their resources to farming since it is their livelihood than those with other sources of income.

In terms of the gender of the household head, 63.11% of those willing to pay were male as compared to 65.07% of those who were not willing to pay. Having a male as the head of household may increase willingness to pay because men may have access to information, land, and other resources, which women may lack due to traditional social barriers. The gender of the household head influences the household's access to land, credit and other productive resources in Africa and other developing countries (FAO 2011). Temesgen *et al*. (2009) found that male-headed households adapt more readily to climate because they have more access to improved technology, information on climate, credit and extension services than female headed household, which in turn help them to adapt to climate change impacts. Male-headed households are often considered to be more likely to get information about new technologies and take risky businesses than female-headed households (Asfaw and Admassie, 2004).

Table 2: Education level, occupation and gender of the household head (%)

Variables	Description	Willing to pay	Not willing to pay	*Chi* Square
Occupation	Farmer	66.39	65.44	0.0339
	Otherwise	33.61	34.56	
Gender	Male	63.11	65.07	0.1411
	Female	36.89	34.93	
Education	Informal	18.85	21.30	
	Primary	47.54	62.50	
	Secondary	13.93	11.40	30.9048***
	College	9.84	4.40	
	University	9.84	0.40	

***, * = Significant at 1%and 10% level, respectively

There was a significant association between farmers' level of education and farmers' willing to pay for crop insurance at 1% significance level. In terms of educational level, majority (79%) of the farmers had accessed education as compared to 21% that had not accessed formal education. Results in Table 3 indicate that 47.54% of farmers willing to pay went to primary school compared to 18.85%, 13.93% and 19.68 % who had no formal education, secondary school and tertiary education, respectively. Among those not willing to pay 21.3% had no formal education, while 62.5% went to primary school, 11.4% secondary school, and only 4.8% had attained tertiary education in the category. Farmers with higher level of education are likely to be more aware of the problems associated with climate change and importance of insurance, hence would exert more effort to pay for insurance cover to reduce the impact of climate change. Danso-Abbeam (2014) noted that better educated farmers are more likely to understand the insurance policy and therefore, are likely to buy insurance policy than their counterparts with less education level. Educated and experienced farmers are expected to have more knowledge and information about climate change and agronomic practices that they can use in response (Maddison, 2006). Education level of farmers is assumed to increase the ability to obtain process and use information relevant to the use of improved agricultural technologies (Anley *et al.,* 2007)

Table 3 presents results of mean age, household size, land size and distance to market. Household heads who were willing to pay for insurance had lowest mean age of 46.49 years as compared to 53.82 years for those not willing to pay. There is a significant difference in the mean age of farmers by willingness to pay at 1% level of significance. Younger farmers are more flexible in adapting to new ideas, less risk averse, and more innovative, hence are more willing to pay for insurance than older farmers who are more conservative to adopt new technologies. Wairimu *et al*. (2016) found that younger farmers had higher probability of adopting Kilimo Salama insurance than older farmers in Kenya. This was attributed to older farmers' high experience in farming and consequent awareness of risk and uncertainties, they had put in place other risk management strategies other than *Kilimo Salama* insurance.

Households willing to pay for crop insurance had an average of 7 members compared to 6 members for

those not willing to pay for crop insurance and was significantly different at 5% level. Higher willingness to pay for larger households may be due to the increased need of being food secure. More household members require more food, hence the need for an assured produce resulting to the demand of insurance. Many family members may generate more income, hence they can be able to pay for insurance. It may also be due to the increased labour force on the farm, which leads to investment in more enterprises in order to increase production, hence more need for cover due to the increased associated risk. Temesgen *et al*. (2008) found larger household size increased significantly the probability of adapting to climate change because large family size is normally associated with a higher labour endowment, which would enable a household to accomplish various agricultural tasks. Households with large numbers have more labour and need more food thus willing to adopt Kilimo Salama to increase production (Abdulai *et al*., 2008).

Table 3: Mean age, household size, distance to market and land size of the respondents

Variable	Willingness to pay	Mean	Std. Err.	*t-Stat*
Age	No	53.82	0.78	5.9496***
	Yes	46.49	0.63	
Hhsize	No	5.52	0.11	-2.4453**
	Yes	6.05	0.20	
Dmkt	No	5.38	0.17	-0.2172
	Yes	5.45	0.27	
Landsize	No	3.99	0.14	-3.4739***
	Yes	4.96	0.28	

***= Significant at 1% significance level

The mean distance to the market for those who were willing to pay for insurance was higher at 5.45 km as compared to those who were not willing to pay at 5.38. Long distance to the market may translate to difficulty in access to information, particularity if roads are in bad condition, which may lead to increased risk of losses through perishability and price fluctuation due to delayed access to the market. This necessitates the need to cushion the farmer against the potential losses that may be incurred, hence the higher willingness to pay. Farmers who are far from markets may experience difficulties in accessing essential services such as inputs, market prices and market trends, which increases risks on the part of the farmer, hence the need to be cushioned by insurance to reduce the risk increasing their willingness to pay. The findings were in contrast to those of Wairimu, (2013) who found that adoption of *Kilimo Salama* insurance scheme decreased by 1.3 percent as the distance to registered agrovets increased by one kilometer.

The mean land size for those willing to pay for insurance is higher at 4.96 acres compared to those not willing to pay at 3.99 acres. There was a significant difference in the land sizes at 1% level. Farmers with larger land sizes may face potentially many risks than those with small sizes, are assumed to have easier access to credit and farm inputs, and thus are more likely to pay for insurance. Further, land size is a sign of wealth and those with larger sizes are assumed to have more financial ability to pay for crop insurance. Bryan *et al*., (2009) showed that farm size positively and significantly increases the likelihood of adapting to climate change. Akhter (2013) noted that farmers with larger landholdings are more willing to participate in food and cash crops insurance.

Table 4 presents the results of access to weather information, extension services, credit and group membership. Slightly lower than half of household heads who had received weather information (44.26%) were willing to pay for crop insurance as compared to 55.88% who were not willing to pay. There was a significant relationship between access to weather information and willingness to pay for crop insurance at 5% significance level. The higher percentage of those who received information not willing to pay may be due to their preparedness to deal with anticipated changes using other methods other than insurance because they access much information.. Farmers who are aware of change in climatic conditions have higher chances of taking adaptive measures in response to observed changes. This is an important precondition for farmers to take response measures in adapting to changes in climatic conditions. Awareness of changes in climate attributes (temperature and precipitation) is important for adaptation decision making (Maddison, 2006).

Table 4: Farmers access to weather information, extension services, group membership and credit (%)

Variables	Description	Willing to pay	Not willing to pay	Chi Square
Weathinf	Yes	44.26	55.88	4.5584**
	No	55.74	44.12	
Exten	Yes	69.67	33.09	45.6586***
	No	30.33	66.91	
Grpmb	Yes	77.05	54.04	18.7656***
	No	22.95	45.96	
Credit	Yes	56.56	20.96	49.0745***
	No	43.44	79.04	

** and *** denote significant at 5% and 1% level respectively.

The results in Table 4 indicate that 69.67% of those willing to pay for insurance had access to extension services as compared to 30.03% who were not willing to pay. The results show that there is significant relationship between access to extension services and farmers' willingness' to pay for crop insurance at 1% significance level. Willingness to pay for crop insurance can be enhanced by information on agronomic practices as well as on climate variability and availability of different agricultural insurance schemes. Extension service providers may be a source of such information, hence farmers with more access to information and technical assistance on agricultural activities have more awareness about the consequence of climate change resulting to increase in their willingness to pay for insurance. Wairimu (2013) noted that contact with extension providers is one way of disseminating new technologies to farmers leading to increased adoption or use of new technologies and practices, hence increased agricultural productivity. Farmers who have high extension contacts have better chances to be aware of changing climatic conditions and also of the various management practices that they can use to adapt to changes in climatic conditions (Nhemachena *et al.*, 2014).

In terms of group membership, 77.05% of those who were willing to pay for crop insurance belonged to a group compared to 54.04% who were not willing to pay. There was a significant relationship between group membership and willingness to pay for crop insurance at 1% significance level. Farmer groups are important channels through which new technologies and methods of production are transferred to farmers, also they access financial assistance from members, hence influencing adoption of insurance. Shongwe *et al.* (2014) noted that social groups such as farmers' cooperatives provide information on farming, credit and resources that can be used when adapting to climate change. Groups may expose individuals to access financial assistance and information about an innovation and causing subsequent adoption (Ndunda and Mungatana, 2013).

Results show that 56.6% of those who were willing to pay for insurance had access to credit compared to 20.96% who were not willing. There was a significant relationship between access to credit and willingness to pay for crop insurance at 1% significance level. Access to affordable credit increases financial resources of farmers, hence they are able to explore increased methods of adapting to climate change including insurance. Farmers with access to credit and markets have high chances of adapting to changing climate conditions. Access to affordable credit increases financial resources of farmers and their ability to meet transaction costs associated with the various adaptation options they might want to take (Nhemachena *et al*., 2014). With more resources at their disposal farmers are able to change their management practices in response to changing climatic and other factors. They are also able to make use of information they might have on changing conditions both climatic and other socioeconomic factors (Nhemachena and Hassan, 2007).

Mean willingness to pay selected crop insurance/ha/year.

Double bounded dichotomous choice model was used to estimate the sensitivity analysis of mean willingness to pay for crop insurance to policy variables and factors affecting farmers' willingness to pay for crop insurance. Double bounded dichotomous choice questions expand the information base of the WTP estimates and may provide efficient assessment than Single bounded dichotomous choice questions. This is because; the number of responses is increased so that a given function is fitted with more data points, the sequential bid offers for yes-no and no-yes responses yields clear bounds on WTP. Finally, the no-no and yes-yes combinations, improves efficiency as they indicate where the respondent's WTP are likely to reside. The model chi-square tests applying appropriate degrees of freedom indicate that the overall goodness of fit of the model was statistically significant Prob > chi2 0.0001 combined with a log likelihood of -176.64283 indicate the strong effect of double bounded dichotomous choice model.

The results of the contingent valuation model in Table 5 indicate that the mean willingness to pay for crop insurance without covariates for the respondents was KES 55923.38 per acre, while with covariates was KES 58552.22 per acre. This indicates that some socio economic and institutional factors have a positive impact on an individual's willingness to pay for selected crop insurance. Covariates are included in order to eliminate some systematic variance outside the control of the researcher that can bias the results and account for differences in response due to unique characteristics of the respondents. However the estimated mean willingness to pay was

the highest at KES 63930.79. This indicates that mean WTP changes when including control variables evaluated at their mean values.

Table 5: Mean willingness to pay for crop insurance/ha/year

Parameter	Estimate (KES)
Mean WTP (Without covariates)	55923.38
Mean WTP (With covariates)	58552.22
Mean WTP (Estimated)	63930.79
Number of observations	131

5. Conclusion

The critical factors affecting farmers' willingness to pay for insurance were group membership, credit access and agro-ecology. Farmers who belonged to a group and accessed credit were willing to pay more for insurance as a response to climate variability. In this research sensitivity analysis was carried out to measure the effect of this variables on the amount farmers are willing to pay. Access to weather information influences the willingness to pay for crop insurance positively. The mean willingness to pay by farmers was improved by group membership and access to credit.

The results of the study provide an insight for the future considerations of government and insurance companies. Low premium with government subsidy can make the crop insurance feasible for both the farmers and the insurer. Farmers should be trained on how insurance operates to ensure that they make informed decision on whether to adopt the insurance scheme or not and when to adopt the insurance to reduce the impact of losses resulting from risks experienced by farmers. The insurance scheme providers should add more effort in training farmers on benefits of an insurance scheme to compliment the information offered by the government extension services to enhance adoption. Also, membership in a group should be encouraged because group membership enhances information, knowledge sharing and access to credit at affordable interest rates to buy insured inputs. Institutions dealing with provision of credit should be strengthened to increase adaptive capacity.

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Ethical approval: "All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards"

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