

## Climate Services for Resilience: Addressing Farmers Barriers and Prospects in Tanzania

*By Julius Peter Gontako, Dodoma, Tanzania*

### Summary

The increasing emphasis on climate change resilience and international development has steered to momentum for more inclusive approaches to planning for and coping to climate change impacts, disaster risk management, and defying comprehensive development challenges. Contained within the movement is an increased ambition on the use of climate and weather information in planning and decision making. This policy brief explores the basics, significance of climate services and issues that affect the use and value of climate services to farming communities. It calls for, an examination of the balance related with provision of climate information, provision of modern equipment and instruments to climate service provider, increased partnerships across areas of the climate services value chain, a combined weather forecasts with local climate data and knowledge, Civil society organizations (CSOs) to back up the operational provision of climate services, creation of a close relationship between climate expert advisors and users, and an enhanced training of local extension agents and traditional leaders.

### INTRODUCTION

Nowadays, Climate vulnerability is persistent harm to the communities and calls for a needful solution. Consequences of climate change are globally observed and are mainly experienced in the global south communities especially vulnerable groups such as farmers. Coulibaly, Mango, Swamila, Tall, Kaur and Hansen (2015) revealed that farming societies in Tanzania are being convoluted by added weather uncertainties. The lives and livelihoods and the social economic development of communities as a whole depend much on the climate of a particular area. The availability and quality of climate information determine the efficacy of decisions made by individuals, organizations, and governments to manage the impacts of climate variability of a particular society and sector.

Vaughan, Hansen, Roudier, Watkiss and Carr (2019) noted that climate services is a process of producing, translating, transferring, and utilization of climate knowledge and information in an informed climate-smart policy planning and decision making. At multisectoral dimension, climate services guarantee effective communication with agriculture, water, fisheries, and other sectors, on the best existing climate science for developing and assessment of climate change coping strategies and plans. At community dimension, society coping capability with current climate variability can be facilitated by easily accessible, timely, and decision-relevant scientific information, further climate

services remunerate the economic and community loss initiated by climate-related disasters.

With a functioning climate services system, the communities are able to enhance future climate change resilience and utilize the opportunity of favorable climatic conditions. However, to make climate service effective there is a need for setting up an enhanced technical capacities and active communication and exchange among climate information producers, interpreters, and communities (Vaughan et, al 2019).

Communities understand climate vulnerability and risks though there is still comparatively little known about the value of climate services for public and private sector users in Tanzania. Over centuries, indigenous knowledge and local adaptation strategies were used to cope with weather and climate change and vulnerability. For example, farmers, fisheries and pastoralists by using indigenous knowledge, are able to predict rain season through observing wing pattern and coming up rain in cloud colors. However, when the intestine is dark colored, containing some water and intestinal veins are full of blood; it signifies that rainy season will start soon. The reverse signifies the coming of drought season. Climate and weather forecast supplement and improve farmers' understanding, hence, allow the rainy season expectation beyond the old-style indicators (Climate Action Network Tanzania, 2018). Nowadays, due to the increase of irregularities in climate, vulnerability is becoming a challenge for farmers to keep up. The uncertainty to

weather information in most cases may affect the decision making of farmers, fisheries, and pastoralists. as it discourages the adoption of new technology and chances for doing business. Despite the fact that in a good season, taking the risks could improve the yields and boost profits, prolonged weather event and eruption of diseases can affect crops, fish availability or livestock production leaving the communities without food and or a burden of debts.

As climate uncertainty affects the type of backup that they provide to communities, institutions that influence and support these communities, such as national agricultural research and extension systems and development non-governmental organizations (NGOs), are also affected. Further, it has a negative effect on the provision of credit and productive input markets hence limit the market for smallholder agriculture and fishing products.

According to Coulibaly et al., (2015) the availability of local climate information cuts the ambiguity and helps communities to choose new crops and climate change coping technologies. This information can help to make a decision to complex and context-decisions about resource allocation to community income-generating activities. However, climate information should go together with other community services such as communication, training, interpretation, and use.

## SIGNIFICANCE OF CLIMATE SERVICES

Climate services benefit to farming, fisheries and pastrolists communities can be in the form of an individual, combined or the surroundings, however, there are some benefits that are accumulated in one level that cannot be of momentous to another as manifested below;

- Climate information can increase understanding of prospective climate consequences and/or support farmers lessen the impact of negative outcomes by informing the chance of decision making about specific crops, the timing of planting, and the application of fertilizer.
- Farmers can use forecasted weather information to cut the expenses of coping with extreme events that have less possibility of occurrence.
- Awareness of climate services can assist farmers to prepare for the climate-generated opportunities.
- Climate information can assist farmers to get ready for less intense but more common vulnerabilities.
- In a long time, scale, access to climate information can raise average incomes above standard levels as constantly improves decision making. Further, it provides nonmonetary benefits, such as reduced time for crop planting, less workload, or enriched nutrition.
- Help farming entrepreneur to make right decisions about market. e.g. grain importers.
- Better decision making done as a result of available climate information could decrease the application

of fertilizer, improve water allocation effectiveness, decrease soil erosion and, eventually lower greenhouse gas emissions.

- Climate services can improve the management of protected spaces and water resources as it enables the provision of productive decisions on land management.
- Climate services enable the adoption of measures to adapt to the negative effects that could significantly affect the economy, community, and nature.

## BASICS FOR CLIMATE SERVICES

- ❖ **Availability:** Climate service should be easy to get to at time and space scales that the user needs,
- ❖ **Dependability:** Climate services should be delivered regularly and on time,
- ❖ **Usability:** Climate information has to be presented in user-specific formats so that the client can fully understand,
- ❖ **Credibility:** Climate information must be trusted and believed so that the user to confidently apply to plan and decision-making
- ❖ **Authentication:** Climate services have to show true, genuine, or validness entitled to be accepted by stakeholders in the given decision contexts
- ❖ **Responsiveness and Flexibility:** Climate service has to react quickly and positively to the evolving user needs
- ❖ **Sustainable:** Climate services should be reasonably priced and reliable over time.

## ISSUES THAT AFFECT THE USE AND VALUE OF CLIMATE SERVICES IN TANZANIA

Bruno, Daly and Dessai (2018) identified the core features that can impact the use and worthiness of seasonal climate forecasts in decision making to farmers, these include;

### 1. FORECAST ISSUES

- Forecast accuracy increases climate service value to users; further, the trustworthiness rating of certain power system elements is directly proportional to perfections in the accuracy weather forecasts in the short-term.
- The time between the initiation and completion of the forecast affect the decision maker in choosing best the adoption technologies as shorter lead time tend to provide more value.
- Probabilistic forecasts are used not only to identify the most likely outcome but also to assess the probability of occurrence of extreme and rare events hence are deliberated more significance than single forecasts.

- Collective forecasts deliver better potential economic benefits than a customary control forecast due to the fact that they provide detailed forecast probability distribution, that allows users to modify their weather forecast-related activities to their particular cost/loss situation, further, have the capacity to discriminate between high predictability environments and that of low.
- The underestimation of forecast value could be a product of a failure to incorporate the best climate science.

## 2. NATURE OF DECISION-MAKER

- Studies examining the influence of agriculture decision-maker behavior on the value of climate forecasts revealed that forecast value is less to risk-neutral decision makers and higher to slightly risk opposers, consequently, disregarding risk aversion when it exists can cause an undervaluation of forecast information.
- Risk-neutral farmers consider of more value the forecasts of adverse climatic conditions as primarily used to evade risk related to unfavorable conditions. (i.e. protective response). However, at increasing levels of risk aversion forecasts of favorable conditions became more valuable as farmers are more likely to look for extra incomes by captivating benefit of promising environments (i.e., attacking response).
- When recipients of climate service began with inaccurate prior beliefs of historical climate data, they are likely to understate the true value of forecasts.
- Climate forecasts use and value can be affected by access to resources such as lack of agriculture loan, capital or technology, labor, and land as they expedite crop establishment.
- Decision maker's perfect knowledge and understanding of climate information forecasts as knowledge on interpretation correlate with forecast accuracy.

## 3. DECISION-MAKER ENVIRONS

The operational environment of the decision maker can affect the utilization and value of climate information.

- Farm policies that decrease earnings variability and the insecurity of farm initiatives also decrease the value of climate forecast.
- Crop insurance programs decrease the value of enhanced climate forecasts as it mitigates potential

losses. However, improved use of climate information can, on the other hand, decrease insurance payments as it reduces the risk of losing crops.

- The use of short- and long-term forecasts in agronomic decisions are positively significant impacted by community norms regarding the use of weather information.
- Individual decision-makers timing of adoption of climate information affects the value of forecasts as those who chose to take up and use the forecasts earlier tend to benefit more.
- The credibility of the forecast and the institutions providing the information influence the decision-makers trust worth on forecasts as a result impacts the value and weather information utilization.
- The sensitivity of the decision-maker to climate variability influence the value of climate information as farming decision maker with operation alternative placed low value on climate information.

## 4. EXISTING MANAGEMENT OPPORTUNITIES

- Farmer with alternative management strategies pays less value to climate information. For example, the forecast value is higher for tenants than for agriculture landowners, as owners abide by crop rotations and have less flexibility to act in response to weather forecasts.

## 5. UNCERTAINTY

- The uncertainty of forecast value is mostly affected by is the ex-ante nature of most studies conducted and their associated assumptions. For example, agriculture crop simulation models are designed to match on-the farming circumstances, however, they do not consider for several characteristics of human behavior (lack of resource to change, personal choice to strategy, change of income generating activity). Practically, if a farmer adopts a particular management strategy due to the weather forecast it takes a number of years to observe the results.
- Failure to account for differences in decision-maker characteristics can result in the underestimation or overestimation of forecast value.

## Recommendations

- ❖ There is a need of examining the balance related with provision of climate information at different scales, sectors
- ❖ There is a need of examining the roles of various organizations in technical and contextual expertise provision needed for development of efficiency climate services.
- ❖ Provision of modern equipment and instruments to climate service provider for delivery of quality services

- ❖ Exploration of realistic gains of national, and local climate service providers in diverse perspectives.
- ❖ Governments and service providers to identify and engage related communities of practice.
- ❖ Civil society organizations(CSOs) to continue to play their role in backing up the operational provision of climate services at the community scale.
- ❖ Partnerships across areas of the climate services value chain can help eliminate knowledge gaps.
- ❖ Creation of a close relationship between climate expert advisors and users to develop clear and decision related weather information.
- ❖ A combination of weather forecasts with local climate data and knowledge is crucial.
- ❖ There is a need for defining and implementing standards and guidance on best practices for climate service delivery.
- ❖ There is a need for enhancing the training of local extension agents and traditional leaders on the concepts of climate services, with local climate information and using indigenous languages and teaching materials.

## Conclusion

Climate services can support decision-making and thus help to farm and fisheries sectors deal with and plan for climate irregularities and change. Climate services should be available, dependable, credible, authenticated, responsive, flexible, and sustainable to users. Provision of Climate services increases understanding of prospective climate consequences and plan for the climate-generated opportunities, cut the expenses of coping with extreme events, and raise average incomes above standard levels as constantly improves decision making. However, the forecast, nature of the decision maker, decision maker environment, available adaptation options and uncertainty are among the core features that can impact the use and worthiness of seasonal climate forecasts. To be effective, there is a need of examining the balance related with provision of climate information, provision of modern equipment and instruments to climate service provider, increased partnerships across areas of the climate services value chain, a combined weather forecasts with local climate data and knowledge, Civil society organizations(CSOs) to back up the operational provision of climate services, creation of a close relationship between climate expert advisors and users, and an enhanced training of local extension agents and traditional leaders.

### For further Readings

Brasseur, G. P., & Gallardo, L. (2016). Climate services: Lessons learned and future prospects. *Earth's Future*, 4(3), 79-89.

Bruno Soares, M., Daly, M., & Dessai, S. (2018). Assessing the value of seasonal climate forecasts for decision-making. *Wiley Interdisciplinary Reviews: Climate Change*, 9(4), e523.

Climate Action Network Tanzania. (2018). Aligning climate resilience, sustainable development and poverty reduction in Tanzania project baseline report.

Coulibaly, J. Y., Mango, J., Swamila, M., Tall, A., Kaur, H., & Hansen, J. (2015). What climate services do farmers and pastoralists need in Tanzania? Baseline study for the GFCS Adaptation Program in Africa.

Mwanga, R. O. M., Kisanga, J., & Dinh, D. (2016). Planning and Review Days on Participatory Integrated Climate Services for Agriculture (PICSA) Implementation in Dodoma and Arusha, Tanzania.

Vaughan, C., Hansen, J., Roudier, P., Watkiss, P., & Carr, E. (2019). Evaluating agricultural weather and climate services in Africa: Evidence, methods, and a learning agenda. *Wiley Interdisciplinary Reviews: Climate Change*, e586.

### Tongyi Environmental Services Company Limited(TESCL)

P.O.BOX 233, Dodoma, Tanzania.

Majengo street, 2<sup>nd</sup> floor, Perugina building

Tel: +255 738 197 775;

Email: [info@tongi.co.tz](mailto:info@tongi.co.tz)

website: [www.tongi.co.tz](http://www.tongi.co.tz)

