

# Info Note

## Piloting an ICT-based App for providing weather forecasts, agro-advisory and market information to smallholder farmers in Ethiopia

*Daniel Fikreyesus, Lidya Tesfaye, Bayu Nebsu, Gebermedihin Ambaw, John Recha*

NOVEMBER 2020

### Key messages

- Localized forecasting requires in-depth knowledge of local weather trends and climatic changes.
- Farmers have a desire to obtain local market prices as it allows them to make an informed decision on whether to go to market.
- There is an increase in the use of information and communications technology (ICT) as a communication medium, which opens a new way of disseminating key information to farmers directly.
- There is a willingness from farmers to pay for such services if they see it fit.

### Introduction

Agriculture is the core sector of the Ethiopian economy (Bekabil 2014). However, smallholder farmers that dominate the sector practice rain-fed mixed farming by using unimproved practices leading to low agricultural productivity (Welteji 2018). Ethiopian agriculture is also vulnerable to climate-related risks such as more frequent droughts and flooding, rainfall variability, and heatwaves (high temperatures) (Amsalu 2009). The impacts of hazards related to current weather variability and climate extremes have already been felt in the country. It is projected that by the year 2050, the negative impacts of climate change, under an extreme scenario of higher temperatures and increased intensity and frequency of extreme events, could cost Ethiopia 8-10% of its Gross Domestic Product (GDP) (Robinson et. al. 2013).

The Government of Ethiopia is making efforts to address these adverse conditions and has designed coping

mechanisms (Tadesse et. al. 2018) for the agriculture sector, overseen by the Ministry of Agriculture. One of the coping mechanisms identified in Ethiopia's National Adaptation Plans (NAP) is the dissemination of localized weather forecasts and agro-advisory services to the farmers and pastoralists who are highly dependent on rainfed agriculture for their livelihoods. As a result, accurate and timely weather and climate information are critical for the agriculture sector and the livelihood of smallholder communities.

### Design of the pilot project

The main objective of the project was to pilot **YeZaRe**, meaning "today" in Amharic, weather forecasts, agro-advisory, and market information dissemination system to smallholder farmers through a mobile phone app and short message service (SMS). Through a mobile app and SMS, location-specific weather forecasts bundled with agro-advisories are disseminated to inform farmer decision-making. Weather information includes 3, 10, 30-day, and seasonal forecast on rainfall onset and cessation. The 10-day forecast includes advisory services with specified management actions. Tailored agrometeorological advisory allows informed decision-making for higher agricultural productivity.

The project was initiated in the year 2018 in two districts namely, Basona Werana of Amhara Region, and Doyogena in the Southern Nations, Nationalities, and Peoples' Region. They are also sites where the Africa Research in Sustainable Intensification for Next-Generation (Africa RISING) project is undertaken. The Africa RISING project has worked on sustainable intensification of mixed crop-livestock systems as a key pathway towards better food security, improved

livelihoods, and a healthy environment in the sites since 2011.

In the year 2018, a baseline survey was conducted in the two project districts targeting a total of 60 households (30 from each district). The baseline included an assessment of the farmers' previous experience and challenges in accessing and utilizing weather forecasts and market information. The required information was collected through a household survey and focus group discussions. Thereafter, by using the YeZaRe system, localized weather forecasts, and climate information with respective agro-advisories were disseminated to these farmers. These households received market price information of key commodities in the Addis Ababa, Debre Berhan, and Hossana major markets. The market information mainly included wholesale and retail prices that were collected two or three times a week depending on the market location and market days.

Apart from the dissemination of district specific weather forecast and market information, a longitudinal study was also conducted to assess the farmer's experience, perception, and understanding as well as challenges in accessing and utilizing such information. The findings provided feedback to guide the process of adjusting the packaging and dissemination of the information.

### Access to weather forecast information

The baseline assessment showed that 97% of the households had already accessed weather information from Ethiopia's National Meteorology Agency (NMA). This information was mainly disseminated through radio, Ministry of Agriculture extension agents, development organizations, television, friends, and relatives in nearby villages (Figure 1). The same number of households also use indigenous traditional knowledge forecasts to complement the forecasts from NMA.

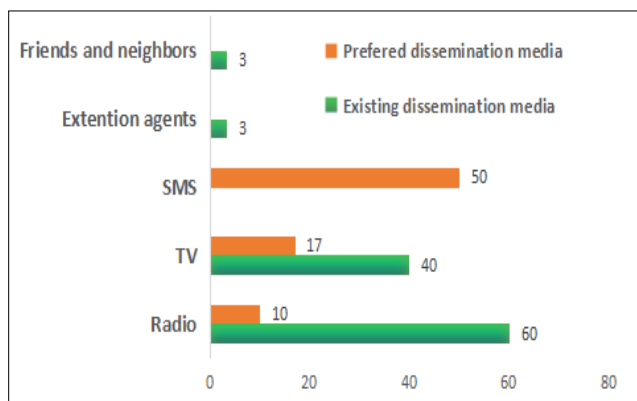


Figure 1. Source of weather forecast information.

Farmers indicated the need for weather forecasts that have related agro-advisory information to deal with climate change-related risks such as expected incidence of pests

and diseases, and suggestions for appropriate remedial actions.

### Access to market information

The provision of market information services is expected to increase the bargaining power of farmers, reduce the cost of transportation, and create a fair transaction process with farmer cooperatives. Most of the farmers sell their products in local markets within their villages or nearby urban centers. Typically, on market days in urban areas, farmers travel for long distances to sell their farm produce. While price tends to fall on such market days as the number of suppliers increase, the middlemen or traders gain unfair advantage of buying products at a lower price. Unfortunately, most of the farmers who travel long distances to sell their farm produce on market days usually get to the market without prior knowledge of the commodity prices. Thus, at the end of the day, they are also forced to sell their produce at a lower price rather than returning home with the goods. This cycle negatively affects farmer's income hence the need to have prior knowledge of the local market prices to allow them to make prior decisions with regard to either going to the market to sell their goods or waiting for the right time.

The baseline study analyzed farmers' experience in accessing market information for major agricultural products (Figure 2) by focusing on the sources of information, communication channels, content of the information, and the preferred means of accessing the market information. These households have access to both village and urban area marketplaces. Typically, village marketplaces are approximately 1 to 3 kilometers from their homes while the urban markets are further away.

Following the project intervention, these households have access to market information such as commodity selling prices, and the potential marketplaces. From the survey, 48% of the households get this information from traders via mobile phone communication, while 23% and 20% of respondents receive information from neighbors and relatives, and cooperatives, respectively. Few of the households receive such information through radio and extension agents.

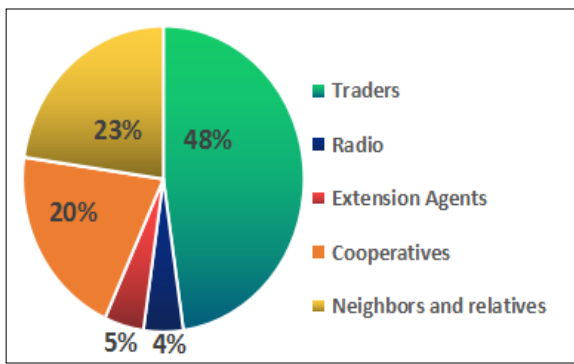


Figure 2: Sources of market information.

The challenges faced by households in accessing markets are numerous. The traders share information based on market speculation i.e. by just calculating their profit margins. The seasonal nature of farm production cycles is a challenge whereby farmers usually require market information during harvesting seasons where the majority of their produce is ready for markets. Farmers also face a limited number of market outlets to sell their goods, making them sell farm produce either to cooperatives or traders during market days. Farmers earn a small profit when they sell to cooperatives and they do not often get the payment immediately. This is mainly because cooperatives collect the products from farmers and sell the goods only when they secure certain minimum quantities. Thus, it forces farmers to wait for long, sometimes up to six months, to get their payment. On the other hand, middlemen and traders pay the farmers immediately, allowing them to have access to cash instantly. Conversely, farmers have very little bargaining power when dealing with traders.

Thus, in addition to market price information, farmers need to have information about the existing alternative market outlets. This could provide them better bargaining power and additional options to increase their income from produce. This requires identifying possible alternative market outlets for commodities.

### Farmer's experience on data dissemination via YeZaRe SMS platform

By using YeZaRe SMS platform, market information was disseminated to 47 farmers (Figure 3) consisting of 28 from Doyogena district and 19 from Basona Werana district. Out of the 28 farmers from Doyogena, 25 farmers received the information sent, while three did not receive the information due to mobile phone network problems. In Doyogena, 24 farmers managed to read the messages. In the Basona Werana district, 17 of the 19 farmers received the information and of these, 14 farmers read the information. The farmers who did not read the text messages could be either illiterate or deliberately ignore SMS due to fatigue from being bombarded by unsolicited messages from marketing agencies through Ethio Telecom, the national mobile phone company.

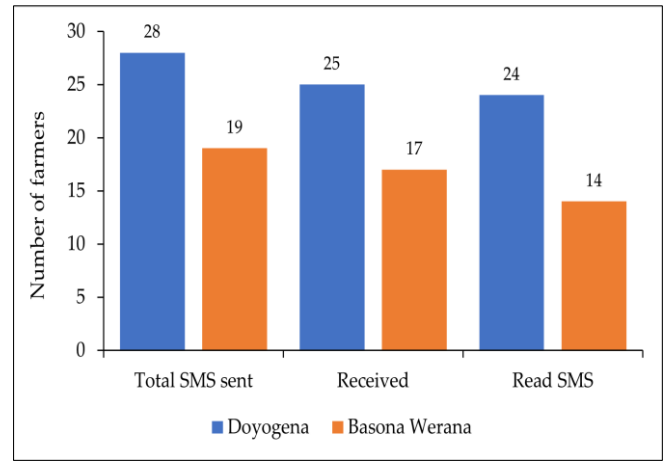


Figure 3: Market price disseminated and response from Doyogena and Basona Werana districts.

The farmers who received and read the message were asked whether they understood the market information (Figure 4). Accordingly, 24 farmers out of 28 from the Doyogena district confirmed that they did understand the information, while about 14 farmers out of 19 from the Basona Werana district clearly understood the message. The farmers were also asked whether the information was helpful or not. Based on their feedback, 23 farmers from Doyogena and 15 farmers from Basona Werana districts confirmed that the market information they received was helpful for more informed decision making on selling harvested products.

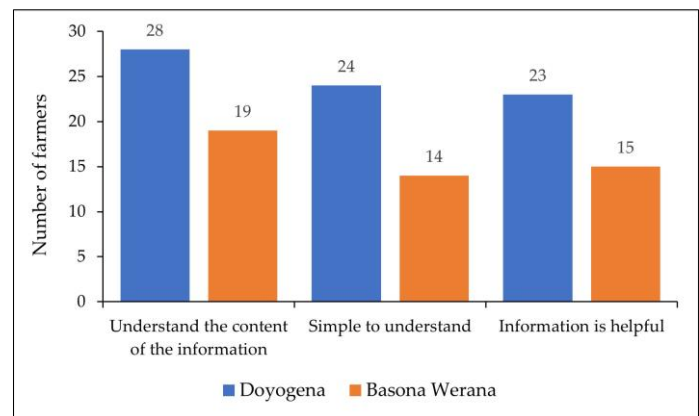


Figure 4: Market price disseminated and response (Sept. 2018 in Doyogena and Basona Werana district).

### Conclusions

From this study, the following key lessons were learned in terms of designing as well as implementing weather and market information services for smallholder farmers. First, it is essential to emphasize delivering locally specific weather forecasts and agro-advisories. This helps farmers to make a better decision on the appropriate climate-smart agriculture (CSA) practices to use. Secondly, standalone weather forecasts and agro-advisory may not be helpful. Farmers need detailed information packages, for example, sources of mechanization equipment, alerts on pest and diseases and their management options, and

sources of credit for farm inputs. Thirdly, farmers preferred to learn more about the nearest local market information compared to the far-off regional markets that have higher travel costs to access. Finally, market information by itself is not enough, and farmers benefit more when it incorporates innovation and technologies to enhance their production, post-harvest handling, and market linkage opportunities with the existing or new market outlets.

## Further reading

- Amsalu A, Adem A. 2009. Assessment of climate change-induced hazards, impacts and responses in the southern lowlands of Ethiopia. *Forum for Social Studies (FSS)*.
- Bekabil UT. 2014. Review of challenges and prospects of agricultural production and productivity in Ethiopia. *Journal of Natural Sciences Research*, 4(18), pp.70-77.
- Robinson S, Strzepek K, Cervigni R. 2013. The cost of adapting to climate change in Ethiopia: Sector-wise and macro-economic estimates. Ethiopia Strategy Support Program II (ESSP) Working Paper, 53.
- Tadesse M, Simane B, Ambaw G, Recha J, Abera, W, Tamene L, Demeke G, Mekonnen K, Radeny M, Solomon D. 2018. Building soil carbon stocks to enhance adaptation and mitigate climate change in climate-smart landscapes, Southern Ethiopia.
- Welteji D. 2018. A critical review of rural development policy of Ethiopia: access, utilization and coverage. *Agriculture & Food Security*, 7(1), p.55.

*This brief summarizes findings from piloting of SMS and mobile app-based market and weather forecast dissemination to smallholder farmers in Doyogena and Basona Werana districts of Ethiopia. The project targeted model farmers who received the information through SMS. Through baseline assessment and longitudinal study during the dissemination period, information and data was collected on the content as well as delivery mechanism. The information generated on both the content and delivery mechanism expects to feed into scaling up of such initiatives in Ethiopia.*

**Daniel Fikreyesus** ([daniel@echnoserve.com](mailto:daniel@echnoserve.com)) is a Senior Researcher at Echnoserve who led the project design, research method as well as preparation of lessons learned.

**Bayu Nebisu** ([bayu@echnoserve.com](mailto:bayu@echnoserve.com)) is a Junior Researcher at Echnoserve who coordinated data collection in the field.

**Lidya Tesfaye** ([lidya@echnoserve.com](mailto:lidya@echnoserve.com)) was a Junior Researcher at Echnoserve who worked on the research design and product development of YeZaRe.

**Gebermedihin Ambaw** ([G.Ambaw@cgiar.org](mailto:G.Ambaw@cgiar.org)) is a Research Officer of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) East Africa.

**John Recha** ([J.Recha@cgiar.org](mailto:J.Recha@cgiar.org)) is a Climate-Smart Agriculture Policy Scientist of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) East Africa.

## About CCAFS Info Notes

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is led by the International Center for Tropical Agriculture (CIAT). CCAFS brings together some of the world's best researchers in agricultural science, development research, climate science and Earth System science, to identify and address the most important interactions, synergies and tradeoffs between climate change, agriculture and food security. Visit us online at <https://ccafs.cgiar.org>.

CCAFS Info Notes are brief reports on interim research results. They are not necessarily peer reviewed. Please contact the author for additional information on their research.

## CCAFS is supported by:

