



# **FORECAST-BASED FINANCING IMPLEMENTATION IN KENYA: OPPORTUNITIES AND CHALLENGES**









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## Key Opportunities

- Key national level institutions that are important in the implementation of Forecast-based Financing (FbF) exist and have shown interest and willingness to engage with FbF
- Humanitarian and disaster management institutions desire to use forecasts to plan for early action, with thinking of who will potentially be affected and cost implications
- The Kenya Meteorological Department seeks to enhance their services thus presents an opportunity to co-develop forecasts designed to trigger early action
- The policy context is currently favourable for supporting early action, demonstrated by the recently approved NDRM policy and the NDRM Bill that is currently under discussion
- A number of data sources on flood and drought vulnerability exist

## Key Challenges

- Lack of a Disaster Management Law
- Lack of a national scale flood early warning system (FEWS) while a drought early warning system for ASALs exists
- Overlapping disaster management mandates and roles among key government institutions
- Data currently used in disaster management is quite old and needs to be updated to reflect dynamics in the context
- Data access at different levels of granularity is limited due to inadequate technical and bureaucratic data sharing infrastructure



# ABBREVIATIONS

<b>ARC</b>	African Risk Capacity
<b>CatDDO</b>	Catastrophe Deferred Drawdown Option
<b>CRA</b>	Community Risk Assessment
<b>CSGs</b>	County Steering Groups
<b>DCP</b>	Drought Contingency Plans
<b>DEWS</b>	Drought Early Warning System
<b>DREF</b>	Disaster Relief and Emergency Fund
<b>DRR</b>	Disaster Risk Reduction
<b>EDE</b>	Ending Drought Emergencies
<b>EWS</b>	Early Warning System
<b>FAO</b>	Food and Agriculture Organisation
<b>FEWS</b>	Flood Early Warning System
<b>FEWSNET</b>	Famine Early Warning Network
<b>FFC</b>	Flood Forecasting Centre
<b>FMIAC</b>	Flood Mapping and Impact Assessment Centre
<b>FSNWG</b>	Food Security and Nutrition Working Group
<b>GPCs</b>	Global Producing Centre
<b>GrIF</b>	Global Risk Financing Facility
<b>ICPAC</b>	IGAD Climate Prediction and Application Centre
<b>IGAD</b>	Inter-government Authority on Development
<b>KFSSG</b>	Kenya Food Security Steering Group

<b>KIRA</b>	Kenya Inter-Agency Rapid Assessment
<b>KWSCRp</b>	Kenya Water Security and Climate Resilience Project
<b>MISs</b>	Management Information Systems
<b>NDCF</b>	National Drought Contingency Fund
<b>NDEF</b>	National Drought Emergency Fund
<b>NDRMA</b>	National Disaster Risk Management Authority
<b>NDRMP</b>	National Disaster Risk Management Policy
<b>OCHA</b>	United Nations Office for the Coordination of Humanitarian Affairs
<b>SoPs</b>	Standard Operating Procedures
<b>UNHCR</b>	United Nations High Commissioner for Refugees
<b>USAID</b>	United State Agency for International Development
<b>WFP</b>	World Food Programme
<b>WRA</b>	Water Resource Authority



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<sup>1</sup> Lopez et al., 2018, Kenya Ministry of Devolution and Planning 2015



# EXECUTIVE SUMMARY

Currently, many predictable extreme events such as floods and drought, result in disasters and suffering. This is aggravated by climate change. The impact of these events can be reduced or avoided if weather and climate forecasts are systematically used for early action to prepare for disaster. Innovative Approaches to Response Preparedness (IARP) project aims to fill this critical gap with forecast-based financing (FbF) supported by data preparedness and cash transfers. The purpose of the feasibility study was to assess to what extent the contexts in Kenya and Kenya Red Cross Society (KRCS) and other relevant stakeholders are conducive to the implementation of FbF, Cash Transfers Programme (CTP) and Data Preparedness, in support of the most vulnerable people affected by the natural disasters in Kenya.

The study was conducted through interviews with key individuals within KRCS and other external key stakeholders and more information collected from relevant literature. FbF implementation in Kenya has a medium feasibility. This is because key national level institutions that would be involved in the implementation exist, and there are opportunities for IARP to demonstrate resonance with institutional mandates, on-going work as

well as the policy context. The KRCS has a well-established presence across the country, and is seen as the 'go-to' organisation for humanitarian emergencies and disaster management, both by the two levels of government and communities. KRCS also has a well-defined contingency plan on which FbF can be anchored.

There are also a number of opportunities that can support the development and implementation of a nation-wide FbF system. First, humanitarian and disaster management institutions increasingly desire to use forecasts to plan for early action, with thinking of who will potentially be affected and cost implications. Second, the National Meteorological Services seeks to have greater impact, which presents an opportunity to develop forecasts designed to trigger early action. Third, the policy context in Kenya is currently favourable for supporting early action, demonstrated by the recently approved NDRM policy and the NDRM Bill that is under discussion. IARP will need to figure out how best to engage with these FbF opportunities. However, strong commitment by a relevant national institution that has the authority to rally support and coordinate FbF work across national stakeholders needs to be established.



# 1.0 INTRODUCTION

Kenya experiences a number of disasters with the most common being weather related, including floods, droughts, landslides, lightening/thunderstorms, wild fires and strong winds. These disasters have increased in number, frequency and complexity and the level of destruction has also become severe with more human and animal deaths, loss of livelihoods and destruction of infrastructure, among other effects resulting in losses of varying magnitudes. In Kenya, droughts and floods are the foremost climate related risks of concern, due to the significant economic and livelihood losses that they cause.

Kenya is a highly drought prone country, because of its peculiar eco-climatic conditions as only about 20% of the territory receives high and regular rainfall. The rest (80%) of the territory is arid and semi-arid lands (ASALs) where annual rainfall varies from 200 to 500 mm, and periodical droughts are part of the climate system. In the 20th Century, Kenya has experienced drought cycles approximately every 10 years. This cycle has significantly increased to every 2 – 3 years in the last three decades, with the country experiencing roughly 12 drought events from 1979 – 2017.

It is estimated that between 2008 and 2011, damage and losses caused by droughts was USD 12.1 billion. In 2011 alone, drought affected 3.75 million people at a cost of USD 427.4 million in humanitarian aid<sup>2</sup>. Most recently, the 2016/17 drought left about 1.25 million people acutely food insecure by January 2017<sup>3</sup> with the number rising to 2.55 million people in need immediate humanitarian assistance by January 2018<sup>4</sup>. Information on drought occurrence and impacts in Kenya tends to be concentrated in the ASALs. Historically, the ASALs are the most affected by drought, with the response being that work by the National Drought Management Authority (NDMA) is focused in these areas. However, it is possible that other parts of the country considered to be high potential areas also experience drought but the information is not well documented.

<sup>2</sup>Kenya Ministry of Devolution and Planning 2015

<sup>3</sup>WFP 2017

<sup>4</sup>KFSSG 2018



Impact and cost implications for floods are less well documented compared to droughts. The 1997/98 El Nino floods are often mentioned because they are considered to be the largest flood losses in the country over the last 50 years. Economic costs were estimated to be between USD 0.8 to 1.2 billion, arising from damage to infrastructure (roads, buildings and communications), public health effects (including fatalities) and loss of crops<sup>5</sup>. In 2018, during the March to May long rains, heavy rains that resulted in flooding left approximately 50,221 households (about 301,326 people) displaced, and caused significant damage to infrastructure such as schools, dams and roads, and outbreak of diseases<sup>6</sup>.

The impact of droughts and floods is therefore a major concern for Kenya. The impact of these

events can be reduced or avoided if weather and climate forecasts are systematically used for early action to prepare for disaster. However, forecasts are not always used to take early action, with governments and humanitarian organisations often starting their response operations after a disaster has taken place. A number of reasons have been cited for this reactive rather than anticipatory actions including the lack of plans and early financing to take early action. If a FbF system is in place, this can support triggering early action to reduce climate-related risks to vulnerable people and save valuable time and money in humanitarian response.

<sup>5</sup>GoK 2012

<sup>6</sup>IFRC & KRCS 2018

**In 2018, during the March to May long rains, heavy rains that resulted in flooding left approximately 50,221 households (about 301,326 people) displaced, and caused significant damage to infrastructure such as schools, dams and roads, and outbreak of diseases.**



## 2.0 FORECAST-BASED FINANCING (FbF)

Forecast-based Financing (FbF) is an anticipatory mechanism to enable access to funding before a disaster, to implement early action based on credible forecasts and in depth risk analysis. The goal of FbF is to anticipate disasters, prevent their impact, if possible, and reduce human suffering and losses. The Red Cross Red Crescent Movement and partners have implemented a number of FbF pilots around the world. One of the key lessons learnt is that FbF implementation so far has only been pilots in communities, which locked implementation to specific areas and therefore people were not prepared to take action in all the areas where extreme weather and climate events would occur. Based on this lesson, the Innovative Approach to Response Preparedness (IARP) Programme (Box 1) is taking a national-scale approach to FbF. This means taking early action anywhere in Kenya where the forecast indicates a high risk of severe impact. The IARP programme is funded by the IKEA Foundation, and is under implementation in Ethiopia, Kenya and Uganda.

As a first step in FbF implementation in Kenya, a feasibility study was conducted, that

aimed to assess to what extent the contexts in Kenya, Kenya Red Cross Society (KRCS) and other relevant stakeholders are conducive for the implementation of FbF, Cash Transfers Programme (CTP) and Data Preparedness. The study adopted a mixed descriptive quantitative and qualitative design involving literature review, questionnaire survey, KIs and FGDs. This approach allowed for complementarity of source data thus ensuring reliable and valid assessment findings based on results and conclusions drawn using the three different methodologies. The key responders were KRCS, KMD, WRA, NDMU, NDOC, NDMA, FSNWG, ICPAC, FEWSNET and Social Protection Secretariat. These meetings, combined with ongoing work with key departments within the KRCS and meetings with other key stakeholders, such as ODI who also work on Forecast based Action in the region, have been key to this study. The findings from this study were discussed and corroborated during a stakeholder workshop held in Nairobi in May 2019. This further shaped the study findings and informed the recommendations put forward.



### **Box 1: Innovative Approach to Response Preparedness Programme**

Currently, many predictable extreme events such as floods and drought, result in disasters and suffering. This is aggravated by climate change. The impact of these events can be reduced or avoided if weather and climate forecasts are systematically used for early action to prepare for disaster. However, forecasts are not always used to take early action, with governments and humanitarian organizations often starting their response operations after a disaster has taken place. Among other things, this is due to the lack of plans and early financing to take early action. If such procedures were in place, this could reduce climate-related risks to vulnerable people and save valuable time and money in humanitarian response.

The Innovative Approaches to Response Preparedness (IARP) programme aims to fill this critical gap with forecast-based financing (FbF) supported by data preparedness and cash transfers. This will put an early warning early action system in place that enables Red Cross National Societies in partnership with government agencies and met services, humanitarian organizations and others to carry out cost-effective and timely actions for the most vulnerable people. This will reduce the impact of climate change and disasters on them, protect their lives and livelihoods, and support their development. The effect of climate-related disasters on communities, including refugee groups, is reduced.

Early warning early action enables National Societies in partnership with government and other agencies to deliver cost-effective, targeted and timely action for the most vulnerable people facing climate-related disasters. The programme will run for five years to the end of 2022 with funding from the IKEA Foundation through the Netherlands Red Cross.

- A countrywide FbF system is in place in support of early warning early action.
- The National Societies use data to better understand risks and identify beneficiaries for greater humanitarian impact.
- National Societies implement cash transfer programming to support early action.



## 3.0 OPPORTUNITIES AND CHALLENGES OF IMPLEMENTING FbF IN KENYA

### 3.1. Challenges

#### 3.1.1 Forecasting Capabilities in Kenya

Understanding existing forecasting capabilities is key in implementing FbF. It is useful to know the existing forecast products, content of the forecasts, type of forecasts (deterministic or probabilistic and the lead times. The Kenya Meteorological Department (KMD) is the institution mandated to generate forecasts in the country by the Kenya Government. KMD therefore is a critical stakeholder in the FbF work.

**The Kenya Meteorological Department (KMD) is the institution mandated to generate forecasts...**

KMD produces forecasts covering a range of timescales: daily, 5-day, 7-day, 10-day agro meteorological bulletins, severe weather forecasts, monthly and seasonal forecasts. All forecasts are presented at national scale, while seasonal forecasts are also downscaled to county level. Some counties, especially those that were part of the WISER Western project<sup>7</sup> and Nairobi, also downscale 7-day forecasts. The lead-time of KMD forecasts ranges from one day to one month in advance. All the forecasts are not 'drought' or 'flood' forecasts but essentially rainfall forecasts. Advisories are issued when there is a moderate probability (33% to 66%) of getting heavy rainfall in various places in the country (Figure 1). For floods, the only available forecast from KMD is for the Nzoia River Basin (Figure 2). Rather than covering the entire basin, the flood forecast is only for water levels at Rwambwa Bridge River Gauge Station, located in a sub-county area (Budalangi) that has been historically prone to floods.

<sup>7</sup>The WISER project in Western Kenya covered Kakamega, Siaya, Kisumu and Trans Nzoia Counties. <https://www.metoffice.gov.uk/about-us/what/international/projects/wiser/cis-kenya>





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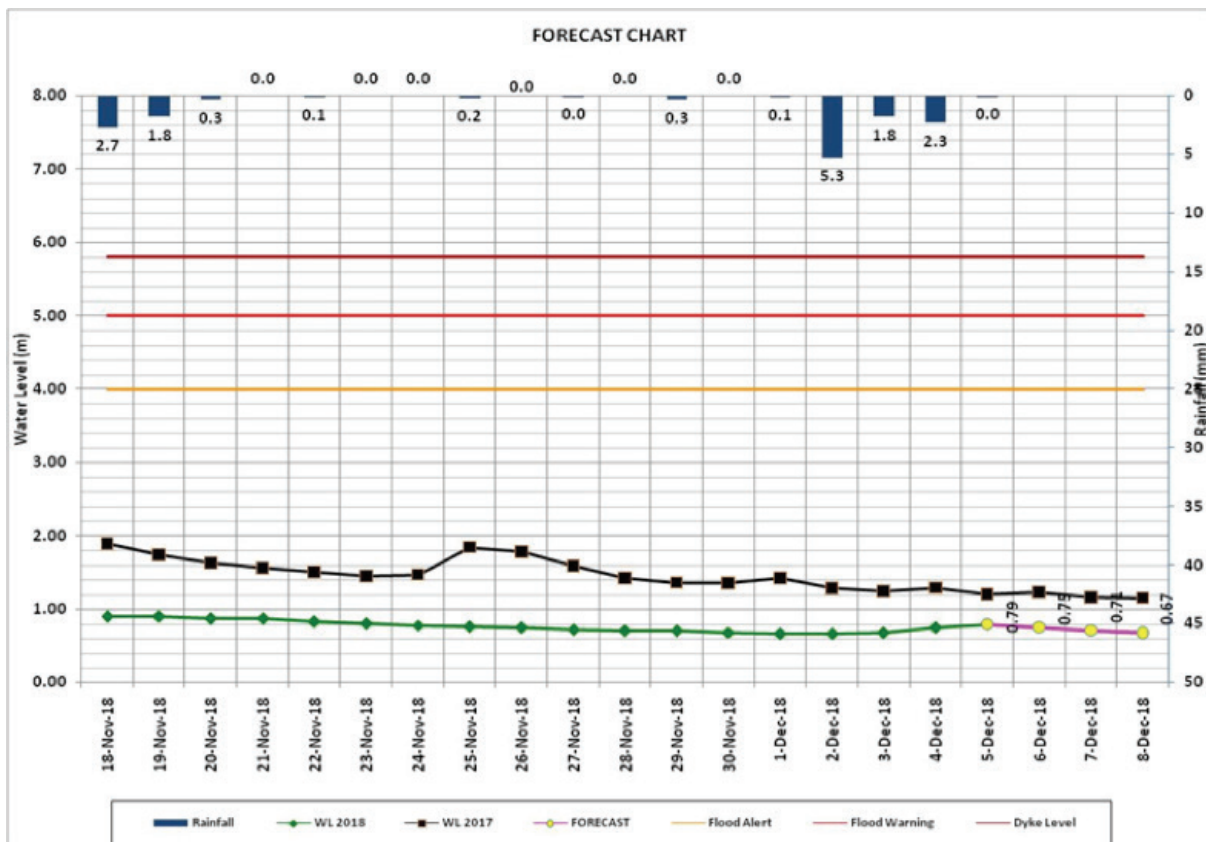


## Heavy Rain Advisory

<b>Message Type:</b>	Heavy Rainfall
<b>Message Update No.:</b>	One
<b>Advisory No.:</b>	10/2018
<b>Date of Issue:</b>	23 <sup>rd</sup> October, 2018 0700UTC
<b>Validity:</b>	From 24 <sup>th</sup> to 26 <sup>th</sup> October 2018
<b>Urgency:</b>	Expected
<b>Severity:</b>	Moderate
<b>Certainty:</b>	Moderate Probability of occurrence (33% to 66% Chance)
<b>Message Description:</b>	Heavy rainfall of more than 30mm in 24 hours is expected on 24 <sup>th</sup> Wednesday October, 2018 over the coastal region of Kenya. The rainfall is expected to intensify to more than 40mm in 24hrs on Thursday 25 <sup>th</sup> October 2018, along the south coast. On Friday 26 <sup>th</sup> October 2018, the rainfall intensity expected along the coast will decrease to 30mm in 24 hours. These heavy rains will be accompanied by strong winds and large waves.
<b>Area(s) of Concern:</b>	Counties expected to be affected include; Kwale, Mombasa, Kilifi Tana River and Lamu.
<b>Instructions:</b>	Residents in all the mentioned areas are advised to be on the lookout for flashfloods. People should avoid driving, wading or walking through any fast moving waters. The heavy rains and strong winds off shore may result in storm surge along the coast, hence fishermen and all in the Marine industry should be on high alert. Continue listening to local media as updates will be provided if conditions change significantly. Further advisories will be issued as we follow upon the progress of this weather event.
<b>Message Addressed to:</b>	Office of the president, Kenya Red Cross, Kenya Maritime Authority, Kenya Ports Authority, National Disaster Operations Centre, Media, County Directors of Meteorological Services (CDMs) of Mombasa, Kilifi, Lamu, Tana-River Counties.
<b>Originator:</b>	Director, Kenya Meteorological Department.

**Figure 1:** A heavy rain advisory issues by KMD on 23rd October, 2018





**Figure 2:** The basin real rainfall for 5th December 2018 was 0.02 mm. The green line shows the daily average water levels at Rwambwa Bridge. The previous day's average river level was 0.79 m, the morning level on 5th December 2018 was 0.75 m at 08:00 HRS and 0.76 m at 09:00 HRS. The purple line in the plot shows the model forecast water level at Rwambwa river gauge station. It was anticipated that the average water level at Rwambwa was unlikely to exceed 0.75m during the next 48hrs. Therefore, there was **No risk of flooding** within the forecast period.



All forecasts produced by KMD are deterministic, with the exception of seasonal forecasts that are sometimes presented as probabilistic tercile forecasts. A deterministic forecast presents a weather/climate prediction as one possible occurrence. For example, when it is said that a forecast of 50mm of rainfall happening in the next 24 hours, then the forecast indicates that 50mm of rainfall would definitely occur. On the other hand, a probabilistic forecast presents the percentage chance that a particular weather/climate condition would occur for example, a 60% probability that the next 24hrs would get 50mm of rainfall. Due to the chaotic nature of the atmosphere, it is not possible to predict exactly what the weather/ climate will be. It means that there is always a level of uncertainty in the forecasts. This makes it important to present forecasts in a probabilistic manner rather than as a deterministic forecast.

The skill of KMD seasonal forecasts was assessed during the implementation of the WISER SC�PEA<sup>8</sup> project in 2005 – 2015. Results indicated that when KMD presents a 40 – 45% probability of below normal rainfall in the October – November – December (OND) short rains season, the actual historical observance of rainfall in this tercile is up to 90%. Based on the relatively good skill assessment of forecasts from Global Circulation Models (GCM), the use of GCM data can potentially enhance the ‘boldness’

of probabilities presented in KMD forecasts, if the GCMs are calibrated. This skill assessment is currently continuing in the Towards Forecast based Preparedness Action (ForPac)<sup>9</sup> Project. According to MacLeod et al., 2018<sup>10</sup>, the skill of most KMD forecasts is relatively unknown. Some forecast verification, such as, for severe weather products, is done through eyeball comparison of the forecast with observations. However, this has not been well documented to get a sense of the overall forecast skill.

KMD’s modelling capacity is limited to in-house runs of the Weather Research and Forecast (WRF) model to generate daily forecasts and severe weather forecasts, and statistical modelling to generate seasonal forecasts. Other products are generated by reviewing forecast products from Global Producing Centres (GPCs) such as the European Centre for Medium range Weather Forecasts (ECMWF), the UK Met Office, the French National Centre for Meteorological Research and NOAA. Currently, KMD is keen to develop impact based forecasts, which is critical in FbF, since the information generated can be easily used, help key stakeholders see the value

<sup>8</sup>The Strengthening Climate Information Partnerships - East Africa is DFID-funded project of the WISER programme (Weather and climate Information and SERVICES for Africa) <https://www.metoffice.gov.uk/about-us/what/international/projects/wiser/scipea>

<sup>9</sup>ForPac <http://www.forpac.org/>

<sup>10</sup>MacLeod, D., Salih, A., Kilavi, M., Coleman, A., Graham, R., Mutemi, J., & Todd, M. (2018). S2S predictability, forecasting and verification in Kenya and GHA. ForPac project technical report. Retrieved from [www.forpac.org](http://www.forpac.org)



of using forecasts as well as determine how much money is required for effective preparedness and response to weather and climate related hazards.

The key limitations and challenges of the forecasts currently developed by KMD in the implementation of FbF include:

Forecasts tend to be subjectively developed – Forecasts, especially at daily to monthly timescales, are developed through consulting various model products from GPCs, rather than from model runs. The challenge is the varying levels of forecaster skill and knowledge hence the inconsistent production of forecasts. Consistency in the reliability of forecasts is important for setting up triggers for early action. Further, access to some GPC products is tied to KMD paying for the required licences, which may not always be paid.

- KMD has limited capability of storing historical model data from in-house model runs – This limits the ability to assess the skill of forecasts that are generated from models in KMD.
- A number of potentially useful products for FbF are currently not produced – These include forecasts for extreme temperatures, dry spells and wet spells, crop growing stages, and lightening and hailstorms.
- Presenting probabilities – It is challenging to assign probabilities to forecasts that are

subjectively developed. While there is a level of objectivity in development of seasonal forecasts and the related probabilities, sometimes probabilities are not included in dissemination of the national seasonal forecasts. Often, presentation of seasonal forecasts groups terciles to give an outlook of: 'Normal to Below Normal', 'Below Normal to Normal', 'Normal to Above Normal' and 'Above Normal to Normal', but without presenting the actual probability figures. Forecasts for all other timescales are deterministic. This is challenging for FbF because forecast probabilities are needed to define thresholds to trigger action.

- Predicting extreme events – While KMD develops forecasts of heavy rainfall under work on severe weather, the skill of these forecasts is not well established. Further, analysis of occurrence and trend of extreme events (e.g. 100 year return period floods or droughts) has not been done to inform capacity to forecast these events.
- Trust in forecasts to take action – Progress has been made by KMD to build public trust in forecasts, through decentralised County Offices and having collaboration with various actors such the Agriculture Sector Development Support Programme. Trust has especially increased for short-term forecasts (daily to 5 days). The level of trust in seasonal forecasts is not clear, while the understanding



and communication of the probabilistic nature of the forecast and defining actions based on probabilities is still a challenge. This often leads to a 'wait and see' attitude rather than taking action on a forecast.

- Climate science in decision making systems – Processes and structures for engagement of KMD and the broader climate science community with the various EWS, disaster management institutions, coordinating platforms and EWS decision making processes are not defined. This emphasises that for preparedness and early action to be forecast-based, the weather/ climate hazard monitoring and early warning service component of EWS must be embedded within wider decision-making systems<sup>11</sup>.

### 3.1.2 Coordination of Disaster Management

The Constitution of Kenya presents disaster management as a shared function between the two levels of government (county and national) and this has resulted in limited coordination. Furthermore, the lack of a law on disaster management in Kenya makes coordination weak. There are multiple coordination platforms across various actors that are useful and mainly rely on good relationships to work.

Disaster management is spread across a number of government institutions including line ministries in Kenya, with overlapping mandates. This often leads to competition and parallel disaster management activities. This raises the question of whose mandate it will be to set up and ensure implementation of the nation-wide FbF system, with the required actor collaborations and fulfilment of roles and responsibilities. The National Disaster Risk Management Bill, once approved, would help address this issue. The Bill will establish the National Disaster Risk Management Authority (NDRMA) that will develop and coordinate implementation of a national and county disaster risk management strategy and plan, as well as disaster preparedness, response and recovery.

Having a nation-wide FbF system developed by national level stakeholders will need to critically figure out how best to engage the county governments, who may perceive the system as imposed over them by the National Government and therefore not support FbF implementation. There is need to consider development of county-level FbF plans and actions that are only supported by the national government when the climate disaster is forecasted to be really extreme.

<sup>11</sup>Bailey 2013



### 3.1.3 Flood Management Capacity

Currently, the Water Resources Authority (WRA) is responsible for hydrological monitoring in various rivers, having 32 telemetric stations across the country. The Water Act 2016 mandates WRA to carry out flood mitigation activities and advice the Ministry of Water on policy formulation for flood control strategies. WRA also maps out flood prone areas, supports communities to develop flood management infrastructure and to disseminate early warning information based on flood monitoring from river gauge stations<sup>12</sup>.

While flood monitoring is happening under WRA, a national scale flood early warning system (FEWS) does not exist. An operational FEWS exists for the lower part of the Nzoia River Basin, through collaboration between KMD, WRA, the County Government and communities. The Kenya Water Security and Climate Resilience Project (KWSCRCP) under the WRA is planning to enhance the FEWS in the Nzoia River, by installing more river gauge stations and automatic weather stations, and enhancing the flood forecasting.

The KWSCRCP is also establishing a Flood Mapping and Impacts Assessment Centre (FMIAC) at WRA and a Flood Forecasting Centre (FFC) at KMD. This work will focus on six flood prone areas in the country<sup>13</sup>, where it was determined that the establishment of a FEWS would be useful. There is opportunity to engage with work under WRA,

and through the KWSCRCP, on developing flood forecasts for FbF as well as defining early actions as part of their role on developing mitigation activities.

Kenya has a tendency to react to floods, rather than have flood management plans in place. WRA has mentioned the existence of sub-catchment water management plans that are currently under review, but it is not clear to what extent the plans include flood management. Further more, flood management structures are not well defined given that mandates for flood response lies across a number of institutions and on the other hand mandate for flood preparedness is not well defined. This situation will need to be considered when defining roles and responsibilities for implementation of flood early action.

### 3.1.4 Data Availability

Hazard and exposure, vulnerability and lack of coping mechanisms are key to informing risk dimensions. The climate and hazard data are also relatively available. However, data on exposure, vulnerabilities and coping capacity that are critical in understanding the impacts of hazards such as drought and flood, availability is poorer.

<sup>12</sup>Development Initiatives 2017

<sup>13</sup>The identified flood prone areas where KWSCRCP will develop FEWS are: Lower Awach Kano, Lower Sondu River, Lower Nyando, Lower Tana at Garissa, Lower Tana at Hola, Lower Tana at Garsen.



**Further more, flood management structures are not well defined given that mandates for flood response lies across a number of institutions and on the other hand mandate for flood preparedness is not well defined....**

This is driven largely by poor management and sharing of these data, and not necessarily from lack of collection.

There are a number of relevant open data sources that have been leveraged within the INFORM framework to produce composite scores for hazard and exposure, vulnerability and lack of coping capacity for the community risk assessment (CRA) dashboard. Some of the available data sets include population, administration, poverty incidence, educational, water sources, sanitation, and employment. A key omission of the available data sets is the granular census data from the 2009 census. The timeliness and relevance of some of the variables from the 2009 census data is questionable. However, the next national census is scheduled for 2019.

Despite the availability of numerous relevant sources of data, there are some challenges/risks

that have been identified:

**Timeliness of data** - For example, the livelihoods area assessment, which is a key tool for many actors was last updated in 2010. This is a concern raised by many stakeholders and this has been attributed to many data collection efforts undertaken by multiple organisations and ministries. The collection efforts take place without utilisation of a key framework of defined mandate (usually based on short term funding) having a consistent, timely set of comparative data sets on which trends could be identified and decisions made was highlighted as challenging.

**Poor data coverage** – arises from this data collection system. As many organisations collect data only in their project area, often without using a framework to make the data comparable, it is also challenging to find data sets that have a national or even multi-county coverage for many indicators.



### **Change from district to county administration**

- as a result of devolution in Kenya. The new county boundaries cross the previous extents of the districts, which means that extrapolation of historical data from districts to the current county level is compromised. This shortcoming can be appended by using the more granular parish or household data, if available, however this granular data is expected to be frequently unavailable.

### **Inadequate technical and bureaucratic data sharing infrastructure**

- most organisations contacted during this study were open to the idea of sharing data and many understood and welcomed the possibilities that come from greater data sharing. However, accessing raw data from many of these stakeholders has been a slow procedure, either due to the data not being readily available in a sharable form, bureaucracy, financial issues or lack of data sharing capacity.

## **3.2 Opportunities**

### **3.2.1 Disaster Management Capacity**

The existing institutional framework for disaster management in Kenya is heavily weighted towards reactive emergency response and disaster management. A systematic approach through planned disaster management is rare, with initiatives undertaken in a less consistent, less planned, less harmonious and virtually always reactive manner. This is due to lack of a coordinated policy framework, strategic guidelines and disaster management law. As a result, there are a number of national disaster management institutions with overlapping mandates as well as guidelines (such as the National Disaster Response Plan under the National Disaster Operations Centre (NDOC) and National Emergency Response Plan and

**... most organisations contacted during this study were open to the idea of sharing data and many understood and welcomed the possibilities that come from greater data sharing.**





Standard Operating Procedures (SOPs) under the National Disaster Management Unit (NDMU).

However, this is expected to change because in May 2018, the Government of Kenya approved the National Disaster Risk Management Policy (NDRMP). The NDRMP covers activities on preparedness, as well as response. Institutions directly involved in disaster management (i.e. NDMA, NDOC and NDMU) as well as line ministries who support implementation of disaster management activities will be guided by the NDRMP. This provides as chance to gain commitment on FbF from these institutions, if it is presented as a way of designing and implementing preparedness as indicated in the Policy.

### 3.2.2 Drought Management Capacity

Functional capacity exists within NDMA in terms of regularly operating the Drought Early Warning System (DEWS) that covers the ASAL counties, planning for drought management and stakeholder coordination. Coordination of drought management is considered relatively strong in Kenya<sup>14</sup>, due to the existence of NDMA. The NDMA Act 2016 mandates the institution to coordinate drought management, including implementation of policies and programmes. A key programme currently being implemented

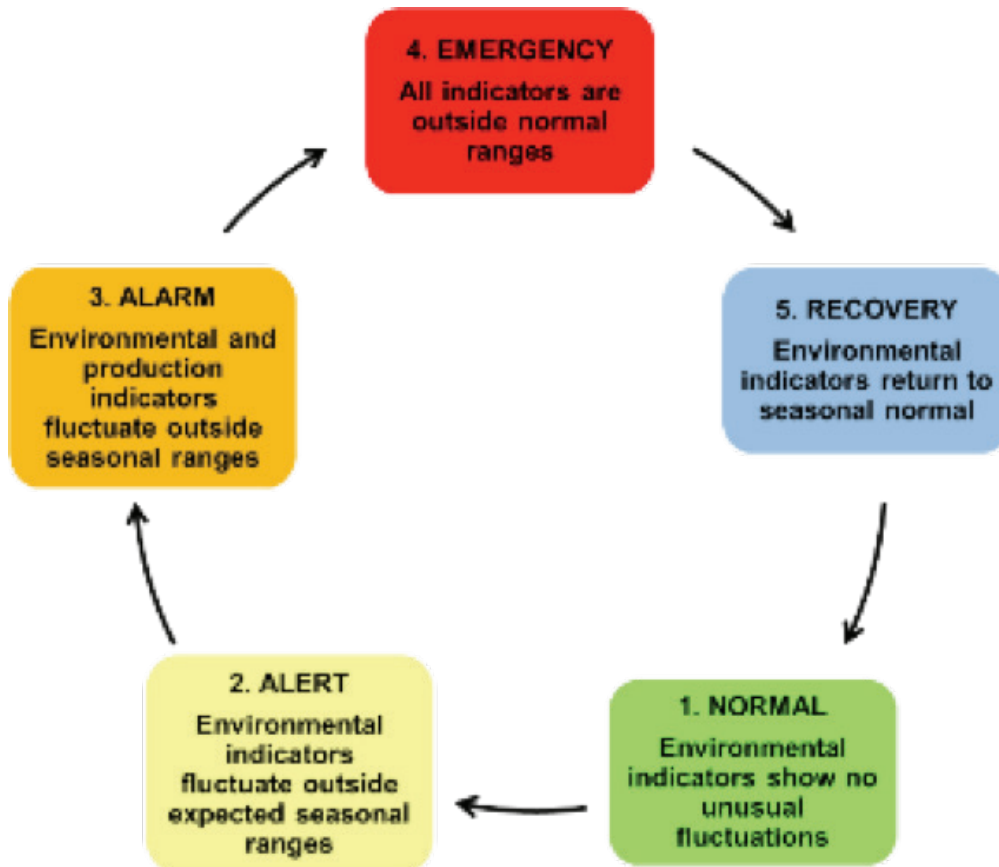
by NDMA is the Ending Drought Emergencies (EDE), which aims to stop drought from being an emergency by the year 2022.

NDMA has county offices in all the 23 ASAL counties, and have set up community DRR structures. The county office regularly monitors the drought situation based on indicators in the DEWS, and compiles this into a monthly drought early warning bulletin. A key role that the county offices play is the development of Drought Contingency Plans (DCP) for the county. While NDMA does the coordination, DCP development is done under the County Steering Groups (CSGs). CSGs bring together five key sectors – Agriculture, Livestock, Water, Health, Education, and Peace and Conflict – together with the local, national and international organisations such as the World Food Programme (WFP), the Food and Agriculture Organisation (FAO).

The DCPs put together actions across all phases of drought (Figure 3), and for all key sectors involved. A budget for implementation of the proposed actions is included. Further, the DCPs have standard operating procedures where institutions/ organisations that form the Response Taskforces or Working groups are defined, together with their roles at the different

<sup>14</sup>Development Initiatives 2017





**Figure 3:** NDMA drought phase classification



stages of drought. Overall, implementation of the DCPs first rests with County Governments.

NDMA is also the secretariat for the national level Kenya Food Security Steering Group (KFSSG)<sup>15</sup>. A key role that the KFSSG plays is conducting post-season assessments together with NDMA county offices and the different sectors. These assessments form a key part of the Government's declaration of drought as a national disaster. For example, in Feb 2017, the 2016 short rain assessment showed that an estimated 2.6 million people were acutely food insecure and required urgent humanitarian assistance<sup>16</sup>. Based on this assessment, the Government declared the drought a national disaster, which boosted resource mobilisation from the National Treasury and other partners to manage the observed conditions. On March 16, the UN released a Flash Appeal for Kenya in response to worsening drought conditions, requesting nearly USD 166 million for humanitarian assistance between March and December 2017<sup>17</sup>.

**On March 16, the UN  
released a Flash Appeal  
for Kenya...**

In addition to the government initiated NDMA, the Famine Early Warning Network (FEWSNET) has a regional office in Kenya. FEWSNET produces six-month assessments and outlooks of food security in the country, considering observed rainfall, drought and other factors that affect food security such as markets and trade. This is done in partnership with NDMA and the UN World Food Programme (WFP), and with participation in the KFSSG.

FbF work will be well placed to integrate into the existing capacity and structures for drought management, which already have elements that can support development and implementation of early action.

### 3.2.3 Financial Mechanisms

Several financing mechanisms currently exist at the national and county level, that could potentially support implementation of early action through FbF. It is important to note that funding from the finance mechanisms listed below is not always available. This is mainly

<sup>15</sup>The KFSSG includes: Ministries of Devolution and Planning, Agriculture, Livestock and Fisheries, Water and Irrigation, Health, and Education, Science and Technology; National Drought Management Authority (NDMA); WFP, FEWS NET, FAO, UNICEF, World Vision, ACF and various other NGOs.

<sup>16</sup>KFSSG 2017

<sup>17</sup>USAID 2017



due to reliance on funding from international donors to carry out disaster risk management. The Government makes budget allocations to deal with disasters, in the FY 2018/19 Budget (National Treasury, 2018), KShs 5.0 billion was allocated to the Contingencies Fund, but the National Treasury may not necessarily release the entire amount when early action is triggered. Hence structures to make such funding available for FbF will need to be defined.

National Contingencies Fund and the related County Emergency Fund are expected to address urgent and unforeseen events that were not budgeted for and cannot be delayed until a later financial year without harming the general public interest and that threaten to cause serious damage to human life or welfare and the environment. Money into the contingencies is expected to be up to a maximum of KShs 10 billion, while the County Emergency Fund should not exceed 2% of the total county government revenue.

Catastrophe Deferred Drawdown Option (Cat DDO) from the World Bank given to the Government, which is a contingent line of credit that will provide rapid access to funding in case of a disaster. Towards this, in May 2018, the National Treasury received USD 200 million (World Bank, 2018).

National Drought Emergency Fund (NDEF) is the successor to the National Drought Contingency Fund (NDCF), which had the EU as major contributing donor. The fund will provide a common basket of emergency funds for drought risk management. The NDEF Regulations that were approved by the Government in May 2018 allocates 50% of the total budget of the Fund in each financial year to preparedness and resilience interventions. Response and recovery interventions are allocated 40% and 5% of the Fund respectively.

African Risk Capacity (ARC) is an insurance that pools climate risk across countries in Africa, and gives pay outs based on whether defined thresholds have been achieved at the end of a rainfall season. Kenya has been a signatory to ARC since 2012. A drought operational plan was developed in October 2013, focussing on interventions to scale-up of cash transfers through the Hunger Safety Net Programme and to provide access to water in drought prone areas. The first premium contribution to ARC was made in 2014 for the 2015-16 period. To date, Kenya has however never received a pay out (Development Initiatives, 2017). Kenya has not made any further premium contributions between 2017 and 2018.

Global Risk Financing Facility (GRiF) is a funding mechanism that was established by



the governments of Germany and the UK, with support from the World Bank, in October 2018. The GRiF will support earlier and more reliable response and recovery to climate disasters, by setting up or scaling up pre-arranged risk financing, including national disaster insurance programs. The funding targets to enable greater disaster preparedness and recovery, towards strengthening the resilience of vulnerable countries to climate related disasters. The GRiF currently has an allocation of USD 145 million (World Bank, 2018).

FAO Early Action window was established within the existing Special Fund for Emergency and Rehabilitation (SFERA) that aims to enable FAO to take rapid and effective action in response to food and agricultural threats and emergencies. The Early Action window is a flexible fund that

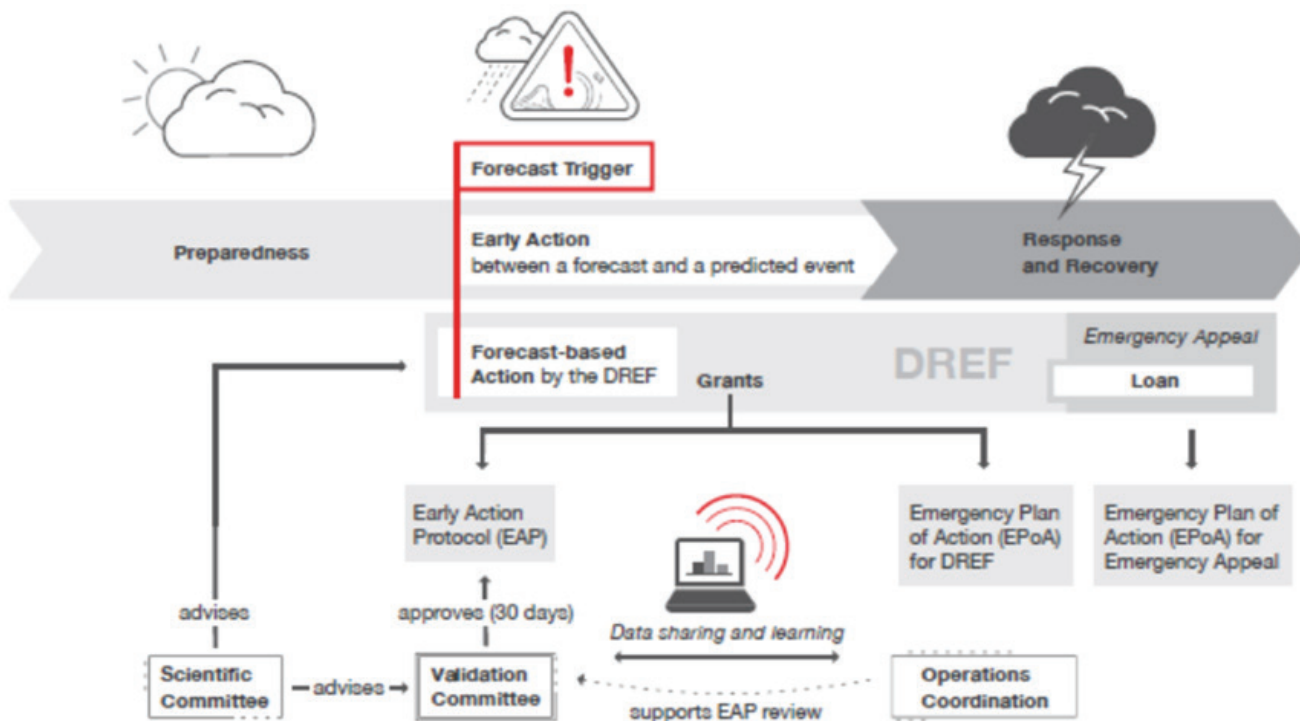
is rapidly released to mitigate the impacts of an anticipated event. Use of the SFERA Early Action window was piloted in Kenya during the 2017 drought, releasing USD 400,000 that was used to distribute feed for key breeding animals of the most at-risk pastoralist households in Marsabit, Wajir, Kilifi and Kwale counties. The intervention also involved provision of water and veterinary care. Set up of the early warning to trigger action was done in collaboration with NDMA, while the early action was implemented together with key government officers (FAO, 2018).

FbA by the Disaster Relief and Emergency Fund (DREF) is a funding mechanism that was introduced by IFRC in December 2017 to help National Societies have quick access to funding for early actions that are triggered by a forecast, as indicated in a pre-developed and

**The GRiF will support earlier and more reliable response and recovery to climate disasters, by setting up or scaling up pre-arranged risk financing, including national disaster insurance programs.**







**Figure 4:** The structure of the Forecast based Action by the DREF

pre-approved Early Action Protocol (EAP). It is a flexible cash reserve to enable timely availability of funding (Figure 4). The mechanism provides a vehicle for donors to support the FbF concept (IFRC & GRC, 2018).

KRCS Disaster Management Fund is established under the KRCS Disaster Management Policy, to

finance KRCS disaster management operations. The fund is expected to be operational at the national and county level, drawing finance from grants and donations, and money that is unutilized at the end of an emergency operation appeal.



### 3.2.4 Data Collaborations Frameworks

There are a number of data collaboration and sharing agreements, coordination groups and shared tools, however many faced difficulties in uptake, technical problems or a lack of sustainability. Fortunately, outside of the formal collaborations systems and tools, there are numerous platforms in use within Kenya. A further review of these will be conducted in the near future however it is important to mention that outside of the most common global platforms (HDX etc.), there are a number of Kenya specific and organisation specific platforms (such as the RCMRD portal), including most notably a government portal - <http://icta.go.ke/open-data/> - which contains data sets from both national and county government and shows tacit approval and encouragement for the promotion of open data in Kenya.

Kenya Inter-Agency Rapid Assessment (KIRA) is a joint assessment tool that emerged from the 2011 drought crisis in the Horn of Africa. The tool aims to provide timely information on humanitarian needs and support strategic decision-making in the early stages of a sudden onset emergency, both for anticipated events such as the elections of 2013 and for unanticipated rapid onset events like conflicts and floods. The development of this tool bridged the gaps relating to multi-sectoral assessments for sudden-onset emergencies.

KIRA consists of secondary data review such as pre-disaster/crisis, lessons learnt from similar events and crisis/disaster-specific information. This tool is popular among most stakeholders since it provides a single incident report and joint analysis reducing workload. The current challenge with KIRA is lack of funding, thus affecting sustainability.

A key forum where data collaboration as well as governance structures are established and developed regionally is the Food Security and Nutrition Working Group (FSNWG) that has a presence in Kenya and also within the wider IGAD Region. FSNWG has a number of sub-groups including Climate led by ICPAC; Food Security led by FAO and FEWSNET; Market led by FAO, WFP and FEWSNET; Livestock led by ICPAC; Nutrition led by USAID and UNHCR; and Humanitarian led by OCHA.

The Kenya Food Security Steering Group (KFSSG) functions include provision of technical advisory services on issues related to food security and drought. Members of the KFSSG are appointed because of technical capacity on issues related to food security and drought management, with NDMA functioning as the secretariat. KFSSG activities have previously contributed to Sectoral

<sup>18</sup>Limbu et al., 2015

<sup>19</sup>IFRI 2012



Working Groups (SWGs) namely; Data and Information, Health and Nutrition, Agriculture and Livestock, Water and Sanitation, Food Aid Estimates, Education & Disaster Management . KFSSG plays a key role in conducting post-season assessments together with NDMA county offices and the different sectors. These assessments form a key part of the declaration of drought as a national disaster by the Government of Kenya. During, before and in recovery after a drought in Kenya, the KFSSG was identified as the key coordination mechanism, including for assessment and data sharing. Almost all key stakeholders in food security, including KRCS, were identified as being represented in the KFSSG.

Ideated in 2011 and launched in 2016, the Single Register (SR) can be classified as an integrated beneficiary registry with a web-based reporting interface that provides a platform where common and essential information across five social assistance programs is stored, analysed and reported . In detail, the SR enables the Government of Kenya to link together the management information systems (MISs) of its five major social protection schemes: Old Age Grant, Disability Benefit, Orphans and Vulnerable Children's Cash Transfer, Hunger Safety Net Programme, and World Food Programme (WFP) Cash for Assets Scheme. The single registry is developing a system of modular linking that

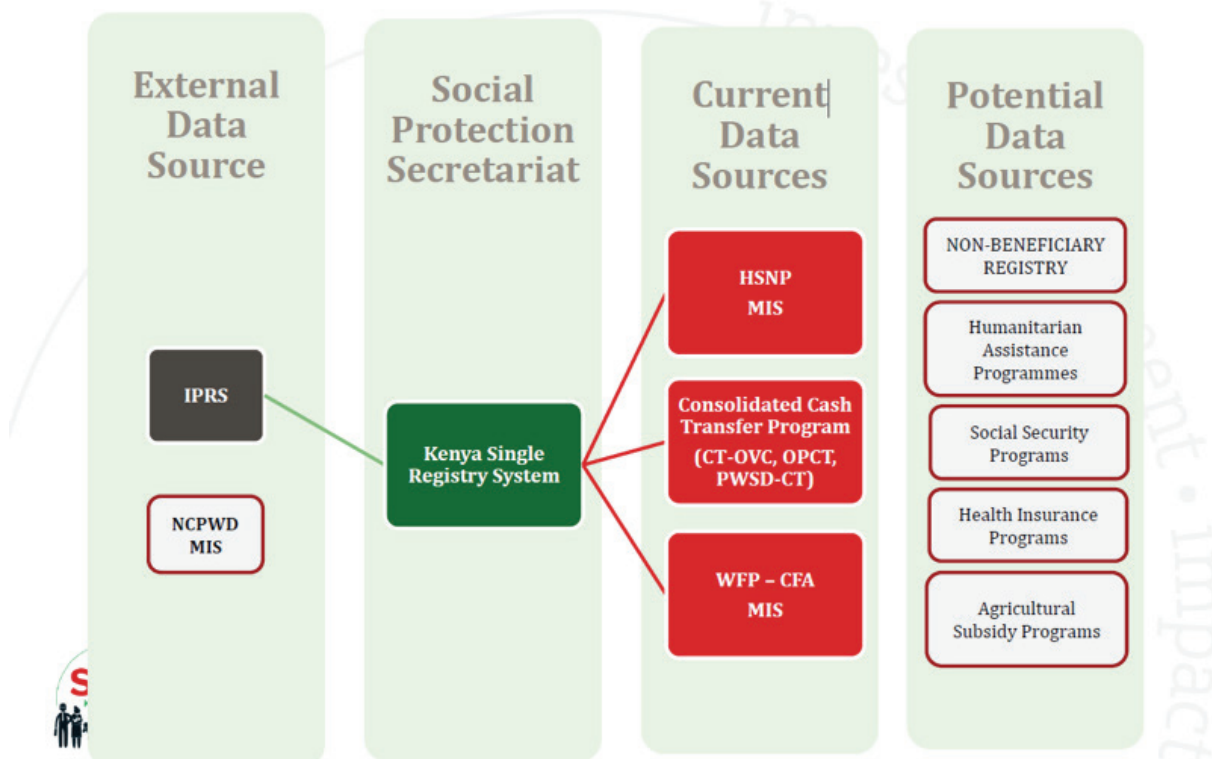
allows other organisations to access and add to the SR as a user. A recent overview of how the Social Protection Department sees the SR developing and engaging new data sources can be seen Figure 5.

Kenya's SR is different in design compared to attempts by other countries to develop social registries. Kenya's system is essentially an integrated beneficiary registry ('data warehouse') holding information on all the beneficiaries of the national social protection system, and is continuously and automatically updated as individual programme MISs update their information on beneficiaries. The SR, which offers a publicly available online version sharing aggregate data trends also acts as a single point of reference to give an overview of who is receiving, what type of assistance (and how much), where the assistance is received and when the assistance is transferred .

The SR is an attractive proposal in terms of data access, as it would give a large amount of data (see the framework below) for more than 465,000 beneficiaries from the WFP's Jenga Jamii and 839,000 households from the National Safety Net Programme, amongst others. These beneficiary identities are also validated via the Kenyan National Population Register at the Ministry of Interior and Coordination of National Government. There are also a number of potential



# Single Registry Potential Data Sources



**Figure 5:** Social protection conceptualisation for SR development (Mwangi, 2018)

challenges which remain to be investigated with the use of the single registry, partially regarding how beneficiary data is collected, but primarily regarding data responsibility and the implication

of using and feeding beneficiary data in a centralized, government controlled database.



## 4.0 RECOMMENDATIONS FOR EFFICIENT IMPLEMENTATION OF FbF

### Defining extreme events

Forecast-based Forecasting focusses on anticipating and taking early action in advance of extreme weather and climate events, rather than regular events that stakeholders have the capacity to manage. To implement FbF, it is thus important to define what constitutes extreme drought and flood events. This will help to assess whether available forecasts can provide the required anticipatory information on these kinds of events. It will also inform prioritisation of useful forecasts and define what needs to be forecasted. More broadly, defining extreme flood and drought events will help to understanding risk across the country.

### Enhance modelling capabilities in KMD for extreme events

The severe weather forecasts from KMD present a start to predicting extreme events. The challenge with this is that probabilities in the severe weather forecasts are not well defined, as the forecasts are based on subjective forecasters' knowledge and not model runs. Capacity to





consistently generate objective and probabilistic forecasts in KMD will need to be improved, together with enhancing the lead time of the forecasts, depending on stakeholders' need for forecasts to take early action.

### Forecast skill assessment

Assessment of the skill of KMD forecasts will need to be done to inform prioritisation of useful forecasts for early action. Combined with probability of the defined extreme event occurring, the results from skill assessments will help in understanding the reliability of forecasts so as to decide when to take action based on forecast provided, and the implications of whether it would be worthy actions or when actions will be in vain (Figure 6).

Forecasts from KMD tend to be subjectively developed, which may pose a challenge for skill assessment. An appropriate methodology for forecast skill assessment will need to be defined. Even more critical, will be to raise awareness within KMD on the usefulness of forecast skill



		Occurrence of Event	
		$T_{crit}$ exceeded: Extreme Event	$T_{crit}$ not exceeded: No Extreme Event
Humanitarian Action	$p_{th}$ is exceeded Early Action	a Worthy action Losses avoided 	b Action in vain Unnecessary expenses 
	$p_{th}$ is not exceeded No Early Action	c Fail to act Losses not avoided 	d Worthy inaction 

**Figure 6:** Four scenarios linking actions and extreme event occurrence. This sort of contingency table is useful in designing thresholds for action based on information on forecast reliability (skill and probability)



to early action, and build the capacity required by KMD to continually conduct forecast skill assessments for extreme events.

### **Communication and understanding of probabilistic forecasts**

There is need to raise KMD's awareness on the usefulness of communicating forecast probabilities, whenever this information is available. At the same time, it will be important for actors to have a good understanding of probabilistic forecasts, and the implications for actions, such as informing scenario development during contingency planning undertaken by stakeholders such as KRCS and NDMA. Understanding of probabilistic forecast is also important to building trust in the forecasts.

### **Collaborations: From rainfall forecasts to flood and drought forecasts**

Since a national scale flood early warning system does not exist, there are gaps in understanding flood occurrence and extent in the country. Suggestions indicate that it will be useful to construct a historical flood extent database, based on reports of past floods and river flow records. This database can be useful for defining rainfall amounts that cause flooding in various places, and therefore help to link rainfall forecasts to floods. Reference can be made to the ForPac Project being implemented in Nairobi County using observed rainfall thresholds to simulate

historical flood occurrence using the 3Di model. Also the KWSCR project, which aims to work with KMD to develop near real time rainfall forecasts that will then be translated into flood inundation forecasts in a good starting point for FbF work around flood modelling.

In the case of droughts, seasonal and monthly forecasts as well as 10-day agro meteorological bulletins can potentially be turned into drought forecasts. This can be done by possibly linking these with monitoring information from the DEWS operated by NDMA. The ForPac Project is already exploring the potential to develop an 'early alert' drought phase, through using seasonal or monthly forecasts to generate a forecast of vegetation condition index (VCI), which is a key drought indicator in the DEWS. There is also work under ForPac that involves crop modelling for drought. The work under ForPac focusses on two drought prone counties. Through collaboration, it is recommended that these ideas be taken to cover the entire country.

Another option for drought forecasting could be to explore whether the work under the Africa Risk Capacity (ARC) can move from monitoring into forecast information. For example, developing a forecast of the Water Requirement Satisfaction Index (WRSI) at seasonal or sub-seasonal timescale to indicate potential drought. A third option is through working with the Famine Early



Warning Network (FEWSNET) that produces projections of food security over a six-month period. This can be, for example, work with FEWSNET, NDMA and other relevant actors to generate forecasts for other extreme drought related risks that are of concern to actors, beyond food security.

### **Integration into existing work**

It is necessary to further map out existing related work and figure out entry points to integrate FbF into mainstream work within key institutions. This will ensure that FbF is not seen as additional work or burden, but rather enhancing existing work and mandates and therefore ensure support for implementation and the long-term sustainability.

### **Financing FbF early action**

Several mechanisms that could potentially finance early action already exist in Kenya, as well as within the Red Cross Movement such as the Imminent DREF and the FbA window to the DREF. Understanding how these mechanisms operate, and the entry points to support early action will need to be generated. This will inform prioritisation of what finance mechanisms FbF work can best engage with, and the lobby and advocacy needed. Further, stakeholder agreement will be needed to ensure coordination or integration of the potential financing mechanisms so that there is no lapse in funding for early action.

**Several mechanisms that could potentially finance early action already exist in Kenya... Understanding how these mechanisms operate, and the entry points to support early action will need to be generated. This will inform prioritisation...**





## 5.0 CONCLUSION

Currently, there are a number of key institutions that are keen on anticipatory approach when it comes to disaster risk management particularly when it comes to weather and climate related disasters. There is also an increasing desire by humanitarian and disaster management institutions to use forecast to plan for early action. This makes FbF implementation feasible in Kenya, in addition to that fact that, the national meteorological services wishes to have greater impact. Thus, presenting an opportunity to develop forecasts designed to trigger early action. The policy context in Kenya is currently favourable for supporting early action

as demonstrated by the recently approved National Disaster Risk Management Policy and Bill that is currently under discussion and an opportunity to advocate for the inclusion of FbF. Hence, to successfully implement FbF in Kenya, in addition to the identified opportunities, a strong commitment by the relevant government-led institutions that have the authority to rally, support and coordinate FbF work across the country is critical.

**... to successfully implement FbF in Kenya... a strong commitment by the relevant government-led institutions that have the authority to rally, support and coordinate FbF work across the country is critical.**











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## THE INTERNATIONAL CENTER FOR HUMANITARIAN AFFAIRS (ICHA)

The International Center for Humanitarian Affairs (ICHA) strives to create an appropriate and effective knowledge management framework that synthesizes multiple information technologies to collect, analyze, and, manage information and knowledge for supporting decision making in humanitarian action, disaster relief and improving community resilience.

The framework so developed is intended to help identify, specify and quantify information needs, track status of disaster scenarios and provide

policy makers and practitioners with efficient and sustainable recommendations based on past experience and research based evidence.

ICHA is a knowledge hub which focuses on generating data and information through action based research that is relevant to communities dealing with situations that call for humanitarian, resilience building and development action.





## THE KENYA RED CROSS SOCIETY (KRCS)

The Kenya Red Cross Society (KRCS) was established on 21 December 1965 through the Kenya Red Cross Society Act. (Chapter 256 Laws of Kenya). Its Constitution is based on the Geneva Conventions of 1949 and their Additional Protocols of 1977 to which Kenya is a signatory.

The National Society was officially recognized by the Government in the Kenya Red Cross Society Act (Chapter 256 Laws of Kenya) as a voluntary aid Society auxiliary to the public authorities in the humanitarian field and as the only National Red Cross Society that carries out its activities in the Kenyan territory. In relation to public authorities, the Society maintains an autonomy, which allows it to act at all times in accordance with the Fundamental Principles of the Red Cross and Red Crescent Movement.

As auxiliary to the national and county governments, we will work with our communities, volunteers and partners to ensure we prepare for and respond to our humanitarian and development needs. We will focus our collective capabilities and resources to alleviate human suffering and save lives.

Over the years, KRCS has remained the leading humanitarian agency and the strongest humanitarian brand in Kenya, the East Africa region and Africa. This is evident with the level of expectation and confidence that the communities in Kenya have bestowed on the Society. At national level, operations are spearheaded by a management team led by the Secretary General while at county level, KRCS is governed by boards and administratively managed by a Regional Manager.













## **ICHA** | International Center for Humanitarian Affairs At the Kenya Red Cross Society

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