COMMUNITY PERCEPTION ON WEATHER VARIABILITY IN THE LAKE VICTORIA BASIN, RWANDA AND UGANDA

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ABSTRACT

The study was conducted in districts of Bugesera, Kirehe and Nyamagabe in Rwanda and Buikwe, Busia, Kamuli, Masaka and Namutumba in Uganda to explore community perceptions on weather variability. Household interviews and focus group discussions were conducted to document awareness of traditional ways of weather prediction, local indicators of weather prediction, source of knowledge, effects of weather variability as well as communities' coping strategies. Traditionally, behavior of birds, insects, moon, clouds, and direction of wind has always been the main indicators of rainfall, drought and flood pattern prediction. The main reported sources of information were parents, elders, friends and experience. Poor crop harvest, pests and diseases, crop wilting and extinction, etc, were effects of weather variability. Coping strategies were tree conservation, irrigation, use of manure and fertilizers, use of insecticide/pesticides and anti-erosion activities, etc. Community knowledge is useful and should be integrated with other conventional methods to predict weather variability.

KEYWORDS

Community knowledge, coping strategies, weather variability, weather prediction

1. INTRODUCTION

Rural communities have always been relying on their local or indigenous knowledge as the most the most important resource their sustainable livelihood. This is because indigenous knowledge integration process provides for mutual learning and adaptation, which in turn contributes to the empowerment of local community (Ezeanya, 2014). For example, communities have overtime been experiencing the changes in weather and have developed different strategies to cope with changes (Nangoma, 2007).

Though weather pattern is attributed either directly or indirectly to human activity, changes directly affect small holder farmers in developing countries with low adaptive capacity to weather variability that depend entirely on natural weather conditions for agriculture (Egeru, 2012). For instance, changes in frequency and severity of weather variability can lead to drought or flood which affect human livelihood through its related and connected impacts such as increased food insecurity, shifts in the spread of diseases, soil erosion and land degradation; infrastructure damage and settlements as well as shifts in the productivity of agricultural and natural resources (Mahendra Dev, 2011). With increasing socio economic challenges like poverty, food insecurity and increasing burden of diseases, effects of weather variability are magnified (Kirkland, 2012). In recent decades, weather variability has attracted much attention not only because of the globally unparalleled persistence of low rainfall, but also because of the low capacity of society and economical systems to cope with the related risks (Mengistu, 2011).

In developing countries like Uganda where rural population have agriculture as the main source of food and income, changes in weather patterns strongly affect the population to earn a living due to their inability to cope with changes in weather variability (Mertz et al., 2009). Nevertheless, rural communities have developed various agricultural practices and technologies such as diversification of crops on farms, use of local tolerant crops and seeds that can withstand extreme conditions of drought, flooding and postponement of planting and sowing time of crops when rains are unpredictable to cope with weather variability(Van et al. 2011; Lasco et al. 2011). In addition, tree crops have also been planted to contribute and reduce soil erosion, stabilize soil conditions, and increase soil fertility.

Despite the availability of literature on weather variability and its severity on smallholder farmers, little has been documented on community's ability to predict weather variability, community experiences on its effects and how local communities cope with these effects. The aim of this paper is to assemble and document local knowledge on weather prediction by documenting local indicators of weather prediction, source of knowledge of weather prediction, effects and coping strategies of weather variability within the Lake Victoria Basin (LVB). The study was conducted to answer the following broad questions: How have the communities traditionally been predicting weather conditions? What are the effects of weather variability on community livelihood? How have the farming communities responded to those changes? Exploring communities' perceptions of weather variability and insights into indigenous coping mechanisms can help get a better picture of how the phenomenon of global climate change can be successfully communicated worldwide and think of adaptation intervention that can build on local adaptation measures.

2. METHODOLOGY

2.1. STUDY AREA AND SAMPLING STRATEGY

The study was conducted within the LVB, covering the districts of Bugesera, Kirehe and Nyamagabe in Rwanda; and Buikwe, Busia, Kamuli, Masaka and Namutumba in Uganda. LVB is characterized by its high varying climate conditions. Its climate is tropical and generally rainy with two dry seasons and it is semiarid in the northeast. Agriculture is the most important economic activity employing over 80% of the workforce (Awange et al. 2007).

2.2. SAMPLING STRATEGY OF PARTICIPANTS AND STUDY AREAS

Household interviews were conducted in each of the study districts using questionnaires and focus group discussions (FGDs)with interest largely focused on traditional indicators of weather prediction, source of information and knowledge on weather prediction, and insights about effects of weather variability and local coping strategies to the effects of weather variability. In total, 700 household heads were interviewed with 100 questionnaires administered in each districts in Rwanda and 80 in each district in Uganda. In each district, two sectors and two sub counties were purposively selected for the survey in Rwanda and Uganda, respectively. In each sector/sub-county, two cells in Rwanda and two parishes in Uganda were randomly selected. In each sector and sub county, two cells and two parishes were randomly selected. Similarly, two villages were randomly selected in each cell and parish in Rwanda and Uganda, respectively. In total, eight villages were selected from each district for the household surveys.

After household survey, FGDs were held in two cells (Rwanda) and parishes (Uganda) in each of the selected districts. The main aim of FGDs was to validate the household survey data and collect more data on traditional ways of weather prediction, effects of weather variability and coping strategies. A total of 8-15 members of the same sex were mobilized for the two FGDs session in each cell/parish. Separation by gender was to capture the variability in responses and ensure that views were as representative of both sex categories. Each gender group comprised of members of different age categories, youth (18-30 years), middle aged (mid thirty to forty) and very old persons above 50 years.

2.3. Data Management

Quantitative data from the household survey were coded and entered into SPSS (Statistical Package for Social Sciences) software Version 20. Descriptive statistics were computed to show the awareness of traditional ways of weather prediction, source of knowledge of weather prediction, experience of weather variability and coping strategies. Analysis of variance and Chi square statistics were computed to show the influence of socio demographic characteristics on knowledge about local indicators in predicting weather variability. Data from FGDs were subjected to analysis based on emerging themes and patterns as described. Qualitative content analysis was used to generate categories and explanations (Elo & Kynga¨s 2008).

3. Results

3.1. Communities' Awareness Of Traditional Ways Of Weather Prediction

Households and communities at large in Rwanda and Uganda were examined for their awareness of traditional indicators used to predict weather variability. Results indicate that most of the people interviewed were aware of the traditional or indigenous ways of weather prediction (Fig. 1). It was revealed that local communities in Uganda were far more aware of traditional ways of weather prediction compared to local communities in Rwanda. As far as gender is concerned, it was revealed during FGDs that males were more aware of the traditional ways of weather prediction than females in both countries. Unawareness of indicators of weather prediction was also far higher for females in Rwanda compared to females in Uganda.

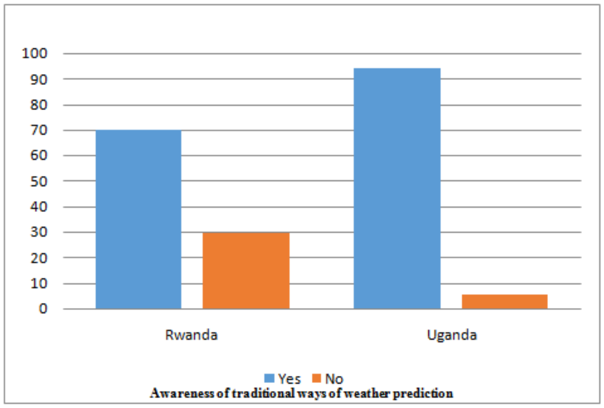

Figure1. Community awareness of traditional ways to predict weather

3.2. Socio-Demographic Characteristics Influencing Community Awareness Of Weather Prediction

One-way analysis of variance (Table 1) indicated how significantly age, family size, land size, period spent and income influenced communities' awareness of traditional ways of predicting weather variability. Results revealed that only family size positively and significantly influenced communities' awareness of traditional ways of weather prediction (F=8.814, P=0.003). Other socio-demographic factors do not have any influence on community awareness of traditional indicators of weather prediction. With this, a question will be to know who between a big family and a small family is more aware of traditional indicators predicting weather variability.

Table 1. One-way analysis of variance results for continuous variables related to awareness of traditional ways of weather prediction

	Aware			Not aware				
Variable	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**F**	**P-value**
Age	581	46.94	15.628	109	44.30	44.30	2.620	0.106
Family size	566	7.36	2.831	108	5.85	2.831	8.814	0.003*
Land size	563	5.41	13.281	102	2.96	4.813	3.396	0.066
Period spent	571	30.21	20.177	108	29.94	21.011	0.017	0.896
Income	584	41.40	102.934	109	23.99	45.018	3.008	0.08

In addition to one-way analysis of variance, contingency and Chi square analysis were performed with categorical variables from sociodemographic data. Results indicated that awareness on traditional indicators predicting weather is significantly influenced by sex (X^2= 13.471, P=0.000), level of education (X^2=31.942, P=0.000) and having land (X^2=4.629, P=0.038). Thus, there is a difference between males and females, those who have attended school and those who have not and finally those with and without land as far as weather prediction is concerned.

Table 2. Contingency table and Chi square statistics for categorical variables related to awareness of traditional ways of weather prediction

Variable	Category	Aware	Not aware	X^2	P-value
Sex	Male	341	43	13.471	0.000*
	Female	225	61		
Marital status	Single	33	6	2.497	0.476
	Married	465	85		
	Divorced	16	1		
	Widowed	66	16		
Education	None	139	49	31.942	0.000*
	Primary	314	52		
	Secondary	126	7		
	University	0	1		
Having land	Yes	567	101	4.629	0.038*
	No	18	8		

3.3. Community Knowledge On Traditional Ways Of Weather Prediction In The LVB

Generally, local indicators reported to predict weather in the LVB districts were birds, insects, cloud, wind, temperature, moon, stars, trees, frogs and sun (Table 3). Local indicators reported to predict rain patterns and drought were behavior or appearance of specific birds, insects, appearance of stars and the moon, behavior of the sun and clouds and leafing and flowering of trees. Flooding as weather pattern in Rwanda is predicted by presence or appearance of insects, birds and frogs in an uncommon behavior. Presence of clouds and temperature were also reported to predict flood. It is uncommon behavior of one of the indicators mentioned above that predicts the coming of the rain, sun or flood.

Table 3. Local indicators on weather prediction in LVB study districts

		Rwanda		Uganda	
Pattern	**Indicator**	**Type of prediction**	**Weather forecast interpretation**	**Type of prediction**	**Weather forecast interpretation**
Normal Rainfall year	**Birds**	-Presence of birds (e.g. *Rushorera*)	-Birds moving around houses is a sign of rain -*Rushorera* bird singing the whole night predicts the rain	Presence of *Nsulugabi* and *Nyange* birds	When moving in groups, they predict the rain season
				Presence of *Butu*, *Amatutuma*, *Pantoigo* and *Kansaala*, *amahohote*, *Empangu and Amahuyi* birds	When singing in big number, it predicts that rain season is due
				Duck raising wings constantly	A sign of rain
	Insects	-Presence of insects (e.g. ants, flies)	Ants moving out of holes in a long line, many flies moving around predict the rain	Butterflies, Safari ants, caterpillar	Predict rains when moving in large numbers
	Clouds	Presence of clouds	Many clouds any everywhere is sign of rain	Nimbus clouds	Rain prediction when scattered
	Wind	Light wind	Cold wind in the morning and hot in the afternoon is a sign of rain	Direction of wind	Moving from East to West is a sign of rain
	Temperature	Temperature rises	Temperatures rising predicts the rain	High temperature	Hot day and night temperature predicts rains.
	Moon	Appearance of moon	Unclear moon predicts that rains are due	Appearance of moon	Unclear moon or slanting moon predicts that rains are due
	Stars	Appearance of stars	Many stars in the sky predicts rains	Appearance of stars	Disappearance of stars in the night predicts rain season
	Trees	Tree regeneration	Start of leafing of trees predicts that rains are due	Melice excels (*Mvule*) and *Ficus sur*	Start of leafing of these trees predicts that rains are due
				C. schweinfurthii (Empafu), emituba , avocado and *Ficus sp.*	Shading off the leaves predicts the end of rain season
	Frogs	Frogs singing	Frogs predict that it is due to rain.	Frogs crying	The signs of singing or crying of frogs predicts that it is due to rain.
	Sun	Appearance of sun	Alternating of sun and clouds is a sign that rains are due.	Appearance of sun	The cloud sun appearance predicts that rain is due while clear sun with a lot of sun shine predicts also predicts it will rain that day
				Health	Increased sickness in the population has been linked to rain season
Drought	**Birds**	Birds flying	From East to West is a sign of a long period of sun -Many birds in trees is also a sign of drought	Appearance of *Kamunye* bird	It shifts and twists to the tail to predict that sunshine/drought is still a lot in the area
	Insects	Appearance of insects	Many insects on a long line in a road and moving straight predicts a lot of drought	Presence of *Endobozi*, Caterpillars and bees	They predict that the sunshine or drought is a lot
	Wind	Appearance of wind	A strong and cold wind in the morning predicts predict a long period of drought	Misty wind	Mist and wind in the morning predicts sun shine and drought
	Temperature	Day temperature	Cold mornings is a sign of drought	Day temperature	Very cold temperature in the morning with wind predicts that there is a lot of sun shine or drought.
	Moon	Appearance of moon	Light and clear moon is a sign of drought in the area	Appearance of moon	Clear, flat or normal moon predicts a

					lot of sun shine or drought
	Trees	Poor growth	Shedding off leaves shows that drought is coming	Coffee and *V. apiculata*	Shading off leaves of the species is a sign of a lot of sun
				Omusabya tree	The flowering of this tree flowers predicts drought
				Mango	The high yield of mango trees predicts a lot of sun shine
	Birds	Presence of birds	Many in the wild (forest) and sometimes often take western direction predict a lot of sun		
	Frogs			Quiet frogs	Predict that there is a lot of sun shine or drought.
	Sun			Clear sun	Clear sun, but red in color predicts a lot of sun shine or drought
	Health			Skin appearance	The appearance of pale skin among the people predicts drought - Water in pots is very cold
Flood	**Insects**	Appearance of insects	Appearance of many insects at home predicts a lot of flood		
	Clouds	Appearance of clouds	Cloudy mornings predicts floods		
	Temperature	Night temperature	A lot of heat in the night indicates that floods are due.		
	Frogs	Presence of frogs	Frogs crying the whole night is a sign that floods are coming.		

3.4. Community Source Of Knowledge On Weather Variability

There are different sources of knowledge on weather patterns (Table 4). Parents, friends, neighbours, experience, elders, radio, school were reported as sources of knowledge on weather patterns. Results show that in both countries, parents were mostly reported to be the source of knowledge on weather pattern (rainfall, drought and flood). In Rwanda, parents were reported to be the source of knowledge on rainfall year by 76.6% of the respondents. Only 86.6% of the respondents reported parents as source of knowledge on drought year while 60.7% reported them as source of knowledge on flood year. In Uganda, 74.9% of the respondents reported them to be the source of knowledge on rainfall year and 71.9% to be the source of knowledge on drought year while 69.6% of the respondents said parents were source of knowledge on flood year. Elders came to the second rank as a source of knowledge on predicting rainfall year, drought and flood.

Table 4. Source of knowledge on weather patterns

Source	Rwanda (%)			Uganda (%)		
	Rainfall year	**Drought year**	**Flood year**	**Rainfall year**	**Drought year**	**Flood year**
Parents	76.6	86.6	60.7	74.9	71.9	69.6
Friends	2.2	1.8	-	7.8	7.5	9.6
Neighbors	3.8	-	-	-	-	-
Experience	1.1	4.5	25.0	10.6	12.6	8.9
Elders	15.8	6.2	7.1	6.3	7.8	11.9
Radio	-	0.9	7.1	-	-	-
School	0.5	-	-	-	-	-

3.5. Perceived Impact Of Weather Variability

Negative effects of weather variability on growing crops in general and IFTs in particular were also raised by the communities during the survey. In Rwanda, poor harvest loss, abnormal crop growth, pests and diseases, crop wilting, and crop extinction were reported to be the negative effects of weather variability. Among these effects, crop wilting was mostly reported (15.5%) while crop extinction was the least reported (0.7%) to be the negative effect of weather variability. The same effects were reported in Uganda but in addition to that lack of seedlings and soil erosion were other effects reported in the country. Poor harvest loss was the first effect (45.3%) followed by crop wilting (8.0%). Lack of seedlings was the least reported (3.0%) negative effect of weather variability on growing indigenous fruit trees and other crops. The findings also show that the effects reported are related to agriculture which means that farmers are the first to suffer during long rains, drought or when winds are strong.

Table 5. Effects of the changing of weather variability

	Rwanda	Uganda
Effects	% respondents (N=300)	% respondents (N=400)
Poor harvest	6.5	45.3
Abnormal crop growth	1.0	7.0
Pests and diseases	4.5	6.0
Crop wilting	15.5	8.3
Lack of seedlings	-	3.0
Soil erosion	-	4.8
Crop/species extinction	0.7	6.0

3.6. Community-Based Coping Strategies In Responses To Effects Of Weather Variability

Communities in the study areas have developed measures to cope with negative effects of weather variability. As the effects are agricultural related, they put measures in place to protect their crops (Table 6). In Rwanda, strategies such as conservation of trees, irrigation, use of pesticides and insecticides, use of manure and fertilizers, replanting to replace dead crops and fruit trees, establishment of exotic plantations and growing resistant crops were reported by the communities under study to be the strategies for coping with weather variability. Of all these strategies, replanting to replace the dead crops and fruit trees was the most reported strategy (15.8%). The least reported strategy was use of manure and fertilizers (1.8%). In Uganda, conservation of trees, irrigation, use of pesticides and insecticides, mulching, anti-erosive activities, use of manure and fertilizers were reported by the communities to be main strategies to cope with effects of weather variability. Conservation of trees was however the most reported of all these strategies (36.0%) followed by irrigation (9.0%). The least reported strategy was use of manure and fertilizers (0.3%).

Coping measures mentioned in FGDs were also similar to measures by households during the survey. Given the above coping strategies, there is a need to apply options for diversified production systems and diversified options that can help vulnerable people cope with changes in weather variability and related socio-economic implications.

Table 6. Farmers' coping strategies on weather variability in the LVB

Coping strategy	Rwanda (% respondents)	Uganda (% respondents)
Conservation of trees	-	36.0
Irrigation	11.6	9.0
Use of pesticides and insecticides	8.5	3.0
Mulching	-	1.8
Anti-erosive activity	-	1.3
Use of manure and fertilizers	1.8	0.3
Replanting to replace dead crops and fruit trees	15.8	-
Establishment of exotic plantations	3.0	-
Growing resistant crops	2.4	-

4. Discussion

4.1. Communities' Awareness Of Traditional Ways Of Weather Prediction

Farming communities in both countries are aware of the traditional indicators of predicting the weather and climate conditions. Actually, as revealed in different studies, rural farmers are far better in predicting weather variability (Chavas, 2008; Chinlampianga, 2011). This is because change in weather affects their daily agricultural activities. There is therefore a reason for them to be aware of anything related to weather and climate variability. As reported, awareness is associated with sex. Gender difference in awareness of weather prediction is attributed to the gender ability to acquire information. There is also assumption that the more educated people are, the more likely awareness on weather prediction is. This means that there is a big gap in people having formal education and those with informal education when it comes to weather prediction using traditional indicators. Having land as another factor determining awareness of traditional indicators of weather prediction makes us think that since most people live of farming production, being aware of the traditional indicators is unavoidable. All this shows that not all people are knowledgeable about weather prediction. It is only for certain categories of people. Being aware of such knowledge is an entry into understanding of cultural beliefs in a given society.

4.2. Community Knowledge On Local Indicators Used In Weather Prediction In The LVB

The methods of predictions show that local communities within the LVB are aware of the weather variability and knowledge to predict weather patterns as they perform their day-to-day activities. They often see changes in weather and use their knowledge to predict drought, rainfall even flood through a number of indicators. Traditional rainfall forecasts/ predictions differ across communities, cultural background, and environment around the community. They rely on local indicators of weather, i.e. signs, signals and rules that have been passed down from their grandparents. Among the signs or indicators used to predict weather variability, birds play a big role. The information reported in this study does not contrast a study conducted in Tanzania which reported that birds are very important in the prediction of weather patterns (Kangalawe et al., 2011). The knowledge has been incorporated in their everyday life and had been helpful for longtime. This shows that their adaptation to the changes that may arise from weather variability cannot harm a big number of people as this knowledge may help know plan their coping strategies.

Clouds, winds direction, moon, stars etc. have also been reported as indicators of weather variability. These findings are shared with other studies that also highlighted the use of the signs to predict weather in other places. A study by Lefale (2010) reiterated that indigenous communities in Samoa island (South Pacific) note the changing of weather by reading the sky, reading the clouds, and types of winds. Lefale calls the use of these indicators “traditional ecological knowledge of weather and climate” which has entered in people’ minds until it has become like myths and legends. They use this knowledge to predict environmental changes, including changes in climate and weather. By way of example, in New Zeland, moon lying on its back indicates a month of spilling water is ahead, clouds in the sky indicate approaching rainfall or storm, the booming sound of waves across the land predicts a storm coming, etc.(King et al., 2008). Likewise, agro pastoralists in Kenya whose main activity is farming and animal rearing (Speranza et al., 2010) rely on the different indicators that help in their daily activities.

Through interacting local environments over centuries, communities, especially rural farming communities develop wealth knowledge such as these indicators of predicting weather variability. These are lessons that are incorporated into their traditional practices of agriculture and environmental conservation. Such knowledge helps them develop coping strategies when serious effects of weather variability occur. Such knowledge therefore needs to be sustained and incorporated into modern agriculture since this mainly depends on the weather behaviour.

Community willingness and capability to use different cultural and environmental signs and signals for weather prediction also determines their level of vulnerability to weather and climate hazards. Though this indigenous knowledge is almost similar in countries, it is not always consistent, as these signs are part of each person’s knowledge and experience and they tend to differ even within a village (Okonya & Croschel, 2013; Risiro et al., 2012; Gyampoh et al., 2011). Relying on them may sometimes mislead you. Mengistu (2011) affirmed that the knowledge of knowing the future weather and climate condition is only given to God and anybody who makes an attempt to predict it is a magic. There is therefore a need to include this knowledge into climate change policies at all levels. In fact, traditional weather-related indicators could guide farming communities' choices on their farming activities. They are used as guidance for farmer choices on their farming activities. Farmers actually use this knowledge in deciding on crop variety, planting dates, and other coping strategies, so as to produce good yields (Zuma-Netshiukhwi et al., 2013).

4.3. Source Of Knowledge On Weather Variability

Farmers get information on weather prediction from different sources. Parents and elders as the highly reported sources of knowledge are strong sources and body of knowledge for the community. As it has also affirmed in other studies, parents and elders are strong source of knowledge (Dixit & Goya, 2011). Information or knowledge on weather variability sourced from parents is strong and passed through different generation. It is always considered as the right way to go. Other reported sources of information on weather variability were radio, friends, experience and schools. These sources do not have a high impact because people's knowledge seems to be limited to old people.

4.4. Effects Of Weather Variability

Most of the identified impacts are negative and are related to decline crop yield which leads to famine. Communities consider famine and low yield as the most important negative impact of changes in weather variability. This awareness and knowledge help farmers know how and when to prepare their gardens for planting.

Agriculture is the most exposed to effects of weather variability because of its dependence on weather conditions. This is supporting Pinedo-Vasquez (2008) who says that lands are prone to floods, droughts, and other natural disasters. In addition, changes in weather variability from year to year are one of the main causes of variable crop yields and because of this; small farmers will be particularly affected because their ability to adapt is smaller and not lasting (Kirkland, 2012). Changes in weather with shifting rainfall patterns, temperature, winds have significant effects on communities' livelihood as these have a serious effect on food security, agriculture and household economic growth (Kangalawe & Lyimo 2013). Similar cases were reported in the study by Drine (2011) where the study revealed that high temperature, severe drought decrease agricultural productivity.

4.5. Community-Based Coping Strategies In Responses To Effects Of Weather Variability

Given that the effects of changes in weather variability are related to agriculture and food security, sustainable land management can reduce the vulnerability and help people adapt to alternative effects derived from the changes or effects of weather variability (Rao et al., 2007). Coping with and adapting to effects of weather variability involves major decisions and significant investments. As Uganda's and Rwanda's rural population depends on the land for its livelihood (Tukahirwa, 2002; Bizoza & Havugimana, 2013), land management should be the first activity to give high priority as the important aspect for their livelihood and the strong strategy to cope with effects of weather variability. Thus, availability and productivity of land in turn depends on how it is managed to generate food, income, and environmental benefits such as clean water and reduced weather variability related risks (Magunda, 2010). Coping strategies of farmers in LVB are consistent with what have been revealed in other studies. A study by Senbeta (2009) also revealed that diversification to off-farm and non-farm activity also helps farmers retain assets or to withstand weather and climatic shocks. In addition to the adaptation strategies reported in the study, a study by Egeru (2012) reported other adaptation strategies of weather variability such as early planting and planting of fast maturing varieties, trading livestock, with other food stuff, migrating to other places, seed storage, weeding patterns.

Indigenous coping strategies or adaptation practices throughout the farming practices potentially contribute to adaptation to effects of weather variability and must be supplemented by planned adaptation. Therefore, approaches that improve the traditional agricultural practices such as tree, fruit tree species and crop diversification, etc. can enable farmers survive extreme events that may occur. This diversified planting will help have diversified products. This will increase their food security; enhance income opportunity among the farmers which would reduce their risks to effects of weather variability since they provide basic services.

5. CONCLUSION

This study provides information on community perception of weather variability and the role of IFTs in the adaptation of the effects of weather variability. Communities showed wealth knowledge about weather variability. First of all, knowledge on traditional indicators of weather prediction is an indicator of rich knowledge among the people. In addition, information on weather variability using traditional indicators comes from a variety of groups and organisations including CBOs and NGOs. As a way of adapting to the experienced and perceived effects of weather variability, farmers use their local strategies such as early planting, tree farm plantation, intercropping system, using pesticide, manure and fertilizers, etc. Local knowledge on weather variability and adaptation options significantly help rural farming communities in increasing and sustaining their productivity even there is a serious change in climatic conditions. There is therefore a need to include this knowledge into policies addressing climate change and coping strategies.

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