ANALYSIS OF EXISTING FORECAST-BASED FINANCING MECHANISMS AND SOCIAL SECURITY SYSTEMS IN ZIMBABWE

FINAL REPORT

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ASB Arbeiter-Samariter-Bund
cbm christian blind mission
CDD Centre for Disability in Development – Bringing hope, dignity and meaning to life
IDA International Disability Alliance
Malteser International – Order of Malta Worldwide Relief
Jairos Jiri Association – Demystifying Disability

CONTENTS

1 INTRODUCTION

This document presents a comprehensive analysis of existing forecast-based financing mechanisms and social security systems in Zimbabwe under the Putting Persons with Disabilities at the Centre of Humanitarian Preparedness and Response, P4132 project.

2 BACKGROUND AND PURPOSE OF STUDY

Christian Blind Mission (CBM) and its partners' humanitarian activities aim to equally reach and actively involve persons with disabilities, addressing specific needs while promoting and facilitating full inclusion in mainstream services. CBM and its partners, including Jairos Jiri Association (JJA), work on programmes that are context-specific, from disability inclusive preparedness to immediate life-saving needs to reconstruction.

The humanitarian sectors of priority are:

i. Inclusive food security/ basic needs assistance
ii. Inclusive health care services
iii. Protection (disability mainstreaming)
iv. Inclusive WASH services

The above includes medical and rehabilitative services, Cash-and-Voucher-Assistance and distribution of food and non-food items, capacity development of Organisations of Persons with Disabilities (OPDs) and awareness-raising on the rights and needs of persons with disabilities in humanitarian situations as well as the construction and rehabilitation of accessible water supply points and sanitation facilities. The partners aim to ensure that all planning and response to humanitarian situations as well as recovery is inclusive of, but not restricted to, persons with disabilities, other more at-risk members of society, and their families. They do this by working with local partners as well as with international humanitarian organisations, meaning that local, specific knowledge is harnessed while at the same time large-scale 'mainstream' interventions become inclusive. This strategic approach ensures no-one is left behind.

Climate shocks contribute significantly to the humanitarian burden and lead to poverty and food insecurity. By 2030, climate change could force tens of millions people into extreme poverty. Social protection policies and programmes that aim to reduce poverty, deprivation and vulnerability are increasingly seen as an instrument to help households and communities manage climate risks. In the event of a disaster, persons with disabilities (PDs), who are often the most marginalized members of society and are disproportionately affected by humanitarian crises, are usually left behind in disaster risk reduction programs. To reduce the impacts of disasters, scientific forecasts can be a useful tool to prepare communities before disasters arrive. Forecasts and assessments of drought, flood and other extreme weather events can identify the hidden dangers of extreme weather and provide a theoretical basis for disaster prevention and mitigation. Impact-based forecasting provides the information needed to act before disasters and to minimise the socio-economic costs of weather and climate hazards. Organisations and individuals can make critical decisions to ensure that resources and supplies are in place to take early action and to respond as soon as it is safe to do so. Impact-based forecasting is one of the crucial elements of forecast-based humanitarian and financing systems. Being able to make use of the early warnings would mean saving lives and homes in a cost-effective manner. There are many actions that can be taken in the window between a forecast and a disaster, which can make the disaster much less devastating for communities in vulnerable areas.

We work on programmes that are context-specific, from disability inclusive preparedness to immediate life-saving needs to reconstruction

Aiming to address this issue, CBM and its partners, including JJA, are piloting a framework for Forecast-based financing (FbF). FbF is a strategy to enable anticipatory humanitarian action by releasing a pool of funds triggered by scientific forecasts of extreme weather events, such as droughts or floods. This approach allows humanitarian actors to act before disasters strike, and thus avoid suffering and losses by reducing risks and strengthening the resilience of the vulnerable communities. However, the challenge has often been that although forecasts

are available, it has not been possible to use them to effectively prepare humanitarian resources and take action, due to a lack of funding prior to the disaster. For the FbF system to allocate funding for early action in case of triggers, a certain probability of the extreme event taking place must be reached. To safeguard this, it is crucial to select the best-suited forecasts and risk analyses. Over the years, many agencies have invested in conducting extreme weather hazard risk and impact analysis. In Zimbabwe, the Meteorological Services Department are mandated to coordinate all matters relating to climate forecasts and extreme weather events and works closely with Zimbabwe Vulnerability Assessment Committee (ZimVAC) using a multi-sectoral approach to conduct vulnerability assessment in the country. Essential questions to answer in this analysis include:

- Which potential forecast products are available?
- Which is the most appropriate forecast product we can use?
- Which mandates exist using various products?

3 SCOPE AND OBJECTIVES OF THE CONSULTANCY

3.1 SCOPE

The objective of the study was to identify and analyze existing forecast-based financing mechanisms and social security systems in Zimbabwe. The results were used for identification of Standard Operating Procedures (SOPs) for preventative actions which reduce risks, enhance preparedness and response and mitigate impact of disasters. In this regard, the study aimed to consolidate recent extreme weather hazard risk and humanitarian impact analyses as well as to identify priority actions for the implementation of the FbA intervention(s). An analysis of existing forecasts, initiatives and systems, their verification, type, reliability, lead times, and sources of data for forecasts are presented as an inventory to inform the decision on which one to use.

Guiding Research Questions

i. What are the weather hazard risks in the country and the associated humanitarian impacts based on relevant identified indicators?

ii. What are the localized early actions based on identified risks?

iii. What is current status of FbF in Zimbabwe?

iv. What is the potential and opportunities within FbF in Zimbabwe?

v. What are the existing gaps in local FbF mechanisms in addressing the needs and capacities of persons with disabilities?

vi. What are the adequate forecast data sources and internal alert mechanisms?

vii. What are the thresholds and lead times provided by forecasts?

viii. What are the defining triggers of actions based on the thresholds and lead times provided by forecasts?

ix. How can FbF mechanisms be integrated into social protection systems?

x. What are the recommendations to the project for implementing FbF programming?

3.2 OBJECTIVES

3.2.1 General Objective

The main objective of the consultancy was to deliver a comprehensive analysis of comprehensive analysis of existing forecast-based financing mechanisms and social security systems in Zimbabwe and recommendations for implementing FbF programming.

3.2.2 Specific Objectives

Objective 1
To conduct an analysis of historic extreme weather hazard risks in the country and the associated humanitarian impacts based on relevant identified indicators.

Objective 2
To identify early actions based on identified risks.

Objective 3
To provide an inventory of existing forecast-based financing mechanisms and social security systems in Zimbabwe.

Objective 4
To identify the existing gaps in local FbF mechanisms in addressing the needs and capacities of persons with disabilities.

Objective 5
To identify forecast data sources, thresholds, lead times and internal alert mechanisms for FbF implementation in Zimbabwe.

4 EXPECTED PRODUCTS

1. An inception report, detailing consultant's understanding of the TORs, proposed methodology and the data collection tools to be used in the assignment
2. Final report detailing:
    a. Historical extreme weather hazard risks, and the associated humanitarian impacts in Zimbabwe
    b. Localized early actions based on identified risks
    c. The comprehensive analysis of the current status of FbF in Zimbabwe,
    d. The existing gaps in local FbF mechanisms in addressing the needs and capacities of persons with disabilities
    e. Recommendations of forecast data sources, thresholds, lead times and internal alert mechanisms for FbF implementation in Zimbabwe
3. Report of the results of the analysis for presentation at a technical validation forum on Forecast based Financing.

5 METHODOLOGY

The methodology involved a process beginning with a study to analyse extreme weather hazard risks, the associated humanitarian impacts in Zimbabwe, an inventory of existing FbF mechanisms in Zimbabwe, and ending with the submission of recommendations for implementing FbF programming in Zimbabwe. In the process an analysis of historic extreme weather events and their respective humanitarian impacts, the localized early actions based on identified risks, existing gaps in local FbF mechanisms in addressing the needs and capacities of persons with disabilities and a prioritization of the actions for FbF implementation based on the results of the analysis was provided. A multi-method approach was used, including analyses of historic weather data (precipitation and temperature) as well as a spatial analysis to assess and map the extreme weather hazard in the country, combined with expert and stakeholder consultations to determine the localized early actions based on identified risks, existing gaps in local FbF mechanisms in addressing the needs and capacities of persons with disabilities, recommendations of forecast data sources, thresholds, lead times and internal alert mechanisms for FbF implementation in Zimbabwe.

5.1 OVERVIEW OF EXISTING EXTREME WEATHER RISK ANALYSES AND METHODS IN ZIMBABWE

To describe and characterize the existing agricultural drought risk analyses and methods in Zimbabwe, literature review was conducted, particularly those related documents and publications from Meteorological Services Department (MSD), Department of Civil Protection, Food and Agriculture Organization of the United Nations (FAO), Zimbabwe Vulnerability Assessment Committee (ZimVAC) and other relevant research institutions dealing with Disaster Risk Reduction. Relevant actors from these organizations and experts from other relevant sectors were interviewed.

5.2 HAZARD EXPOSURE AND VULNERABILITY IN ZIMBABWE

A multi-method approach was used, including analyses of historic precipitation and temperature data to assess extreme weather hazards, as well as a spatial analysis of extreme weather risk in Zimbabwe to identify high-risk areas and provide a prioritization of vulnerable regions based on the results of the analysis, combined with expert and stakeholder consultations to determine vulnerability and exposure of vulnerable communities (including people with disabilities) in the identified hotspots.

5.2.1 Extreme Weather Events

A temperature anomaly is the departure from the average temperature, positive or negative, over a certain period (day, week, month or year). In this study, the normal average temperature was calculated over a period of 30 years (1981 - 2010) for each station. Temperature anomaly maps were then plotted to see areas that are vulnerable to extreme weather events (warm and cold spells).

5.2.2 Drought Analysis

Drought is defined as a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. Drought is a recurrent feature of climate change that occurs in virtually all climate

zones. Agricultural droughts were classified using Standardized Precipitation Index (SPI) data calculated from the monthly rainfall totals for each station ((Edwards and McKee, 1997, McKee et al., 1993, McKee et al., 1995, WMO, 2012). The SPI is an index that is used to provide assessment of drought severity and is based on the probability of the observed cumulative precipitation deviating from the climatological average for any time scale (1 month, 3 months, 6 months, 12 months, etc). The Standardized Precipitation Index (SPI) is a widely used index to characterize meteorological drought or abnormal wetness on a range of timescales. The SPI provides a comparison of the precipitation over

a specific period with the precipitation totals from the same period for all the years included in the historical record or for all the years in the reference period (1981 - 2010). SPI reflects the probability of recording a given amount of precipitation. The probabilities are standardized so that an index of zero indicates the average precipitation amount per year. Positive SPI values indicate greater than normal precipitation, and negative values indicate less than normal precipitation.

SPI for the years between 1981 and 2020 were calculated from rainfall data from 47 stations run by the Zimbabwe Meteorological Services Department across the country. The analysis was then used to produce drought prone map of Zimbabwe, and thus identify drought prone areas in the country. The meteorological drought map used the following classes over the 40 year period: Mild (15 - 20 drought years), Moderate (21-30 drought years) and Severe (31-40 drought years).

5.2.3 Flood Proneness

Flooding is defined as an overflow of water onto land that is normally dry. Flooding occurs due to heavy rains, tropical cyclones or rising dam or river levels that results in the destruction of crops and structures such as homes and other infrastructure. Data from the Zimbabwe National Water Authority (ZINWA) was used to produce flood prone map of Zimbabwe based on recorded frequency of floods over a 10 year period (2011 - 2020) and thus identify flood prone areas in the country.

5.2.4 Hazard Vulnerability Assessment

Vulnerability has been used in different contexts having various definitions depending on background (Nkem et al., 2013). Vulnerability encompasses a variety of concepts including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity" (IPCC, 2007). Therefore two closely tied sides of vulnerability have to be considered, the external side of risk shocks and stress and the internal side looking at the means of coping. The level of vulnerability is further defined in terms of the consequences that remain after adaptation has taken place. The factors that make a system vulnerable to a hazard depend on the nature of

the system and the type of hazard in question (Brooks et al., 2005). The factors determining vulnerability levels will vary from country to country and from region to region. Sensitivity in turn is described as the "degree to which a system is affected by or responsive to climate stimuli" (IPCC, 2001). The factors that make a rural community in semi-arid Africa vulnerable to drought will not be identical to those that make areas of a wealthy industrialized nation vulnerable (Brooks et al., 2005). The relationship may be expressed in the form of an equation as:

Vulnerability
= f(Hazard, Sensitivity, Adaptive Capacity) (1)

In this study, a portion of the Intergovernmental Panel on Climate Change (IPCC) definition which define vulnerability as the degree to which the country is susceptible to the adverse effects of climate variability, change and extremes (IPCC, 2013) was considered. Vulnerability is a complex measure and therefore cannot easily be reduced to a single metric but should be done credibly so as to inform policies and to mitigate against increased climate change variability and change (Füssel and Klein, 2006).

Hazard or exposure can be interpreted as the direct danger (i.e., the stressor), and the nature and extent of changes to a region's climate variables (e.g., temperature, precipitation, extreme weather events). This study focused mainly on climatic variables and the associated effects. Sensitivity describes the human–environmental conditions that can worsen the hazard, ameliorate the hazard, or trigger an impact. Adaptive capacity represents the potential to implement adaptation measures that help avert potential impacts.

In order to understand the nature of vulnerability of people living with disability in the country, elements of vulnerability as given in equation (1) were analysed using a Hazard Vulnerability Assessment (HVA) matrix. Exposure to hazards is often reflected in the frequency of occurrence of the hazards. A Hazard Vulnerability Assessment matrix is a conceptual and communicative tool to condense these complex phenomena into a visual summary that flags possible areas for policy action. The Matrix was intended to support prompt identification of critical and emerging vulnerability elements.

To gather the necessary information in relation to extreme weather vulnerability and exposure of vulnerable communities, a survey method was used. This methodology entails the use of questionnaires and key informant interviews to gather the opinions of participants on extreme weather risk, vulnerability and its impacts in different settings. Informants were selected from those stakeholders and socioeconomic subsectors of interest whose opinions related to the vulnerability and exposure of people with disabilities was seen as important in developing a methodology for establishing an anticipatory humanitarian action mechanism (Forecast-based Financing/FbF) to address imminent risks of insecurity in Zimbabwe. The target audience of the study are the involved partners as well as external stakeholders at national, regional and global level working on Disability inclusive Disaster Risk

Reduction (DiDRR), including:

1. Staff from national/regional organizations for Persons with Disabilities (OPDs)
    a. National Association of Societies for the Care of the Handicapped (NASCOH)
    b. Federation of Organizations Disabled People in Zimbabwe (FODPZ)
    c. National Council of Disabled Persons of Zimbabwe (NCDPZ)
    d. Centre for Humanitarian Analytics
    e. Zimbabwe Albino Association
    f. Epilepsy Foundation
    g. Zimbabwe Association of the Visually Impaired (ZAVH)
    h. Quadriplegics and Paraplegics Association of Zimbabwe (QUAPAZ)
    i. Leonard Cheshire Disability Zimbabwe
    j. Deaf Zimbabwe Trust
    k. National Disability Board
    l. Senator for Disability
    m. ZIMCARE TRUST
2. Staff from agencies that are responsible for DRM:
    a. Department of Civil Protection
    b. Zimbabwe Meteorological Services Department
    c. ZimVAC
    d. Department of Social Welfare (Ministry of Public Service, Labour and Social Welfare)
    e. ZINWA
3. Staff from FbF Actors (Organizations that are already implementing FbF)
    a. WFP (FoodSECuRE Facility)
    b. FAO (Early Warning Early Action Approach)
    c. WHH
    d. World Vision
    e. Red Cross

A semi structured interview/questionnaire tool (Appendix A) was developed for the purpose of collecting data from these organizations and individuals. Remote or face to face key informant interviews were conducted on the above target groups. Topics related to extreme weather events and its impact on different communities and for different needs were discussed. The participants were guided to identify the vulnerability and exposure in the communities of their constituencies and the levels of severity and frequency by which they have been affected by extreme weather during the past few years. Assessments of high-risk areas, combined with an analysis of the drivers of risk were done in order to identify high risk areas in terms of extreme weather frequency and severity, exposure, and vulnerability.

5.3 POSSIBLE EARLY ACTIONS

The possible early actions to be taken in order to reduce the impact of the identified hazards were investigated through key informant interviews. This allowed the identification of localized early actions based on identified risks.

5.4 HAZARD FORECASTING

An analysis of existing hazard forecasts, initiatives and systems, their verification, type, reliability, lead times, thresholds and sources of data for forecast-based financing was done as an inventory to inform the decision on which forecast and risk analyses perform best in Zimbabwe. Based on these findings, the best model(s) of FbF was identified. This information was derived from key informant interviews with agencies responsible for DRM and FbF actors (Organizations that are already implementing FbF) in the country mentioned in 5.2.4 above.

5.5 INSTITUTIONAL CAPACITIES AND PROCESSES

The study investigated the technical, economic and institutional challenges to scaling up FbF in Zimbabwe. Taking a qualitative approach, the structures and policies around disaster management in the country were examined, including options for financing and the forecasting infrastructure and dissemination systems.

5.6 FINANCING

Through the KII, the study investigated whether institutions have guidelines on financial mechanisms targeted at the challenged groups, and how the funding is distributed among the different challenged groups.

5.7 SOCIAL PROTECTION

The participants were consulted on whether there are safety nets targeting people living with disabilities in the country, the source of the funding for these and the sort of relief the institutions offer the disabled communities.

6 RESULTS

6.1 HAZARD EXPOSURE AND VULNERABILITY IN ZIMBABWE

6.1.1 Historical Climate

The country experiences its rainy season along with relatively high temperatures from October to March; and its dry season with low temperatures from June to August. After the dry and cold season, the average temperature peaks around October or November. As shown in Figure 1, the mean monthly temperature of the country ranges between 15 °C and 25 °C, for the reference climatology period (1981 – 2010). During the same time period, the mean monthly precipitation of the country varies from 2 mm to 160 mm, resulting in an annual average rainfall of roughly 630 mm.

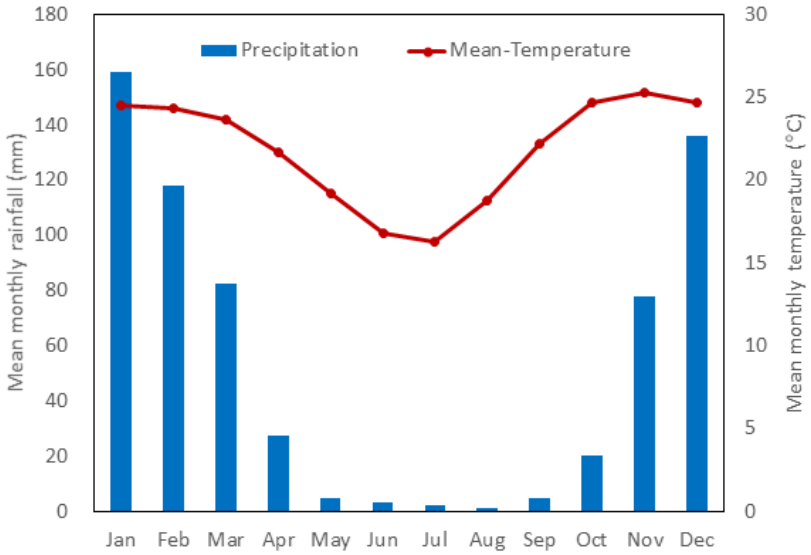
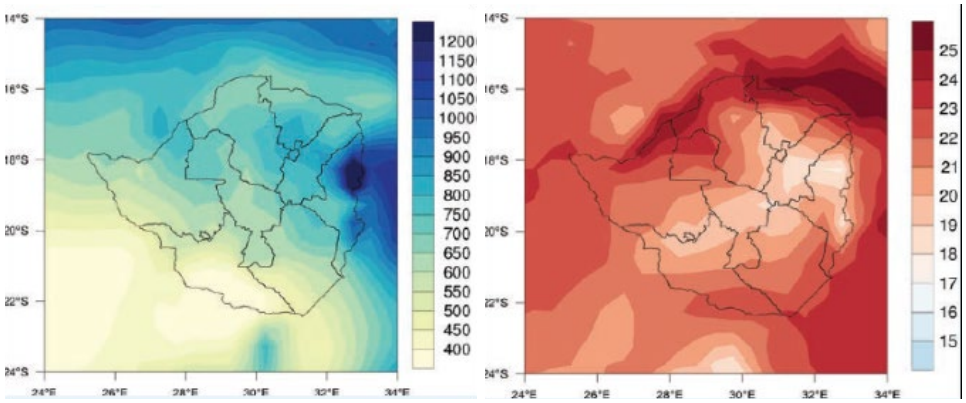


Figure 1: Observed climatology of mean monthly temperature and mean monthly rainfall for Zimbabwe (1981 – 2010)

Total annual rainfall varies at both temporal and spatial levels. Figure 2 shows maps of average annual rainfall (left) and annual temperature (right) for Zimbabwe.

Figure 2: Observed climatology of mean annual rainfall (left) and mean annual temperature (right) for Zimbabwe (1981 -2010)



The northern and southern parts of the country experience warm temperature compared to central and eastern areas. On average, southern Zimbabwe receives less rainfall (300 – 500 mm) than the northern (700 – 1000 mm) and eastern (above 1000 mm) parts of the country. The high-elevation areas in the east and the highveld are generally cooler than the lower areas. Average annual temperature ranges between 18°C and 22°C for the higher areas (or central and eastern areas) and between 22°C and 25°C for the lower areas (southern and northern areas).

Figure 3 and Figure 4 show the trends in mean annual temperature and precipitation in the past decades. Mean annual temperature has increased by roughly 0.03°C/year from the 1970s to 2020. The impact of the warming trend on the intensification of the droughts was more prominent during the January to March period and has put stress on agricultural and water sectors, which are keys for economic growth. On the other hand, the country has experienced a decreasing trend of mean annual rainfall in the past decades. As shown in Figure 3, rainfall has declined by approximately 1.2 mm/year from 1970 to 2020. Late onset and early season cessation of the rainy or growing season has been observed for all the agro-ecological regions.

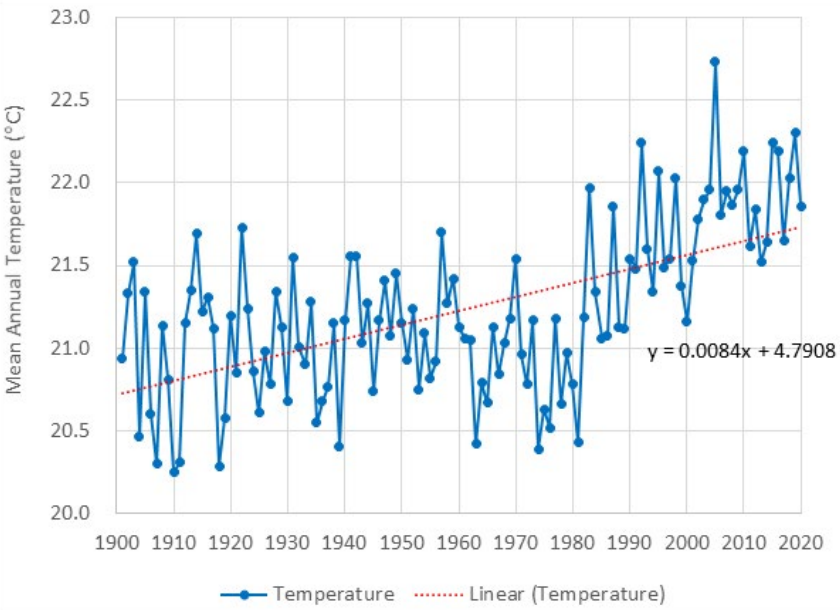


Figure 3: Mean annual temperature trends in Zimbabwe (1901 - 2020)

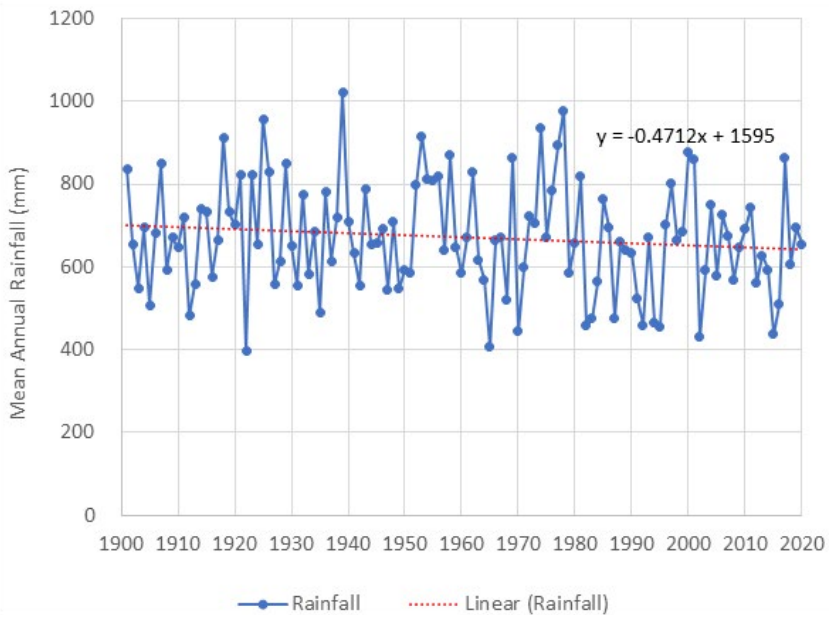


Figure 4: Mean annual rainfall trends in Zimbabwe (1901 - 2020)

6.1.2 Hazard Mapping

6.1.2.1 Major Shocks and Hazards in Zimbabwe

Table 1 shows the major shocks and hazards nominated/highlighted by the stakeholders for inclusion in this study and their relative threat (risk) from analysis of the vulnerability assessment matrix.

HAZARD	RELATIVE THREAT
Droughts	61%
Flood (riverine/flash)	33%
Extreme weather	30%
Tropical Cyclone	26%
Temperature Extremes	22%
Severe Thunderstorm	22%
Wild Fire	15%
Landslide	7%
Earthquake	7%

Table 1: Major shocks and hazards nominated by stakeholders

6.1.2.2 Drought

Agriculture is the most important economic sector in Zimbabwe, contributing to about 70% of the employment and 13% of the annual GDP (). However, recent productivity has been decreasing, particularly for small grains and maize crops. Erratic rains, drought, mid-season dry spells and other negative effects on agriculture combine to cause crop and livestock price changes. The prices changes are often a threat to livelihoods since they lead to unaffordability of food when they are high and a reduction in income when they are low.

Other factors causing low agricultural productivity in rural areas include lack of support services and credit as well as limited access to inputs such as seeds and fertilizer. Agriculture in Zimbabwe is particularly vulnerable to droughts, which occur regularly and are expected to increase in coming years due to climate change. Figure 5 shows the normalized rainfall anomalies calculated from rainfall records between 1981 and 2020.

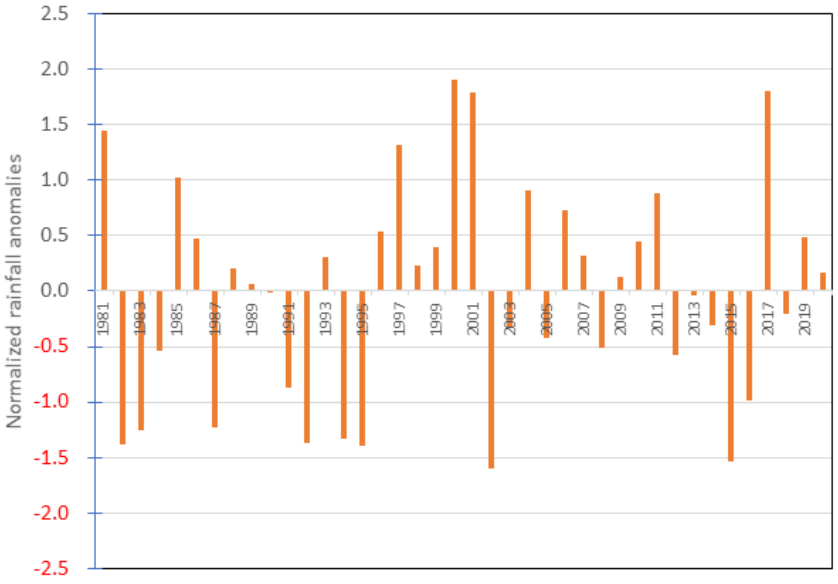


Figure 5: Normalized rainfall anomalies for Zimbabwe (1981– 2020)

The last 30 years have shown a trend towards reduced rainfall or heavy rainfall and drought occurring back-to-back. Table 2 shows the characterisation of years according to rainfall records.

CRITERIA	RAINFALL ANOMALY	NO. OF YEARS
Extremely wet year	Above +2.0	0
Wet year	Between +1.0 and +2.0	6
Normal	Between -1.0 and +1.0	26
Dry year	Between -2.0 and -1.0	8
Extremely dry year	Less than -2.0	0

Table 2: Characterisation of years (1981 to 2020) according to rainfall records

Durations and intensities of the drought years that occurred in the country were obtained from analyses of the SPI. The criteria for a drought event for any of the timescales was defined according to McKee et al. (1993). A drought event occurs any time the SPI is continuously negative and reaches an intensity of -1.0 or less. The event ends when the SPI becomes positive. Each drought event, therefore, has a duration defined by its beginning and end, and an intensity for each month that the event continues. The positive sum of the SPI for all the months within a drought event can be termed the drought's "magnitude" or "intensity". Three-month and 6-month SPI time series computed for the country show recent significant droughts in the 1982/3, 1987/88, 1991/2, 2002/3 and 2015/6 seasons. The 1982/3 and 1991/2 droughts were very severe and had a substantial negative impact on the country.

The effects were manifested in severe water and food shortages and death of livestock. From the results, on average mild to severe dryness occurs once in 3 years virtually in all climate zones of Zimbabwe. However, from rainfall anomalies across the country, some areas experience these dry conditions more often than the others (Fig. 6).

6.1.2.3 Mid-Season Dry Spells

Dry spells are defined as prolonged periods of dry weather of at least ten consecutive days that happen after the onset of the wet season. A mid-season dry spell is described in terms of its length expressed in days and the frequency of occurrence. Its impact is directly related to the length and time of occurrence and therefore scores can be treated as one combined score. The 5-point scale shown in Table 3 was used to map the risk of mid-season dry spells starting from the third week of January (1981 – 2020).

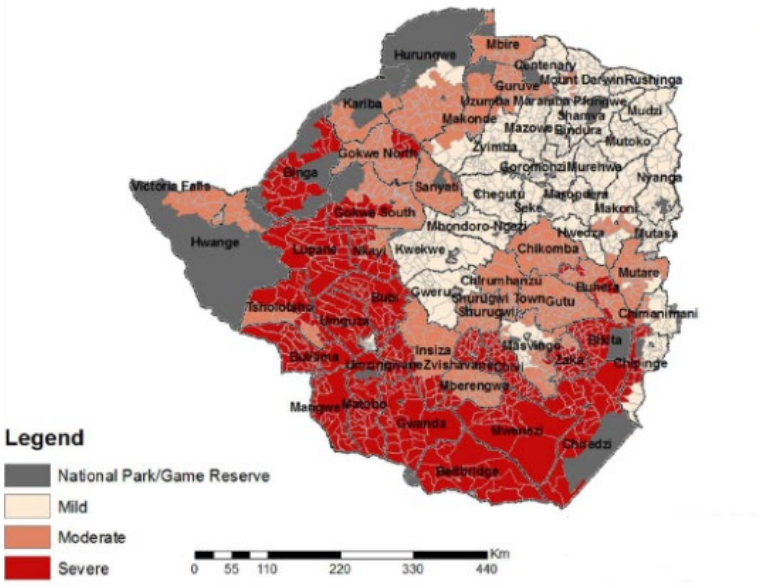


Figure 6: The map of drought proneness in Zimbabwe

RISK	DURATION OF DRY SPELL
None	0 -10 days
Low	11 -14 days
Medium	15 -21 days
Medium high	22 -31 days
High	> 32 days

Table 3: The 5-point scale used to map proneness of the country to dry spells

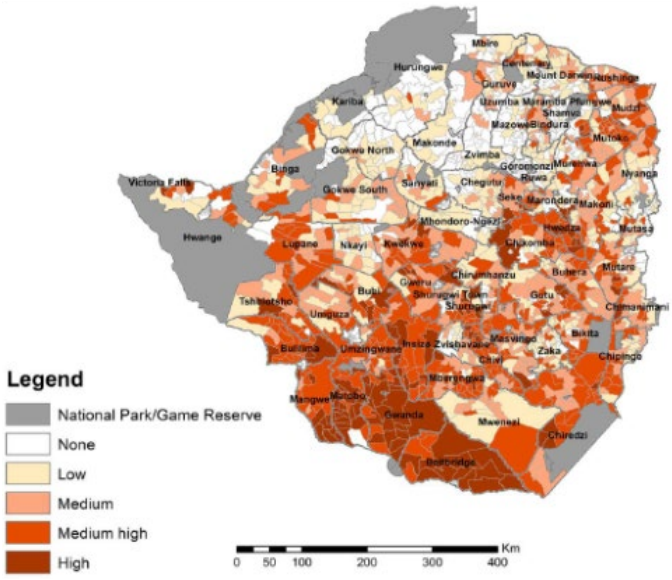


Figure 7: The map showing the risk of dry spells in the country

6.1.2.4 Flooding

Flooding is defined as an overflow of water onto land that is normally dry. Flooding occurs due to heavy rains, tropical cyclones or rising dam levels that results in the destruction of crops and structures such as homes and other infrastructures. The scoring of the flood prone map of Zimbabwe was based on recorded frequency of floods over a ten year period (2011 – 2020) based on data from the Zimbabwe National Water Authority (ZINWA). The scoring was as shown in Table 4. Figure 8 shows the risk of flooding in Zimbabwe with highest risk over the northern areas, Beitbridge and some parts of Tsholotsho District.

FLOOD INCIDENCES	RISK
No recorded incidences of flooding	None
1 to 3 incidences of flooding	Low
3 to 5 incidences of flooding	Medium
More than 5 incidences of flooding	High

Table 4: Scoring used to map flood risk

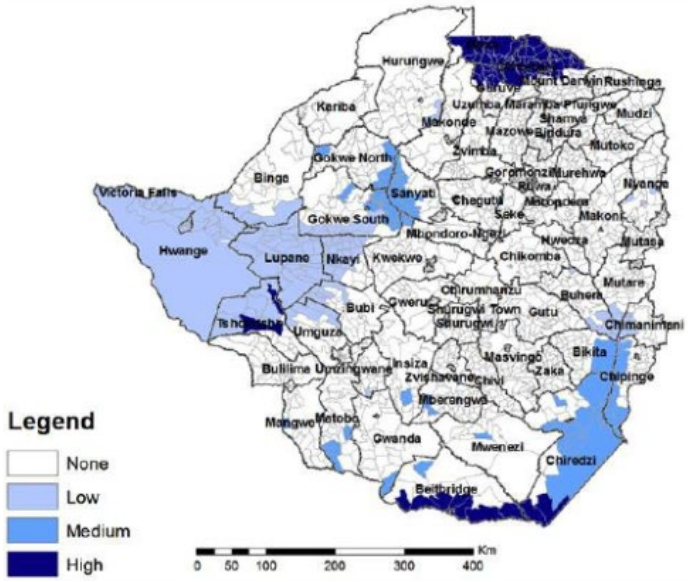


Figure 8: The map of flood risk in Zimbabwe

6.3 Possible Early Actions

The possible early actions to be taken in order to reduce the impact of the identified hazards were investigated through key informant interviews. Early actions that can be prioritised during an impending crisis include evacuation, provision of shelter, provision of food and clothing and provision of cash transfers to purchase affected people's needs.

Table 5 gives some examples of possible early actions for the main hazards.

Table 5: Possible Early Actions

HAZARD	CHARACTERISTICS	POSSIBLE EARLY ACTIONS
Drought	Uses a community's seasonal cropping calendar and operational context, to develop a menu of anticipatory actions that the food security sector can implement ahead of a drought.	**3 – 6 MONTHS LEAD TIME** 1. Asset creation programmes can focus on the rehabilitation of water points or construction of irrigation infrastructure. 2. Vulnerable smallholder farmers can be trained on alternative agricultural practices and livelihood options, 3. Farmers provided with access to drought-resistant seeds that will guarantee them a harvest in case the rains come too late or fail completely. **1- 3 MONTHS LEAD TIME** 1. Communication of early warning information to vulnerable populations, 2. Cash transfers for the purchase of agricultural or other inputs. **1 MONTH LEAD TIME** When the probability of a disastrous drought is highly certain, nutrition and food distribution programmes can be scaled up to avert the worst of impacts and prevent people from resorting to negative coping strategies in the following lean season.

HAZARD	CHARACTERISTICS	POSSIBLE EARLY ACTIONS
Floods	Personal safety is the most important consideration during a flood. Since floodwaters can rise very rapidly, people should be prepared to take action before water reaches them or your property.	**BEFORE A FLOOD** To prepare for a flood, communities should: 1. Build an emergency kit and make a community communications plan. 2. Avoid building in a floodplain unless the building is elevated and reinforced. 3. Elevate the furnace, water heater and electric panel in areas that have a high flood risk. 4. Consider installing "check valves" to prevent flood water from backing up into the drains. 5. If feasible, construct barriers to stop floodwater from entering buildings and seal walls in basements with waterproofing compounds. 6. Identify safe zones and conduct drills with the community members. **DURING A FLOOD** If a flood is likely in an area, communities should: 1. Listen to the radio or television for information. 2. Pay attention to local signals given during floods events 3. Be aware that flash flooding can occur. If there is any possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move. 4. Be aware of stream, drainage channels, canyons and other areas known to flood suddenly. Flash floods can occur in these areas with or without typical warnings such as rain clouds or heavy rain. 5. If you must prepare to evacuate, you should do the following: 6. Secure your home. If you have time, bring in outdoor furniture. Move essential items to an upper floor. 7. Turn off utilities at the main switches or valves if instructed to do so. Disconnect electrical appliances. Do not touch electrical equipment if you are wet or standing in water. **AFTER A FLOOD** Although floodwaters may be down in some areas, many dangers still exist. The following are some things to remember after a flood: 1. Avoid moving water. 2. Stay away from damaged areas unless assistance has been specifically requested by police, fire, or relief organization. 3. Play it safe. Additional flooding or flash floods can occur. Listen for local warnings and information. It is always safe to climb to higher ground. 4. Return home only when authorities indicate it is safe. 5. Roads may still be closed because they have been damaged or are covered by water. If barricades have been placed upon a barricade or a flooded road, go another way. 6. Stay on firm ground. Moving water only 6 inches deep can sweep you off your feet. Standing water may be electrically charged from underground or downed power lines. 7. Flooding may have caused familiar places to change. Floodwaters often erode roads and walkways. Flood debris may hide animals and broken bottles, and it's also slippery. Avoid walking or driving through it. 8. Be aware of areas where floodwaters have receded. Roads may have weakened and could collapse under the weight of a car. 9. Stay out of any building if it is surrounded by floodwaters. 10. Use extreme caution when entering buildings; there may be hidden damage, particularly in foundations.

HAZARD	CHARACTERISTICS	POSSIBLE EARLY ACTIONS
Storms	Evacuation	Stay inside and keep away from all windows, skylights and glass doors. Go to a safe area, such as an interior room, closet or downstairs bathroom. Never go outside the protection of your home or shelter before there is confirmation that the storm has passed the area.

6.4 EXISTING FORECAST-BASED ACTION MODELS AND CAPACITIES

A number of organisations provide support for actions taken in the event of disasters, including:

1. Red Cross and Red Crescent Movement
2. World Food Programme (WFP)
3. Start Network
4. Food and Agriculture Organization (FAO)
5. Zimbabwe Resilience Building Fund (ZRBF)
6. World Vision
7. UNICEF

Before discussing the possible applicability of FbF for Disability inclusive Disaster Risk Reduction (DiDRR), it is important to examine the current state of FbF and its existing application in situations of natural disaster, famine, and political crisis. Currently, three institutions have fully developed or are in the process of developing FbF mechanisms: The Red Cross and Red Crescent Movement, the Start Network, and the United Nations, within which there are four different FbF models in development or operation. Beginning with the best documented FbF tools, we will describe each model and their associated funding mechanisms. This information was derived from literature and key informant interviews with agencies responsible for DRM and FbF actors (organisations that are already implementing FbF) in the country.

6.4.1 Red Cross and Red Crescent Movement FbF mechanism

The largest and most prominent actor within the FbF space is the Red Cross/Red Crescent Movement. The FbF mechanism connects humanitarian practitioners with scientists and meteorological agencies to adopt joint early action protocols (EAPs) based on defined danger thresholds to automatically disburse funding and stage early actions before disaster strikes. Successfully implemented FbF mechanisms – put in place at the level of national Red Cross societies – pull funding from the Disaster Relief Emergency Fund (DREF) housed at the headquarters of the IFRC in Geneva Switzerland (Forecast-based Action by the DREF, 2018). To understand the mechanism, it is useful to examine its seven-step design (Figure 10).

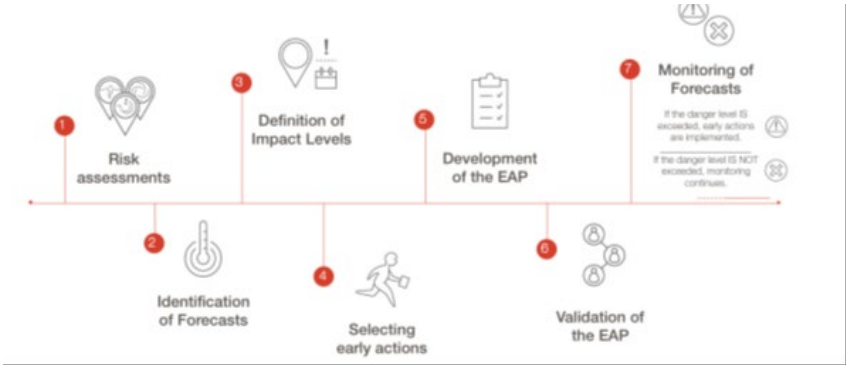


Figure 10: The seven steps of an FbF mechanism's development. (Forecast-based Financing: A New Era of Disaster Relief, 2018, p. 2).

In the initial step of an FbF mechanism's design, a specific extreme weather event and at-risk geographic area are selected. Once the potential disaster is selected, the implementing National Society (often in partnership with Partner National Societies) carries out an extensive context analysis to identify the

vulnerability and exposure of local populations to the selected disaster, relevant features of the environment, and local stakeholders and potential partners (Forecast-based Financing: A New Era of Disaster Relief, 2018). Subsequently, and in collaboration with meteorological agencies and scientists, the capacity of local forecasts is reviewed, gaps are identified, lead times are estimated, and information is collected on what forecasts are most useful for the project's aims. Once the forecasts are agreed upon, danger levels corresponding with the severity of the forecasts and their expected damage are set as "trigger" points at which early actions should be undertaken. Next, all involved groups determine what early actions are appropriate at each "trigger" point, examining their feasibility and humanitarian impact. The combination of assessments, forecasts, impact levels and early actions are then compiled into the EAP, which must be approved by all partners (National Society, local and national government, meteorological agencies) and IFRC headquarters. Once the EAP is approved, the FbF mechanism is considered to be in effect, forecasts are monitored and if a danger level or "trigger" is reached, funding is disbursed automatically from the DREF and early actions are staged.

The Zimbabwe Red Cross Society (ZRCS) FbF project in Zimbabwe was co-funded by Danish Red Cross and Finnish Red Cross and implemented by ZRCS. The project was initiated in 2019 (when feasibility studies when done) and runs until July 2022. It targets 3000 to 4000 households in Wards 7,8,9,10 and 13 (Manjolo, Simatelele, Siachilaba, Siansundu and Saba) of Binga District. The project is focused on mitigating the effect of drought by putting in place early warning and early/ anticipatory action system that enables ZRCS in partnership with Government institutions to act early. The project has started by developing pre-funded Early Actions triggered by Meteorological forecasts to mitigate the impacts of drought on vulnerable rural populations.

6.4.2 World Food Programme (WFP)

The Red Cross FbF tool has been adopted by other organizations as well, including the World Food Programme, which is implementing an innovative Forecast-based Financing (FbF) approach called the FoodSECuRE facility in several countries to close the humanitarian funding gap, support communities in the mitigation and management of climate risks and reduce losses and damages in the livelihoods of people who are faced with increasing climate extremes. FbF enables anticipatory actions for disaster mitigation at the community and government level using credible seasonal and weather forecasts. These forecasts are linked to predetermined contingency plans, actors and funding instruments which are used to reduce the humanitarian caseload in the critical window between a forecast and an extreme weather event. This mechanism is changing the way the humanitarian system responds to climate-related disasters: it complements the existing readiness of humanitarian actors to respond to humanitarian needs with an anticipatory system to reduce the scale of these needs before they materialize. FoodSECuRE is "a multilateral, multi-year, replenishable fund" that brings together forecasting and flexible funding to mitigate the effects of droughts, floods and storms and their associated after-effects including crop failure and livelihood disruptions (WFP, 2015; WFP, n.d.). The mechanism seeks to make funding available before the onset of disaster and throughout its potentially long-term aftermath, providing multi-year funding and expertise to improve community resilience to climatic shocks and livelihood disruptions (FoodSECuRE, n.d.). FoodSECuRE, like the Red Cross FbF, relies on long-term and short-term forecasts to "trigger" the disbursal of funding to stage new programs or scale up existing programs, sometimes with a months-long lead time to the onset of the disaster. The FoodSECuRE mechanism is divided into three phases, to encompass the full disaster cycle, from pre-disaster to post-disaster phases (Fig 11).

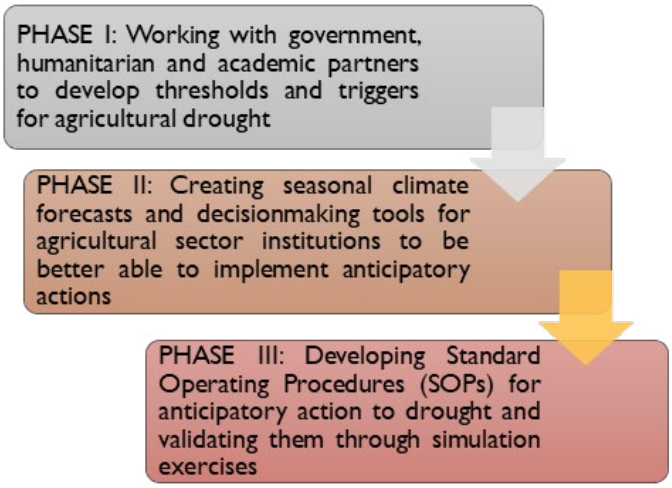


Figure 11: Activities involved in the WFP FbF approach

Phase I utilizes climate forecasts tied to specific "triggers" to stage resilience-building activities at the community level (Food Security Climate Resilience Facility, n.d.). Phase II is activated in the immediate aftermath of a climate disaster, acting in chorus with government responses (Food Security Climate Resilience Facility, n.d.). Finally, Phase III aims to improve resilience in the aftermath of disaster with predictable, long-term funding of activities focused on food and nutrition (Food Security Climate Resilience Facility, n.d.). Although it uses a similar "trigger" mechanism to automatically disburse

funds, FoodSECuRE is distinct from FbF in its ability to address slow-onset disasters with months of lead time and its focus on multi-year funding and resilience. While this is surely within the reach of the FbF mechanism, current FbF pilot projects address disasters with shorter lead times such as floods and heat waves. FoodSECuRE benefits from the slow-onset nature of events like drought, the availability of numerous indicators that can predict crop failure and deterioration in food security, as well as the large pre-existing presence of the WFP in many drought and famine-prone regions of the world. WFP has implemented FbF for flood and drought risk management in Latin America and Asia and while it has only started the programme recently (2019) in Africa. These case studies demonstrate how it has been implemented and also explore Fbf sustainability and integration with other disaster risk financing tools. Figure 9 shows the key activities of the FbF approach.

6.4.3 Start Network: Start Fund Crisis Anticipation Window (CAW)

The Start Network is a consortium of more than 40 non-governmental organizations, including major organizations such as Save the Children, Mercy Corps, CARE International and Oxfam, among others. At the core of the Network's vision is a system in which funding will be dependable and predictable, based on humanitarian need" Toward this end, the network designed the Start Fund, a pooled fund supported by various European governments and the European Commission, to serve as a fast-action mechanism responding to small or medium scale crises lacking sufficient funding, sudden deteriorations in chronic emergencies, and to stage early actions (Start Network, 2015).

The Start Fund has a wider scope than FbF and includes more traditional post-disaster response actions. Housed within the Start Fund is the Crisis Anticipation Window (CAW), the Fund's FbA mechanism. To date, the CAW is used to respond to six types of disasters, namely drought, floods, heat waves, hurricanes and typhoons, disease outbreaks, and displacement caused by conflict (Start Fund: Guidance, n.d.). To activate the CAW, a member NGO must issue an alert of an impending humanitarian crisis to the Start Network (Start Fund Anticipation Window, 2016). A group of experts organized by the Start Network reviews the alert using a combination of third-party analysis and input from member organizations (Start Fund Anticipation Window, 2016). A decision to activate the fund is issued within one day, at which point Start Network members can submit project proposals to address the crisis (Start Fund Practical Guide, n.d.). Organizations present in the disaster-affected country review the proposals, which are scored using preset criteria, and select which projects to fund (Start Fund Anticipation Window, 2016). The fund aims to disburse funding within 72 hours of an alert (Start Fund Practical Guide, n.d.).

Figure 12: The Start Fund alert cycle (Start Fund Handbook, 2017, p. 11).

The design of the Start Network's CAW is quite different from the FbF model in two main ways. First, the CAW does not include a "trigger"mechanism. Disbursal of funding is contingent on a time-bound review at institutional and country levels. While this more flexible model allows for consideration of a wider range of factors and situations meriting humanitarian response but might sacrifice some of the speed offered by an automatic and pre-agreed trigger. Second, the design of the CAW allows for the network to respond to humanitarian emergencies other than extreme weather events. Because the fund is not tied solely to meteorological forecasts, the early warning or forecasting aspect of the CAW must rely on a mixed methods approach more akin to current CEW.

6.4.4 Welthungerhilfe FbA Zimbabwe

The Start Network is currently exploring the potential adaptation of the FbF model for its member network with pilot projects in Zimbabwe and Kenya in collaboration with the German NGO Welthungerhilfe, and a collection of local organizations

(Start Fund Crisis Anticipation Window, 2017). Welthungerhilfe's FbA programme with technical support by the Start Network has the aim of enabling Start Network members in Zimbabwe to get ahead of droughts by building a scientific model that predicts droughts, allocating funding to Early Action Protocols (EAPs), and implementing Early Actions that limit the damage caused by severe droughts and protecting livelihoods through preventative action. WHH developed this approach over the past 3 years in Madagascar and are now scaling and adapting it to Zimbabwe and Kenya. The approach appoints Start Network member organisations in Zimbabwe as EAP Custodians. The EAP Custodians will collaborate in the development and implementation of EAPs. The WWF FbA project seeks to address drought induced food insecurity in Zimbabwe and is still in the process of identifying the study areas. The project completed a Drought Hazard Risk and Humanitarian Impact Analysis and Inventory of Forecast Models study in Zimbabwe in March 2021 and will soon be developing and implementing the EAPs in the identified study areas.

6.4.5 Food and Agriculture Organization: Early Warning Early Action (EWEA)

The FAO's Early Warning Early Action (EWEA) mechanism, focuses on agricultural productivity and food security at global and national levels, and uses internal and external analyses and forecasts to stage anticipatory actions (FAO, 2016). The EWEA is primarily concerned with food security and, in collaboration with "national government and humanitarian, development and scientific partners" monitors natural disasters, plant and animal diseases, drastic changes in food prices, and conflict trends for their impact on food security (FAO, 2016; Early Warning Early Action, 2019). Like FbF, the EWEA uses a system of agreed upon "triggers" to rapidly release funding and take anticipatory actions from a dedicated Early Action Fund within the organization's larger and well established Special Fund for Emergency and Rehabilitation (SFERA). Unlike FbF, which uses localized forecasts FAO's FbA approach "harnesses information systems at global, regional and local levels to forecast potential disasters and safeguard critical agriculture and food security assets" (Early Warning Early Action, 2019). EWEA's attention to such a diverse set of indicators and information sources – economic, meteorological, epidemiological, etc. – sets it apart from its fellow FbA mechanisms and speaks to the larger institutional capacity and steadier multi-year funding available to the FAO in comparison to other organizations.

6.4.6 The Zimbabwe Resilience Building Fund (ZRBF)

The Zimbabwe Resilience Building Fund is a long-term development initiative with an overall objective of contributing to increased capacity of communities to protect development gains in the face of recurrent shocks and stresses enabling them to contribute to the economic development of Zimbabwe. This objective will be reached through multi-stakeholder implementation of three interlinked multi-sectorial outputs, namely:

i. Application of evidence in policy making for resilience increased. This will mainly be done by

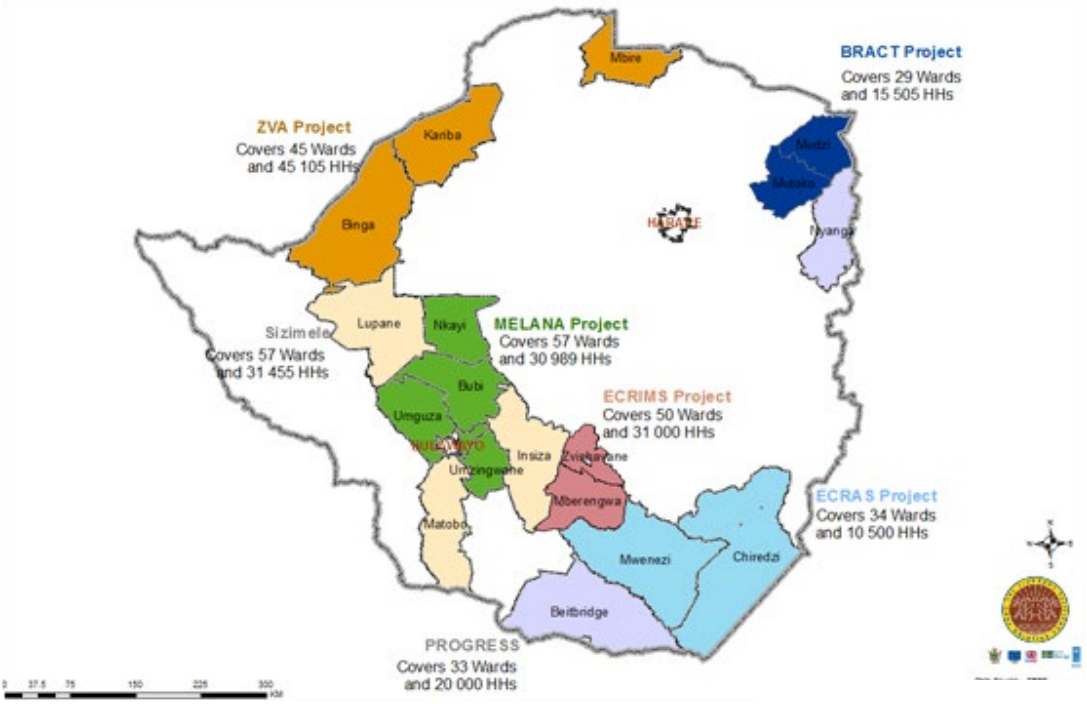


Figure 13: The ZRBF project areas

setting up an independent base of evidence for programme targeting and policy making (including M&E) and promoting capacity assessment and building of central and local government partners to improve application of evidence

ii. Absorptive, adaptive and transformative capacities of at-risk communities increased and improved. This will be pursued via the setting up of Multi Donor Fund which will allow partners to come together around the Resilience Framework and principles to improve adaptive, absorptive and to a certain extent transformative capacities of the targeted communities.

iii. Timely and cost effective response to emergencies rolled out via existing safety net and other relevant programmes. These will be achieved by setting up a risk financing mechanism which will provide appropriate, predictable, coordinated and timely response to risk and shocks to benefitting communities, from a resilience perspective.

The Fund also supports national surveys critical for resilience programming such as livelihoods and vulnerability assessments, poverty surveys and agriculture related surveys.

6.4.7 The Existing Gaps in Local FbF Mechanisms in Addressing the Needs and Capacities of Persons with Disabilities

Persons with disabilities are not a homogenous group, and include people with physical disabilities, vision disabilities, hearing and speech disabilities, cognitive disabilities, and psychosocial disabilities, among many others. Moreover, people with similar disabilities may experience common barriers in different ways, and some barriers may equally affect people with very different disabilities. These barriers can be physical, informational, and communicational in nature and can involve legislation, regulation, policy, and attitudes.

In terms of the evidence gathered in this study from interviews with staff from Zimbabwe Red Cross Society, WHH and WFP FbF programmes, the majority of FbF mechanisms do not yet have comprehensive guidelines for the inclusion of persons with disabilities in beneficiary selection. At present there is no way to readily identify FbF projects or mechanisms that are disability-inclusive. Consequently, there is no way to benchmark the degree to which these mechanisms are disability-inclusive, nor measure the extent to which the mechanisms can be described as "disability informed," and/or including "disability actions,". Most of the projects are still in the process of developing these guidelines. For example, ZRCS only had their first Beneficiary Selection Criteria Consultative Workshop in Binga on 6 October 2021. The aim of the workshop was to engage district level stakeholders on the best-fit beneficiary selection criteria and to articulate the early and anticipatory actions that the project will seek to undertake. WHH are yet to hold such consultations although they have developed a framework for beneficiary selection and targeting. Generally, the guidelines refer to beneficiary selection based on vulnerability assessments using vulnerability indicators and community ranking and the formation of an Advisory Committee, in the case of ZRCS or in the case of WHH, Early Action Protocols (EAPs) custodians comprised of Start Network member organisations in Zimbabwe. The Advisory Committee and EAP Custodians will collaborate with the FbF partners in the development and implementation of the FbF approach and early action plans. However, there is no mention of inclusion or consultations with people with disability in the guidelines or following general principles of disability inclusion, engagement with OPDs, and applying universal disability inclusive design principles.

The major gaps in the guidelines of local FbF mechanisms in addressing the needs and capacities of persons with disabilities include:

i. FbF mechanisms have mostly been developed with a top-down approach. There is need for a bottom-up approach and fusion of ideas on how the disability groups need to be assisted with information being provided by the affected. The groups can provide information on plausible models of implementation.

ii. Lack of guidelines on how disability will be incorporated into the criteria for the selection of households that receive support;

iii. Absence of information on how databases of disabled persons and their locations will be generated and maintained;

iv. Absence of statistics on the targeted disability groups and numbers affected;

v. Lack of disaggregated data on interventions according to disability groups;

vi. Lack of data on impacts of climate shocks/extremes on different disability groups based on their vulnerabilities and capacities.

vii. Lack of anticipatory action targeted at persons with disabilities in FbF models.

viii. No clear information in the beneficiary selection guidelines on how the different disabled groups will actually be targeted and helped (the chain of actions), who should help them, lead times, actual actions taken based on disaster, and expected response of affected.

ix. No plan of drills to be done, no early warning

information targeted at persons with disabilities, and appropriately packaged disability inclusive early warning information;

x. Absence of a local FbF/FbA community of practice or plans to form one. Currently, the different players in FbF/FbA are acting in isolation and with no plans to complement each other or share experiences.

6.5 SOCIAL PROTECTION

The 2021 Sustainable Development Review Report shows that 72.3% of Zimbabwe's population were living in poverty, and 22.5% were food poor or extremely poor (Sachs et al. 2021). The same report found that poverty was much more prevalent in rural areas (84.3%) than urban areas (46.5%). The frequency and intensity of natural disasters, especially droughts, floods and storms, have been observed to increase over the past decades. These natural disasters are predicted to further increase as a consequence of climate change and will affect vulnerable communities, particularly people with disabilities much more than people without disabilities. For people with disabilities, the following issues may be of particular concern

- In comparison to their non-disabled peers, persons with disabilities can be more at risk during disasters
- Persons with disabilities can have greater difficulty in accessing basic needs, including food, water, shelter, sanitation and health care services.
- Many persons with disabilities lose their assistive devices during disasters, including artificial limbs, crutches, hearing aids and spectacles.
- Rehabilitation infrastructure can be destroyed and rehabilitation personnel, including care givers of persons with disabilities, may be killed or injured or diverted to other tasks

It is therefore absolutely necessary to strengthen safety nets that target people living with disabilities in the country. The participants were consulted on whether these safety nets are currently available, the source of the funding for these and the sort of relief the institutions offer the disabled communities. Social safety nets are programmes designed to protect the poor and vulnerable from shocks and contribute to reducing poverty. The results of this study show that a variety of financing instruments are available in Zimbabwe to contribute to the safety nets for vulnerable communities. According to the Zimbabwe Vulnerability Assessment Committee (ZimVAC) Rural Household Assessment report for 2021, most rural households in Zimbabwe receive support from Government (54%), UN/NGO (26%), church groups (6%) rural relatives (16%), urban relatives (17%), diaspora (9%) and charitable groups (9%). Government was the major source of support in all the rural provinces followed by UN/NGO agencies from the period April 2020 to March 2021. Support for households is in the form of food, cash, crop inputs, livestock support, WASH inputs, and support for mitigating the effects of weather and climate related disasters and disease outbreaks.

Zimbabwe has the National Social Protection Policy Framework (NSPPF) with 4 pillars which are social assistance, social insurance, labour market interventions and programmes aimed at supporting livelihoods and building resilience. Persons with disabilities are considered in any one of the 4 pillars through wellness of their families. People fitting into these groups are children in difficult circumstances, Persons with Disabilities and the elderly. However, there is no clear framework on how disabled persons are assisted apart from the general framework available. In addition, social safety nets have continued to deteriorate due to the worsening state of the economy in recent years, there is a lack of transparency and accountability in choosing beneficiaries and distribution of benefits and there is lack of capacity to implement

Vulnerability Assessments

The first step in any humanitarian effort is vulnerability assessments. Vulnerability assessments are coordinated by the Zimbabwe Vulnerability Assessment Committee (ZimVAC). ZimVAC is a consortium of Government, UN agencies, NGOs and other international organizations established in 2002, led and regulated by the government. It is chaired by Food and Nutrition Council (FNC), a department in the Office of the President and Cabinet whose mandate is to promote a multi-sectoral response to food insecurity and nutrition problems. However, the vulnerability assessments do not effectively include disability as part of the social assessment, so that persons with disabilities are meaningfully consulted, and are protected from negative impacts and included in mitigation plans and actions. The ZimVAC process does not include disability screening as a cross-cutting theme (as is the case for gender). This could have offered a model for tracking disability. Disability data is only available in the calculation of dependency ratio which is calculated as the ratio of the dependent population (children aged 0 –17 years, the elderly or persons aged 65 years and over and disabled persons aged 18 – 64 years) to the active population (18 to 64 years old). As a result disaggregated data for persons with disability is largely unavailable.

Disaster Risk Management

The Department of Civil Protection (DCP), within the Ministry of Local Government, Public Works and Urban Development, is responsible for Disaster Risk

Management efforts in Zimbabwe.

The objectives for disaster risk management for the DCP include:

i. To develop an integrated and coordinated approach to reducing disaster risk and to address impacts of climate change through a multi-stakeholder approach.

ii. To enhance early warning systems and capacity of hydro-meteorological services to advise on weather related impacts on new infrastructure as well as mitigation of potential damage to existing infrastructure.

iii. To review and update policy and by-laws on building standards and codes to make them adaptive to climate change.

iv. To advise on investment in climate resilient social infrastructure.

v. To enhance community resilience to climate change.

vi. To strengthening early warning systems (EWS) on climate related risks.

vii. To develop and sustain an integrated approach in all sectors of the economy to reduce impacts of climate extreme events and other disasters.

Updated information and increased collaboration between the various stakeholders has improved operational efficiencies in DRM in Zimbabwe. Stakeholders have also improved the transparency of funding and spending by using standard protocols and guidelines. However, despite the generosity of donors and NGOs, the funding gap in the country remains. The institutions support all people; however, there are limited existing guidelines on financial mechanisms targeted at the challenged groups (particularly people with disabilities), and how the funding is distributed among the different challenged groups. There are currently no up to date databases for people with disabilities, so targeting them is not easy.

6.6 HAZARD FORECASTING

An analysis of existing hazard forecasts, initiatives and systems, their verification, type, reliability, lead times, thresholds and sources of data for forecast-based financing was done as an inventory to inform the decision on which forecast and risk analyses perform best in Zimbabwe. Based on these findings, the best model(s) of FbF was identified.

Flood Forecasting and Monitoring

In assessing the suitability of a forecasting system for a specific hazard in a given location, it is important to understand the cause of that hazard. Each sub-hazard is driven by a set of geophysical factors that may very well overlap, but can differ significantly in the context of temporal and spatial distribution (Barredo 2007) as well as predictability. For example, 'flood' is a broad term, used to represent any occasion where water temporarily inundates the land. When choosing a suitable forecasting system the cause (e.g. flash, fluvial, surface-water, lake, storm-surge or glacial lake outburst flooding) needs to be disaggregated, since a system designed to predict a particular flood sub-hazard may not be suitable for predicting another. Flooding is an in interesting example in that sense, since riverine floods can occur with little or no rainfall at the location of the flood, while flash floods will almost only occur if heavy and/or persistent local rainfall has been experienced (Jonkman 2005).

The Zimbabwe National Water Authority (ZINWA)

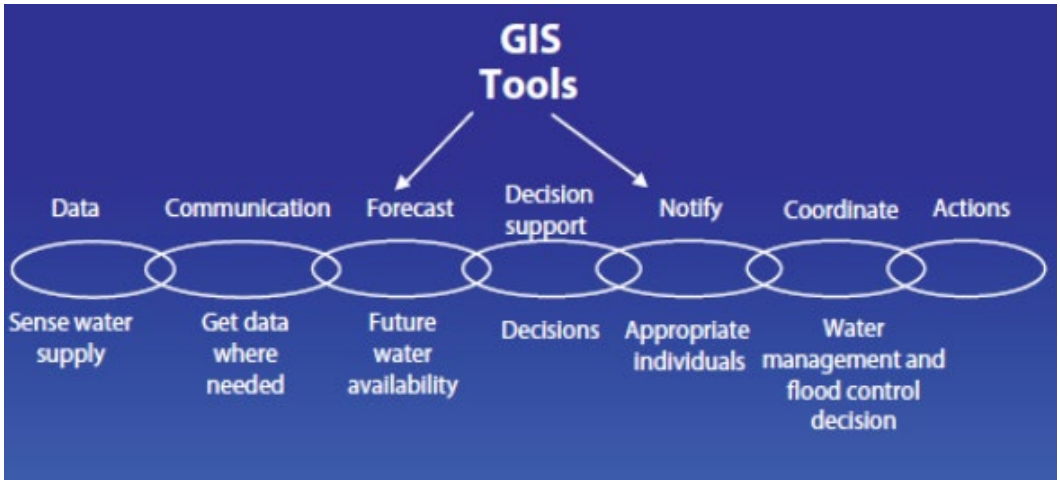


Figure 14: Linkages within a flood forecasting and warning system

is a parastatal institution that falls under the Ministry of Lands, Agriculture, Fisheries, Water and Rural Resettlement (MLAFWRR) and is tasked with managing the country's water resources. It has 342 river monitoring stations. However, not all these stations are used for flood monitoring purposes. Only 37 are used for floods monitoring purposes. Dam levels are monitored weekly, which constitute more than 80% (149 dams) of the total storage in the country. ZINWA has linkages with the Southern African Development Community (SADC) Earth Satellite Observation Monitoring Station and a flood monitoring software is being developed by the University of Zimbabwe. Figure 14 shows the linkages within a flood forecasting and warning system.

Trigger methodology uses concept of impact-based forecasting to produce an intervention map which takes into account:

- Settlements in flood prone areas
- Poverty and Vulnerability
- Flood forecast area
- Deployment area

Rainfall Forecasting

On the other hand research shows that the El Niño Southern Oscillation (ENSO) has significant implications on rainfall across the country. Specifically, the country tends to receive less than average rainfall during the warm phase of ENSO (or El Niño) during the rainy season from October to March;16 and it often experiences more than average rainfall during the cool phase of ENSO (or La Nina) also during the rainy season. For example, during the 1987–88 El Niño year, seasonal precipitation decreased and the rainy season shortened in comparison to neutral or La Nina phases. Drought conditions in the year 2015/2016 also align with an El Niño phase, while the very wet years of 1999/2000 and 2017/8 align with La Nina. As a result, meteorological hazards can be forecast

Almost all the FbF mechanisms reviewed in this study use probabilistic forecasts (including all the Red Cross pilot systems and the World Food Programme (WFP)'s FoodSECuRE programme. Several mechanisms use real-time monitoring data rather than forecasts, which can provide advance warning of socio-economic and humanitarian impacts of drought. For slowly evolving drought hazards, real-time monitoring of impact precursors is clearly favoured over forecast information. A few systems involve a hybrid of both real-time monitoring and forecast information. The Meteorological Services Department is the institution that has the mandate to issue weather and climate forecasting information in the country. This can be done in collaboration with other scholars and such information is passed to users through the media. The use of Indigenous knowledge, though important to the local communities in predicting risk has been sidelined.

Systematic Observations

Currently MSD has 47 synoptic stations. 12 provide data to the Global Telecommunication System (GTS), nine (9) are Aviation stations, and one (1) is an upper air station. MSD also operates almost 500 volunteer rainfall stations and 20 AWS

Products

- Daily weather forecasts
- Probabilistic 3 day and 10 day forecasts
- Probabilistic seasonal forecasts (3 - 6 month)
- Agro-meteorology and rainfall bulletins
- Advisories and warnings

Dissemination Platforms

- Early Warning Community Radios
- Social Media
- Virtual Weather Recording Studio
- WhatsApp
- Bulk Short Message Service
- Website
- Print and electronic media

Challenges

- Low appreciation of the socio-economic value of the Meteorological Services Department.
- Insufficient funding.
- Old and outdated equipment
- Low visibility of products and services
- Lack of effective mechanisms for collaboration with academic institutions.
- Reliance on external players (HPC, donated equipment).
- Sparse network of station does not permit easy downscaling of forecasts to local level
- The climate data gaps and the management system has data format compatibility problems.
- Attrition of trained staff.

- It is not always in the required format.
- The ability to analyse and interpret forecast information is still a preserve of a few and not widespread.

6.6 INSTITUTIONAL CAPACITIES AND PROCESSES

The study investigated the technical, economic and institutional challenges to scaling up FbF in Zimbabwe.

1. Forecast-based Financing is by design only inherently scalable and sustainable with capacity-building and coordination activities at the national, district and community level. The key organizations at the centre of FBF, such as the Meteorological Services Department and Department of Civil Protection, need capacity building in terms of the equipment required to produce and disseminate forecasts and early warnings. The staff in these institutions also need capacity to use contemporary as well as indigenous knowledge to generate tailored site specific forecasts. Communities also require training on Community Based Disaster Risk Management (CBDRM) to effectively implement FbF. Some communities have received some training and have locally developed DMRM, but implementation has not yet been done. In addition, the communities that have received such training are still too few.
2. The SOP development process also requires continuous multi-stakeholder engagement and collaboration for FbF to generate the desired benefits beyond disaster risk mitigation, including enhanced national ownership of FbF tools and processes, potential for knowledge transfers to other government and non-government stakeholders, and stronger partnerships between NGOs and key partners such as the Meteorological Services Department and disaster management agencies. Currently the collaboration among partner institutions is still rather weak and needs to be strengthened if FbF is to be effective.
3. The SOPs should be anchored in national institutions and be easily accessible and open to improvement and adaptation across different sectors and hazards as needed. These elements can in turn promote greater trust, interest and investment in developing FbF mechanisms and integrating them within national disaster risk management frameworks and funding mechanisms for continuity in the communities in which FbF is implemented.
4. FbF is most effective and can play a key role in building resilience against climate-related risks if shock-responsive social protection programmes are strategic entry points for the integration and sustainability of FbF within the national context. Social protection programmes can act as one of the implementation modalities alongside other government and humanitarian channels to allow a broader range of anticipatory actions and funding to reach more people in need.
5. FbF can enhance the efficiency and effectiveness of social protection programmes, for example by using impact-based forecasting to improve the targeting and timing of assistance. In response to a trigger, social protection systems can use their registry and distribution channels to scale up timely assistance for both current beneficiaries as well as new ones through a horizontal expansion of the programme. Most institutions currently do not yet have robust databases of vulnerable people (e.g. people with disabilities), implying that the assistance may not reach the intended beneficiaries.
6. Forecast-based Financing is more effective when implemented as part of a comprehensive and well-integrated risk management strategy that combines different disaster risk financing tools to anticipate, absorb and prepare for the impacts of climate related disasters. This will enable organizations implementing FbF to complement rather than replace other disaster risk reduction, seasonal preparedness and resilience-building activities. This still needs further development and strengthening.

7 PROPOSED FRAMEWORK FOR FBF

Because of its simplicity, we propose an adapted version of the Red Cross FbF mechanism for this study. This framework is shown in Figure 10.

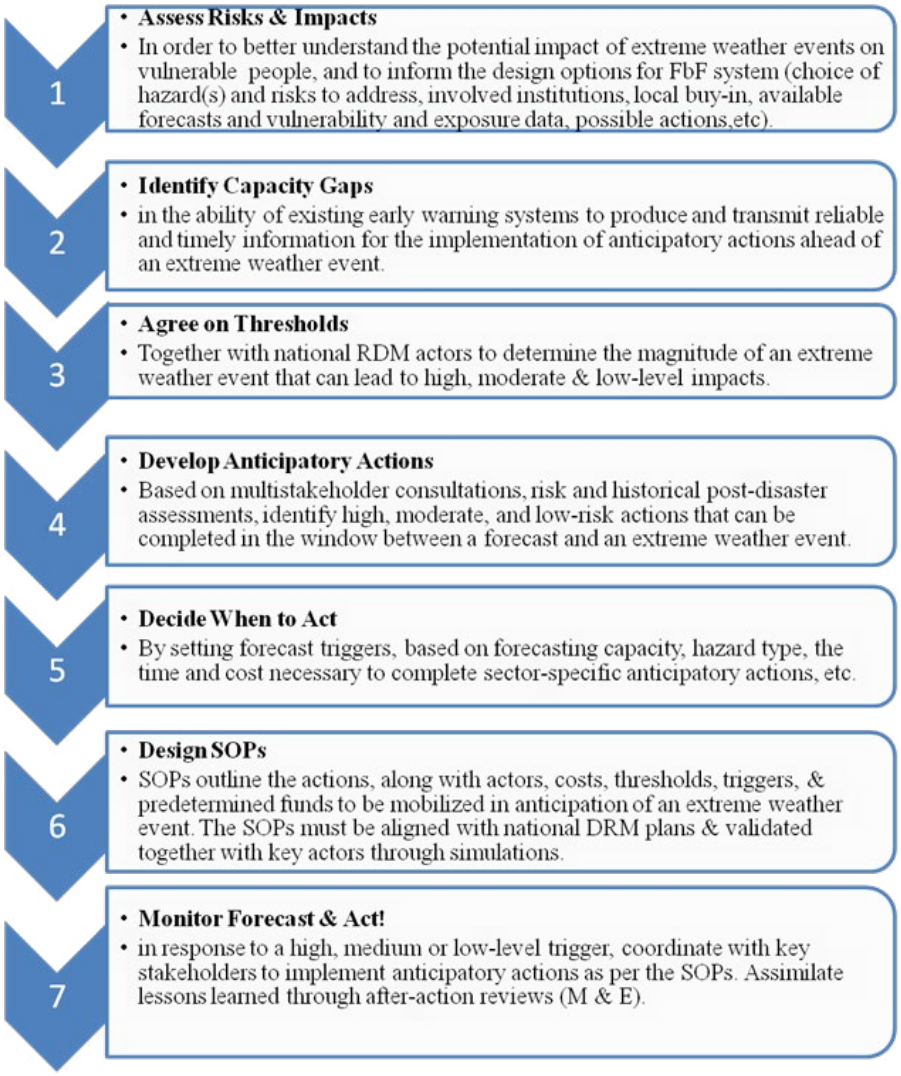


Figure 10: Seven-step methodology for designing and implementing an FbF system. (Source: https://manual.forecast-based-financing.org/chapter/cash-based-early-action/)

The framework should support and integrate into national and local disaster risk reduction (DRR) policies and plans and in the international aid system. The implementer should assess the underlying assumptions, institutional arrangements and operational approaches to be used by different agencies engaged in the disaster preparedness and response mechanism, and answer two questions:

i. How could flood, drought or extreme weather forecasts be made more relevant to decision makers and used to provide early support to vulnerable communities through existing delivery systems?

ii. What are the opportunities for scaling up the Red Cross community-level pilot forecast-based financing mechanisms?

8 RECOMMENDATIONS

Key recommendations include:

1. Provide a prioritization of the regions/districts based on the results of the analysis.
2. Conduct risk mapping in target districts using participatory approaches.
3. Include people with disabilities in planning FbF approach and early actions. To ensure that the FbF mechanism is disability-inclusive, plans and early actions should be developed by:
    a. Engaging the disability community, including OPDs, in meaningful, accessible consultations.
    b. Building disability expertise into staff implementation and review processes.
    c. Countering data gaps by supporting collection of disability data (for example, through censuses, household surveys, and supporting statistics offices).
4. Establish a dedicated ICT capability & interpreting forecasting within JJA, MSD, DCP & other partner organizations through:
    a. human resources (dedicated staff),
    b. technical capacities (training of the staff in ICT & interpreting forecasts),
    c. equipment (computers, internet connection).
5. Scale up CBDRM initiatives to build resilience of at-risk communities.
6. The technical DRM staff at Provincial/District level should assist in coordinating DRM (prevention, mitigation, preparedness, response, and recovery), including at Ward and Village level to avoid fragmentation or duplication of efforts. Use the structures for DRM coordination for climate change adaptation planning and coordination.
7. Align the FbF mechanism with existing DRM Policy and commence implementation in support of an effective DRM system.
8. Provide adequate funding for DRM at national level in line ministries, and at sub-national level.
9. Guarantee availability of cash reserves that may be rapidly disbursed through fast-track mechanism in support of disaster response operations.

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APPENDIX A

SEMI-STRUCTURED INTERVIEW QUESTIONS

Section A: Demographic Questions

1. What is your full name? (Surname first)
2. What is your gender?
    a. Male
    b. Female
    c. Prefer not to say
3. What is your age group?
    a. Under 25 years
    b. 25 - 29 years
    c. 30 - 34 years
    d. 35 - 39 years
    e. 40 - 44 years
    f. 45 - 49 years
    g. 50 - 54 years
    h. 55 - 59 years
    i. 60 - 64 years
    j. 65 years and above
4. What is the highest level of education you have completed?
    a. Did not attend school
    b. Graduated from high school (O Level)
    c. Graduated from high school (A Level)
    d. College graduate (Certificate or Diploma)
    e. University graduate (Undergraduate)
    f. Graduate school (Masters)
    g. Graduate school (PhD)
5. What is your country of practice?
6. Organization do you work for?
7. Which disability group do you represent?
8. What is your current position in organization?
9. Duration in your current position
    a. Less than 1 year
    b. 1 - 5 years
    c. 6 - 10 years
    d. 11 - 15 years
    e. 16 - 20 years
    f. 21 - 25 years
    g. 26 - 30 years
    h. Over 30 years

Section B: Hazard Exposure and Vulnerability

10. Please fill in the Hazard and Vulnerability Assessment Matrix below:

EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	
	Likelihood this will occur	*Possibility of death or injury*	*Physical losses and damages*	*Interruption of services*	*Preplanning MEMP*	*Time, effectiveness, resources*	*Community/ MOAs and resources*	*Relative threat**
SCORE	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 - 100%*
Droughts								0%
Extreme weather								0%
Drought								0%
Severe Thunderstorm								0%
Temperature Extremes								0%
Tropical Cyclone								0%
Earthquake								0%
Flood, Riverine/flash								0%
Landslide								0%
Wild Fire								0%
AVERAGE SCORE	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0%**

**Threat increases with percentage.*

RISK =	PROBABILITY *	SEVERITY
0.00	0.00	0.00

11. Which livelihoods activities are common among the challenged groups (in general or that you represent)?
12. Which hazards affect the challenged people you serve the most?
13. What are the impacts of these hazards
14. How do the physically challenged groups cope/respond?
15. Are these groups aware of climate change?
16. What has been observed to have changed?

Section C: Hazard Predictability and Forecasting

17. How do you define short, medium and long term in the sense of forecasting?
18. What type of forecasting methods are used in Zimbabwe? (deterministic, probabilistic, real-time monitoring, surveillance or hybrid)? Why?
19. Which forecasting methods do you think would be most usable for slow-onset disasters?
20. What are the main sources of forecast information (national meteorological institutions, global mechanisms such as FEWS NET etc.) used in your case?
21. Are there specialised mechanisms through which forecasts are send to the various groups
22. Which is the most reliable of the methods of dissemination?
23. What are the main challenges in retrieving forecast information?
24. What are the main challenges in analysing forecast information?
25. What level of accuracy you are expecting in the forecasts?
26. What kind of lead time is optimal for forecast-based financing?

Section D: Possible Early Actions

27. Are there any DMRR processes currently being practised in communities?
28. At what stage do communities respond to issued forecasts/warnings?
29. Are the vulnerable (eg PWDs) included in decision making prior and during disasters?
30. Are there personal preparedness mechanisms for PWDs in place?
31. What sort of actions are taken?
32. Which institutions provide support for actions taken?
33. What stage of hazard occurrence triggers action from institutions dealing with disabled people?
34. How are early actions prioritised during an impending crisis?

Section E: Socio-Economic Vulnerability and Risks/Social Protection

35. What kind of vulnerability assessments are used in your case for planning of the forecast-based action (especially for PWD)?
36. How has the target population participated in the vulnerability assessments?
37. In your view, how should they be participating?
38. How do the vulnerabilities differ for different groups or women, children and men, male and female headed households in your case? How do the vulnerabilities differ between occupational or livelihood status (pastoralist, non-pastoralist, subsistence farmers, labour etc.)? What other social groups that have specific socio-economic vulnerabilities have you identified?
39. How have you defined the risks in your case? How are the triggers for action defined? Are there differences between geographical areas (locations) and if so, how are they addressed?
40. Can some target groups in your case be identified as chronically food insecure? If so which groups?
41. Are some groups especially vulnerable to periodical food insecurity stress? If so which groups?
42. Are there function social service and protections mechanisms? Can you please describe how they work?

Section F: Questions on FbF

43. What kind of challenges are there in merging forecast and vulnerability data in terms of FbF?
44. When looking at slow-onset disasters, at what level you think the focus of forecast based financing should be (community, local, district or similar, national, regional)?
45. What kind of analysis on impact of identified disasters has been done in your case?
46. What do you see as the main benefit in applying forecast-based action in slow-onset crises?
47. What would be the biggest challenge in applying forecast-based action in slow-onset crises?

Section G: Institutional capacities and processes

48. How do you see the role of Vulnerability Assessment Committees (VAC) and similar assessment teams, which are typically deployed right after disaster, in case of forecast-based action i.e. before disaster strikes? When should they be deployed? With what focus or terms of reference?
49. What kind of early actions were defined in your case? How were the prioritized actions decided? Who were consulted in planning the actions?
50. Are the actions especially addressing food security and livelihoods? Are they dependant on the type of expected risk or disaster impact?
51. What kind of interventions you think would be most applicable in addressing food insecure families (cash based, food, access to safety, shelter, transport, mitigating impact to livelihood, positive coping strategies etc.)?
52. Have you done efficiency evaluation of the actions applied based on forecast? Were the actions implemented cost-efficiently? Were the objectives achieved accurately and timely?
53. What do you see as an alternative to the forecast-based early action taken?
54. How do you justify implementing the forecast-based early action?
55. If forecast indicates favorable season (e.g. precipitation) would it be justifiable to conduct forecast-based action to support vulnerable groups (e.g. PWDs)? Why/Why not?
56. Can the forecast-based actions have implications on socio-economic vulnerability? How?
57. Are the forecast-based actions identified in your case linked to long term programming (disaster risk reduction, resilience, community development activities, policy, advocacy)?
58. Do the actions need maintenance, follow-up etc. after implementation? How is it ensured?
59. Are there SOPs in use or being developed to assist the vulnerable?
60. What gaps exist that limit institutions in offering necessary support in times of crises?

Section H: Financing and Social Protection

61. What is the main source of financing in your case? Who is paying? Is suitable funding available for forecast-based actions?
62. Do institutions have guidelines on financial mechanisms targeted at the challenged groups?
63. How is the funding distributed among the different challenged groups?
64. To whom are the funds allocated to? Who is implementing the forecast-based actions?
65. Is local government involved in either actions or financing and if so, how?
66. Are the financing or actions in your case linked to local social service and protection mechanisms?

67. Are private sector partners (e.g. insurance companies) involved in either actions or financing and if so, how?
68. Are there other NGOs, local community groups or actors etc. involved in either actions or financing and if so, how?
69. Have you done calculation on return on investment or similar in your case?
70. What is the tolerance for acting in vain for your organization? Have you defined monetary values? What is a high enough risk (losses) and probability (forecast) to accept allocating resources? When is the action taken justifiable even if the risk does not materialize?

Section I: Feedback, recommendations, open criticism from respondent

- Open feedback …

END

APPENDIX B

LIST OF KEY INFORMANTS INTERVIEWED

PARTNER	ATTENDEE	EMAIL	ECONET	NETONE
NASCOH	Mr Masaya	nascodisability@gmail.com	0775642217	…
FODPZ	Mrs Mavhima	...	0787910422	...
	Nasper Manyau	...	...	0716974706
NCDPZ	Anna Shiri	president@ncdpz.org.zw	0782382077	...
	N. Nicodemus	m-e@ncdpz.org.zw	0773594054	...
	Praise Ndebele	programs@ncdpz.org.zw	0778025015	...
Centre for Humanitarian Analytics	Wonder Mafunda	wonder@cha-africa.org	0772661343	...
	Lucia Mutsvedu	...	0772989138	...
Zimbabwe Albino Association	M. Maunganidze	...	...	0713109819
Epilepsy Foundation	Mr Kadzviti	...	0773595246	0715217690
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	Yvonne Makadho		0778283880	...
QUAPAZ	Bernard Madzivire	benmadzivire@gmail.com	0772415403	...
Leonard Cheshire Disability Zim	T. Zimbudzana	tzimbudzana@leonardcheshire.org.zw	...	...
Deaf Zimbabwe Trust	Paida Chimhini	...	0774787260	...
National Disability Board	Senzeni Mutevedzi	...	0778410019	...
Senator for Disability	Sen. Khupe	...	0777958458	...
ZIMCARE TRUST	N. Aribino	aribinozy@gmail.com	0774483221	0715617095
FAO	Tsitsi Magadza	Anticipatory Action Coordinator	...	...
DCP	Lameck Betera	Acting Deputy Director	...	...
MSD	Linia Mashawi Gopo	lmashawi@gmail.com Deputy Director, Operations	0775813008	...

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