

Assessing Weather Forecasting Needs of Smallholder Farmers for Climate Change Adaptation in the Central Rift Valley of Ethiopia

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Introduction

- ❑ Climate change is now a global concern because of its wide-ranging effects on the environment and on socio-economic and other related sectors, including agriculture, water resources, food security, human health, terrestrial ecosystems and biodiversity (IPCC,2007; UNFCCC, 2007).
- ❑ Change in rainfall patterns and rising temperatures causes a shift in crop growing seasons and affects food security in low income and agriculture based economies (Deressa et al., 2011).
- ❑ Agriculture is the main source of the Ethiopian economy that supports 38.8 % of the GDP (UNDP, 2016) and 78 % of the population are employed in this sector (Martins, 2014). Despite its high contribution to the overall economy, this sector is the most vulnerable sector to climate variability and change (NAPA, 2007).
- ❑ Thus, adaptation of the agricultural sector to adverse effects of climate change will be imperative to protect the livelihoods of the poor and to ensure food security (Bryan et al., 2009).

Introduction Cont...

- ❑ Adaptation can greatly reduce vulnerability to climate change by making poor farmers better able to adjust to climate change and variability, moderating potential damage, and helping them cope with adverse consequences (IPCC, 2001)
- ❑ Recent studies by Jotoafrika (2013) indicate that smallholder farmers depend on rain-fed agriculture in most of sub-Saharan Africa and that they adjust their planting patterns and farming calendar to the onset, duration and end of rainy seasons
- ❑ However, with changing rainfall due to climate, their planting patterns and farming calendar no longer match seasonal rainfall distribution which often lead to crop losses
- ❑ Seasonal rainfall forecasts are thus crucial for the provision of early warning information to be used by farmers (Jotoafrika, 2013)

Introduction Cont...

- ❑ According to Bryan et al., (2009) the accessibility and usefulness of weather information as one factor that affects a farmer's ability to adapt to climate change
- ❑ In addition, studies show that, climate-related concerns and information have claimed to be among the major factors considered by farmers in their decision-making (Celia et al., 2009)
- ❑ The promise of using weather forecasts to better manage agriculture and food security has been part of the rationale for sustained investment (Hasen et al., 2011)
- ❑ It is therefore, important to understand weather forecasts may have considerable potential to improve agricultural management and rural livelihoods

Introduction Cont...

- ❑ However, constraints related to access, understanding and capacity to respond, have so far limited the widespread use and benefit of weather forecasts among smallholder farmers (Hasen et al., 2011)
- ❑ In this study Central Rift Valley (CRV) is used as the case study area. It is one of the environmentally vulnerable regions in Ethiopia, where rainfed crop production has expanded rapidly over recent decades (Jansen et al., 2007)
- ❑ The region is highly affected by inter-annual rainfall variability and associated climate risk. This calls for a need for weather information utilization by farmers to adapt the impacts of climate change at local level (Hirut and Kindie, 2015)

Objective

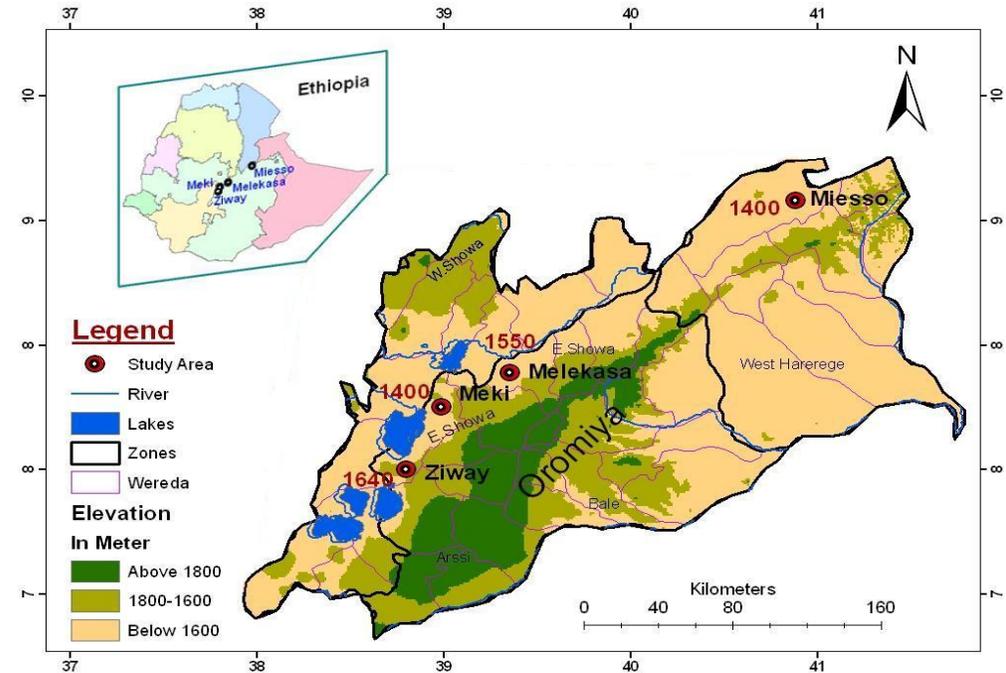
- ❑ To find out how farmers perceive impacts and causes of climate change and whether or not farmers have access to weather information to mitigate potential impacts of climate change in the study areas

Materials and Methods

- The areas covered by this study are:
 - Meki, Melkassa, Miesso and Ziway

- The choice of districts was based on farming systems and representativeness of agro-ecological settings

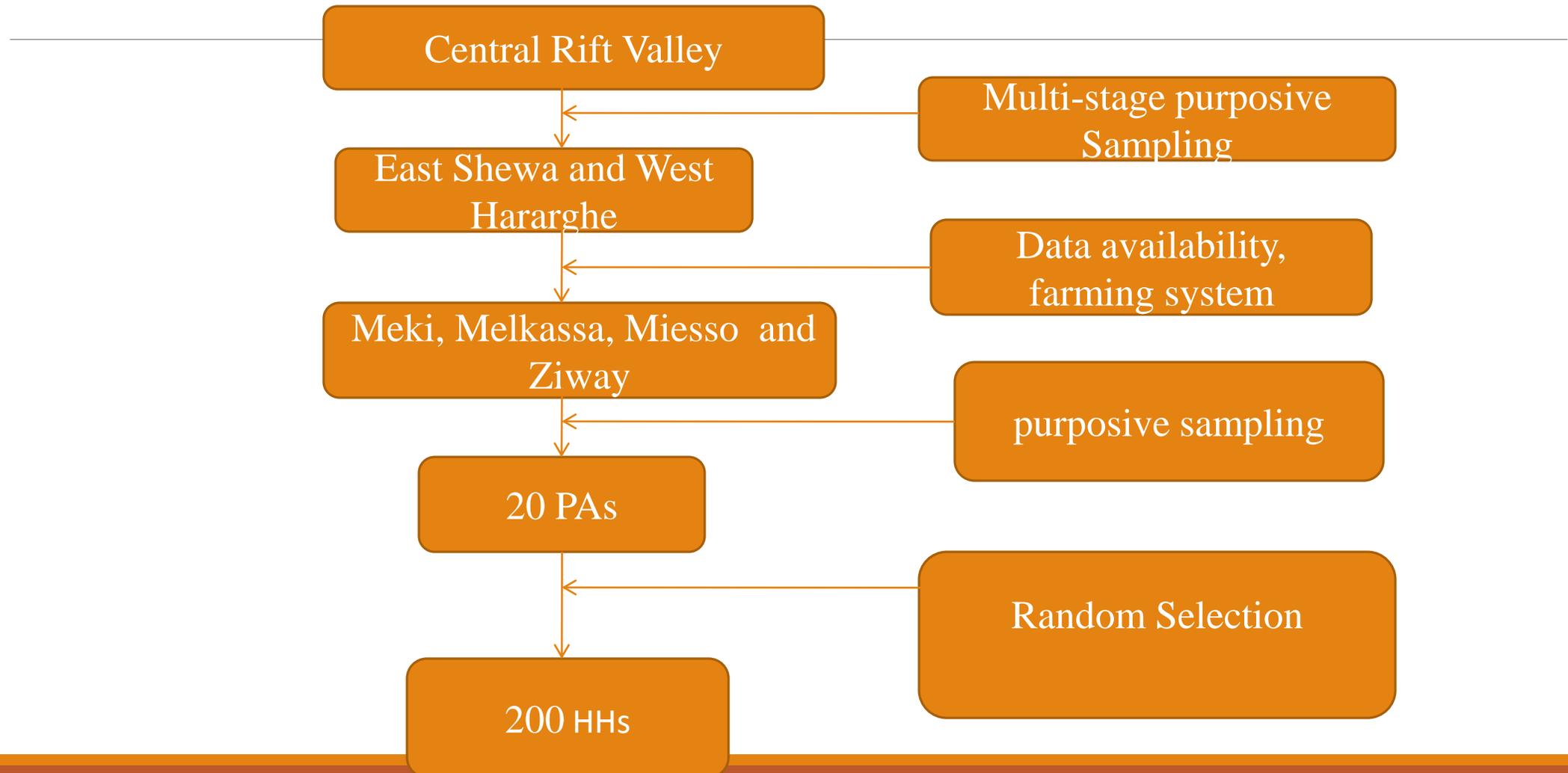
- The study areas have a bimodal rainfall pattern



Altitude, major crops grown and medium length of growing period in the study area

Site	Altitude (m.a.s.l)	Major crops	Medium length of growing period (days)
Meki	1400	Teff, Wheat, Sorghum, Barley, Millet, Maize, Field pea, Chickpea, Lentils ad Horse bean	101
Melkassa	1550	Maize, Sorghum, Haricot beans and Teff	88
Miesso	1400	Sorghum, Maize, Common beans, Sesame, and Chat	118
Ziway	1640	Maize, Teff, Horse bean, Barley, Wheat, Sorghum, Onion, Tomato, Cabbage	104

Sampling procedure



Research Participants, Instruments, and Data analysis

Research Participants

- ❑ 200 farmers
- ❑ 34 development agents and
- ❑ 18 agriculture related experts

Data Collection Instruments

- ❑ Structured questionnaire
 - for farmers
- ❑ Key informant interview
 - for DA's and experts
- ❑ Secondary data
 - research centres and
 - district agricultural offices

- ❑ SPSS software were used and descriptive statistics was generated and interpreted

Result and Discussion

Demographic characteristics of sample farmers

❑ Sex

- Male: 164 (82%)
- Female: 36 (18%)

❑ Marital status

- Married : 192 (96%)
- Single : 6 (3%)
- Divorced: 2 (1%)

❑ Age

- 46 to 55 years (78%)

❑ Education level

- formal education (57%)
- illiterate (38%)
- Adult education (5%)

❑ Language

- 53% speak Afan Oromo
- 2 % speak Amharic
- 45% Both

Access to climate information by farmers

Questions	Response (%)				
	Meki	Melkassa	Mieso	Ziway	Average
Access to climate information					
Yes	58	60	50	76	61
No	42	40	50	24	39
Climate information service					
1977s	2	0	0	4	1
1987s	4	2	2	4	3
1997s	24	42	10	28	26
since 2007	28	16	38	40	31

Questions	Response (%)				
	Meki	Melkassa	Mieso	Ziway	Average
Type of climate information					
Daily weather forecast	56	46	32	64	50
Ten day weather forecast	2	14	14	10	10
Monthly weather forecast	0	0	0	0	0
Seasonal weather forecast	0	0	4	2	1
Source of climate information					
Television (TV)	6	4	0	4	4
Radio	52	48	40	46	46
Development Agents (DAs)	0	0	2	2	1
Neighbours	0	2	2	4	2
Village leaders	0	4	0	2	1
TV, Radio & DAs	0	0	0	18	5
Radio, Das, & sharing with neighbours	0	2	6	0	2

Questions	Response (%)				
	Meki	Melkassa	Mieso	Ziway	Average
Reason for not accessing climate information					
Not aware of climate information	0	10	6	4	5
Do not know about the role of climate information	0	6	0	0	2
Do not believe that climate information can be helpful	6	0	0	0	2
Do not believe that climate can be forecast	16	14	34	4	17
The information given is not credible	16	6	12	14	15
There is no centre to be contacted	4	0	0	0	1

Access to weather information by development Agents (DAs)

Questions	Response (%)
Where do you get climate information	
NMA	3
District Bureau of Agriculture	37
Television, radio, news paper & meeting	60
Kind of information you get	
Seasonal forecast for 4 months	6
Daily weather event and forecasts	42
Information about seasonal cropping practice	52
Climate information clear and easy to understand	
Yes	41
No	59

Weather information used by institutions

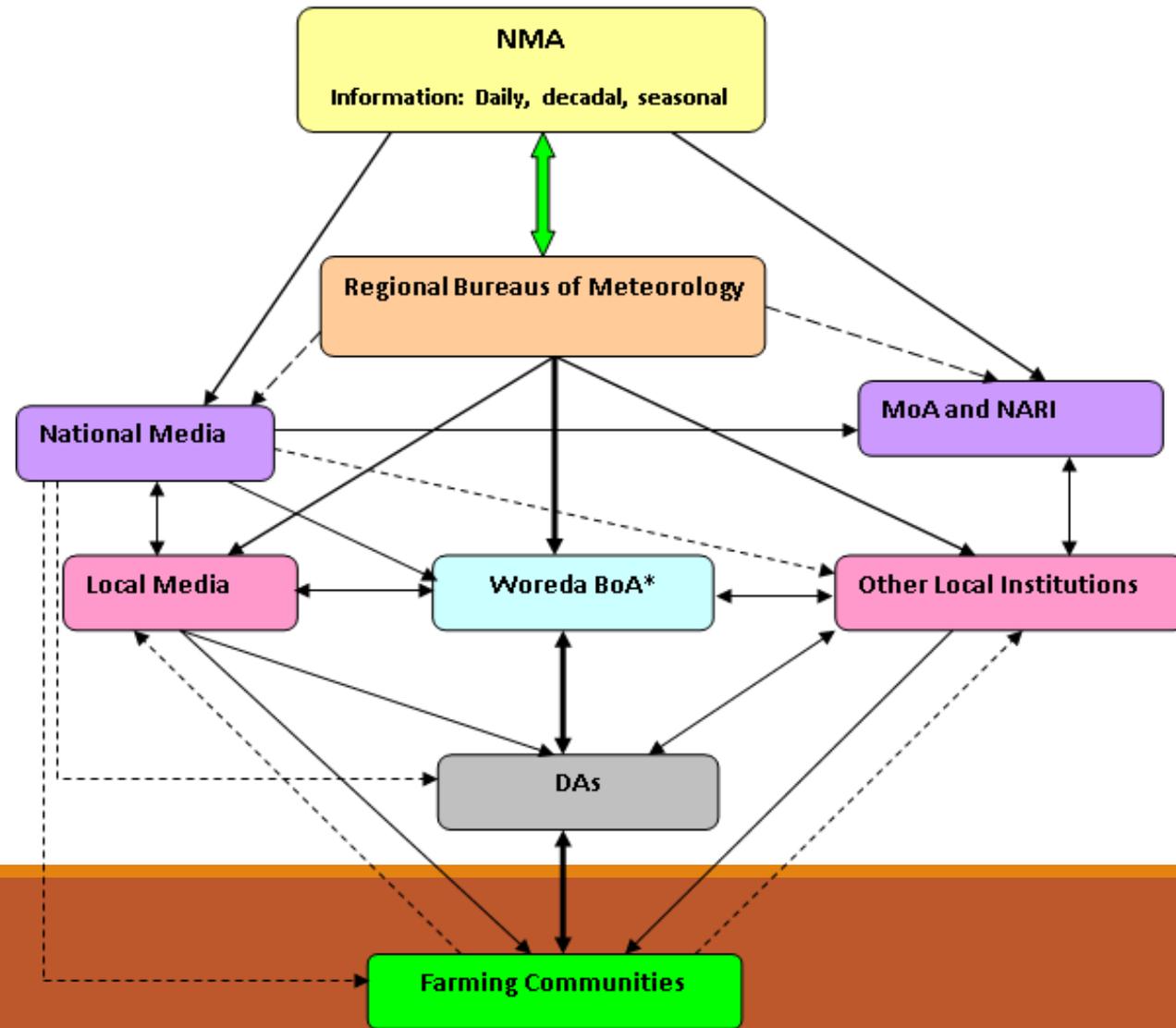
Issues considered	Response (%)
What kind of weather information do you use	
Daily forecast	17
Monthly forecast	33
Seasonal forecast	61
Source of weather information	
NMA website	44
Regional meteorological offices	11
MARC	22
Media	23
Agricultural office	22

Issues considered	Response (%)
Purpose of weather information	
Planning agricultural activities	39
Planning health services	22
Planning aid requirements	22
Research works	28
Providing advisory services to different communities	50

Gap in Accessing weather information and Proposed organogram for weather information flow

Gaps Identified

- ❑ Farmers do not access regularly and intentionally and do not use the information for their agricultural decision making in most cases because the forecast given is too general
- ❑ Difficulty in understanding forecast details and terminologies used
- ❑ Irregularity on the time of broadcasts and language used
- ❑ Lack of awareness and absence of centres that coordinate and downscale weather information at local level



Proposed organogram for weather information flow. The thick ness and continuity of lines indicate the degree of information flow

Conclusion

- ❑ Weather information need assessment in the study areas has shown that, most farmers, development agents and different governmental and NGOs have access to weather information as compared to 39 % of farm households who do not have access to climate information due to lack of awareness, and lack of knowledge on the role and use of weather information, and lack of trust regarding forecasts.
- ❑ The need for weather information as an adaptation strategy for climate variability and change has been emphasized by farmers, DAs and institutions working on the study areas.
- ❑ However, difficulty in understanding the weather forecast terminologies and details, lack of representativeness of the forecast, inconsistency in the time of information provision and language problems are mentioned as major barriers in accessing and using weather information for climate change adaptation.

Recommendation

- ❑ Weather forecast should be down scaled into regional level and should be location specific
- ❑ Disseminate the weather forecast through local media in local languages
- ❑ The forecast should include additional agriculturally important variables such as start and duration of rainfall season, dry spell period, crop water requirement, crop pest and disease
- ❑ Probabilistic nature of seasonal forecasts should be given with technical guidance to help farmers and interpret easily and respond to the forecast
- ❑ The NMA should follow the new organogram of climate information service delivery in order to provide accurate and tailored forecasts to the farming community and other users
- ❑ Upgrading the knowledge and skills of existing development agents in climate change, climate risk management and climate information management through short term training
- ❑ Advanced research on community adaptation mechanism need to encourage

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