FORECAST-BASED FINANCING AND EARLY ACTION FOR DROUGHT

Guidance Notes for the Red Cross Red Crescent

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Introduction

I. Context

A. Drought, a humanitarian issue

Droughts are natural disasters caused by a lack of sufficient water or moisture to address demand. This phenomenon in turn affects a wide range of aspects like crop production, animal forage, drinking water supplies, and can lead to famine and epidemics among other humanitarian disasters. The impacts of droughts are far reaching and severe: they have killed over 10 million people since 1900 and affected 73.9 million between 2008 and 2017, making it one of the most widespread and devastating types of hazard in the world (CRED, 2018, p.5; Sutanto et al., 2019). However, defining droughts, and acting to reduce their impacts, is complex. For instance, there exists no global authority to consolidate the measurement of drought, and even the term means many different things to different people. For instance, "drought" has been used to refer to events that deviate from seasonal term averages in rainfall, to slight deviations from average, to gaps within rainy seasons, to conditions where water supply does not meet livelihoods needs, and to a range of social-economic causes that lead to water shortages.

The humanitarian sector has a long experience with responding to the impacts of droughts, particularly for situations of severe food insecurity, epidemics, and conflict. With population growth, increasing urbanisation, and anthropogenic climate change, general stresses on water supplies are increasing worldwide, and causing drought-like conditions related to the combination of hydro-meteorological and socio-economic phenomena (IDMC, 2019). Changes in precipitation patterns can exacerbate existing humanitarian issues when communities who have previously not known droughts become confronted with hazards to which they have no experience and are not resilient.

B. Forecast-based Financing and Early Action

There is increasing acknowledgement that the impacts of hydrometeorological hazards can be lessened through preparedness and early actions that aim to decrease community vulnerability and exposure, as well as develop systems of warning and preparedness. In recent years, the humanitarian sector has had increased interest in disaster preparedness. As meteorological science and observations become more widespread and accurate, many hazards can now be anticipated, providing enough time for humanitarians to increase community resilience to the risk. As such, the concept of forecast-based action and financing (FbA/FbF) was developed by the Red Cross Red Crescent and partners with this precise goal. This new paradigm allows national societies to access funds in anticipation of hazards through a peer-reviewed early action protocol (EAP). As yet, eight EAPs have been approved to anticipate cyclones, floods, cold-waves, extreme winter conditions, and volcanic ash (see IFRC FbA by the DREF). To date, there are no finalised EAPs for drought but a number of RCRC National Societies have started the development process.

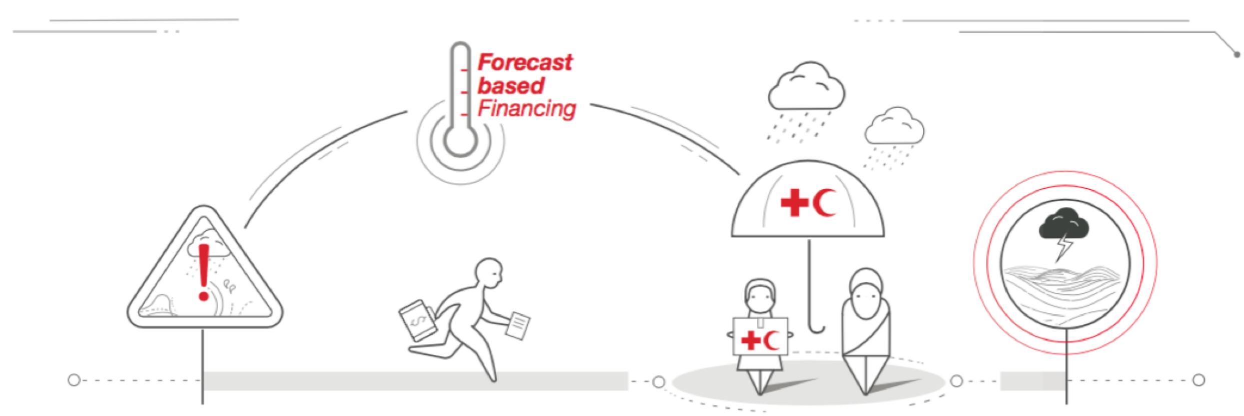

Figure 1 - FbF Diagram

Forecast-based early action rests on the correct anticipation of an imminent hazard which triggers a set of early actions to be conducted in order to lessen the negative impacts of the extreme event. Within the Red Cross, the procedure to build an FbF/FbA program follows a robust methodology with many requirements, as outlined in the FbF Manual.

Figure 2 - EAP Validation Steps

C. Forecast-based action for drought

Within the RCRC, experience in FbA mainly lies in preparing for fast-onset disasters (with the exception of the Mongolia EAP for extreme winter conditions or "dzud") However, there is a great interest and currently at least 5 national societies are planning to or in the process of developing EAPs for drought (Kenya, Uganda, Ethiopia, Niger, Zimbabwe in process; others that are considering it include Mozambique, Namibia, Zambia, Mali, Philippines, Pakistan, DPRK, LAC region etc.). Other institutions including FAO, WFP and the Start Network have more extensive experience implementing anticipatory action for droughts. While the concept and the FbF Manual (the foundational document for FbA within the RCRC) were designed to be hazard neutral - the guidelines heavily reflect what has been learned through piloting and developing operational FbA systems within the RCRC, shaped around the program logic for fast-onset hazards such as floods, cyclones and cold waves. As will be detailed further in this report, droughts can be framed as slow-onset phenomena, their impacts build-up over time, and the depth of their impact depends on a range of contextual factors. As such, the methodologies and guidance developed within the RCRC have been sometimes found difficult to use in tackling drought through FbA and there is a strong need to provide drought-specific, practical guidance to national societies on all areas of the FbA system including hazard analysis, trigger models, possible early actions, intervention-impact analysis, and early warning systems programs. As seen in Table 1, many challenges have been identified at every step in the development of EAPs for drought.

Step	**Potential Challenges**
Risk Assessments	● Understanding the risks associated with more extreme drought events as compared to typical years. ● Understanding how the risks differ between the potential beneficiaries of the program (e.g. the poorest households) as compared to the general population, and between differing livelihood groups. ● Understanding the differing levels of risk in different areas (e.g. villages with river access to support some irrigated crops or household use, and other villages with no river access at all would experience the same drought events differently). ● Risks associated with drought can be multiplied by other socio-economic factors
Identification of Forecasts	● National versus global forecasts ● Low skill of seasonal forecast (and uncertainty) ● Granularity and scale of available information ● Limited forecasts available to anticipate rainfall anomalies that can compound the impacts of drought.
Definition of Impact Levels	● Low historical impact data ● Impacts may be chronic ● Relationship between the hazard and impacts may not be clear or consistent (e.g. some years of low rainfall correlate with food insecurity and others do not).
Selecting Early Actions	● Different actions appropriate for different livelihood groups, or for households of very low socio-economic status (e.g. landless day labourers, migrants, disadvantaged social groups) ● Resource intensive - useful actions (e.g. monthly cash transfers) may be very expensive per household
Development of the EAP	● Can be a very time-intensive process for staff requiring input from external specialists
Validation of the EAP	● FbA by DREF criteria (see Annex 4)
Monitoring of Forecasts	● May be delays in the release of early warning information produced by third parties (e.g. a drought bulletin). ● May require training to interpret forecasts or other early warning information to know if the threshold for action has been reached
Early Action	● Missed events and false alarms, while an accepted risk in any FbF system, can cause disappointment and reduce confidence in the system.

	● Compounding hazards which could make it difficult to implement due to unforeseen circumstances (e.g insecurity, migration, epidemics etc.)

Table 1. Potential challenges for FbA for drought

II. This Project

A. Background

Demand for FbA for drought is pressing, and a number of RCRC national societies are already beginning to explore anticipatory action, and finding current FbA guidance difficult to apply to these hazards. This need was particularly showcased at the well-attended sessions on FbA for drought at the Maputo Africa Regional FbF dialogue platform and the call for a Drought FbF working group call in April 2019. This demand then concretised with discussions at the Berlin Global Dialogue Platform in November 2019, and the formalisation of this project by the Red Cross Red Crescent Climate Centre, supported by the British and French Red Cross.

B. Aim

This report presents a knowledge synthesis on which to ground initial discussions and development of FbA for drought within the Red Cross Red Crescent.

C. Methodology

The project presented here ran from December 2019 to May 2020. It began with participation, brainstorming, relationship development, and a presentation of a poster at the Global Dialogue Platform in November 2019. Desk studies and remote consultations formed the basis of documentation for this report. Key informant interviews and discussions were conducted with over 15 scientists, social-scientists, humanitarian practitioners, and other experts, on the topics of FbA, drought definitions and forecasting, early warning systems, drought impacts and indicators, humanitarian response, and current drought-related work. In parallel, the authors of this work undertook deep document analysis of academic and grey literature pertaining to the same subjects. The triangulation of the knowledge and insights gleaned from these investigations created a canon of information that was then combined and synthesized for this report

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III. Documentation

1. ***Guidance Notes - A Report on FbA for Drought***: The detailed synthesis of this research project, in 4 different chapters on different sections of FbA. Information compiled and synthesized in this document is meant to provide guidance and ideas on the different elements of FbA for drought.

2. ***Decision Tree - Questions and Pathways to FbA for Drought:*** Acting as the practical executive summary of the Guidance Notes, this flowchart guides decision-making for FbA for drought. It presents questions and fundamental elements to take into consideration while thinking of developing such programs. The accompanying text details the justification, logic, components of these steps. It is linked to different sections of the FbF Manual.

3. ***FbA for Drought - Stylised and Example Calendars:*** As an exercise, these stylised calendars of potential FbA programs for drought showcase how FbA for droughts differs from traditional drought response, and where early actions could be triggered based on available information. Accompanying this are two examples from FEWSnet bulletins for Kenya and Ethiopia droughts that show where early action for drought-related food insecurity could have been taken in the lead-up to RCRC response appeals.

4. ***EAP Criteria and Droughts:*** A one-pager on the potential barriers for FbA for drought to follow current EAP criteria to access the DREF. Additionally, an annotated version of the validation table highlighting certain sections that may require further consideration to be usable for droughts.

5. ***Collaborative Notes - Webinars on FbA for Drought:*** These notes were taken by facilitators and participants during the two webinars presented about this research on May 4th and 6th 2020. The document compiles ideas, questions and answers, archives of the different sessions, and video-recordings of the webinars.

A. Hazard Analysis

What are droughts and why are they different from other hazards?

Some Helpful Definitions

- Aridity: An arid region is a chronically dry area, one that sees little annual precipitation and that has little groundwater resources (e.g. a desert). These regions can see similar conditions than the ones associated with drought, but experience this as a chronic condition not necessarily an extreme weather event (i.e. a deviation from the norm).

- Biomass: A measure of the total amount of organic material. Monitoring biomass through remote sensing and field observation can help monitor the development of droughts as crops fail and pasture amount decreases.

- Evapotranspiration: A process that refers to the transfer of water from the land to the atmosphere through evaporation from the soil and by transpiration from plants, which is increased by hot temperatures. Hot temperatures reduce the water available for crops, pasture and surface water sources, and thus can make drought impacts more severe.

- Decadal and seasonal variation: Climatic variability or cycles can occur at the scale of seasons and decades. Seasonality of precipitation is a fundamental component of many of the countries that experience drought, separating the "rainy season(s)" from the "dry season(s)". Decadal variation can exist on top of these seasonal cycles, dividing years into "wet years" and "dry years" - this can be important knowledge when examining climate trends and analysing drought risk.

- Drivers of predictability: Large-scale climatological and meteorological processes and cycles that determine the variability of seasons and drought events. The presence of these drivers can increase the accuracy of forecasts and lead-time for anticipatory action

- Dry spells: Unusually long periods of dryness and low precipitation. Dry spells are not yet droughts, but if they last at seasonal scales, they can turn into droughts. However, dry spells can create impacts similar to drought if they occur at certain strategic times in agricultural calendars, for example.

- Lead-Time: The amount of time between a hydrometeorological forecast and whatever phenomenon or event it predicts. This notion is central to FbA as it indicates the amount of time made available for early action by the forecast information.

- Surface and groundwater: Water is stored both at the surface of the Earth (in rivers, lakes, wetlands, glaciers etc.) and in the ground (in confined and unconfined aquifers, wells, sub-subterranean lakes etc.). Hydrological drought refers to the depletion of these sources. Groundwater recharge refers to the process by which water moves from the surface to subsurface layers through processes such as percolation; the amount of water soil can hold is a function of many geological and geomorphological characteristics.

- Rainy season onset and cessation: The beginning and end-dates of the rainy seasons can be particularly important to understand in analysing the risk and impact of droughts. Droughts can occur when the rainy season arrives late, putting a strain on existing water sources, affecting crop production, pasture growth etc. Similar impacts occur, if the rainy season ends early (i.e. is shortened).

- Heat Stress: Referring to situations of low humidity and high temperatures that can increase pressure on plants when water supply is insufficient to address evaporative demand. Heat stress can cause plant biomass to decrease and crops to fail.

I. Definitions of Droughts

The first suggestion to work on developing FbA for droughts is the identification of the humanitarian impacts that we are concerned with reducing. These impacts are many-fold and complex, stemming from different definitions of drought and highly-contextual elements that make populations exposed and vulnerable to the different dimensions of drought events.

Drought refers to acute water shortage, a decrease from the expected average of water resource availability over a certain period of time (Yihdego and Eslamian, 2018). However, the framing of the hazard is particularly unclear, both in literature and in practice; as can be seen in Table 2, drought is generally defined in four different ways (Wilhite and Glantz, 1985; Yihdego and Eslamian, 2018). This framing stems from the 1990s when research brought a shift in understanding drought as a one-off natural disaster to conceptualising it as a natural cycle that can be worsened depending on a range of hydro-meteorological and socio-economic factors (Yihdego and Eslamian, 2018). Many different characteristics of droughts exist. The natural hazard has often been characterised in meteorological terms (meteorological drought) or by their impacts (hydrological, agricultural, socio-economic) (GWP and WMO, 2019). These different types of drought can overlap, are related, and can be difficult to untangle. Additionally, the relative importance of the dominant driver of the drought event depends on what hydrometeorological element (precipitation, groundwater, soil moisture etc.) is most important in the context.

Types of Drought	***Definition***
Meteorological	Lower than average precipitation, longer than average dry seasons, or multiple successive seasons of below average rainfall
Hydrological	Depletion of water supply in surface and groundwater bodies as a reflection of low precipitation and recharge.
Agricultural	Scarcity of water and low soil moisture content available for agriculture and pasture.
Socio-Economic	When the demand for water exceeds the supply and negatively impacts communities and individuals.

Table 2 - Different Types of "drought"

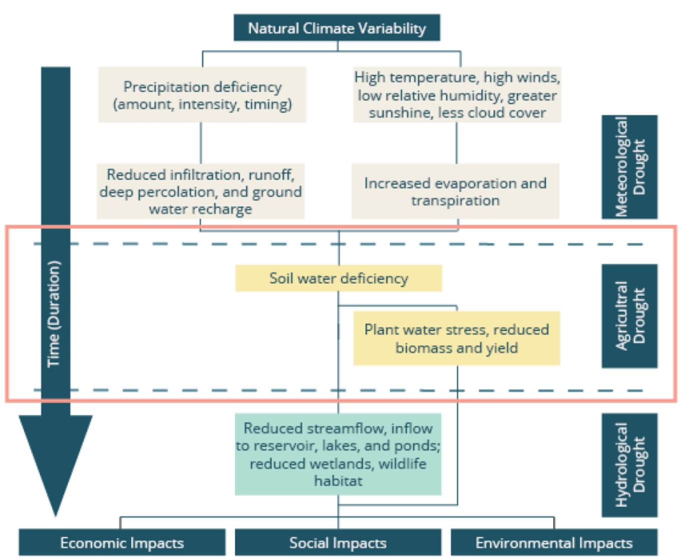


Figure 1: Classification of Drought in Time. Made by Panis (2019). Adapted from Wilhide (2000)

Figure 3. Another possible classification of drought. Made by Panis (2019) adapted from Wilhide (2000)

Flash Droughts
Pendergrass et al. 2020

Droughts may not only be slow-onset and long-lasting situations, as recently highlighted by new research by Pendergrass et al. (2020). The authors of this paper define a little-studied, (and as yet debated) phenomenon they call "flash droughts". These are extreme events characterised by a sudden onset of dry conditions that quickly (on the order of weeks to months) intensify drought conditions causing severe impacts (Pendergrass et al. 2020). The paper identify three common elements to the definition of flash droughts (Pendergrass et al. 2020):

- " The event should involve a rapid onset and intensification"
- " Intensification rate should be high"
- "The event should end in a state severe enough to qualify as drought"

The causes of flash droughts are yet to be fully understood but above average temperatures, precipitation deficits, quick declines in local soil moisture, are all thought to be contributing factors. The prediction of these phenomena poses particular challenges as it is difficult to capture their timescales credibly in S2S timescale prediction and therefore in the commonly used tools for drought monitoring. The paper also discusses the implications of flash-droughts on impact-based drought early warning systems, in particular as it is thought that human activity and anthropogenic climate change may increase the frequency and intensity of these extreme events.

In humanitarian practice, the term "drought" is often used to refer to some socio-meteorological combination where water shortages produce stress on human and livelihood systems. Droughts are a function of the fragility of human systems, and they become disasters where systems cannot cope with deviations from the hydro-meteorological norm. It has been argued that droughts are particularly devastating when livelihood choices are strongly determined by the climate (e.g. the decision to grow certain crops, or traditional seasonal migration patterns) - for instance, if in a given year, the weather patterns are different than normal, those livelihoods are especially vulnerable to these changes. It has also been argued that droughts pose specific challenges to income generating activities marked by low productivity that are not able to take advantage of 'good years' in order to provide a buffer during 'bad years'.

Drought Severity = Intensity x Duration x Magnitude x Frequency

Figure 4. Another way to conceptualise the severity of a drought by its intensity, duration, magnitude, and frequency.

II. Main causes of dryness and water scarcity

There are many causes of rainfall and water scarcity that lead to droughts. Again, the causes are deeply contextual but have in common that they deplete or degrade surface and subsurface water resources and recharge. For our purposes, these causes can be divided into causes of dryness and causes of water scarcity.

A. Causes of Dryness

- Low levels of seasonal precipitation, particularly during the rainy seasons, are often the main cause of severe meteorological droughts. This decreases the overall amount of water available during the season, and the effects can compound over time.
- Erratic precipitation at strategic times in the agricultural calendar can also cause similar effects as below average seasonal rainfall. For instance, dry spells do not have to be very long to have a strong effect, but if they occur at certain key moments of the year (for instance in the first weeks of planting) they can deeply affect food production, incomes and market prices.
- Research is also currently examining potential links between increased temperatures and evapotranspiration and droughts (Miralles, 2019). Notably, positive feedbacks of desertification create drought conditions through decreasing agricultural crop production and increasing scrubland.

Droughts and Climate Change

There is evidence that, since at least the 1950s, patterns, frequencies, and intensity of droughts are changing around the world (IPCC, 2014; Ault, 2020). Areas that have previously been sheltered from major drought impacts (e.g. Western Europe) are seeing new climatic patterns in their seasons while others (e.g. the Sahel and South America) are experiencing more erratic precipitation. Sparse data and little records of long-term variability limits this analysis in many regions for the time being, but recent scientific advances have shown that at least some of these observed changes can be attributed to anthropogenic climate change (Ault, 2020). For instance, a study of the 2018 Cape Town drought shows that the likelihood of the drought was tripled by anthropogenic forcings (Otto et al., 2018). Similarly, Ault (2020) shows that the frequency, severity, and duration of droughts is increasing, and that this risk could be lessened through reductions in GHG emissions.

B. Contributing factors to water scarcity

- Population growth and urbanisation decreases the amount of water available per capita, and can cause hydrological drought by depleting surface and groundwater resources, particularly when coupled with low or erratic precipitation.
- Displacement of populations increases pressures on the available water in the locations they have moved to, which need to be shared with the host population.
- Similarly, the intensification of agriculture, pastoralism, and industrialisation can also increase the pressure on available water resources, pollute surface and groundwater sources, and alter the uses of water (for instance, dams can divert rivers and thus move water availability from one location to another).
- Choice of income generating activities can produce a higher water demand, creating a socio-economic drought (e.g. reliance on water-intensive maize production vs cassava).
- Insufficient access to, or management of, ground water resources to buffer reliance on surface water.
- Environmental degradation / desertification/ land and grazing management.
- The pollution of water sources, abstraction, land use change and other anthropogenic factors influence the water system and can cause a decrease in water availability
- Overarchingly, resource management practices and legislation and oversight are particularly important in creating or exacerbating drought conditions. As such, droughts can be an issue

of bad resource allocation, and therefore, comprehensive hydrological knowledge and institutions are particularly important in lessening the potential impacts of the hazards.

III. Impacts and indicators of drought

Forecasting the impacts of drought requires knowledge about climate sensitivity and resilience of local food systems networks, livelihood strategies and diversity, and many other context-specific variables. Indeed, droughts have a range of physical and socio-economic impacts. The following section lists some of the main indicators used by academics and practitioners to identify that a drought is occurring and monitor its progress.

A. Hazard-related indicators and indices

There exist many physical indicators of a drought that are monitored by scientists and governments to track the development of drought impacts. The complex and insidious nature of drought means that all these indicators are proxies to understand the impacts that dry conditions are having on an area. Our main suggestion here would be to examine the World Meteorological Organisation Handbook of Drought Indicators and Indices (which are classified in a traffic-light method of ease of use) identifies which indices could be available and appropriate for the context.

Indicators of drought	**General Description**	**Example Indices**
Meteorology	Meteorological indicators of drought measure precipitation events and averages to compare whether seasons and sub-seasons are receiving below normal precipitation. Many indicators measure these differences, with different understandings of spatial distribution, indices, and anomalies.	• Aridity Anomaly Index • Percent of Normal Precipitation • Standardized Precipitation Index (see below) • Weighted Anomaly Standardized Precipitation
Soil Moisture	Calculating how much water is available for crops and pasture (and groundwater recharge) can be an essential metric to monitor the beginning and progression of agricultural drought (Bolten et al. 2009; Yilmaz et al. 2020). However, we are often	• Soil Moisture Anomaly • Root Zone Soil Moisture

	confronted with limited (or very complex) indices and data on soil moisture.	
Hydrology	Indications of drought can be found through the measurement of water resources in streams, dams/reservoirs, and aquifers. Lower than average measures are often used as proxies for hydrological or socio-economic drought as they show the risk of complete depletion of available water. Increases in travel distance to water sources are also used in a similar way.	• Palmer Hydrological Drought Severity Index • Standardized Reservoir Supply Index • Standardized Streamflow Index • Streamflow Drought Index
Remote Sensing	Satellite imagery, remote sensing, and the whole range of earth observation tools, are also used to monitor drought conditions (West et al. 2019). These tools can help experts identify areas of drought or dryness, and monitor its extent over geographic and seasonal/sub seasonal timescales. For instance, the Group on Earth Observations Global Agricultural Monitoring (GEO GLAM) monitors crops at the global scale for the Agricultural Market Information System.	• Normalized Difference Vegetation Index • Temperature and Vegetation Conditions Indices • Vegetation Drought Response Index Note: another overview can be found in Krishnamurthy et al. 2020, Table 1.
Socio-Economic	Socio economic indicators of drought can give an early estimation of certain drought impacts which can be used in tandem with other sources of information such as forecasts, soil moisture monitoring etc. The choice of these indicators will depend both oncontext of the region of interest and on the impacts we are trying to address through early action.	• IPC phases • Staple food price • Annual or seasonal staple crop production • Pasture biomass

Table 3. Indicators of drought (WMO, Handbook of Drought Indicators and Indices)

Standard Precipitation Index (SPI)
The standard precipitation index (SPI) is one of the most used metrics to quantify meteorological drought. This calculates deviation of rainfall from norm over a defined period (Sutanto et al. 2019). The SPI takes the record of observed precipitation, fitted to a probability distribution that is then transformed to a normal distribution. Negative values indicate lower than average amounts of precipitation. The magnitude of drought can be calculated through the positive sum of the SPI over the season (AMS, 2020). There are also conversion tables that exist to calculate the return periods of droughts based on the SPI (these can be particularly useful for FbA for drought triggering systems) (WMO, 2012, p.11). An extension of the SPI is the SPEI, the Standard Precipitation and potential Evapotranspiration Index, that adds the impact of evapotranspiration to the metric, and provides a better indication of water stress.

Table 2. Probability of recurrence

SPI	Category	Number of times in 100 years	Severity of event
0 to -0.99	Mild dryness	33	1 in 3 yrs.
-1.00 to -1.49	Moderate dryness	10	1 in 10 yrs.
-1.5 to -1.99	Severe dryness	5	1 in 20 yrs.
< -2.0	Extreme dryness	2.5	1 in 50 yrs.

B. Vulnerability-related indicators

Organisations, academics, and governments who monitor drought onsets or development also use a range of socio-economic indicators that provide a picture of the impacts of hydro-meteorological drought events on communities - these socio-economic indicators can be monitored to follow drought onsets and progression.

- The **loss of crops and livestock** can be a good indication that dryness or lack of water is impacting livelihoods: as dry conditions depletes water stores, there will be less and less available for crops and forage. Reduction in the amounts of agricultural and pastoral work and delays in livelihood seasons can also show abnormal situations.

- **Increases in market food prices**, particularly for staple foods, and decreases in the value of livestock is an important indication of socio-economic drought. As droughts develop, decreases in amounts of available food cause prices to rise. For this, global and national monitoring of food security greatly takes into account these changes.

- The appearance of **socio-economic coping strategies** often provide a picture of the severity and extent of a drought (Jokinen, 2019). The destocking of livestock, selling land, removing children from school and force marriage, and rural migration, are but some examples of these strategies taken to reduce the pressure of droughts and increase coping capacity, sometimes with negative effects. In Niger for example, the availability of young female goats of reproductive age is an early indication of distress among pastoralists. Monitoring increases in appearance of these trends can provide indication of the extent of the drought impact felt by communities. Some of these strategies, when they appear, are signs that the window to act early may have passed - notably, the selling of land and livestock is often taken as the very last resort. This starts to occur at scale when peak impacts are felt. However, many coping strategies used for drought may also be used in response to other stressors (e.g. insecurity, disrupted market access, market volatility, major changes in non-food commodities such as the cost of petrol) and parsing out which trends are primarily observed because of drought can be difficult.

The IPC

The Integrated Food Security Phase classification (IPC) is an important measure of food insecurity. Its Population Tracking tool provides food insecure population data for 30 countries and is publicly accessible. Widely used and adapted in different ways, this scale aims to provide a standardised indication of the severity of a situation.

(1) Minimal/None
(2) Stressed
(3) Critical
(4) Emergency
(5) Crisis

A wide range of indicators are used by the IPC to monitor foods security including hazards, mortality, food availability and access, food consumption (in quantity and quality), changes in livelihoods etc. It has been noted that drought conditions often drive changes in IPC phases, and monitoring this situation can provide an indication of current conditions of vulnerability and of the risk of worsening situations that could potentially be eased through early action.

IV. Uniqueness of droughts to RCRC FbA experience

While the impacts of droughts have long been of concern to the humanitarian sector, the FbA concept, rationale, and methodology have been shaped by a decade of work on fast-onset disasters. However, there are key differences between drought and these other hazards, as seen in Table 4.

Hazard Characteristics	**Flooding/Cyclones etc.**	**Droughts**
Timing	Fast-onset hazards	Slow-onset hazards with no clear start or end dates.
Lead Time	Only a few days or maximum weeks of lead time for early action. Usually just one window of opportunity to act before the impact event	Possibly weeks to months (e.g. if strong El Nino signal in certain regions) of lead time. More than one opportunity to act early during different phases of the seasonal/crop calendar
Triggers and Indicators	Triggers are mainly combination of hydro-meteorological forecast combined with exposure and vulnerability data	Many other indicators could be used including remote satellite data (soil moisture etc), food security and food prices monitors etc.
Scale of geographic impact	Impacts useful confined to a specific prone area (coasts, rivers etc.)	Impacts can be scattered and large scale
Impacts	Impacts are immediately visible and localised. Impact data is collected via standardized processes such as Damage and Needs Assessments.	Can often be "silent emergencies" - impacts are insidious and build over time, and have a wider scope. Less clear methodologies to collect impact data.
Actors in anticipatory action	High level of humanitarian involvement in all aspects of the DRR timeline.	Many government, development, and humanitarian actors are involved in drought preparedness and response.

Table 4. Main differences between FbA experience and droughts

A. Long and Unclear Temporal Framing

As seen in Figure 5, droughts have unclear calendars on a continuum from months to centuries which makes them quite different from hazards such as cyclones and floods. The drivers of drought span short-term scales (months to seasons), interannual scales (years to decades), and on the scales of decades to centuries (Pulwarty and Sivakumar, 2014).

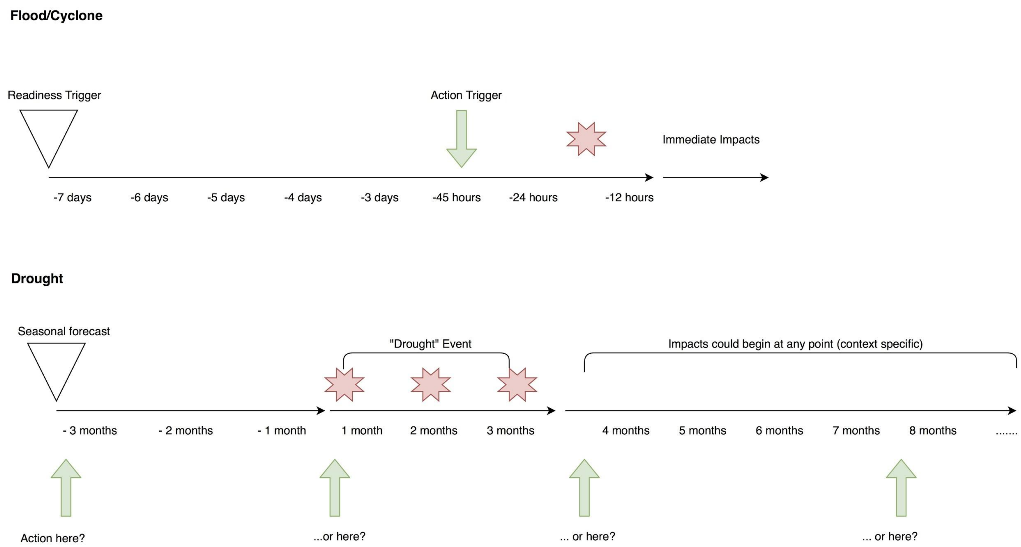


Figure 5. Contrasting the timeline between fast-onset hazards and droughts

The unclear timing of a drought calendar complexifies the conceptualisation of "early" action, and therefore may blur the distinction between anticipation and response (and development) (Jokinen, 2019). Ault (2020) compares a drought to a disease, it can begin before showing any symptoms. As such, for anticipatory action, it can be difficult to decide when to act within the drought period, in particular to understand when droughts begin and end. Further, impacts can intensify if consecutive rainy seasons are below average, creating cascading effects, even if the season at hand is not particularly severe.

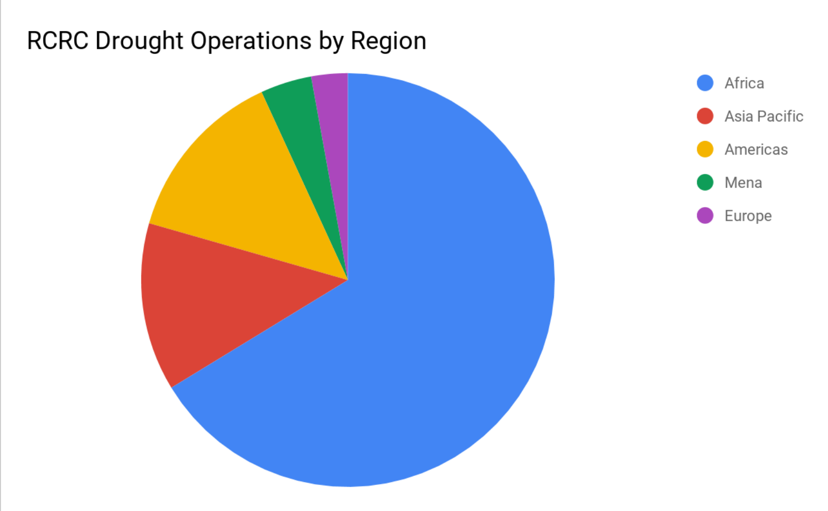
Deciding *where* to act adds complexity to anticipatory action. Indeed, droughts also tend to affect a much wider area than other natural hazards such as floods. Indeed, the impacts of droughts can quickly become regional problems that affect more than one country, and therefore command a large amount of humanitarian resources (Yihdego and Eslamian, 2018). Over these large areas, the insidious impacts of droughts are not necessarily obvious after their indicators peak. Indeed, it has even been argued by researchers interviewed for this project that, in many cases when the researchers identify that a drought is occurring, practitioners are in fact only noticing the impact of two or more consecutive seasons which have similar impacts to drought seasons, but do not have below average rainfall. Additionally, distinguishing between the conditions that meet criteria of hydro-meteorological drought and periods of dryness can be difficult: droughts are often understood to occur over long stretches of time but periods of abnormal dryness or breaks in the rainy seasons can cause similar impacts.

The geography of RCRC drought operations

Drought is a global phenomenon that manifests itself in many ways in different regions. For this work, an overview of the history of drought operations within the Red Cross Red Crescent was conducted to identify general trends on which to focus concerns on FbA for drought.

Records show 176 RCRC operations for drought from 1955 to the present: 26 DREF and 150 general Appeals that targeted over 15 million beneficiaries. Four appeals are still active, as of the completion of this report in May 2020.

Over 100 million CHF was requested by these operations. In general, these operations are solely focused on response. The geography of these operations show a major demand in Africa, mainly related to food insecurity, and often for chronic droughts such that appeals are often renewed over many years. By far, the largest amount of appeals have come from the African continent, over 66 percent. Next are the Americas and Asia (both 13 percent), followed by Mena and Europe. Within the African continent, 46 percent come from East Africa, 40 percent from West Africa, and the rest from Southern and Central Africa.



This analysis shows a clear humanitarian focus on response to impacts rather than anticipation. Specific references to weather forecasts are sporadic, and early warning systems are barely mentioned, but phrases like "drought-conditions are likely to..." are commonly found. Many of these appeals illustrate the slow and insidious nature of droughts: it is common to find phrases like "three consecutive failed rain seasons" (MDRKE009, Kenya 2009), "poor performance of the OND 2018 rains season" (MDRSO007, Somalia 2019), " 2.4 million people in severe food insecurity [800'000 more in 6 months]" (MDRKE016, Kenya 2011). Additionally, certain appeals show that socio-economic conditions, notably related to food prices or conflict, can prolong the effects of drought even when the hydro-meteorological conditions alleviate.

B. Complex and compound disasters

Droughts are also compounding hazards: their impacts grow overtime and can overlap with other hazards. For instance, the 2014 and 2018 Californian drought events are prime examples of an event of low precipitation and extreme temperatures that caused a range of disasters: Extreme wildfires (during the 2018 event, over 1,800 km2 was scorched and 300 homes were destroyed), damaged soils (which in its turn increase the vulnerability to landslides and flooding; Moftakhari & AghaKouchak, 2019), and decreased wintertime water storage (AghaKouchak et al., 2014, 2018). Both the causes and impacts of droughts are all highly contextual, depending on the livelihood profiles of the area, its climate and experience with extreme weather, and its vulnerability and exposure to water scarcity.

Many factors of exposure and vulnerability shape the impacts of droughts. For instance, in highly vulnerable food systems where productivity is low and reliance on rain-fed agriculture is high, food insecurity can often be caused by only small deviations from seasonal precipitation averages, or dry spells within otherwise normal or above normal rainfall years. The extent of the phenomenon and its impacts are deeply dependent on the socio-economic context in which the water scarcity occurs. For instance, rainfall scarcity can lead to deep food insecurity but it can also deplete potable water reservoirs, leading to health and sanitation problems, or degrade gazing grounds and create loss of fodder leading to livestock mortality, loss of income, and negative coping mechanisms such as forced migration. For clarity, we could separate these impacts between primary ones (such as reduced crop yields and water scarcity) and secondary ones (such as food insecurity and epidemics). These impacts are often insidious and indirectly (although strongly) linked to dry conditions.

Different livelihood groups are also affected differently by droughts and may see peak impacts at different times - indicators of the hazard and its impacts for one group may very well be different from another. For instance, an indication of peak drought for farmers is often crop failure while for pastoralists, this may be loss of foraging range - parsing between these differences will be necessary for FbA for drought in a way that is not as central for other hazards such as floods which tend to impact mostly everyone that is exposed to them (albeit at different levels). The impacts of drought are therefore far reaching, arguably more so than slow-onset hazards, and arrive at different times for different groups. Sifting through these impacts to identify which ones to address through early action (and when to begin them) can be particularly difficult.

Drought and food insecurity

Food security and droughts are often seen as interlinked. Indeed, droughts put pressure on food production, particularly in countries whose food systems rely on rainfed agriculture by decreasing crop yield and pasture. Drought conditions can force households to use their grain and food provisions, sell their land or destock their animals, and resort to other coping strategies to respond to food stress. Droughts can have long-lasting effects on agricultural productivity, notably by increasing soil erosion and decreasing groundwater resources, therefore decreasing regions' resilience to future shocks. It is not only seasonal droughts that can have such effects however, rainfall anomalies can also multiply the effects of low cumulative rainfall on food security, particularly if these occur at key parts of the agricultural or pastoral calendars. Even small deviations in rainfall variability can be devastating for already-fragile livelihoods with chronic low productivity. Additionally, many socio-economic factors such as population growth, urban development, and conflict can compound the effects of drought conditions on food security by increasing demand in already stressed situations.

C. Stakeholder landscape

A wide variety of actors are involved in drought anticipation and preparedness, from government agencies, development actors, and the humanitarian sector. As Bengtsson (2018) cites " FbF will only be a success if it is a result of extensive collaboration between the relevant stakeholders". Stakeholders interviewed for this project reinforced this and emphasized the importance of collaboration and cohesion between different methods and approaches, given the multi-faceted nature of the hazard. Research also has showcased the political nature of drought. Indeed, governments can be reluctant to announce a drought as it can reflect policy failure, and quickly spiral into political rifts. In contrast, humanitarian actors can be eager to frame events as drought in order to justify support to chronically poor or vulnerable people. We can sometimes see a lag, therefore, between humanitarian indicators of drought and official declarations, drought interventions in anticipation of or in response to events that are never declared as such. As an example, Barter (2019) highlights the 2011 drought in the Horn of Africa: "the slow response to the 2011 drought was widely recognised as an immense failure [...] Only two years on, the Horn finds itself yet again on the precipice of catastrophe, yet the humanitarian response to date is woefully inadequate." Approaches to working with drought may differ but there exists great potential in understanding the strengths and weaknesses of each approach in context, and organisations and institutions can be working either in conjunction or in parallel to reinforce FbA, avoid duplication of efforts, increase the effectiveness of actions, and ensure full coverage of drought affected communities, in ways that are sustainable and effective.

D. Conceptual and practical challenges

The development of this research has highlighted at least three challenges in conceptualising FbA for drought. First, FbA for drought presents a **challenge of framing and definition**: it is complex and difficult to define drought, unpack its timeline and determine early actions that can be taken to reduce its potential impacts. Next, providing guidance for the development of FbA for drought is **contextually challenging** due to the highly contextual nature of this phenomenon that looks different in different regions and impacts individuals and livelihood groups in various and complex ways. Finally, developing FbA for drought in the way the system has been framed through experience in the RCRC presents **structural challenges** and questions on the access of such financial mechanisms as the DREF.

B. Thresholds and Triggering Systems

When act, and on what basis?[1]

The FbF Manual chapter on Trigger Methodology outlines in detail the logic and methods to be used to develop robust triggers. In this section, we hope to add a few particulars and suggestions for drought.

Some conditions for an effective trigger for FbA for drought

1. Sufficient historical data on past droughts, their causes and impacts
2. Identified drivers of rainfall predictability in the region (if forecasts are going to be used, and not triggering entirely on observations in anticipation of the impacts) or else sufficient rainfall observations
3. Sufficient knowledge of livelihood profiles in the region and knowledge of differential impacts of drought conditions on livelihood groups.

Many options exist to frame the temporal aspect of droughts, and therefore the weather forecast and/or early warning indicators we are examining. The appropriateness of this choice will depend on the impacts to which a FbA program for drought is trying to respond and the context of the region a national society is working in. For instance, it is important to understand whether we want to identify the first indications of an abnormally dry period or whether we are trying to identify when the peak impacts of a drought occur. The timing of the impact might also differ for different groups (e.g. droughts will be experienced differently by farmers depending on subsistence agriculture, livestock herders, daily labourers, or other livelihood groups)

Seasonal forecasts of rainfall patterns can provide DRR practitioners with more time to conduct interventions, but this may not be sufficient given forecast availability and skill in different regions.

[1] A special thank you to Marc van den Homberg and Marijke Panis for their insights and help on this section.

Drivers of meteorological predictability

In order to create an effective triggering system, the hazard you are attempting to anticipate must contain drivers of predictability that will be one of the foundations of your forecast. For droughts, these can include, among others:

1. Two rainy seasons/year (e.g. in East Africa)
2. Julian-Madden Oscillation (Anderson et al., 2020; Peng et al., 2019)
3. ENSO cycles (Gore et al. 2020)
4. Indian Ocean Dipole – for East Asia and Australia (Yuan et al. 2008; Ashok et al. 2003)

Further than seasonal forecasts, there are many indications of drought that could be made part of a staggered triggering system (see Annex 3). Indeed, prolonged nature of droughts can provide more time for early actions as compared to a couple of days or hours for floods and cyclones, allowing their conceptualisation and deployment to be done without the same level of urgency of fast-onset hazards. However, with the longer outlook of seasonal forecasts, comes more uncertainty, less granularity and lower accuracy of the prediction. Notably, situations and forecasts can change throughout the seasons. This presents a challenge for the development of robust triggering systems and involves a heightened risk of false alarms, which have been shown to quickly erode the trust necessary for humanitarian presence. For these reasons, a clear and comprehensive understanding of the seasonality of the region's climate, and of context-specific tipping points, is a fundamental first step to any FbA for drought program.

Droughts and decadal variation

The climate experiences variations on many different timescales from seasons to decades. These variations occur as a result of forces from within the earth system (e.g. interactions between the ocean and the atmosphere) and forces that are external to the earth system (e.g. variations in solar radiation). Variations at the decadal timescale are patterns that are experienced during a time period in the range of 10-30 years. For example, 1970s and 1980s in the Sahel region were characterized by severe and recurrent droughts, which were the result of a decadal variation causing a period of dryness during that time period, resulting in devastating humanitarian impacts. This dry period was preceded by a period of wetter years on average in the 1940s, 1950s and 1960s in the Sahel, and has subsequently been followed by a period of relatively wetter years from the 1990's to the present. Similar patterns of decadal variation have been documented for other parts of the world, including for the Asian Monsoon and the climate of the Pacific Islands. Decadal variations can complicate what is considered 'average' rainfall in an area, and therefore what is considered a drought, as droughts are defined by lower than average precipitation in a season. Decadal variations can also have implications for the risk landscape - changing the hazard profile of a country for a period of time. At longer timescales, climatic variation on the order of decades increases uncertainty of future climate projections and therefore makes necessary greater flexibility in planning. For forecast-based action, it is important to understand the patterns and driving forces behind these in order to analyse risk and return-periods of drought events. This is essential to hazard analysis which requires a comprehensive understanding of the phenomenon and its impacts. Additionally, this creates socio-economic challenges as well since climatic variation impacts community resilience and affects the livelihood strategies that are taken.

I. Identifying drought impacts

For drought, the first suggestion here by experts is to develop triggers with a comprehensive understanding of the impacts the drought program hopes to address. It is important to clearly define the basis on which we are creating an FbA program for drought: the importance of framing the definition and indicators that we will be focusing on is paramount. The choice of triggers will be based on which impacts we are most concerned about, what livelihood zones are most likely to be affected, and what impacts the program is attempting to reduce through early action. Then we can identify empirical thresholds at which drought becomes a humanitarian concern - this will be highly context specific. When available, data on historical droughts can help identify context-specific impacts of drought. This can be central to setting thresholds by which impacts are felt by different parts of the population of interest. Notably, we can ask the question: "at what point are drought impacts felt by communities, at what point are they no longer coping with this situation, and what are qualitative and quantitative measures of these thresholds?"

Local and traditional knowledge

These discussions on droughts present an opportunity to emphasize the importance of local and traditional knowledge for hazard preparedness. These systems can determine communities' resilience and impact reduction strategies, as well as provide national societies with information to build triggers and early actions for FbA. For droughts, particular attention must be paid to local cultures of food production, traditional drought preparedness methods, local drought monitoring and indicators, as well as historical memory of drought impacts (Streefkerk, 2020). For example, see Šakić Trogrlić and van den Homberg (2018) who describe some traditional indicators of drought from local knowledge systems in Malawi.

Deep understanding of the local context, and the needs and wants of the targeted community would allow us to identify which drought impacts are most strongly felt by different groups of the community. Similarly, national societies should know how droughts are anticipated locally through existing drought forecasting and early warning systems as well as traditional monitoring methods. Analysis of the performance of these systems could very well provide us with localized models on which to base a triggering system that could then be triangulated with national and global systems of forecasting and monitoring. Experts in trigger methodology have indicated a more appropriate strategy may be to build on tools that currently exist at the government level such as national drought monitoring systems. As such, the ideal is an iterative process with the ground level along with a technology push that creates new ways to analyse drought and drought risk.

Historical impact data

Historical impact data on droughts can be hard to access at useful granular and temporal scales. The information sources can include data such as records of remote sensing, government databases, drought-response plans, insurance pay-outs etc. Tools are being developed to consolidate this information towards the creation of impact databases that would match drought impacts to hazard records. These will be particularly useful in order to build FbA programs for drought and help understand the expression of drought in-context.

II. Drought Early Warning Systems

As explained in the previous section, droughts do not have clear start and end dates, but the timing of below average rainfall matters deeply. Particularly for crops and forage, a dry spell at the beginning of the planting season can be particularly devastating for crop yields. As such, in order to act in anticipation, triggering systems must be based on monitoring and forecasting at the right times to capture these events and act early. Many countries that regularly experience droughts already use some form of available early warning systems to monitor food insecurity and other impacts. These systems are based on observations of a variety of indicators that are often held by the national governments or else pegged on monitoring systems such as FEWSnet (globally) and the Cadre Harmonisé (West Africa and the Sahel), which are used to monitor deteriorating conditions and anticipate peak impacts.

Case Study: Drought Early Warning Systems in Kenya

In Kenya, ForPAc, a SHEAR funded project, has worked with the National Drought Management Authority (NDMA) to bolster an integrated drought early warning system that issues monthly early warning bulletins. The system monitors livelihood zones, biophysical indicators (e.g 3-month rainfall anomalies), indicators of production (e.g. crops, livestock), as well as access and use (e.g. trade, milk consumption, cost of water, malnutrition risk).

Pre-existing early warning systems already form part of many Early Action Protocols within Red Cross Red Crescent FbA programs - often as one part of a triggering system. Indeed, early warning systems may in fact become a fundamental tool for anticipation, particularly if there are no functional seasonal or sub seasonal forecasts for the country. Where they exist, these systems may be even more important for slow-onset hazards like drought, necessary but not sufficient - layers of additional (ideally) local indicators must be added to these in order to form an appropriate FbA trigger. These drought EWS must be assessed for skill, appropriateness of the lead-time for early action, and thresholds that must be set before the trigger is reached. There are also important considerations of granularity of the information provided, and whether this is usable by a national society.

Local indicators

We refer to local drought indicators as metrics and tools for a specific country or region (i.e. not global). These can be, for example, monitoring local temperatures, local rainfall and water resources, staple crop yields, food prices etc. This data is collected in order to address the strong context-specificity of drought and therefore more accurately predict its impacts and monitor its progression.

It is important to note that local indicators cannot be collected specifically for the FbF system by RCRC national societies. Rather, the information must be collected by another institution and be publicly available at regular intervals in order to use this for an FbA triggering system. Indeed, collecting data on local indicators would require from the national society a team of enumerators that work continually to collect and process that information in all places where the program could possibly trigger (e.g. collect food price information for every village market). This would have extensive cost implications and likely over-burden the national society staff and volunteers. As such, the inclusion of local indicators into an FbA trigger must involve assessing what indicators are relevant for the impacts the program is trying to anticipate and identify which of those indicators are already collected (e.g. the ministry of agriculture's food price bulletin) and are available at the time they would be needed to inform a possible trigger.

III. Triggering methodology

In general, early action triggering systems have been developed in two ways. Awareness of the differences in these methods is useful given that, for droughts in particular, these methods may be functioning side-by-side in the same area.

1. Consensus-based. This is the method used in systems like FEWSnet and within UN agencies such as the FAO, WFP, and the Start Network. Through this, many sources of information are triangulated by experts who make real-time judgement on action (either with pre-defined indicators to consider, or with more flexibility).
2. Data-driven: The current FbA triggering system set-up in the RCRC requires robust, quantitative, data-driven triggers that are peer-reviewed and validated in advance of any potential trigger.

Given the different layers of complexity with drought, different types of triggers may be required beyond what is often used in EAP development. For instance, unconventional triggers for FbA for drought could include metrics such as staple food prices, percentages of crop failure, and other elements of food security early warning systems. Thinking outside the box in terms of both hydro-meteorological and socio-economic indicators could be particularly useful.

Usefulness and skill of seasonal forecasts

Consider the usefulness of seasonal forecasts, based on where predictability of the seasons is known, and the known drivers of predictability (e.g. ENSO and IOD in East Africa). Indeed, certain regions (and seasons) may have greater current potential for a functional triggering system that is largely based on a seasonal weather forecast. Notably, weather forecasts are more accurate in certain regions, especially those whose rainy seasons that can be better predicted due to the presence of drivers of predictability. Similarly, regions with two consecutive rainy seasons provide us with greater information on which to peg staggered triggers. This may be helpful to consider, if making the choice between more than one country where to trial an FbF for drought system. In particular, it has been suggested that Northern Latin America, East Africa, and Indonesia are three areas where FbA triggers for drought could be tested.

Many practitioners and experts interviewed for this work suggested that a staggered triggering system, at different lead times and for different early actions may be the most appropriate to tackle droughts (see Annex 3). Indeed, given the long-lead time and variability over seasonal timescales, we could envision multiple sets of early actions triggered by different indications of probability of peak drought impacts. For instance, a first set of no-regret early actions could be triggered at the first indication of a lower than average predicted rainy season. Then, a second set of early actions could be conducted based on whether the probability of a drought is increasing or decreasing. Then, a third set of actions could be conducted during the drought, before peak impacts are felt by the population. For instance, cash transfer could be seen as a last early response action.

C. Early Actions

What meaningful anticipatory or early response actions could be taken to reduce the potential impacts of drought?

An iterative process

In current FbA guidance (for instance in the FbF Manual), the section on Early Action comes after the section on Triggers. For the sake of consistency, we have followed the same order in this report. However, it is important to note that the development of triggers and early actions is an iterative process - early actions and triggers are both developed in order to prepare for identified impacts. As suggested in annex 1, a menu of potential early actions could be first identified, and this list then narrowed as analysis conducted for the trigger methodology showcases the lead-time that is given by the forecast information and therefore the actions that are feasible.

Once impacts have been identified, we must develop early actions that address the impacts of drought that we are concerned about. Early actions for drought can resemble currently practiced drought response actions, but two distinctions are made, in their timing and in their focus on increasing resilience and preparedness. Throughout the development of these early actions, close relationships with communities and consultations are necessary in order to identify which ones may be possible, useful and accepted.

Drought response actions

The following drought response actions were identified from RCRC emergency appeals analysed for this report.

- Food and basic needs assistance
- Health Service deployment (e.g. mobile clinics)
- Health and hygiene promotion, including distribution of WASH non-food items at household level (purification tablets, jerry cans, soap)
- Nutrition screening
- Fuel subsidies
- Water storage instrument distribution
- Soup kitchens
- Vegetable garden planting
- Support for water resource management (rehabilitation of bore-holes and other water storage units, (re)establishment of local water management committees)
- Cleaning of drainage systems
- Identification and promotion of possible livelihood activities that may not be affected by drought (e.g. fishing)

I. Examples of Early Actions for drought.

The following list examples of possible meaningful early actions that may be possible to take under an FbA program for drought.

Droughts and livelihood resilience

The severity and duration of drought impacts can be a function of the resilience of households and communities. Indeed, droughts often become humanitarian disasters when water scarcity overlaps with low coping capacity or other shocks. Livelihood resilience to shocks is also a function of socio-economic conditions such as dependency on specific climate conditions, the possibility of diversification, available resources, social cohesion and capital, political stability etc. As such, in order to avoid the worsening of humanitarian indicators during droughts, programs must emphasize the resilience of livelihoods, their ability to respond to shocks, and promote positive coping strategies, which may include a discussion from moving to less climate sensitive income generating activities.

1. Perhaps the most direct early action is the **transferring of cash** to beneficiaries. This generally takes two forms: unconditional or conditional transfer of funds directly to individuals, households, or communities through cash or vouchers. There would many purposes of cash transfers for FbA for drought, notably to allow households to purchase non-perishable food items to get them through particularly difficult lean seasons, to assist communities to rehabilitate water storage facilities, to avoid falling into negative coping strategies such as destocking livestock, selling land, taking children out of school etc. The goal behind these cash transfers will determine the modalities of the action, the amounts, methods of transfer, etc. and the logic must be clearly thought-out.

2. **Water storage** is another set of early actions which can be undertaken to protect existing water sources, enhance storage and limit depletion, lead to better water management in situations of stress etc. For instance, **plastic drums and/or jerry cans** have been distributed in some countries to allow households to collect rainwater, and the **rehabilitation of bore hole**s has also led to increased water resources in anticipation of failed rainy seasons. Establishing (or re-establishing) **water management committees** can additionally be important in times where the limited water resources must be managed and accounted for with particular attention.

3. Since droughts can be linked to disease outbreaks and a range of health issues related to poor water quality, many risk reduction programs involve protecting communities against these. Health-related drought impacts should be identified early, and health services deployed where needed. For instance, projects have seen the distribution of **water purification tablets, vaccinations** of people and animals against diseases such as cholera and hepatitis. **Advice and awareness** raising on different elements of health and sanitation can also be useful to avoid drought-related epidemics.

4. Given that many impacts of droughts that preoccupy the humanitarian sector are elements of food insecurity, a range of early actions have been developed regarding agricultural and pastoral practices (in particular, UN agencies such as FAO and WFP have extensive experience in this sector). For example, **destocking**, **fodder distribution/planting**, and animal **vaccinations** are commonly used actions. the development of **micro-irrigation and precision agriculture** can limit the pressure on water resources during periods of low precipitation. Similarly, the d**istribution of fertilizer and farming tools** can increase the yields of fields under stress. **Training on crop diversification and storage** can also be conducted when a drought is anticipated far enough in advance - some programs have developed **vegetable gardens** and **distributed small livestock** to increase the amount of food available in communities. Perhaps the most widely early action for food security over recent years has been the **distribution of drought tolerant seeds** at the beginning of the planting seasons.

Forecast-based Financing for Mongolia Dzud

A validated early action protocol for Mongolia makes it possible for national society to access the DREF in anticipation of forecasted extreme winter conditions (or Dzud). Dzud is particularly devastating to the large herder community of rural Mongolia, causing mass livestock death, and subsequently issues of economic insecurity. This project has the longest lead time of any DREF FbA program and is perhaps the closest example, as yet, to FbA for drought within the Red Cross Red Crescent - a program triggered with a seasonal prediction for a hazard that is strongly socio-economic. The EAP follows the nationally-produced risk map (“Dzud risk map”) at the threshold of when the “dzud risk map indicates 20 percent coverage of the highest risk level over no less than 3 provinces”. When this happens, the EAP plans for two types of early actions: cash distribution and the distribution of livestock nutrition kits to low socio-economic status herder households.

II. Theory of Change

The following exercise lays out the stepwise rationale for all early actions established in the FbA program, guiding both their choice and details. Robust theories of change (ToC) should be at the base of all development of early action protocols (refer to Editable Theory of Change here)

The following showcases two examples of theories of change that could be used for unconditional cash transfers, meant to show the different times for acting with the same program. The process begins by identifying the problem (in red), then the choice of early action (blue), its expected effect (green) and finally the desired outcome of the early action (yellow). These are meant to be very simplified and stylised examples to demonstrate the potential difference between acting before peak impacts and acting before the failed rainy season itself.

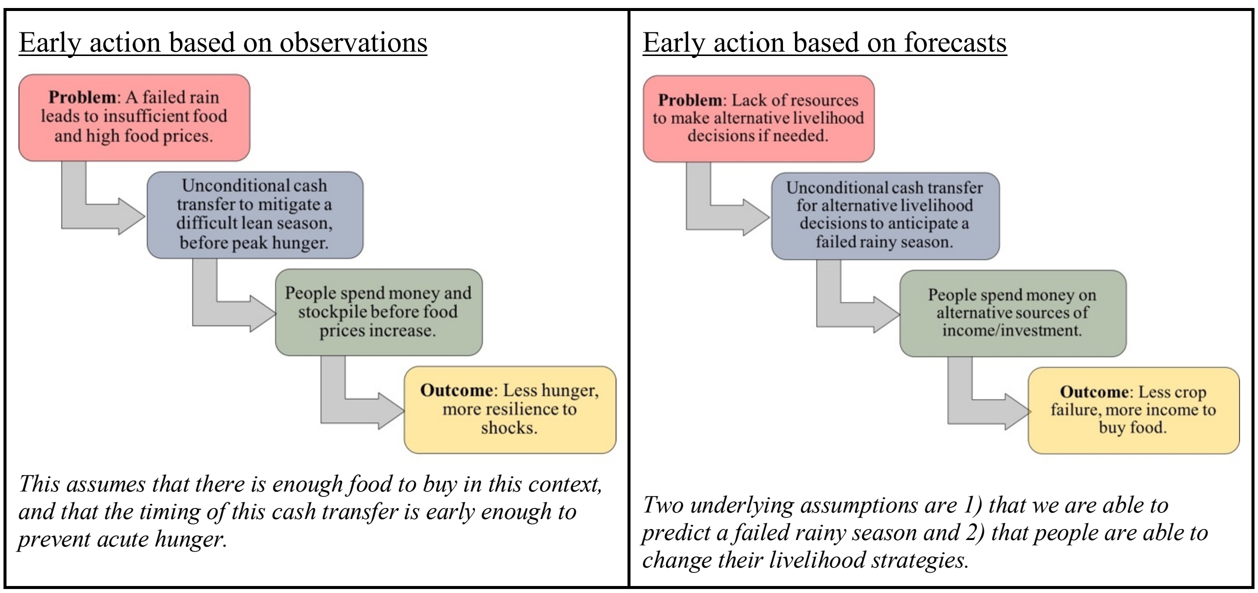


Figure 6. Example Theories of Change

D. Monitoring and Evaluation

How do we measure the success of FbA for drought programs?[2]

I. Specific Challenges and Advantages of M&E for Droughts

The complexity of droughts described in above pose challenges but also advantages for monitoring and evaluation of FbA for drought programs.

a. Following general M&E guidelines for droughts

Monitoring and evaluation (M&E) is a fundamental component of FbF that allows national societies to track EAP activation and evaluate its successes and failures. There exist clear and robust guidelines to this component. These must be well-understood and followed in order to create an effective program: the monitoring and evaluation of FbA programs is not fundamentally different from other types of M&E - M&E for FbA for drought should not be very different either.

M&E for FbF - Steps

Before Program Development

1. Appoint an expert in M&E for the program
2. Set-up a Logframe for the program
3. While prioritizing early actions, include the M&E perspective

During Program Development

1. Define the measurement and evaluation of each early action and overall FbF system
2. Define responsibilities for data collection and the timeframes this will be conducted
3. Summarize the what, when, how, by whom of the M&E plan for the EAP

During and After EAP Activation

1. Monitor the early actions that were implemented
2. Collect and analyse all collected data about the impact of the early actions
3. Systematize learnings through a workshop, an internal report, and updates to the EAP

[2] A special thank you to Clemens Gros for sharing his expertise and time for this section.

b. The Counterfactual

Ideal M&E requires a comparison of the activated program to a counterfactual in order to answer the question: "What would have happened without FbA?" The exercise allows us to quantify and qualify the differential impact of the FbA program and understand whether it was successful given pre-established parameters for success. Droughts present a particular challenge for humanitarian actors because they are typically geographically widespread while currently, funding under FbA by DREF is limited. Therefore, not everyone in need of forecast-based assistance will receive help. While this is very unfortunate, it presents an opportunity from an M&E perspective: It is likely that some communities affected by the drought will not have been reached by the program. These communities can serve as a comparison group against which to evaluate the effectiveness of the early actions.

c. M&E Timing

The right timing of M&E around the triggering of early actions is important. Data cannot be collected too long after the program's completion (because people may forget details about their drought experience and about the assistance they received) but far enough in the future to measure its effects (because the effectiveness of certain types of assistance, for example providing seeds and fertilizer, will only be visible during/after the next growing season).

Ideally, the M&E plan includes measuring baseline conditions for the control and targeted FbA groups, in order to compare this with post-intervention conditions. However, this is resource intensive and time-consuming and is therefore often difficult, especially given that a forecast may not be able to indicate the exact locations that will be most affected by the drought, and it is not logistically possible to cover an entire country with baseline data collection 'just in case'. In this way, the lack of clarity in the onset and end-dates of droughts complexifies an already delicate balancing act: practitioners are confronted with the trouble of timing early actions to reduce the potential impacts of an unclear hazard, and the added difficulty of timing the M&E to follow. However, droughts also provide a particular advantage in this area, given the slow nature of their impacts -fast-onset hazards are often too unpredictable to conduct baseline surveys. Slow-onset hazards like droughts offer a different time horizon and therefore more opportunity to do baseline data collection once it is possible to identify the most affected geographic areas.

II. Some Suggestions for Drought M&E

1. **Think about monitoring and evaluation during the early stages of the program development.**

Planning out how to evaluate success of a FbA program early in the development stages can make it more effective. Indeed, planning M&E in parallel helps to define the goal of the program, the logic and theory of change behind each decision, and the different FbF components including the timing of triggers and different early actions. Overarching should be the question: what does the success of this drought FbF program look like?

For example, the main goal of the FbA program may be to prevent vulnerable households to adopt negative coping strategies: as the drought may wipe out harvests and therewith the main source of food and income for most, families may be forced to exchange or sell valuable assets – such as farming equipment – for money or food, or they may have to forego meals and remain hungry. To prevent this, the chosen FbF early action may be an unconditional cash grant distribution to vulnerable households. The outcome indicator and measure of success may be the observed incidence of valuable assets sales among the beneficiary population (which should be lower than the rate of asset sales in the comparison group) and the number of days the households report not having had enough food to eat. These indicators should be defined in the FbF program's M&E plan (see example and template here).

2. **Peg M&E timing and components to the early actions, not the hazard**

The timing of M&E data collection depends mainly on the timing of the early actions and their expected effects, not the hazard context because the beginning and end of a drought period are not necessarily the times when results can be observed. Instead, the data should be collected as soon as one can expect the effect of the action to have fully materialized. This will depend on the impact that the program is trying to address, and therefore the tools it has chosen. For example, if the early action involves the distribution of drought-resistant seeds, monitoring of the program would ideally occur after the following harvest.

3. Try collecting data more than once over the drought period, using innovative data collection tools

Droughts are typically characterized by long lead-times (the time period between the forecast and the onset of the dry period) and an overall duration of several weeks or months. This is a challenge from an M&E perspective because, when collecting data, the more people have to remember, the more likely they are to forget certain details. The longer time horizon is also an opportunity for M&E because, thanks to innovative and inexpensive data collection tools, it may be possible to collect limited amounts of information more frequently. For instance, to limit the effect of recall bias, national societies could conduct regular check-ins through mobile phones, either short phone calls or SMS surveys to the target FbF and comparison group respondents. This is a technique widely used in the development sector and enjoys increasing popularity among humanitarian organizations. There are free and low-cost solutions for mobile data collection readily available, for example, via UNICEF's RapidPro platform (offered to other organizations via TextIt), and commercial solutions from Magpi, Viamo, and others.

4. Document the whole process

As was shown in the development of FbA, documenting the learnings from the development of the program and its evaluation is particularly important in the first years of the concept. M&E structures allow for this process to be explicitly written and compiled. The canon created will allow other national societies to emulate, be inspired, and learn from previous pilots, and build towards a robust system of drought anticipation and early action. Learning guidance is available in the FbA M&E manual, including guidance and an exemplary agenda for a lessons learned workshop.

Useful References

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