CLIMATE SERVICES

Study on the Use of Climate-related Indigenous Knowledge Services to Support Anticipatory Action in Zimbabwe

WFP
World Food Programme

SAVING LIVES
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Contents

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Chapter 1: Background

1.1. Introduction

The United Nations World Food Programme (WFP) is piloting the Anticipatory Action (AA) approach in Zimbabwe. AA is designed to manage climate risks by acting in anticipation of severe weather events, based on weather forecasts and pre-positioned financing. This study was commissioned to investigate possible pathways for the integration of indigenous knowledge systems (IKS) in the decision-making processes within the AA approach.

The World Meteorological Organization (2013) notes that '… a climate service is a decision aide derived from climate information that assists individuals and organizations in society to make improved ex-ante decision-making.' Climate-related IKS are used traditionally in many parts of the world to provide climate services. The definition of IKS used for the purposes of this report is given in Section 1.5.

A more complete understanding of current use of IKS in climate forecasting amongst the targeted communities is necessary before their integration into AA. This document details the processes and findings of a study commissioned by WFP Zimbabwe in June 2021 to investigate the current state and use of climate-related IKS in four districts of Zimbabwe: Mbire, Matobo, Mudzi and Binga.

1.2. Objectives of the study

The study was undertaken to assess knowledge of climate-related IKS in the target districts in Zimbabwe and to explore whether IKS can be integrated into AA.

In summary, the objectives of the study were to:

- Assess knowledge of climate-related IKS in Zimbabwe;
- Investigate the extent that climate-related IKS is used in the study population and its possible integration into AA and;
- Provide initial guidance on how to integrate and use IKS in AA projects.

1.3. The role of climate forecasting in Anticipatory Action

The AA programme is an innovative approach that enables the implementation and financing of actions before an extreme weather event has occurred. The anticipatory actions aim to prevent and mitigate the effects of extreme weather on the food security and nutrition of highly vulnerable people.

The success of the AA approach depends, to a large extent, on the ability to forecast adverse weather events with high skill and accuracy to subsequently take appropriate, informed action to adapt to the new situation. Seasonal climate forecasting and other long-term and short-term forecasting systems are therefore integral to the AA approach. When forecasting information is available, decisions to avert climate-related hazards and their impacts can be taken at both individual farming household level and programming level. Dube et. al. (2016) have shown that farmers who access seasonal climate forecasts make important farming decisions based on the information. Such decisions may include the seed varieties to be purchased, the type and quantity of fertilizers to purchase, the time of year to plant, and plant density per planted area, among other issues (Chisadza et al. 2013). In general, climate forecasting assists farmers and stakeholders to maximize yields where conditions are favourable by preparing the right inputs and investments, whereas in a year with extreme weather events, farmers can more effectively protect their families, crops and livestock (Alvera, 2013).

Forecasting is broadly divided into three types, according to the lead time offered by the forecast (Blench, 1999):

- Weather forecast: forecasts limited to lead time of days;
- Seasonal climate forecasts: forecasts that offer a lead time of several months;
- Long-term climate forecasts – long-term forecasts projecting climate over several years.

While the current seasonal climate forecasts obtained through the Zimbabwe Meteorological Services Department (MSD) have played an important role in AA, they have been found to have several limitations, including challenges with accuracy, generalizations/low resolution (spatially and temporally), inaccessibility, and lack of precision at local ward, village and household level (Moyo, 2020). These issues are discussed later in the findings section.

1.4. The need for a complementary forecasting system

Approximately 60 percent of the African population is not covered by early warning systems to cope with extreme weather and climate change. A significant proportion of the rural population in Africa has limited access to scientific forecasts. As a result, they depend on IKS-based forecasting which they have used and relied on over many years. One of the strengths of IKS is that the indicators are locally accessible in different geographic locations, enabling even remote communities to have access to climate forecasting information (Dube et al, 2013). The various challenges related to the accessibility, reliability and use of 'modern/contemporary' meteorology-based weather and climate forecasting methods have led to increasing calls for the utilization or integration of IKS in seasonal climate forecasting to bolster the efficacy and accuracy of forecasts. Most IKS indicators are observable several months before the onset of the rainy season, thus enabling anticipatory planning (Chisadza, 2013).

1.5. Definition of indigenous knowledge systems

The term 'indigenous knowledge' refers to the sum of facts and place-based knowledge known or learnt from cumulative day-to-day experience, or acquired through observation and study, and handed down from generation to generation by individuals and communities (Berkes 2000; Sanga, Ortalli 2003 & Sillitoe, 2007).

Indigenous Knowledge System (IKS) refers to a set of knowledge that is orally passed down from generation to generation and is learned by observing the environment surrounding communities.

This knowledge is also referred to as indigenous technical knowledge (Archaya 2011). This knowledge is a result of cumulative repetitive observation and experience (Chisadza et al. 2013). With regards to climate and the environment, scholars often refer to a more specific type of indigenous knowledge known as traditional ecological knowledge (Dube et. al. 2016). Similarly, Salick and Byug (2007) define IKS 'as the wisdom, knowledge and practices of indigenous people of a particular community and the knowledge should have been gained over time through experience or should have been orally passed on from generation to generation'.

The concept of IKS has increasingly become topical, and in disasters and development discourse it is increasingly being accepted as integral to addressing multiple challenges faced by rural communities due to climate change (Mapfumo et al., 2015; Moonga & Chitambo, 2010 & Saitabau, 2014). The past decade has witnessed an emerging and dominant view that emphasises local knowledge as a key component of an agricultural system and the view that scientific knowledge must enhance local knowledge, rather than displacing it (Jain, 2014; Joshua et al., 2011; Maconachie, 2012; Osbahr & Allan, 2003). Indigenous knowledge has a strongly practical emphasis that is oriented towards planning, and its dynamism enables incorporation of new elements (Flavier et al., 1995; Kolawole et al., 2014; Orlove et al., 2010). More recent studies have shown that resilience building for smallholder farmers in Africa starts with ability to anticipate climatic changes and accordingly adjust farming practices to lay the groundwork for sound food security, particularly in the context of climate variability and change (Kolawole et al., 2014). Mafongoya et al (2021) acknowledge that, 'IKS is important in providing seasonal forecasting information, which is critical in making decisions in planning, designing cropping calendars, offering early warnings, as well informing preparedness against disasters.' This is because IKS is considered to form the basis of local-level decision-making in many rural communities on the continent: as such it would be difficult for communities to be resilient without it (Adger, 2012). Chisadza, Mushunje, Nhundu and Phiri (2018) assert that IKS plays an important role in climate forecasting in Africa's smallholder farming communities, particularly in occasionally predicting local weather information and frost. According to Nhemachena (2010), this knowledge only qualifies as IKS if it has significantly helped to solve problems related to climate change and variability, among many other socio-environmental concerns.

Chapter 2: Study materials and methods

2.1. Description of study sites

The data collection for the study was carried out in four districts of Zimbabwe: Mbire, Matobo, Binga and Mudzi. All four districts primarily lie in agroecological regions IV and V and they are characterized by low and erratic rainfall (450–650 mm/year) with very high temperatures and inherently poor soils.

Climate change has worsened the already extreme weather patterns in the districts, resulting in significant food shortages. For example, drought has affected all these districts. Key economic activities include smallholder mixed crop-livestock systems. Maize, sorghum, millet and groundnuts are grown in all the districts, albeit at different scales. Livestock include primarily cattle and goats and there is frequent risk of overstocking, which means that pastures and grazing lands have been depleted. All four districts are in areas that border the neighbouring countries of Mozambique (Mbire and Mudzi), Botswana (Matobo) and Zambia (Binga and Mbire). Adding to the challenges faced by communal farmers in the districts, they all either contain or are close to major national parks or wildlife conservation areas.

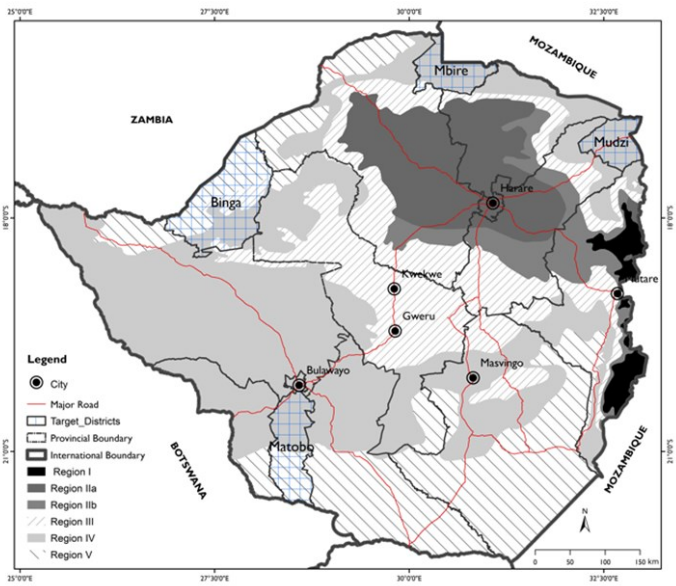

FIGURE 1: The location of the study districts

Table 1: Key statistics about the study districts

Descriptor	Mudzi	Mbire	Matobo	Binga
Province	Mashonaland East	Mashonaland Central	Matabeleland South	Matabeleland North
Number of Wards	18	17	26	25
Population (2012 Census)	133 252	82 380	93 940	139 092
Population density/km^2	32.05	17.96	17.54	10.43
Total land area (km^2)	4 158	4 696	7 245	13 338
Population Growth rate	0.39	17.54	-0.60%	10.43
Female/Male ratio	52/48	51/49	52/48	54/46
Percentage of Rural Population	96.1	100	99.4	96.2

Source: Zimbabwe National Statistics Agency, 2012 and City Population (date unknown)

2.2. Study methodology

The study was conducted using a mixed methods approach that combines qualitative and quantitative approaches. The following data collection methods were used.

2.2.1. DESK REVIEW

Research that has been conducted in Zimbabwe and other parts of Africa was reviewed to establish the current state of IKS on weather and climate forecasting in Zimbabwe and Africa in general. The review focused on the use of IKS in weather and seasonal climate forecasting. The literature review also focussed on the concept of forecast-based-financing to understand how it is operationalized.

Online resources with collections about ecological phenomena such as names of trees and birds were reviewed to confirm the names supplied by the study informants. This website was particularly useful for confirming the names of trees, birds and animals.

2.2.2. KEY INFORMANT INTERVIEWS

Eight key informant interviews were held per district with key programme stakeholders in AA, including selected WFP programme staff, WFP partner organizations, members of the AA Community of Practice in Zimbabwe, Meteorological Services Department officials, district AGRITEX officers, district agronomists, lead farmers at district level, recognised Indigenous Knowledge Practitioners at district and ward levels and traditional leadership representatives. Due to the COVID-19 lockdown protocols, all respondents were contacted virtually over Zoom, with those respondents who could not be accessed by Zoom called on their mobile phones. While this approach generally worked well, in a few instances, respondents' mobile numbers were either unreachable or network challenges prevented a smooth discussion. In most cases, the discussions proceeded well. Network challenges were particularly experienced in Matobo and Mbire. The second challenge with virtual interviews was that many of the indicators visual indicators include trees, animals and insects.

2.2.3. SURVEY

A total of 200 households across the four districts were targeted through a mobile phone-based survey. This approach was taken because the research team could not physically visit the study sites due to the COVID-19 lockdown protocols in place during the data collection period. The household survey targeted respondents in the districts where the AA project would be implemented. Approximately equal numbers of households were selected across the districts, with stratification by ward wherever available sampling frames allowed for this. Within a ward, the selection of household-level respondents was based on available beneficiary lists from partner organizations and stakeholder registers from the district- and ward-level Anticipatory Action Plan validation meetings for the AA project. Where such lists were not available, WFP staff responsible for specific districts were able to source lists from partner organizations implementing WFP programmes within the same districts and wards.

The study also took gender representation into consideration in the selection of respondents. Figures 2 to 4 show the representation of various sample sub-categories. Fifty-nine percent of the respondents were male while 41 percent were females. This may indicate unequal access to communication gadgets such as mobile phones. Most of the respondents reported being in the lowest income bracket, earning US$0-49 per month. This explained the levels of poverty in the study areas, which also contributes to limited access to seasonal climate forecasting information, as households cannot purchase communication gadgets such as radios. The average age of the respondents varied between the districts, from 44 years in Mbire to 56 years in Matobo. As shown later in the study, it appears that average age also directly correlated with levels of knowledge about indigenous knowledge systems and their use.