



Establishment of multi-stakeholder and functional interdisciplinary technical network for sustainable access to weather and climate information services by agricultural users in Zambia



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KEY MESSAGES

- ▲ Several challenges exist related to monitoring of climate variables, development of user-friendly information products, communication of tailored products to users, and appropriate use of climate information services to address climate risks in Zambia.
- ▲ With adequate resources, flexible and inclusive collaboration with concerned parties, and sufficient stakeholder buy-in, it is possible to develop a system-based approach to improve availability and access to tailored weather and climate services using interactive communication.
- ▲ The establishment of a multi-stakeholder and functional Interdisciplinary Technical Network (ITN) (embedded into government structures and using appropriate instruments) is key for sustainable access to climate information by end users.

INTRODUCTION

Access to and the utility of weather and climate services is a crucial aspect of climate-resilient agriculture. Climate information, in particular, can impact decision-making by Zambian stakeholders – most importantly decision-making related to agricultural production, value addition, and marketing. The provision of weather and climate services involves the generation and contextualization of information and knowledge derived from climate research, for decision-making at all levels of society (Vaughan and Dessai, 2014). The aim of weather and climate services is to provide people and organizations with timely and tailored climate-related information and knowledge that can be used to enhance production and productivity, protect lives, livelihoods, and property and reduce climate-related losses.

However, there are challenges related to the monitoring of climate variables, the development of user-friendly information products, communication of tailored products to users, and appropriate use of climate information services to address climate risks. In general, there is a lack of data, systematic and integrated approaches to analyze and prepare customized information products, and institutionalization of climate information services to support adaptation planning within local governments (Göpfert, Wamsler and Lang, 2019).



To boost the concrete actions contributing to adaptation and resilience to climate change, many African countries – including Zambia – must develop a system-based approach to improve availability and access to weather and climate services, develop interactive ways of communication, and set up open data systems. In Zambia, the generation, communication, and use of climate information services involve various challenges, including limited access to existing climate data and information from external research organizations (Irish Aid, 2018), insufficient capacity among potential users to access, understand and interpret and act upon available information products, little evidence of mechanisms to integrate information requirements and feedback from vulnerable communities into scientific research and climate services to improve services in the short, medium to long term (Koelle *et al.*, 2014).

Various partners are collaborating to ensure that Zambia's agriculture becomes more climate-resilient. The Food and Agriculture Organization of the United Nations (FAO) and the Government of Zambia have established a partnership to develop and institutionalize the climate information services and improve their access and use by the agricultural producers in eastern Zambia. New meteorological stations were installed to facilitate the monitoring of meteorological parameters and the generation of weather and climate information. The Zambia Meteorological Department (ZMD) has to effectively link with the extension workers, farmers, and several other food systems actors to give them better access to climate information. Efforts were made to improve the capacities of various stakeholders, including extension workers and farmers, to disseminate and use climate information.

To institutionalize the processes of the generation, communication, and use of climate information, an Interdisciplinary Technical Network (ITN) was established within the Ministry of Agriculture. The ITN was set up following guidelines developed

by the World Meteorological Organization, which require member states to develop a national framework for climate services. Based on the highly technical analyses carried out by the ZMD and the Water Resources Management Authority, the ITN can generate and deliver a seamless flow of climate (including hydrological) data and information to farmers, with recommendations for agricultural activities.

The objective of this policy brief is to address, in a systematic way, the challenges associated with the provision and use of agroclimatic services in Zambia. The brief outlines a realistic pathway to provide sustained climate information services to agricultural producers and strengthen the capacity of users at different levels.

THE USE OF WEATHER AND CLIMATE INFORMATION IN EASTERN ZAMBIA

A preliminary scoping study indicated that there were insufficient monitoring systems of hydrometeorological variables that influence agricultural production in Zambia. The scoping study and the subsequent consultations with the ZMD and other stakeholders recommended the establishment of an ITN to institutionalize the climate information services including generation and delivery of climate information and advisories - from data collection points to the data analysis and communication point (the ZMD) to agricultural end-users. The information products could be presented as advisories, which end users could easily understand and implement the suitable technologies and practices to adapt to climate variability and change. Based on the results of the scoping study, an ITN was established in 2018. The members of the ITN are presented in Table 1. Discussions on membership of the ITN were carried out and it was formally constituted but it requires institutionalization for sustained functioning.



Table 1: Members of the Interdisciplinary Technical Network

ORGANIZATION	DESIGNATION
Zambia Agricultural Research Institute (ZARI)	Principal Agricultural Research Officer
Zambia Meteorological Department (ZMD)	Principal Meteorologist (Research and Development)
Disaster Management and Mitigation Unit (DMMU)	Principal Research Planning Officer – Vulnerability Assessment
Ministry of Agriculture <i>Department of Agriculture (DOA)</i> <i>Policy Planning Department (PPD)</i>	Principal Agricultural Officer – Crops Senior Economist
University of Zambia <i>Math/Agriculture</i>	
Water Resources Management Authority (WARMA)	Water Engineer Senior Hydro-informatics Officer
Food and Agriculture Organization Climate Change and Natural Resources Department	Technical focal point Principal Climate Change Adaptation Officer

Source: Project documents

However, the ITN had no legal mandate to operate within the framework of the Government of Zambia (GRZ), nor were there provisions to sustain the ITN beyond the project period. Nevertheless, efforts were made to institutionalize the network by housing it within the Ministry of Agriculture. As a first task, the ITN conducted a baseline survey and SWOT (strengths, weaknesses, opportunities, and threats) analysis of weather and climate services in Zambia (Table 2.).

The SWOT analysis was conducted in the Mambwe and Nyimba districts in eastern Zambia. It revealed that the use of climate information varied according to location. For example, farmers from agricultural camps in the Mambwe district reported that they obtained climate information from radio and television and used it to make their production decisions. Meanwhile, farmers in camps in Nyimba reported that poor radio and television reception resulted in the inadequate accessibility of weather information. An in-depth study of 89 farmers established that 21 percent of them received weather information in September, 34 percent in October, and

39 percent in November. These months coincide with the beginning of the rainy season, and hence with that of the agricultural production season. Respondents primarily received weather information during agricultural meetings, from agricultural extension officers, and radio and television.

The respondents of the baseline survey indicated that the following types of information would be useful for production decisions: rainfall distribution patterns for each sublocation, weekly updates on expected amounts of rainfall, winter climate information to support the production of winter crops, daily weather forecasts, pest warnings. In addition, the surveyed farmers indicated that they were interested in receiving training on how to interpret and apply climate information to make the right decisions to reduce the impacts of weather and climate events, as well as in developing their skills in the use of new farm techniques, such as Conservation Agriculture (CA).

Table 2: SWOT analysis of weather and climate services in eastern Zambia

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> ♦ Availability of weather and climate data from newly established weather stations. ♦ Availability of weather and seasonal forecasts from ZMD. ♦ Linkages of ZMD with the subregional, regional, and global networks. ♦ Existence of national extension services as intermediary organizations to process and communicate the information to farmers. ♦ Availability of digital and print media and increasing use of social media. 	<ul style="list-style-type: none"> ♦ The insufficient number of meteorological stations despite some improvements. ♦ Insufficient computation skills and equipment. ♦ Weather information is not presented in a user-friendly way to address location-specific problems. ♦ Late communication of seasonal forecasts. ♦ Inadequate outreach for weather products and services. ♦ Weather information is not communicated in local languages. ♦ Unreliable or non-existent mobile networks in some areas. ♦ Limited use of indigenous/local knowledge.
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ♦ Existence of weather data collected by other organizations, which can be incorporated into weather data generated by the ZMD. ♦ Collaboration with other stakeholders. ♦ Supportive government policies. ♦ Introduction of tailored courses on meteorology at the university level. ♦ Availability of social media platforms for information gathering and communication. 	<ul style="list-style-type: none"> ♦ The absence of a legal mandate or framework for the ITN. ♦ Damage to the meteorological equipment caused by vandalism and theft and natural calamities. ♦ Error in data collection due to inadequate maintenance of meteorological stations and technical capacity of observers ♦ Lack of sustained funding to support the weather and climate information system and the ITN beyond the project period.

Source: Project documents

INSTITUTIONALIZATION OF WEATHER AND CLIMATE SERVICES FOR THE AGRICULTURE SECTOR

The role of the ITN, once established, is to ensure farmers' access to timely, reliable, and user-tailored weather and climate information, thus boosting their resilience to climate variability and change and promoting science-based decision making in agri-food systems.

The ITN recommended the creation of four working groups within the National Framework on Climate Services, to focus on the following areas:

- (i) the packaging and tailoring of climate information.
- (ii) the dissemination of climate information (it was proposed that this should go with a dissemination plan).
- (iii) policymaking, governance, and coordination, and
- (iv) capacity development.

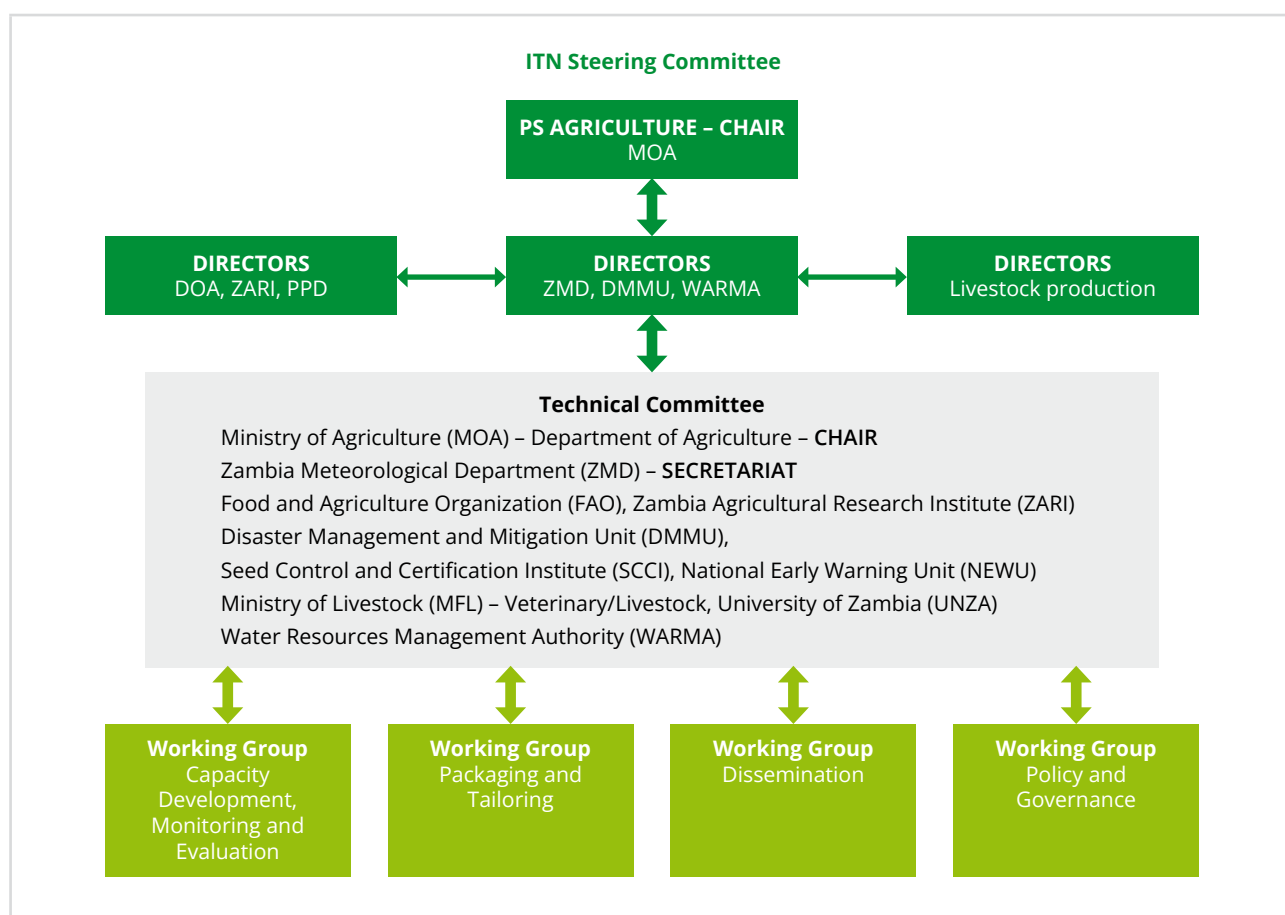
The governance structure (i.e. ITN steering committee) was proposed (See Figure 1). It comprises the Permanent secretary of the Ministry of Agriculture as a chair to the steering committee, a multi-disciplinary set of representation from livestock, crop and other ministries, a technical committee and various working groups. In May 2019, the strategic plan was developed for the ITN. To achieve the network vision of "Access to quality, timely and reliable weather and climate information for climate-resilient agriculture", seven objectives were proposed as follows:

1. Establish additional weather and rainfall observation stations to enable production of location specific weather and climate information
2. Provide user friendly weather and climate services to end users through better packaging and tailoring of climate information; the Zambia Meteorological Department (ZMD) for example could develop and co-produce climate services with agricultural experts and users



3. Undertake continuous review and assessment of user climate information needs
4. Disseminate timely user-friendly weather and climate information to facilitate decision making
5. Enhance scientific knowledge and technical skills through training of relevant key stakeholders
6. Create awareness for the application of weather and climate information through farmer field schools
7. Incorporate local knowledge in the production and dissemination of weather and climate information
8. Build the ITN operational capacity and sustainability.

Figure 1 Proposed structure for the ITN



Source: Project documents

The road map to the delivery of climate information involves the ITN determining the focus of agroclimatic services and elaborating the technical and operational details of their provision (i.e. of the generation, transformation, and transmission of climate data and information). The ITN will further determine the administrative

structure (e.g. the institutional arrangements) for the delivery of agroclimatic advisories. In addition, it will work to strengthen the capacities of extension officers, farmers, and agro-dealers, as well as dissemination and transmission channels (such as the media).

POLICY OPTIONS FOR CONSIDERATION

The climate information services discussed in this brief demonstrates that an interdisciplinary technical network can help institutionalize the flow of agro-climate information. It further illustrates that weather and climate information can be collected and processed by the ZMD and used by various actors in agricultural sector to inform cropping decisions by the smallholders. However, the technical capacity of ZMD to forecast extreme climate events and other disasters must be strengthened. In addition, the functional capacity of the network has to be ensured by improving the interconnectivity of networks and committees. The ITN, once operational could align its activities with horizontal committees responsible for vulnerability assessments (such as the Zambia Vulnerability Assessment Committee) or disaster management committees, to ensure a holistic approach to climate change adaptation.

In the past, weather and climate information has been generated partly with data collected by farmers to support the activities of the ZMD; however, a clear flow of this information should be determined. Furthermore, there is a clear need to strengthen the capacities of the local staff members of the ZMD to process data and generate localised information in liaison with the agricultural extension staff and together develop and communicate tailored information to agricultural producers including farmers.

This should be done in collaboration with District and Provincial Agricultural Coordinator's Offices. The ITN is an important interdisciplinary mechanism in the entire weather and climate information service system and there is a strong need to operationalize it within the government functions to ensure sustainability.

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