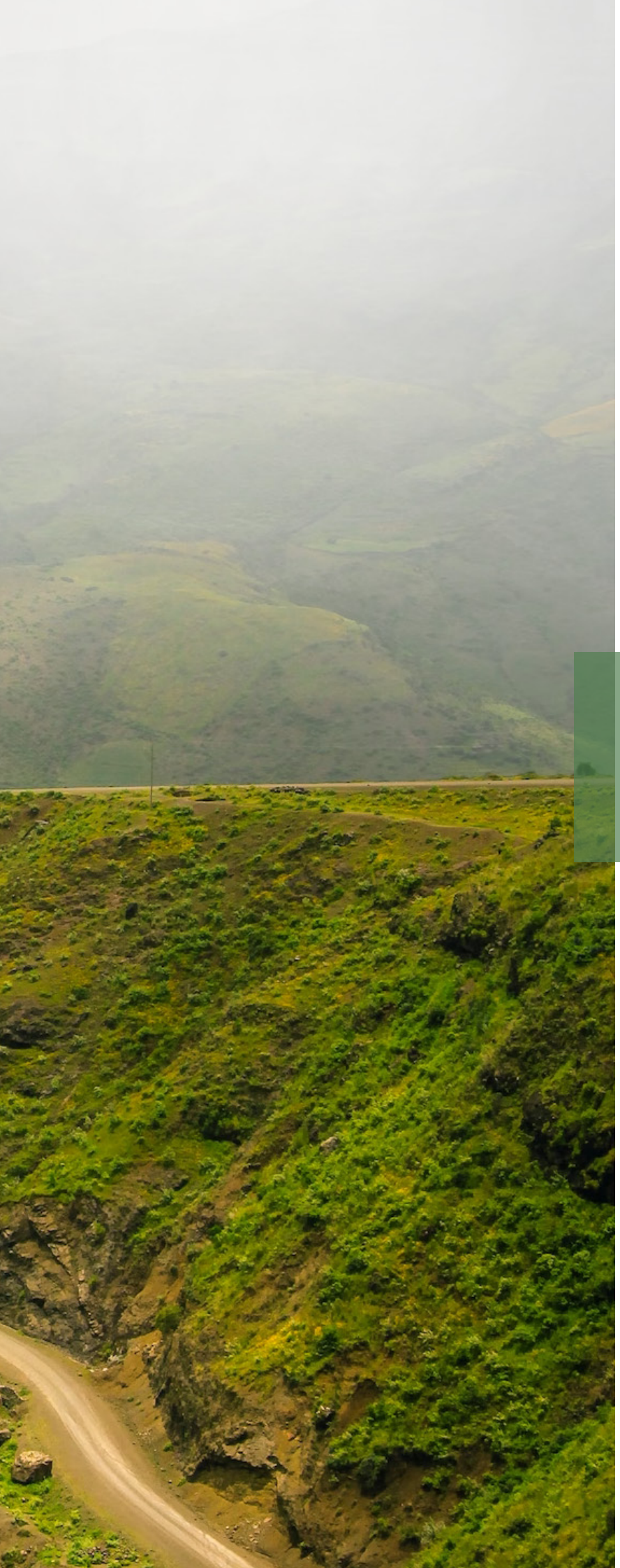
# A ROADMAP FOR MULTI-HAZARD, IMPACT-BASED EARLY WARNING AND EARLY ACTION SYSTEM 2023–2030

## BUILDING DISASTER RESILIENT COMMUNITIES IN ETHIOPIA



**Ethiopian Disaster Risk Management Commission**

Addis Ababa, Ethiopia
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This publication is a roadmap established by the Ethiopian Disaster Risk Management Commission (EDRMC) with the support from the Asian Disaster Preparedness Center (ADPC) and the Bill & Melinda Gates Foundation (the foundation). The publication was made possible from the support of the Early Warning Technical Working Group (EW-TWG) and concerned stakeholders.

# FOREWORD

Ethiopia's vision to build 'Disaster Risk Resilient Communities and Nation' requires robust national systems that address climatic and human-made hazards. This is urgent as the hazard trend (depth, extent, and severity) appears to increase rather than decrease. Therefore, saving lives and livelihoods along with supportive anticipatory actions is a priority agenda for the government and its partners, civil society organizations, and the community at large. The ongoing policy reform initiative is expected to radically transform disaster risk management in Ethiopia by implementing priority actions in line with the United Nations and Continental Frameworks.

Despite Ethiopia's 50-year history of innovations in early warning systems, the priority area has been fragmented, poorly funded, and devoid of early action in most cases. With heavy responsibility resting at the national level, the former system lacked a sense of ownership by regional systems and the community. The unbalanced and skewed focus on crisis management by the government, along with development and humanitarian partners, created gross neglect of anticipatory actions that resulted in massive expenditures of resources on a year-round basis.

To address these significant gaps, the Ethiopian Disaster Risk Management Commission and stakeholders have envisaged that the transformation of the Ethiopian early warning system into a Multi-Hazard, Impact-Based Early Warning and Early Action System will have a tremendous impact on the creation of a resilient nation and resilient communities in Ethiopia. Such a system would undoubtedly alleviate the challenges of resource limitation, harmonization, and interoperability. The changes encompass not only the improvement of the availability and accessibility of the data through the leveraging of technologies but also the optimal use of disaster risk information, the mainstreaming of disaster risk plans across sectorial ministries and specialized agencies, and the enforcement of full legal accountabilities.

My heartfelt thanks and appreciation are extended to all those who contributed financially and technically to the creation of this organic roadmap and participated in its write-up. In this regard, the financial and technical contributions of the Bill & Melinda Gates Foundation and the Asian Disaster Preparedness Center are highly appreciated. The leadership and foresight of the Commission are equally commendable. Finally, to achieve Ethiopia's vision of 'Disaster Risk Resilient Communities and Nation' by 2030, I urge all stakeholders to deploy the full potential necessary to materialize the implementation of the Multi-Hazard, Impact-Based Early Warning and Early Action System, a genuinely transformative roadmap.

**Ambassador Dr. Shiferaw Teklemariam**
Commissioner, Ethiopian Disaster Risk Management Commission

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# ACRONYMS

| | |
|---|---|
| **ADPC** | Asian Disaster Preparedness Center |
| **ARC** | African Risk Capacity |
| **AU** | African Union |
| **AU-ARC** | African Union-African Risk Capacity |
| **BRE** | Building Resilience in Ethiopia |
| **CRGE** | Climate Resilient Green Economy |
| **CSA** | Central Statistical Agency |
| **DPPC** | Disaster Prevention and Preparedness Commission |
| **DRM** | Disaster Risk Management |
| **DRM-SPIF** | Disaster Risk Management Strategic Program and Investment Framework |
| **DRR** | Disaster Risk Reduction |
| **IDDRSI** | IGAD Drought Disaster Resilience and Sustainability Initiative |
| **IGAD** | Intergovernmental Authority on Development |
| **ECC** | Emergency Coordination Center |
| **EDRMC** | Ethiopian Disaster Risk Management Commission |
| **EMI** | Ethiopian Meteorology Institute |
| **ENCU** | Emergency Nutrition Coordination Unit |
| **EW** | Early Warning |
| **EWS** | Early Warning System |
| **FAO** | Food and Agriculture Organization |
| **GIS** | Geographic Information System |
| **HRD** | Humanitarian Requirements Document |
| **ICT** | Information and Communication Technology |
| **IGAD** | Intergovernmental Authority on Development |

| | |
|---|---|
| **IVR** | Interactive Voice Response |
| **LEAP** | Livelihoods, Early Assessment and Protection |
| **LIAS** | Livelihood Impact Assessment Sheet |
| **MH-IB-EW-EAS** | Multi-Hazard, Impact-Based Early Warning and Early Action System |
| **MoFA** | Ministry of Federal Affairs |
| **MoH** | Ministry of Health |
| **NECC** | National Emergency Coordination Center |
| **NMI** | National Meteorological Institute |
| **NDRMC** | National Disaster Risk Management Commission |
| **RFM** | Risk Financing Mechanism |
| **RRC** | Relief and Rehabilitation Commission |
| **SFDRR** | Sendai Framework for Disaster Risk Reduction |
| **the Foundation** | Bill & Melinda Gates Foundation |
| **UN** | United Nations |
| **UNOCHA** | United Nations Office for the Coordination of Humanitarian Affairs |
| **WDRP** | Woreda Disaster Risk Profile |
| **WFP** | World Food Program |
| **WMO** | World Meteorological Organization |

# 1 BACKGROUND

Ethiopia has been affected by multiple climate-related hazards, including droughts, floods, landslides, pest infestations, earthquakes, and volcanoes. However, recurrent drought, which has increased in magnitude, frequency, and impact, notably since the 1970s, has caused negative consequences on the lives and livelihoods of many agricultural, agro-pastoral, and pastoral populations of the country. In recent decades, flash floods and seasonal river floods have become more frequent and widespread across several parts of the country, including in poor urban slum communities. Ethiopia's vulnerability is further exacerbated by the country's high level of poverty, conflicts, displacement, inadequate infrastructure, population pressure, reliance on natural ecosystems, and limited access to essential services, including the absence of effective early warning systems and actions.

Over the past half a century, Ethiopia has undergone various policy reforms and institutional arrangements to prevent, prepare for, and respond to disasters. The first institutional response, perhaps a pioneer in Africa, was the formation of the Relief and Rehabilitation Commission (RRC) in the aftermath of the 1973/74 famine. Its focus was on humanitarian response and emergency relief. In the Commission's formative stage, the first-ever early warning system was created in 1976, although its emphasis on drought and food insecurity has remained.

A turning point in the institutional response was the country's effort to link relief to development by reorganizing the Disaster Prevention and Preparedness Commission (DPPC) in 1993. This was accompanied by various policies and national guidelines, which include the importance of creating an integrated early warning system (EWS) in Ethiopia. However, the focus was overly dominated by food insecurity assessments.

A progressive policy shift was demonstrated when the country promulgated the 2013 National Disaster Risk Management Policy, which has shifted Ethiopia's disaster risk management approach from predominantly drought and food insecurity-focused and relief-oriented drought management model to a somewhat multi-sectorial disaster risk management approach. The 2013 policy, although needing further updating and refreshing, has provided, in principle, the basic framework for reducing disaster risks and addressing potential consequences of disasters by providing appropriate and timely responses to disasters before, during,

and after the disaster period at all levels. This has been achieved by establishing a coordinated, accountable, and decentralized response system.

Since 2015, the Government of Ethiopia and its key partners have introduced various policy guidelines and disaster risk management measures in alignment with the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030 and the Africa Program of Action for the implementation of the Sendai Framework in Africa.

The Roadmap for a Multi-Hazard, Impact-Based, Early Warning and Early Action System (MH-IB-EW-EAS) builds on the country's long history and experience in EWS. It is also concurrent with Ethiopia's commitment to the SFDRR 2015–2030, Priority 4 (enhancing disaster preparedness for effective response and to 'build back better' in recovery, rehabilitation, and reconstruction) and Target G (substantially increase the availability of and access to multi-hazard EWS and disaster risk information and assessments to the people by 2030). It aligns with Ethiopia's commitment to the Paris Climate Agreement (Article 7, paragraph 7c) for climate change adaptation and the Africa Program of Action for implementing the Sendai Framework in Africa.

It is essential to underline that the roadmap development process is accompanied by the legal reform initiative, which is aimed at amending the accountabilities and mandates of the Ethiopian Disaster Risk Management Commission (EDRMC). The 363/2015 proclamation for the amendment of the establishment of the National Disaster Risk Management Commission (NDRMC)/EDRMC states the reorganization of the Commission under the Prime Minister's Office. This is a positive step towards elevating the portfolio of the Commission and strengthening its power through the creation of a functioning National Platform for Disaster Risk Reduction. It will also provide the Commission extended mandate to effectively coordinate disaster risk management (DRM) endeavors with multiple stakeholders, including regional and federal government bodies, representatives of civil society organizations, and National Red Cross and Red Crescent Societies. The new proclamation is also expected to promote local community participation and raise public awareness about disaster risk reduction and management. It is hoped that the legal reform will enhance the creation of solid collaborations among key early warning stakeholders and the establishment of a comprehensive Geographic Information System (GIS) database, which contains, among others, geo-hazard assessments and information on climate change, climate risk reduction, and climate change management. The legal reform will further pave the way for the coordination, accountability, and enforcement of inter-jurisdictional and regional emergency management initiatives.

The MH-IB-EW-EAS integrates hazard information with risk analysis to provide meaningful early warnings that allow governments, communities, and individuals not only to understand the risks related to impending events but also to act early and respond to disasters to minimize negative impacts. The system strengthens cooperation among the various agencies involved as well.

The legal reform measures and institutional arrangement amendments, along with the transformation of the EWS, will undoubtedly contribute to the enhancement of collective responsibilities and accountabilities for the implementation of the National Disaster Risk Management Strategic Program and Investment Framework (DRM-SPIF) and transformation of Ethiopia's resilient capacity in disaster risk knowledge, preparedness, climate change adaptation, response, and recovery. Since the formation of the NDRMC in 2016, various institutional arrangements have been made to enhance the implementation of the DRM-SPIF, which underlines the importance of a multi-hazard, multi-sectoral, decentralized, and community-centered EWS. In this regard, the formation of the Early Warning Technical Working Group (EW-TWG), which consists of experts drawn from various government sectors, United Nations (UN) agencies, and non-government organizations, has become instrumental in translating policy mandates and igniting changes in the national early warning system. The EW-TWG has so far contributed to the improved understanding of hazard exposure and vulnerability in the country. It has been instrumental in developing Woreda Disaster Risk Profiles (WDRP), conducting ongoing assessments of flood and drought hazards, and establishing contingency plans and support for emergency command posts in strategic locations. It has also contributed to developing historical data archives related primarily to floods and droughts.

Nonetheless, some have challenged the Ethiopian EWS for not effectively advancing multi-hazard, multi-sectoral, and people-centered services as stipulated in the 2013 policy. The lack of digitalization of the system, limited transparency, accessibility, and utilization patterns of early warning information by diverse stakeholders, and weak institutional capacity of early warning actors at various administrative levels point toward the urgency of designing and implementing the MH-IB-EW-EAS.

## 1.1 Vision

By 2030, the roadmap envisions resilient communities protected by robust, multi-hazard, and multi-sectoral government-led EWS in Ethiopia.

## 1.2 Principles

The following principles are at the heart of the MH-IB-EW-EAS framework and reflect the essence of Ethiopia's disaster risk and early warning management governance. The principles serve as the foundation for the pillars of the MH-IB-EW-EAS to guide the deployment, operationalization, and key functions of the country's EWS.

**Accountability** - All government and non-governmental parties should be held accountable for the early warning information and predictions they produce.

**Credibility** - Early warning information and analysis must stem from credible sources, and it shall earn the trustworthiness and confidence of its users.

**Do no harm** - All parties shall endeavor not to cause damages or suffering due to their actions on DRM/early warning.

**Ethical** - DRM/early warning operations and decision-making shall always be guided by ethics and values that accept and respect the primacy of human life and human dignity.

**Impartiality** - Early warning information, analysis, and decisions should be based on objective data without bias, prejudice, discrimination, or preferring to benefit one group or community over another.

**Leaving no one behind** – EWS shall address the concerns, needs, and inclusion of the most vulnerable social groups, including women, children, people with disability, and the elderly.

**Neutrality** - Early warning information, analysis, and decisions do not take sides and shall be conducted regardless of the political, faith, identities, or social background of the people or the communities under the coverage of EWS.

**People-centered and community-oriented** - EWS should seek to preserve and include local and 'traditional' perspectives and strengthen community ownership. An EWS should be developed in collaboration with the end-users, and its impacts shall be clearly communicated and understood by the disaster-affected people. It needs to be more people-oriented with a focus on last-mile outreach.

**Transparency** - EWS should be transparent, allowing public access to early warning data and knowledge products. Both at federal and regional levels, EWS should be located within government structures and operate within a clear legal framework under the spirit of accessing the information as a credible source for public benefit.

# 2

SECTION 1

# PATHWAYS[1]

The Ethiopian EWS is composed of an integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication, and preparedness systems and processes that enable risk-prone communities to take timely action to reduce disaster risks in advance of hazardous events.

By introducing the MH-IB-EW-EAS, Ethiopia's early warning EWS addresses several hazards and analyzes their impacts in contexts where hazardous events may occur alone, simultaneously, cascading, or cumulatively over time, considering their potential interrelated effects.

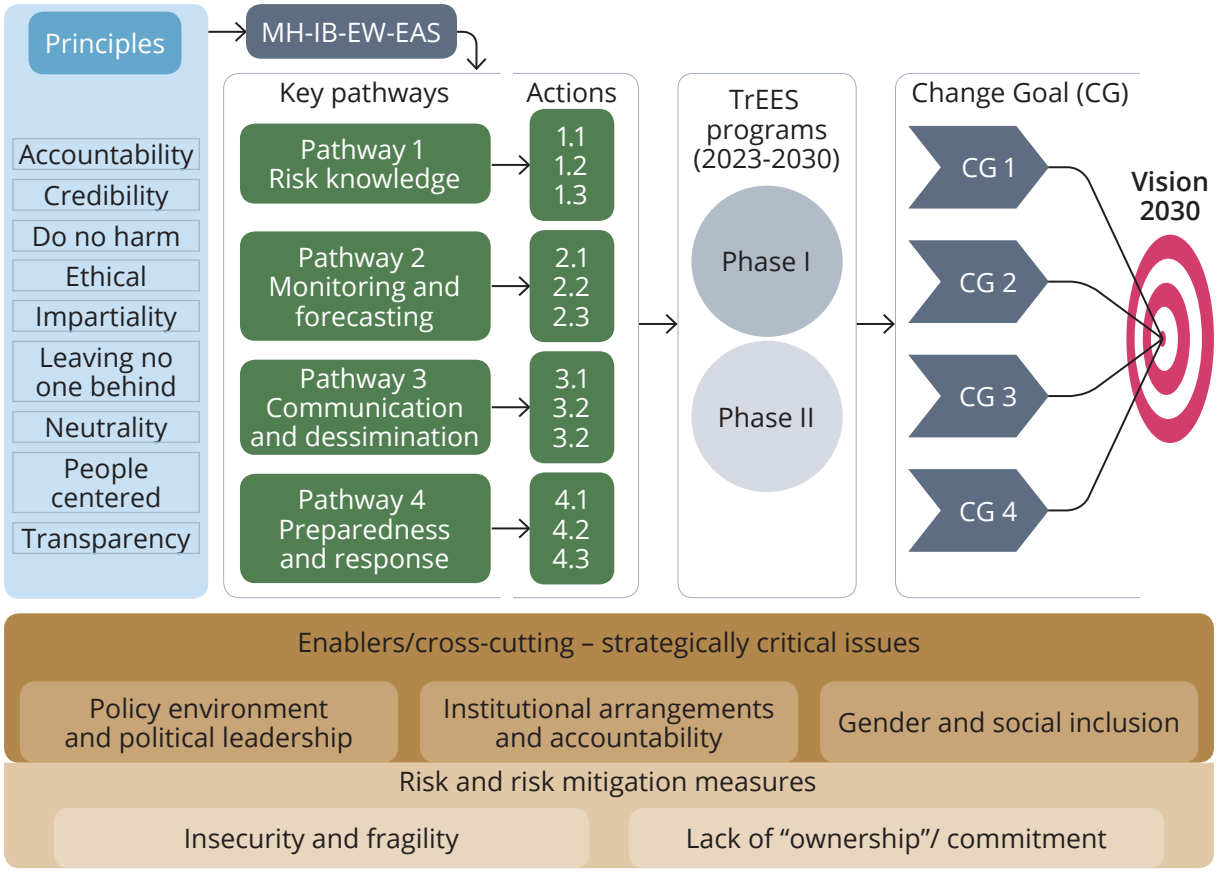



**Figure 1. A Roadmap for Multi-Hazard, Impact-Based Early Warning and Early Action System in Ethiopia**

1 The Pathway, according to this document, outlines a general course of action for transforming Ethiopian EWS. It includes the MH-IB-EW-EAS pillars that envisage Ethiopian EWS's desired future.

The proposed MH-IB-EW-EAS, therefore, anchors the four pathways of EWS as defined by the Sendai Framework and inspired by the World Meteorological Organization (WMO) checklist for multi-hazard early warning and recognized in the 'guiding principle for community early warning' by the International Federation of Red Cross. The roadmap also embraces the inclusion of traditional knowledge, which will help galvanize the effectiveness of the four pathways in the roadmap implementation.

The following framework includes four interrelated pathways - disaster risk knowledge; monitoring, observations, and forecasting; warning communication; and early action and response - in order to achieve resilient communities through the MH-IB-EW-EAS.

### Change Goal 1: Enhanced Disaster Risk Knowledge

By 2030, comprehensive and automated disaster risk information and knowledge base available and constructed for all dimensions of disaster risk, including hazards, exposure, vulnerability, and capacity at household, community, and organizational levels.

### Change Goal 2: Robust Disaster Detection, Monitoring, and Forecasting Services

By 2030, the capacity for detection, monitoring, and forecasting of prioritized hazards and analysis of their potential impacts enhanced and optimized, leveraging existing and new digital technologies as well as global information systems.

### Change Goal 3: Effective Early Warning Dissemination and Communication System

By 2030, communication and dissemination systems (including the development of last-mile connectivity) improved, people's access to advance warnings increased, and all levels of coordination and information exchange capacity optimized.

### Change Goal 4: Preparedness, Early Action, and Faster Response Capabilities

By 2030, the capabilities to prepare for and respond to warning messages and the capacity to trigger multi-sectoral early actions for risk reductions enhanced.

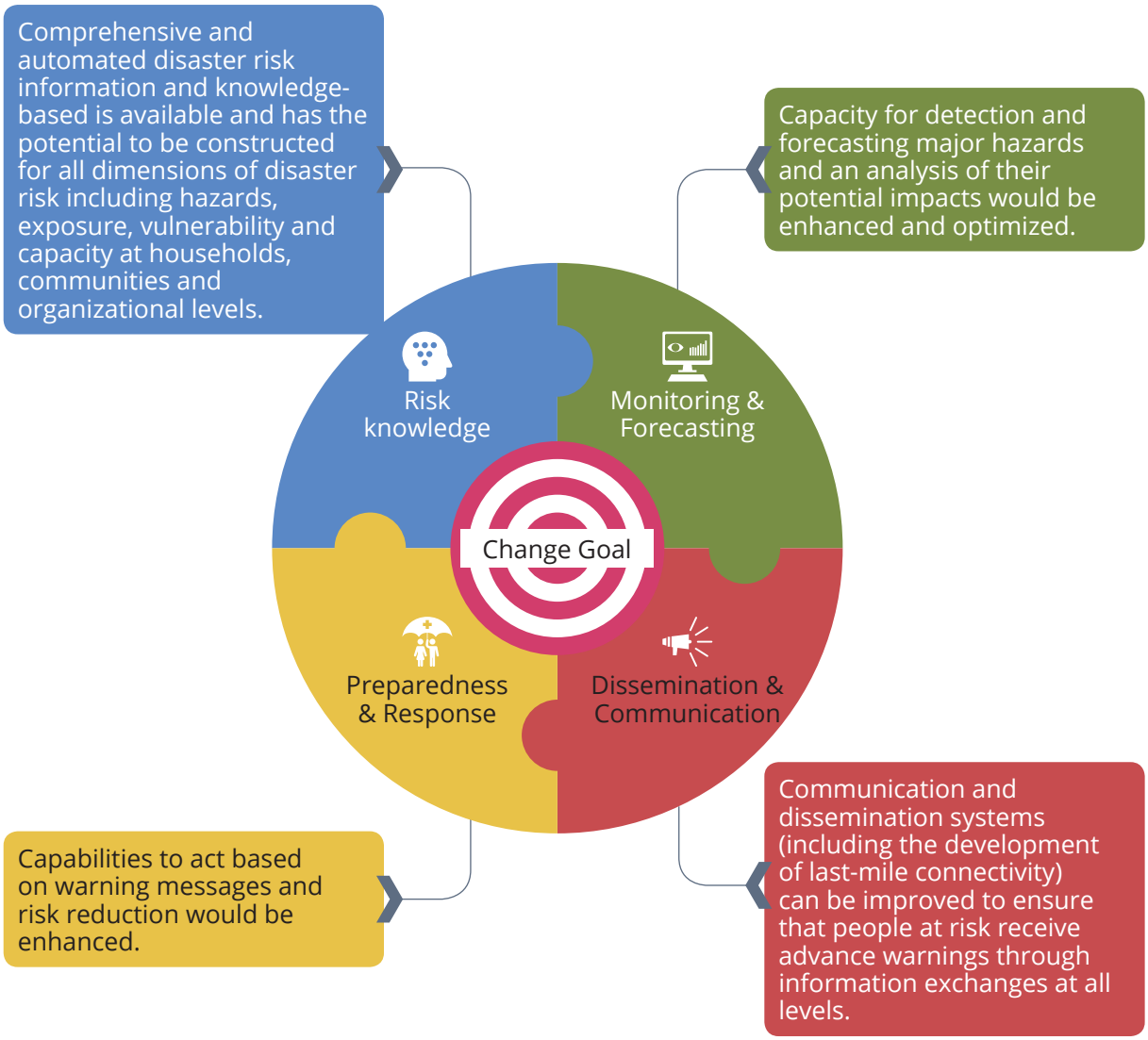



**Figure 2. Four pathways and change goals of the Ethiopian Multi-Hazard, Impact-Based Early Warning and Early Action System**

## 2.1 PATHWAY 1: ENHANCING DISASTER RISK KNOWLEDGE

Disaster risk knowledge is vital to designing and implementing effective EWS, enabling risk-informed timely decisions, and providing appropriate preventive, preparedness, and response measures.

Disaster risk knowledge encompasses establishing organizational arrangements, systems, and tools for disaster risk management, creating awareness and identification of multi-hazard threats, assessing community vulnerability studies and risk profiles, and storing and sharing disaster risk information. It also includes the creation of an informed public and risk-aware citizens through effective risk communication channels and community-based emergency mitigation, preparedness, and response plans.

In this regard, existing assessment reports indicate that the establishment of Ethiopia's WDRP has begun to create a solid knowledge base by collecting comprehensive data on each Woreda's hazards, vulnerabilities, and coping capacities. Having covered over half of the Woredas in the country

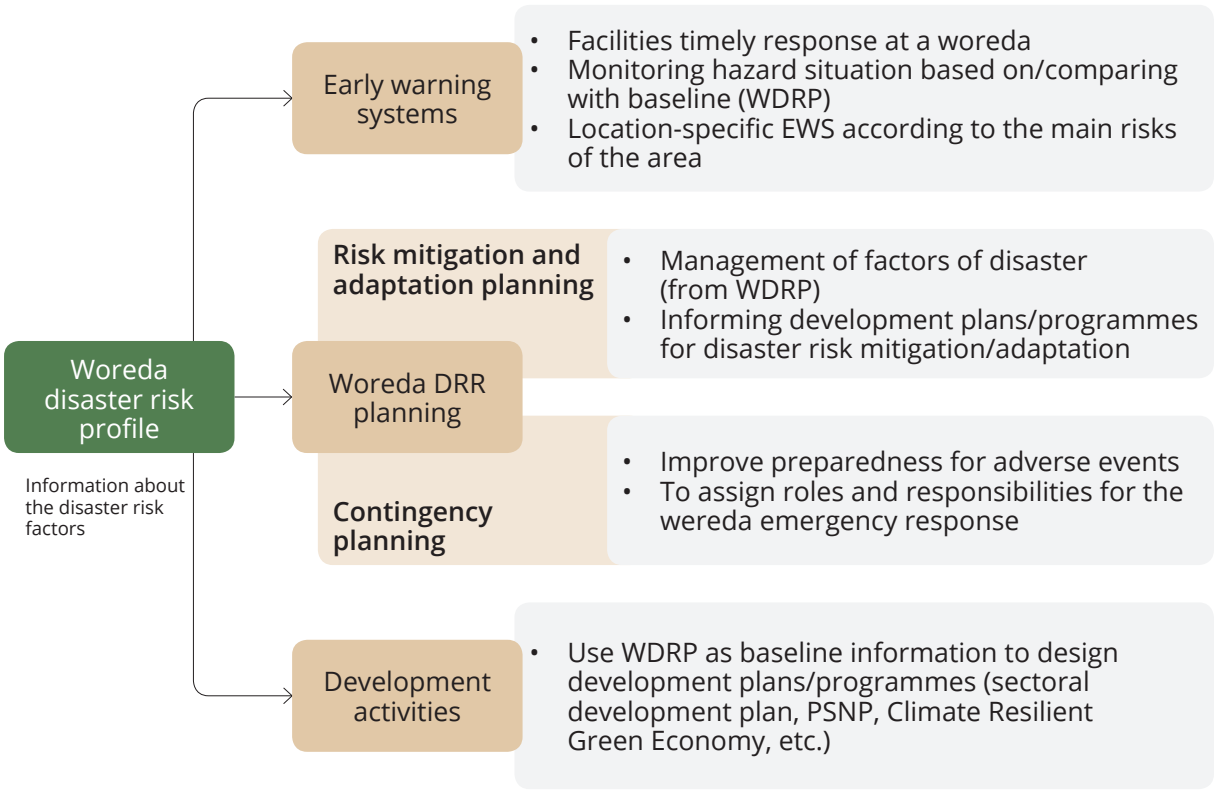



Figure 3. Features of EWS and its links to response and early actions

by the end of 2022, these communities have an improved understanding of their risks. They have enlisted appropriate disaster risk reduction (DRR) and contingency planning strategies.

Even though there have been a few good starts in Addis Ababa and a recent study on the Dire Dawa city risk profile, Ethiopia's expertise in understanding disaster risks in urban environments and developing urban risk-informed multi-hazard EWS requires enhancement.

The existing national disaster risk management policy and its accompanying DRM-SPIF have contributed to creating a better enabling environment for promoting disaster risk knowledge across the country.

Nonetheless, the pace of the implementation of the WDRP could have been faster than the current trend. It is reported that the process of developing WDRPs was completed for over 480 woredas. Of these, only the profiles of 347 woredas were posted online, and the DRR plan for only 431 woredas was completed.

It is also found that the existing WDRPs must be updated to incorporate emerging trends and early warning threats. The database has not been digitalized and has never been readily available or publicly accessible. The existing data is not disaggregated by gender or socially vulnerable groups. The profiles should have been powered by geospatial information. The list of the indicators/variables used to construct the profile is cumbersome and needs to be more rigorous to serve the central purpose of risk awareness and mitigation. The indicators have been predominantly qualitative and need to be backed up by historical data and complemented by vital quantitative indicators for more accurate profiling of vulnerability, exposure, and associated risk elements in rural and urban contexts.

Another critical issue concerning disaster risk knowledge is the need for more clarity and understanding of the roles and responsibilities of agencies involved in generating disaster risk knowledge. Sectorial alignment and relevant risk dimensions were fairly established, although heavyweight was given to flood and drought hazards.

The lack of digitalization of data gathering, management, cleaning, analysis, and risk communication services has significantly hindered the regular updating of the disaster risk profiles and optimal utilization of resources. As a result, the rural disaster risk profile and the database have yet to be fully utilized for forecasting and integrating disaster risk into the community and Woreda development plans.

The urban risk profiling exercises could have learned from their rural counterparts. Various database technologies could have been leveraged. The profiles must be standardized, harmonized, and technologically supported.

The rural and the newly introduced urban disaster risk profiles have faced similar challenges. They need more data on conflict, displacement, population, mortality, social cohesion, and indigenous coping strategies.

A review of the Woreda disaster risk profiles also indicated that the absence of a binding legal framework created a vacuum in making Woreda disaster risk management bodies accountable. This has contributed to the limited availability, accessibility, and utilization of WDRPs.

As a result, various stakeholders reported that the WDRP and overall disaster risk knowledge endeavors need to be further strengthened with particular attention to the following:

- Locally sourced data and information about disaster risk need to be readily available and accessible to the public. This may include but is not limited to further engagement of sectoral ministries to improve the type and quantity of data collection and its subsequent analysis and utilization.

- There is a broader opportunity for the involvement of NGOs, and other public bodies in the WDRP harmonized data collection process. The types and numbers of early warning indicators need to be revisited in light of disaster mitigation plans and emergency response and early action plans.

- Minimum standards for the collection and analysis of the data must be developed and adhered to, ensuring comparative analysis, improved predictability, and sustained impact.

- In addition to the conventional early warning actors, EDRMC needs to nurture a network of research and academic institutions in disaster risk science, create a mechanism for inter-agency collaborations, facilitate interoperability and harmonization of technical approaches, and prevent duplication of resources.

- Digital platforms need to be upgraded or transformed so that multi-sectoral coordination can be achieved and enough rapid, low-error, and cost-effective storage of WDRP data can be achieved.

- The availability and accessibility of data from existing platforms need to be significantly improved in view of optimizing the WDRP knowledge base as an information clearing point to develop disaster risk mitigation, reduction, response, or recovery plans as needed. In this regard, it is important that a fully operational Woreda-net system is realized to boost a two-way exchange of risk information from national and regional authorities all the way to Woreda DRM structures and vice versa.

- The indicators for current vulnerability assessments need to expand from their current food security and drought-related scope and include multi-hazard geospatial indicators with particular attention to risks related to nutrition, public health, conflict, and displacement in the country.

- In addition to the regular early warning actors, the Commission needs to nurture a network of research and academic institutions in disaster risk science. It is advised to create a mechanism for inter-agency collaborations, harmonization of technical approaches, and inhibition of duplication of resources.

- As part of the ongoing legal and institutional reform measures, accountability mechanisms should be implemented for each sectoral ministry and regional administrative body to ensure that disaster risk information is available, accessible, and utilized, including sharing data through Emergency Coordination Centers, as well as across the entire value chain of EWS.

- Exploiting indigenous knowledge about the multi-hazard early warning and early action in different parts of the countries with diverse cultural foundations to get the maximum benefit out of this knowledge.

## THE ROAD AHEAD: ENHANCING AND OPTIMIZING DISASTER RISK KNOWLEDGE

By 2030, this roadmap aims to achieve a comprehensive and automated disaster risk information and knowledge base that will be available and constructed for all dimensions of disaster risk. These dimensions include hazards, exposure, vulnerability, and capacity at the household, community, and organizational levels.

To improve the disaster risk knowledge management in Ethiopia, the following interrelated change areas and core actions were identified:

- Hazard, exposure, vulnerability, and capacity data collection, analysis, and sharing modalities among federal line ministries/ sectorial offices, regional and woreda DRM bodies harmonized and strengthened.
- 'Community of practice' in disaster risk knowledge developed and awareness of DRM improved through networks of academic institutions, practitioners, professional associations, and community leaders.
- Interoperability among early warning actors increased, and information exchange improved locally, regionally, and transcendentally.

The following key actions are proposed to improve disaster risk knowledge by 2030:

### Table 1. Key Change Areas and Actions for Disaster Risk Knowledge

| **Change goals for Disaster Risk Knowledge** | By 2030, comprehensive and automated disaster risk information and knowledge base available and constructed for all dimensions of disaster risk, including hazards, exposure, vulnerability, and capacity at household, community, and organizational levels. |
|---|---|
| **Key change areas and actions** | |
| **1.1. Hazard, exposure, vulnerability and capacity data collection, analysis and sharing modalities among federal line ministries/ sectorial offices and regional bodies harmonized and strengthened.** | |
| 1.1.1 Natural hazard maps are developed and assessed, as appropriate, to identify vulnerable geographical areas and communities. | |
| 1.1.2 Assessments of community vulnerability to all relevant natural hazards are conducted. | |
| 1.1.3 Mobile-based data collection and big data analysis tools and platforms, GIS mapping, open-source mapping, drones, and satellite mapping are used to collect and analyze all elements of risk data. | |
| 1.1.4 Monitoring tools and networks set up to ensure the tracking of all national priority hazards. | |
| 1.1.5 Through IoT-connected weather instruments, integrating automated synoptic and surface weather stations and sensors for water flow and landslide risk, air temperature, and wind speed. | |
| 1.1.6 The interaction of hazards and vulnerabilities evaluated and shared on a timely basis to determine the risks that each region or community faces, and their integration into EWS and DRR plans verified. | |
| **1.2. Community of practice in disaster risk knowledge increased through effective engagement and networks of academic institutions, practitioners, professional associations, community leaders, and other stakeholders.** | |
| 1.2.1 National standards for the methodical gathering, exchange, and assessment of hazard and vulnerability data are developed, and when appropriate, regional, or nearby countries help to standardize them. | |
| 1.2.2 A local community hazard, vulnerability, and risk assessment engagement strategy is established. | |

1.2.3 Regular reviewing and updating of risk (hazard, vulnerability, exposure, and capacity) data is established and maintained.

**1.3. Early warning information exchange and interoperability among early warning sectors improved.**

1.3.1 Data on hazards, vulnerabilities, capacity, and risk are available at all levels, including state and non-state actors, government and public offices, and communities.

1.3.2 Established, maintained, and modernized centralized and decentralized knowledge and information management government databases.

1.3.3 Historical data evaluated in characterizing all priority hazards (e.g., geographical extent, magnitude, intensity, disease transmissibility, frequency, probability, return periods).

1.3.4 Multiple hazards and cascading hazardous events are assessed and translated into preparedness scenarios.

1.3.5 Hazard maps (dynamic and layered when possible) developed that identify the geographic areas (e.g., land cover, places, population characteristics) that could be affected by priority hazards.

1.3.6 Impacts on critical infrastructure and secondary risks associated with these impacts evaluated for all priority hazards.

1.3.7 Vulnerability assessment of populations include exposure, potential impact magnitude (including the ability to get out of the way of harm) and capacity to recover.

1.3.8 Vulnerability of women analyzed separately from the vulnerability of men for each priority hazard.

1.3.9 Vulnerabilities of key economic sectors at the national level assessed for all priority hazards.

1.3.10 Integration of indigenous knowledge in risk assessment for all priority hazards.

1.3.11 Results of risk assessments integrated into local risk management plans in a clear and easy-to-understand language.

1.3.12 Data architecture and repository is (including but not limited to a GIS) established and operational to store all event/disaster and risk information.

1.3.13 All priority hazard events are recorded and connected to loss and damage reports. For example, from sources like DesInventar, post-disaster needs assessment (PDNA), etc.

## 2.2 PATHWAY 2: IMPROVING DETECTION, MONITORING, AND FORECASTING

Impact-based forecasting entails a structured approach for combining hazard, exposure, and vulnerability data to identify risk and support decision-making. The ultimate objective is to encourage early action that reduces damages and loss of life from natural and human-made disasters. It requires a

shift from broadcasting the type of hazard to what it will do on exposed and vulnerable targets over a given spatial area and timeline. Identifying different levels of impact enables the issuance of different warnings to encourage adequate responses by relevant users to reduce damage and losses.

Determining potential impacts can incorporate using quantitative hazard impact models to quantify the processes that come together and cause impact. It can also include determining effects based on past experiences of emergency management stakeholders on the ground.

Various reports indicate that Ethiopia's current disaster risk monitoring and forecasting practice has been dominated by hydro-meteorological data delivered by the National Meteorological Institute (NMI), the lead organization in forecasting climatic and meteorological conditions. The Institute is reportedly one of the oldest government agencies in the country responsible for providing weather observation, monitoring, and forecasting for aviation and agricultural purposes.

The Livelihoods, Early Assessment and Protection (LEAP)/ Livelihood Impact Assessment Sheet (LIAS) index, Famine Early Warning Systems Network (FEWS NET), hot spot classification, and integrated phase classification (IPC) are other resources for predicting future situations through close monitoring of disaster risk situations, which often triggers the establishment of contingency funding to reach out to areas and people immediately impacted by the effects of a disaster. It is encouraging to note that Ethiopia has maintained a reasonable level of cooperation with regional Climate Services and the Global Framework for Climate Services to help enhance its capacity to detect, monitor, and forecast disasters.

Hydro-meteorological data gathering, monitoring, and forecasting in real-time monitoring, exchange of information, and forecasting are limited due to an insufficient number of automatic hydro-meteorological stations on the ground and the limited capacity of its systems in hydrological forecasting. Ethiopia generally needs more ability to incorporate an impact-based forecasting approach and needs more access to, analysis of, or interpretation of prediction model outputs into actionable warning messages in the areas of monitoring, detection, and forecasting.

For Ethiopia to have a robust weather forecasting and impact-based EWS, real-time monitoring systems for meteorological and hydrological conditions need to be strengthened by automating existing stations and installing new automated stations. This includes, but is not limited to:

- The development of real-time transmission of data for flood monitoring through expanding the spatial coverage of hydro-meteorological stations and upgrading the current quality and timeliness of the information.

- The strengthening of institutional collaboration and modalities of data exchange between EDRMC and the NMI.

- The revision and updating of meteorological and hydrological data collection tools/ models in view of providing more detailed information on target populations and delivery of user-specific weather and climate information.

- The harmonization and integration of the NMI datasets with global and regional datasets through maintaining solid cooperation with Regional Climate Services and expanding its horizon by embracing new initiatives in accordance with the framework of the Global Framework for Climate Services.

- The leveraging of digital platforms for improving the availability, accessibility, and exchange of systematic and real-time data among different institutions both at regional, national, sub-continental, and continental levels. This may include the leveraging of technologies such as the myDEWETRA[2] platform, Central Statistical Agency (CSA), Emergency Nutrition Coordination Unit (ENSU), remote sensing, satellite observations, and on-ground measurements.

- Development of a standard and protocol for data exchange procedures among different organizations at multiple levels.

- The development of a network of weather stations and data records to improve the real-time monitoring of meteorological and hydrological hazards.

- Enhancement of weather and climate forecasting where the emphasis should be placed on building the capacity of hydro-meteorological services that boost early warning and early action services based on existing weather and climate forecasts. This may include the downscaling and customizing of forecasts along with improvement of the accuracy of forecasting coupled with historical records of past events. It also encompasses strengthening linkages

2 myDEWETRA.world is an open-source web-based system for real-time monitoring and forecasting of natural hazards like floods, landslides, and wildfires.

between climate forecasting information services and emergency coordination centers.

- Establishment of a national disaster database and information-sharing mechanisms.
- The systematization of cross-boundary data-sharing mechanisms and monitoring services, including a closer link to the Intergovernmental Authority on Development (IGAD) and the African Union (AU).
- End-to-end coordination and collaboration on the entire process of warning, data monitoring, data sharing, and forecasting.
- Capitalize on the current legal reform work and establish norms for improving disaster monitoring, analysis, forecasting, and impact prediction tools and methods.
- Training a new generation of hydrologists and engineers to build the necessary human resources capacity capable of developing and operating future forecasting systems in Ethiopia.

## THE ROAD AHEAD: TRANSFORMING DETECTION, MONITORING, ANALYSIS, AND FORECASTING

By 2030, the roadmap aims to improve institutional and human capacity to detect and forecast major hazards with enhanced analysis of their potential impacts in Ethiopia.

To improve the relevance, quality, and efficiency of detection and forecasting of major hazards and analysis of impacts; the following interrelated change areas and proposed course of action were identified:

- Early warning data collection, analysis, and exchange modalities among federal line ministries/ sectorial offices and regional bodies harmonized and strengthened.
- Early warning data automation, modeling, and forecasting among sectorial offices and regional bodies harmonized and improved.
- Early warning access and information exchange, and interoperability among early warning sectors improved.

The following key actions are proposed to be implemented to improve detection, monitoring, analysis, and forecasting in Ethiopia by 2030:

## Table 2. Key Change Areas and Actions for Detection, Monitoring, Analysis and Forecasting

| | |
|---|---|
| **Change goals for Detection, Monitoring, Analysis and Forecasting** | By 2030, capacity for detection and forecasting of major hazards and analysis of their potential impacts enhanced and optimized. |

**Key Change Areas and Actions**

**2.1. Early Warning data collection, analysis, and exchange modalities among federal line ministries/ sectorial offices and regional bodies harmonized and strengthened.**

2.1.1 Mapping of key agencies for detection, monitoring, analysis, forecasting, and data sharing completed and MOU signed/renewed.

2.1.2 Existing federal EWS technical working group strengthened, federal inter-ministerial disaster management council and regional governments early warning platforms reconstituted.

2.1.3 Monitoring tools and networks reviewed and enhanced, set up to ensure the tracking of all national priority hazards.

**2.2. Early warning data automation, modeling, and forecasting among sectorial offices harmonized and improved.**

2.2.1 Technology based hydro-meteorological data services, including grassroots meteorological services are established/improved and made available to the public.

2.2.2 Access to hydro-metrological data and metadata is available for validation, research, and other purposes.

2.2.3 Existing hydro-meteorological monitoring/forecast tools (including real time stations) with a better resolution are in place and made available for users.

2.2.4 Model outputs are calibrated and validated, and data analysis and processing, modeling, prediction, and warning generation, and dissemination are all based on accepted scientific and technical methodologies and protocols.

2.2.5 Forecast-based model for riverine/flash flood monitoring and forecasting is made available and accessible

2.2.6 Interactive Voice Response (IVR) system is strengthened and the central digital platform is linked through the application programming interface (API) from sectoral offices.

2.2.7 Automation and customizing the message for sectors involving conflict data are in place, utilizing available global datasets for monitoring and assisting in modeling/identifying hotspots.

2.2.8 An agreed threshold is in place for analysis of the occurrence of hazards such as composite/overlay analysis.

2.2.9 For all priority hazards, fail-safe systems such as power backup, equipment redundancy, and on-call personnel systems are in place.

**2.3. Early warning information exchange and interoperability among early warning sectors improved.**

2.3.1 Systems for warning and forecast archiving are in place for all priority hazards.

2.3.2 Two-way communication mechanisms for early warning data producers and inter and intra-sectorial information exchange improved.

2.3.3 Early warning data collection and analysis are gender sensitive and inclusive of socially vulnerable groups (children, people with disability, older people).

## 2.3 PATHWAY 3: EFFECTIVE WARNING DISSEMINATION AND COMMUNICATION

Effective warning dissemination and communication are as important as early warning products. Establishing simple, practical, and trustful information and messages are critical for reaching communities and people at risk, thereby enabling the design and implementation of effective preparedness and response measures. Communication and dissemination systems (including the development of last-mile connectivity) must ensure that people and communities receive warnings of impending hazard events in a concerted and effective manner.

The accessibility and dissemination of early warning information to the public are limited, and even scarcely available information is not user-friendly.

Furthermore, no cloud-based information systems support the exchange and sharing of early warning information. As a result, the various departments often share information through the exchange of emails.

It was found that information disseminated to the relevant government departments and development actors has predominantly focused on drought. In contrast, warning information about flooding, which has become severe in recent years, includes only crude information without depicting its specific impact on the affected population nor identifying the measures to be taken across many spatial locations. The Commission and key line ministries in disaster risk management have yet to design and introduce a systematic tool to evaluate the relevance and usability of the warning and communication services by disaster-affected communities and notably vulnerable people. The lack of standardized, formalized, and harmonized information and communication coordination mechanisms among all actors who produce early warning messages have remained a barrier to creating risk-aware communities.

Per its vision of creating more resilient communities to disaster through increased availability, accessibility, and utilization of early warning information, the actions to be taken need to include, but not limited to, the followings:

- Develop a strategy to guide and facilitate communication flows from the operational center to the community for different levels of warning services.

- Focus on last-mile communication, explicitly targeting communities through intrinsically audience-targeted dissemination mechanisms.

- Capitalize on the legal reform work and introduce a legal enforcement mechanism to make all relevant agencies accountable for communicating and disseminating warning information and thereby timely reacting to the warning information.

- Standardize procedures and protocols for the communication of warning messages at all levels. To meet users' needs, the existing multiple languages and channels approach needs to be aligned and reconciled in consideration of all vertical and horizontal institutional linkages.

- Upgrade information technology and cloud services to increase the efficiency and timely dissemination of early warning information. In this regard, establishing a web-based risk communication portal linked to existing systems such as the Woreda Risk Information system, Woreda net, and myDEWETRA can be instrumental in conveying and communicating warning information. The portal can also host disaster-related educational resources to raise public awareness and preparedness at all levels.

- Collaborate with telecommunications companies and internet providers to have access to dedicated telecommunications broadband services and improve warning dissemination.

- Revise and simplify standard early warning messages so they are easily understood and accessible to populations at risk and enable them to take early action to reduce the impact of a disaster. This may include using color thresholds and similar legends to quickly translate and disseminate complex technical and scientific information into targeted messages. The consideration of using multiple channels, including mobile phones, text messages, and broadcasts that use simple technologies (Flags, boards, whistles, and megaphones) can be an alternative option as well.

- Embrace indigenous knowledge for information dissemination, notably among the pastoralist and agro-pastoralist communities, to reach out to the people at the last miles.

- Enhanced community-based institutions that involve youth, women, and other community leaders to increase

community risk awareness and optimize the utilization of early warning information.

## THE ROAD AHEAD: ENHANCING EFFECTIVE WARNING DISSEMINATION AND COMMUNICATION

By 2030, the roadmap aims for more effective communication and dissemination systems (including the development of last-mile connectivity), where communities and people at risk receive advance warnings through strong coordination of information exchange at national, regional, and local levels.

To achieve this, the following interrelated change areas and proposed course of action were identified:

- All priority hazards are communicated and disseminated according to the specific needs of specific groups, and all population members (including women, the elderly, and people with disabilities living in cities or rural areas) are provided with warning services.
- Early warning communication systems are well-equipped with information technology and remain functional at all times.
- Impact-based early warnings are communicated effectively and accessible to all actors to prompt action.

The following key actions are proposed to be implemented to realize improved communication and dissemination services by 2030:

### Table 3. Key Change Areas and Actions for Warning Communication and Dissemination

| **Change goals for Communication and Dissemination** | By 2030, communication and dissemination systems (including the development of last-mile connectivity) improved, people at risk receive advance warnings through information exchanges made at national, regional, and/or Woreda levels. |
|---|---|
| **Key Change Areas and Actions** | |
| **3.1. All priority hazards are communicated and disseminated according to the specific needs of specific groups, and all diverse groups of the population at risk (including women, the elderly, and people with disabilities living in cities or rural areas) are provided with warning services.** | |
| 3.1.1 All priority hazards, with revenant behaviors/characteristics are subjected to regular system-wide tests, evaluations, and exercises for the warning system(s). | |
| 3.2.2 The needs of MHEWS users, including needs influenced by levels of vulnerability, are researched and understood for all priority hazards. | |

**3.2. Communication systems and equipment are in place and become functional.**

3.2.1 A holistic early warning communication strategy (including social media engagement, communication guideline etc.) developed and strengthened.

3.2.2 Agreements developed to use private sector resources (e.g., mobile-cellular, satellite, television, radio broadcasting, amateur radio, social media) to disseminate warnings where appropriate.

3.2.3 'Traditional' community practices embedded in 'modern' communication and dissemination channels in place at all relevant scales.

3.2.4 Face-to-face EWS learning combined with other knowledge sharing platforms is formed and promoted among industry practitioners, students, academics, and others.

3.2.5 Advanced, effective and communication systems and equipment (e.g. (24/7 days live broadcasting, social media, Short Code Hotline and Interactive Voice Recording, early warning Information Kiosk and Drone enable early warning information, etc.) are introduced.

3.2.6 Mandated warning service thresholds are well understood by all states, Woredas and federal governments sectors.

3.2.7 All priority hazards attain early warning messages and advise on risk-reduction actions that are understood by everyone, particularly those in vulnerable situations.

**3.3. Impact-based early warnings communicated effectively to prompt action.**

3.3.1 Impact-based warning messages are clear in indicating risks and providing actions (including last-mile connectivity), and they are easily understood outlining the phases and the level of actions by responsible groups or bodies.

3.3.2 Public awareness, mindset and understanding of warning messages and early actions are enhanced and supported by state-of-the-art communication and dissemination systems.

3.3.3 Coordination across warning issuers and dissemination channels is ensured at the national, subnational, and local levels by warning communication strategies.

## 2.4 PATHWAY 4: PREPAREDNESS, RESPONSE AND EARLY ACTION

An effective EWS informs and guides decisions in preparedness, response, and early actions. This is commonly characterized by the presence of active and functioning early warning platforms; the regular use of early warning monitoring systems; the operationalization of disaster risk management plans (mitigation/adaptation and contingency); and the availability of flexible, responsive funding (contingency fund) or disaster risk financing.

Ethiopia's current disaster risk management policy supports the importance of addressing the root causes of risks before a disaster happens by taking early actions, including development-oriented programs. It also suggests that the implementation of early and timely action shall start at 'normal'

times before the worsening of disaster situations. Even in recent years, the EDRMC has mobilized significant domestic and international resources to respond to humanitarian needs for drought, flood, and conflict-affected people across the country. The availability of early warning information sources, which various agencies in the country have generated, has helped in modeling various preparedness and early action measures. The response to crop infestation, livestock diseases, and health epidemics was relatively rapid and more responsive than other sectors. Some international development partners have also introduced and used mechanisms such as livelihood early assessment and protection and livelihood impact analysis to enhance decision-making in humanitarian response.

In relation to early DRM actions, disaster risk financing has significantly added value to deter the effects of disasters in Ethiopia. In this respect, the regular government budgeting cycle has allowed DRM activities to be integrated into planning and budgeting cycles. Equally, the country's flagship programs, like the Productive Safety Net Program, PSNP, have helped cushion vulnerable communities against climate change related shocks and disasters. The availability of PSNP's Risk Financing Mechanism (RFM) and Contingency Budget has helped to protect income and build beneficiaries' assets. Establishing the Woreda level Contingency Fund (5 percent of the allocated budget) for utilization by communities on emergency response at times of shock has been a valuable mechanism to respond to local needs. The DRM framework indicates that transitory shocks are addressed through a combination of the PSNP instruments (Risk Financing Mechanism and Contingency Budget) and the Humanitarian Appeal. In practice, the Risk Financing Mechanism is rarely used, while the Humanitarian Requirements Document (HRD) Appeal is activated annually. The scaling up of this instrument through shock-responsive and scalable cash transfer programs is encouraging.

The risk transfers initiatives implemented in some parts of the country through involving micro-insurance and micro-finance banks or cooperatives have the potential for further scaling up. It is noted that the Ministry of Agriculture, in collaboration with the private sector (mainly Nyala Insurance, Oromia Insurance, and Oromia Bank) and development partners like World Food Program (WFP) or the African Union-African Risk Capacity (AU-ARC), has been working closely to pilot farmers' risk transfer products in crops and livestock production systems. It is reported that the EDRMC and the Ministry of Finance have started to develop a risk financing strategy and mechanism, which will have enormous potential to promote early actions that would significantly mitigate disasters and minimize their adverse effects.

However, it is undeniable that the country has gone through several humanitarian crises in the past that have claimed lives and disrupted livelihoods. It would have been possible to prevent or significantly reduce these devastating impacts if early warning services and disaster preparedness plans had been more effectively managed. In addition, taking early actions before the hazard event becomes a crisis and timely administrative and political decisions for humanitarian response would have also reduced disaster impacts.

Multiple factors have contributed to these challenges. There needs to be more utilization and application of the existing EWS and Woreda Disaster Risk Profiles to develop scenarios that inform DRR and implement contingency plans that can enhance coping capacities. There need to be stronger linkages between early warning information and early actions, and humanitarian responses are often too late to save lives and restore livelihoods. In addition, humanitarian response needs to be fully informed by routinely collected, organized, analyzed, and monitored early warning information (weekly and monthly early warning information); instead, it is predominantly based on the findings of bi-annual seasonal emergency food and non-food assessments.

The lengthy government-led multi-agency food and non-food needs assessment process sometimes causes delays in publishing official figures on the people in need. This leads to a delay in government approval to implement humanitarian response interventions. Slow funding decisions and competing global humanitarian priorities by development partners are further challenges. The timelines of the response activities and the approval of resources by international development partners often take time to cushion vulnerable people and local livelihoods against shocks.

The participation of communities in the design and decision-making of Woreda and community-based early warning response has often been limited. Community feedback mechanisms were not effectively utilized to prompt early actions. Even if rural disaster-affected communities, notably pastoral and agro-pastoral communities, still use their 'traditional' EWS, sufficient attention is not yet paid to embracing and embedding such knowledge into the country's EWS. Several national universities have begun incorporating disaster risk preparedness and response courses or education in their undergraduate or graduate programs. These additions have contributed to training civil servants with the necessary human capital to mobilize and coordinate preparedness and response functions. However, staff turnover in the sector remains very high, undermining preparedness and response capacities. Furthermore, the sector struggles with

the absence of protocols/codes for response, evacuation, and recovery activities (threshold) or exercises, drills, and simulations. Limited professionalization of DRM, especially towards decision-makers and some humanitarian actors, is a further challenge.

In accordance with its vision 2030 of creating more resilient communities in the face of disaster through increased capabilities for acting upon warning messages and engaging in risk reduction, response, and early action, the steps to be taken need to include, but not limited to, the followings:

- EDRMC needs to improve preparedness and response plans to encompass pre-, during, and post-disaster phases from prevention to recovery and rehabilitation. The plans should be context-specific and different for high and low-land areas. Specifically, the emergency plans should start from the information collected and produced by the WDRP by refreshing or updating the existing guidelines for emergency preparedness, response, and early action.

- EWS should be connected to the WDRP and target the hazards that are relevant for the specific Woredas. Each of the WDRP and subsequent assessments need to be backed by the development of a preparedness and early action plan. The ownership of Woreda leaders and the participation of the local population needs to be strengthened through continuous awareness creation programs.

- Awareness creation is fundamental for effectively responding and acting on warnings. This should be built by incorporating DRM within school curricula at an early stage.

- A baseline of community awareness and the state of EWS cluster indicators should be prepared by organizing a survey. Specific mechanisms for lessons learned should be fostered at the community, regional and national levels. The mechanisms should envisage the gathering of relevant stakeholders after each event to analyze the successes and challenges encountered during emergency management. Within this context, a coordinated use of social media can assist in awareness creation before and when the event is imminent.

- Capabilities to act on warning messages and engage in risk reduction actions need to be enhanced at all scales. The speed of action particularly affects the success of emergency response activities; this could be enhanced by introducing existing technologies.

- Rapid distribution of warnings is not in and of itself sufficient unless stakeholders are well informed about what actions to take in an emergency. With the growing reach of mobile technology and other online platforms like the use of social media, this landscape is now gradually evolving.

- DRM should be included in education at all levels and should also address EWS and improve awareness of the population. Curricula that include EWS and DRM should be developed at every level of education. The mainstreaming of disaster risk knowledge and disaster preparedness education in curricula or extracurricular activities is vital to create a more resilient generation and communities at large.

- To improve risk perception and awareness, a DRM campaign should be designed and implemented. A free call center should be created for the population so that it represents a reference for the risk information in Ethiopia and serves as a data clearing house.

- The development of preparedness and emergency plans for the whole country should be based on risk information. The plan should also include the development of rehabilitation guidelines with a set of prevention and mitigation actions linked with EWS.

- Preparedness plans should include specific measures for creating food reserves and food distributions. The preparedness and emergency plans should be regularly tested through exercises based on prefigured risk scenarios. The response drills and exercises should test the effectiveness of warnings, the understating of the messages communicated by the authorities, and the actions to be implemented for mitigating the impacts on different sectors. Drills should also address the efficiencies of equipment and logistic capacity as well as any redundancy.

- Tailor myDEWETRA platform to the Ethiopian Early Warning Model and integrate it within existing systems in place at EDRMC (e.g., LEAP, Geonetcast, WDRP, CATS, early warning, Disaster Data Base, DRM-SPIF). The platform should be translated into Amharic and be user-friendly. Capacity building should encompass several tasks: provide Information and Communication Technology (ICT) equipment and training at every level, along with financial assistance for administrations and continuous technical assistance.

- Establish, strengthen, or scale up risk financing instruments both at the federal and regional levels to solidify the activation and implementation of contingency funds for early actions with clear early warning trigger indicators.

- Increase investments in resilience building to enhance the coping capacities of exposed populations given certain level of vulnerability and establish conditionality of enhanced DRM levels by households with their access to risk transfer mechanisms. This would create an incentive that would build the confidence for the private sector to pilot and thereafter provide a wide range of risk transfer products.

## THE ROAD AHEAD: PREPAREDNESS, TIMELY RESPONSE, AND EARLY ACTION

By 2030, the roadmap visualizes enhanced and stronger institutional capabilities for early action on warning messages, risk reduction, disaster preparedness, and response.

To achieve this, the following important change areas and courses of action are propose:

## Table 4. Key Change Areas and Actions for Preparedness, Timely Responses, and Early Actions

| Change goals for Preparedness, timely responses and early actions | By 2030, capabilities to act on warning messages and undertake risk reduction actions will be enhanced |
|---|---|
| **Key Change Areas and Actions** | |
| **4.1 Disaster preparedness for early action, effective response, and recovery improved** | |
| 4.1.1 Disaster preparedness measures, including response plans, developed in a participatory and gender-responsive manner. | |
| 4.1.2 Disaster preparedness measures, including response plans, practiced. | |
| 4.1.3 Disaster preparedness measures, including response plans, account for the needs of people with vulnerabilities. | |
| 4.1.4 Multi-hazard risk assessments utilized to develop and design evacuation and recovery strategies. | |
| 4.1.5 Communities' ability to respond effectively to early warnings assessed and enhanced, particularly women and people in vulnerable conditions. | |
| 4.1.6 Capacity to prepare, understand warning messages and taking early action is enhanced. | |
| 4.1.7 Contingency planning is developed in a scenario-based manner following forecasts or likely scenarios across timescales. | |
| 4.1.8 Early action and response options across time and geographical scales are linked to the provision of funding to support them for all priority hazards. | |
| 4.1.9 Community-based organizations including youth groups and women's organizations lead public awareness and education campaigns for all priority hazards. | |
| 4.1.10 Percentage of women that correctly identify what actions should be taken for all priority hazards. | |
| 4.1.11 Previous emergency and disaster events and responses analyzed, and lessons learnt incorporated into preparedness and response plans. | |
| 4.1.12 Previous emergency and disaster events and responses analyzed, and lessons learned incorporated into capacity-building strategies. | |
| 4.1.13 Public awareness strategies and programs evaluated regularly and updated as required. | |
| 4.1.14 Drills and exercises conducted with first responders and community. | |
| 4.1.15 Population at risk acted for a priority hazard when an alert was received. | |
| 4.1.16 Early warnings closely aligned with risk information, particularly with the WDRP and other Urban Initiatives. | |
| 4.1.17 After action reviews of preparedness, response, and early actions practices fostered and strengthened at community, regional, and national levels. | |

3

SECTION 2

# CRITICAL STRATEGIC/ CROSS-CUTTING ISSUES

## 3.1 AN ENABLING POLICY ENVIRONMENT

Ethiopia has promulgated a progressive National Policy and Strategy on Disaster Risk Management (NPSDRM) since 2013. The Policy, which has been under implementation for a decade, is in line with the global Sendai Framework for DRR (2015-2030), the regional Africa Union (AU) strategy, and the IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI) frameworks.

The policy document also envisages reducing disaster risks and potential damage caused by disasters by establishing a comprehensive and coordinated disaster risk management system and contributing to the attainment of sustainable development goals. The DRM policy further aspires to establish effective disaster risk management with defined roles and responsibilities of line ministries/ bureaus at all levels of government and other stakeholders through a decentralized system. This means that the policy sets a conducive policy environment for the implementation of the proposed roadmap for a MH-IB-EW-EAS. Nonetheless, there are reported gaps between the policy document and its translation into practice on the ground. Even though the National Policy and Strategy on Disaster Risk Management provide a legal basis that should ensure accountability and enforce the implementation of DRR at all levels, the effective implementation of this policy and system has been partly hampered by the absence of a legal framework.

Considering this, EDRMC has undertaken a forward-looking legal reform initiative in collaboration with Building Resilience in Ethiopia (BRE) to address the above gaps. If the new legal framework is legislated by the government as a proclamation, it will entrust responsibilities and power that may include, but is not limited to:

- Establish a mechanism for effective control, coordination, decision-making, accountability, and organizational arrangements of all aspects of disaster risk management.
- Ensure that there is strategic, institutional, and financial capacity to build, sustain, and improve the capability to

prepare for, protect against, respond to, recover from, and mitigate all hazards at the national level.

- Support the successful implementation of existing and future national, regional, and international human rights obligations, as well as strategies and policy frameworks for disaster risk management, risk reduction, climate change, and sustainable development both at the federal and regional levels.

- Integrate regional states' humanitarian response activities into national arrangements.

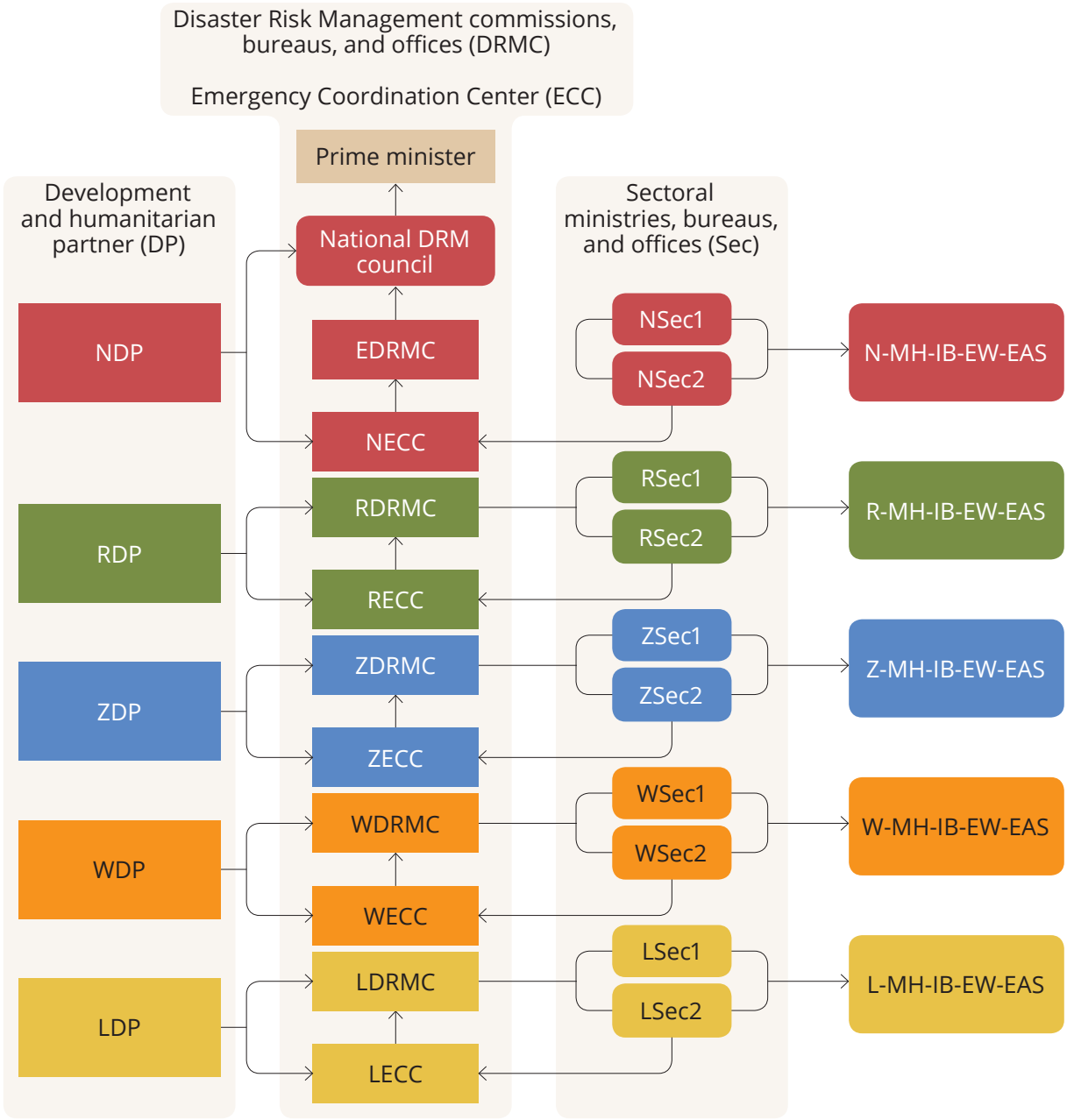
Subsequently, it is hoped that the EDRMC, capitalizing on the new proclamation, may need to work on the development and updating of the various early warning guidelines, training modules, and disaster risk management manuals which are important systems and tools for effective implementation of the Roadmap for MH-IB-EW-EAS of Ethiopia.

Moreover, by being part of the National Disaster Risk Management Ministerial Council and having recently regained autonomy under the Prime Minister Office, EDRMC will be able to effectively exercise its leadership and coordination mandates at the national and international levels in relation to the implementation of the roadmap within its exclusive power. In accordance with the legal reform, it is hoped that EDRMC will assume a stronger legal ground to make each of the line ministries' EWS accountable for the predictions they produce and measure the performance of each early warning subsystem in terms of its predictive capacity and the responsibility for timely action on warning messages. This will eventually nurture confidence, increase transparency, and provide opportunities for learning among line departments and regional states in pursuit of delivering reliable and quality early warning data that contributes to the creation of resilient communities in Ethiopia.

## 3.2 EFFECTIVE GOVERNANCE OF THE ETHIOPIAN EWS

With the current federal system of the country, this roadmap adopts the following EWS governance system where the role of state and non-state actors is presented in Figure 3. It shows the organizational hierarchy, relationships, and lines of communication for the Ethiopian MH-IB-EW-EAS.

The EDRMC, as Ethiopia's higher governmental legal body, shall oversee the implementation of the Ethiopian MH-IB-EW-EAS roadmap, in which state and non-state actors will play roles at various levels of government, including transboundary partnerships. This will consider Ethiopia's DRM




N-National, R-Regional, Z-Zonal, W-Woreda, L-Local

**Figure 4. Ethiopian MH-IB-EW-EAS governance structure**

policy and strategy from 2013, and the Ethiopian DRM Council, chaired by the Prime Minister, shall oversee implementation.

A hierarchy of reporting will be set up in accordance with the federal government of the country for the implementation of the roadmap. Ethiopian MH-IB-EW-EAS will extend from the local to the federal level. There will be a new technical and strategic working platform with key functions pertaining to understanding risks, monitoring and forecasting, dissemination and communication, and preparedness and response capabilities.

The National DRM Council will oversee the overall roadmap's implementation, and the EDRMC will take lead in coordinating and implementing the roadmap. This will be a part of the overall national DRM oversight mechanism. There will be three technical task forces for the MH-IB-EW-EAS platforms at each administrative scale (see Figure 4): Technical, Monitoring, Evaluation and Reporting, and Policy. The national DRM council will hold regular meetings in accordance with its responsibilities and terms of reference, which include serving as the roadmap's implementation and oversight leader. The strategy to support this roadmap will be developed under the direction of the DRM council. The MH-IB-EW-EAS roadmap must be operationalized with support from the government, development partners, civil society organizations, and higher education institutions. The EDRMC, in collaboration with the other lead entities for EWS, will develop a program/plan with clearly defined actions, lead agencies, support agencies, resources, timelines, and monitoring and evaluation measures under the action areas in this roadmap. Furthermore, MH-IB-EW-EAS requirements will be incorporated into the corporate and business plans of government entities.

Based on the guiding principles of this roadmap, the country will adopt a whole-of-society approach to the establishment of an effective EWS. The local level MHIBEWAS will have to establish a platform for joint state and non-state actors that reports to the Woreda and all the way up to the national level. The same EWS governance system shall be established at all administrative scales. ECC will be established as needed, from the local to the national level (Figure. 3). As shown by the following table, Ethiopian early warning governance is aligned with its DRM policy to accelerate road map implementation based on the respective mandates of the sectors.

### Table 5. Roles and responsibilities of 5 tiers of government structures and stakeholders for implementing the MH-IB-EW-EAS roadmap in Ethiopia

| Level of administration | Roles and responsibilities in the roadmap implementation |
|---|---|
| **Federal government** | The federal government is ultimately responsible for implementing DRM and risk-informed MH-IB-EW-EAS across the country. Ministerial sectors are responsible and accountable for higher levels of disasters according to the threshold and must provide demand-driven assistance to regional states and local governments. |
| | In addition to its primary responsibilities of assisting regions and other local governments, it is also responsible for taking on residual responsibilities from regional and local governments, as well as collaborating with international actors during national emergencies. |
| | In accordance with constitutional mandates and federal legal frameworks, establishes harmonized policies and institutional support systems to ensure an effective early warning system and disaster risk reduction. |

| | |
|---|---|
| | In the event of a national level disaster (the legal framework still determines the level), the federal government must ensure effective collaboration and coordination with international emergency services as well as between regions. |
| | It must be capable and retain residual responsibility for dealing with unprecedented hazards (e.g., recent experiences of COVID-19, conflict etc.). Regardless of the level of disaster, the federal government must take immediate strategic action in collaboration with the regions and local governments. |
| | It is responsible for developing standard operating procedures for federal, regional, and local agency actions in the immediate aftermath of a disaster to allow for more systematic disaster response. |
| | Since it is impractical for regions and local governments to establish these costly systems separately, federal sectors/agencies must assume responsibility for meteorological and geological hazards (seismic, volcano, etc.), hydrological monitoring, and advanced forecasting and early warning systems. |
| **Regions** | Regional governments should strive to manage lower levels of disaster without federal assistance and must collaborate with federal sectors/ agencies to manage Level XXX disasters. Furthermore, regions must support disaster preparedness activities and disaster response efforts led by local governments (woredas and kebeles). |
| | They should assess the disaster's impact immediately and advise the federal government on whether to declare a localized or regional emergency. |
| | They should be held accountable for providing overall direction to local governments on capacity building through supportive policy frameworks, institutional arrangements, human resource development, and material assistance. |
| | Based on early warning systems provided by regional or federal sectors/ agencies such as the NECC, the federal government should take immediate action and be alerted on lower level activated ECCs. |
| | Regions must manage vulnerable population databases, vulnerability profiles, and disaster risk profiles in their area. |
| **Zones** | Zones must be responsible and accountable for ensuring adequate resources and logistics facilities in advance of Level XXX disasters. |
| | Conduct, update, and put woreda disaster risk profiling into action. |
| | Respond to localized hazards, assess capacities and vulnerabilities, receive early warnings, and ensure and oversee woreda, kebele and community preparedness. |
| | Zones must prepare to manage a Level XXX disaster during the first critical hours/days because they are closer to those in need (compared to the next higher-level administration), and it may take some time for external agencies to arrive to supplement local efforts. |
| | Integrate MH-IB-EW-EAS into daily community responsibilities. |
| | In the event of an emergency, open spaces and shelters must be able to accommodate a certain share of the total population. The government must stock enough food and non-food items (or procurement could be made from the agreed time of provisions as decided by the threshold). Federal and regional governments can also set appropriate targets. |
| | Zones must manage vulnerable population databases, vulnerability profiles, and disaster risk profiles in their area. |
| **Woredas** | Local governments must be responsible and accountable for ensuring adequate resources and logistics facilities in advance of Level XXX disasters. |

| | |
|---|---|
| | Conduct, update, and put woreda disaster risk profiling into action. |
| | Respond to localized hazards, assess capacities and vulnerabilities, receive early warnings, and ensure community and subnational preparedness. |
| | Woredas must prepare to manage a Level XXX disaster during the first critical hours/days because they are closest to those in need, and it may take some time for external agencies to arrive to supplement local efforts. |
| | Integrate MH-IB-EW-EAS into daily community responsibilities |
| | In the event of an emergency, open spaces and shelters must be able to accommodate a certain share of the total population. The government must stock enough food and non-food items (or procurement could be made from the agreed time of provisions as decided by the threshold). Federal, regional, and zonal governments can also set appropriate targets. |
| | Woredas must prepare to manage a Level XXX disaster during the first critical hours/days because they are closest to those in need, and it may take some time for external agencies to arrive to supplement local efforts. |
| | Woredas must manage vulnerable population databases, vulnerability profiles, and disaster risk profiles in their area. |
| **Local (Kebeles, Villages and Communities)** | They must build the capacity to assess the immediate needs of hazard-affected communities using nationally recognized tools and methods. |
| | Manage community-based early warning systems in all of its value cycles. |
| | They must establish and manage relief distribution points/camps to distribute relief supplies and services in the aftermath of any level of disaster. |
| | Integrate MH-IB-EW-EAS into daily community responsibilities. |
| | Local governments should act quickly, relying on early warning systems provided by regional or federal sectors/agencies such as the NECC. |
| | Kebeles and villages must manage vulnerable population databases, vulnerability profiles, and disaster risk profiles in their area. |
| | Communities must be engaged in all pathways of the MH-IB-EW-EAS, including engagement in risk mapping, dissemination of risk information via different methods, and training for first aid and evacuation activities. |
| | Communities should raise disaster awareness through campaigns, songs, poems, and proverbs. |
| | Communities must be involved in emergency drills and exercises, stocking food and planting crops, and first aid and other basic life support mechanisms. |
| | There must be two-way communication between trained communities (for example, using formal phones and social media), one-way dissemination using electronic media such as radio, or TV. |
| **City administrations** | Municipalities must seek technical assistance from their federal and regional counterparts for hazard mapping, risk monitoring, risk reduction, and incorporating DRM into development because these risk management measures typically cover a larger geographical area. |
| | Conduct, update, and put urban disaster risk profiling into action. |
| | In some regions, responsibilities should be divided between rural and urban metropolises/towns/cities, as well as sub-metropolitan and metropolitan authorities/jurisdictions, based on context and capacity. |
| | Municipalities must immediately notify respective local administration sectors/agencies, regional governments, and interested parties of any disaster incidents, regardless of severity. Timely notification gives local governments, regions, and federal actors enough time to prepare their support efficiently. |

| | |
|---|---|
| | Cities/towns must manage vulnerable population databases, vulnerability profiles, and disaster risk profiles in their area. |
| | Municipalities and city administrations should take immediate action based on early warning systems provided by regional or federal sectors/ agencies such as the NECC. |
| **Intergovernmental and inter-agency coordination and collaboration** | EDRMC is the agency tasked with facilitating and maintaining overall coordination, collaboration, and partnerships among the five tiers of government. |
| | Cities/municipalities must work together as sister municipalities (foreign and domestic) to share and combine resources so that the unaffected municipality can assist the impacted areas or regions. |
| | EDRMC must work with relevant federal ministries and agencies to improve response capacities, such as monitoring, forecasting, and search and rescue. |
| | Developing and strengthening a national disaster/early warning database system, as well as maintaining a robust disaster information management system, are federal responsibilities that the EDRMC must carry out in collaboration with regional and local governments. |
| | The EDRMC must be the agency in charge of facilitating the establishment and operation of early warning systems by federal, regional, and local government agencies in collaboration with NGOs, civil society organizations, communities, and the private sector. |
| | Existing coordination mechanisms and platforms with donors, NGOs, the private sector, and various groups of civil society actors outside of government must be strengthened at all administration levels (see Figure 4.) The EDRMC must facilitate existing formal and informal coordination and collaboration mechanisms, such as humanitarian cluster groups, early warning and DRM working groups, donor groups, I/NGO networks, private sector, and civil society organizations, to ensure a high level of pluralist inter-agency collaboration. |
| | The role and responsibility of local level DRM councils and leaders in mobilizing federal and regional resources to assist local governments is critical (e.g., mobilization of security personnel for disaster preparedness and response). Similarly, the ability of the Local Level Emergency Coordination Centre (LECC) (zonal, woreda, and village) to ensure overall disaster management coordination is critical. |
| | Under the federal government's authority, the MH-IB-EW-EAS and disaster risk management agendas require coordination and collaboration with national level development partners, UN Agencies, intergovernmental organizations, and INGOs. |

In the above table, XXX indicates the threshold that EDRMC and its stakeholders will set for defining declarations, activations, and responses at each tier of the government, including community capacities.

In addition, the current DRM policy and the EDRMC structure recognize the important roles being played by bi-lateral and multi-lateral UN agencies, foundations, regional knowledge-based institutions, NGOs, CSOs, and private sector operators in implementing the various EWSs in Ethiopia.

### Table 6. Matrix of the Governance of Early Warning Systems and Mandates in Ethiopia

| Hazards Types/Incidents | Lead Agency (mandate) | Support Agencies (mandates) |
|---|---|---|
| Crops and Livestock related hazards | Ministry of Agriculture | EDRMC, Ethiopian Meteorology Institute (EMI), EIAR, relevant UN agencies, NGOs, private insurance, micro-finance institutions, USAID, Foreign, Commonwealth and Development Office (FCDO), EU, World Bank and other humanitarian-development partners |
| Forest and bush fire, climate change and environment pollution related hazards | Environmental Protection Authority | EDRMC, EMI, relevant UN agencies and NGOs |
| Human health epidemic related hazards, including malnutrition | Ministry of Health | EDRMC, Ethiopian Red Cross Society (ERCS), relevant UN agencies and NGOs |
| Flood, water supply and water dam related hazards | Ministry of Water and Energy, Ministry of Irrigation and Lowlands (MILLs) | EMI, EDRMC, Ministry of Health (MoH), Ministry of Defense (MoD), ERCS |
| Geological hazards (seismic and volcanism), landslide and slope failure related hazards | Ministry of Mines | EDRMC, Ministry of Agriculture (MoA), Centre for Seismic Studies, Addis Ababa University (AAU) |
| Urban infrastructure/ fire | Ministry of Urban and Infrastructure City Administration / Fire Brigade | Municipality and Regional Administration, EDRMC City Administration |
| Transportation related hazards | Ministry of Transport | EDRMC |
| Conflict, Displacement and refugee | Ministry of Peace / MoFA / National Regional States | Ministry of Peace (MoP), MoFA, International Organization for Migration (IOM), EDRMC, ERCS, Refugees and Returnees Service (RRS) |

## 3.3 INVESTMENT AND PROGRAMMING FOR THE ETHIOPIAN MH-IB-EW-EAS ROADMAP IMPLEMENTATION

Government-led initiatives develop and institutionalize funding mechanisms for the EWS. Locally sourced funding mechanisms, including community funding and financial instruments, will be maximized. This will include determining the public's willingness to pay for EWS services as needed. Innovative revenue-generating activities, public-private partnerships, and international and regional funding support will supplement core funding.

Although the pathways are interconnected, we recommend that resource mobilization be done per pathway to better align financing and avoid duplication. As required, the general strategy and considerations for mobilizing resources and funding for the roadmap will be as follows:

1. Engage and mobilize local resources and make the roadmap community-owned and funded.

2. 2. Establish and benfit from the parliamentarian budgeting approach

3. Enhance partnerships with donors and development partners for resource mobilization and technical assistance.

4. Seize the opportunity of private sector finance and investments for implementing the roadmap.

5. Establish and strengthen a baseline for the institutionalization of a tracking system for MH-IB-EW-EAS roadmap expenditures.

6. Improve programming by humanitarian and development partners, ensuring ease of joint resourcing and planning outside of the government financing system.

7. Develop an MH-IB-EW-EAS financing strategy and establish an integrated national financing framework.

8. Work in close collaboration with the Ministry of Finance and the Ministry of Planning & Development to implement the roadmap.

9. Establishing a multi-actor partnership on multi-hazard impact-based early warning early action financing.

10. Develop MH-IB-EW-EAS financing strategies and financial instruments.

As the next step, this MH-IB-EW-EAS roadmap suggests detailed work on priority program interventions. As it necessitates a thorough technical analysis, we encourage that it should be co-designed with relevant partners.

## 3.4 MONITORING, EVALUATION, LEARNING, AND ACCOUNTABILITY IN THE ETHIOPIA MH-IB-EW-EAS ROADMAP

The DRM Council will establish an M&E Sub-Committee to provide this function in the short term as the capacity strengthening of the federal, regional, and other levels of DRM offices to embrace this function unfolds. The Sub-Committee will develop a Monitoring, Evaluation, and Reporting (MER) framework for this roadmap aligning with those standards established in the national system, including the ten years perspective plan and other global agendas like the SDG 2030 agenda, SFDRR, etc. A gender-sensitive MER system is required for the roadmap to measure and monitor changes over time, track the effectiveness of the MH-IB-EW-EAS, and guide future planning. The purpose of the MER framework is to inform decision-makers whether targets are being met, when circumstances have changed, and whether policies are on track or not being implemented. Information will be provided on which decisions can be made about changes needed in implementation mechanisms. While national-level action and reporting are necessary, there is a need to address and report on MH-IB-EW-EAS within the regional and global context and on aggregate changes over time. This must be integrated into the national climate change adaptation and resilience reporting processes. Notwithstanding, the MER approach should be practical, considering limited institutional capacities and data availability whilst promoting alignment of effort and accountability. The DRM council will oversee reporting on the roadmap at its regular meetings, supported by the EDRMC. The council at different administrative scales of the country will determine the frequency, form, and level of detail of reporting it requires on roadmap activities. The technical committees will prepare an annual report on the implementation of the roadmap, making it available to the National DRM Council and the public through the established process.

### ROADMAP REVIEW

A roadmap review will be undertaken at agreed periods related to existing national and regional reporting requirements to assess whether it aligns with contemporary multi-hazard EWS, climate change and DRR policy, and other developments in the country, the region, and globally. EDRMC, in partnership with development and humanitarian partners, will establish the review period, oversee and consider the outcomes of the review of the roadmap, and determine if it is to be amended or replaced.

To measure MH-IB-EW-EAS's capacity to generate and communicate effective, impact-based, multi-hazard early

### Table 7. Key indicators for the four pathways of the Ethiopian MH-IB-EW-EAS roadmap

| DISASTER RISK KNOWLEDGE | MONITORING AND FORECASTING |
|---|---|
| • Priority hazards and threats are identified<br>• Exposure, vulnerabilities, capacities, and risk of prioritized hazards are assessed<br>• Roles and responsibilities of stakeholders identified<br>• Disaster risk information of prioritized hazards consolidated | • Monitoring systems are in place for prioritized hazards<br>• Forecasting and warning services in place for prioritized hazards<br>• Institutional mechanisms in place for prioritized hazards |
| **WARNING DISSEMINATION AND COMMUNICATION** | **PREPAREDNESS AND RESPONSE CAPABILITIES** |
| • Key organizational and decision-making process is in place and operational<br>• Key communication systems and equipment are in place and operational<br>• Impact-based early warnings are communicated effectively to prompt action by target groups | • Key disaster preparedness measures, including response plans are developed and operational<br>• Public awareness and education conducted for prioritized hazards<br>• Public awareness and response tested and evaluated for prioritized hazards |

warnings, a monitoring and evaluation (M&E) framework will be developed first. For the intended purpose, the Government of Ethiopia will also develop customized indicators and targets. The M&E framework, indicators, and targets will also be checked against international frameworks, such as the SFDRR and, more specifically, target G.

As part of the overall monitoring, evaluation, learning, and accountability efforts, and more specifically to spearhead the four-year TrEES program (see Section III), the Ethiopian MH-IB-EW-EAS will be monitored and evaluated against the indicators of the four pathways as depicted in Table 6.

In general, elaborating the MER process, establishing standards of performance for systems and structures of the EWS, and identifying roles and responsibilities to promote efficient use of resources and transparency in EWS decision-making is central to the outcomes of the roadmap and the overall efficiency of the multi-hazard EWS.

## FUTURE ACTIONS

It is evident that any technically sound EWS cannot be effective unless it is supported and powered by relevant legal accountability mechanisms. In this respect, the following actions are expected to be fully implemented:

- Finalization and promulgation of the new proclamation for the establishment of the Ethiopia Disaster Risk Management Commission. Work towards the legislation

of a new law that ensures early warning accountabilities and coordination matrix among line ministries, regional, zonal, and Woreda DRM bodies.

- Review and update all early warning implementation guidelines and manuals to fit for MH-IB-EW-EAS and strengthen early warning coordination efforts, accountabilities, and directions.

- Ensure the presence of a more reliable and dependable as well as robust early warning information governance system that is less susceptible to manipulation

- Clarify early warning mandates and institutional ownership of all subsystems, including the underlying data collection processes, data quality control, analytical processes, and publication. In most cases, this will be associated with the establishment of a clear mandate (such as the EMI mandate to monitor meteorological conditions), but some subsystems fall between institutional mandates (monitoring of rural retail prices or crop production, for example). Establishing a clear accountability matrix for sharing subsystem outputs in agreed-upon templates is important. It is advisable to separate data collection and operational functions to reduce the risk that data collection will be biased for strategic or operational reasons. To enable this, there needs to be a clear separation of responsibilities between data collection and operation responses.

- Ensure the national ownership of the early warning platform and oversee early action functions. This can be achieved by its formal inclusion in the mandate of the Commission.

## 3.5 BUILDING A NATIONAL SHARED VISION FOR AND CONSENSUS ON DISASTER RISK MANAGEMENT AND RESILIENCE BUILDING

Although Ethiopia has a conducive policy and strategy to promote disaster risk management and resilience building, the country paradoxically has yet to emerge from international humanitarian aid. This has created mixed feelings among the public in general and some political leaders in particular.

In alignment with the country's national development plan and the Sendai Framework for DRR, the EDRMC, its stakeholders, and various administrative units need to work towards a shared national vision of building disaster resilient communities in Ethiopia. It is important to have a clear vision and correct understanding of the mandate of

the Commission, cultivate the interest and commitment of all sections of society to address the root causes of disaster risk in the country and mobilize all public resources to reduce the country's dependence on humanitarian aid, improve risk management capacities and significantly reduce people's vulnerability to their lives, livelihoods, and environmental safety. This should be supported by strong public awareness and community engagement, both of which are key attributes of societal resilience.

## 3.6 ALL-INCLUSIVE AND WHOLE-OF-SOCIETY APPROACH TO DRM

The EDRMC and all responsible stakeholders need to adopt a whole-of-society approach, which seeks to leverage existing assets, knowledge, experience, and capabilities among the different sectorial offices and sections of communities for disaster risk management. It needs to create the momentum of a national movement among the public and establish a dynamic EWS that is interconnected with the operation of multiple sub-systems of early warnings across multiple agencies in the country.

## 3.7 STRONG WOREDA AND COMMUNITY-BASED DISASTER RISK MANAGEMENT CAPACITIES

Woreda's political leadership and all the relevant DRM offices, as first responders, should access and use EWS effectively to design and implement disaster preparedness measures or promote early actions that can reduce vulnerabilities and increase capacities to deal with their respective Woreda's risk. This means that they need to utilize early warning alerts specific to an area or a livelihood zone, increase the level of resources to their Woreda level development programs and resilience-building initiatives, and perhaps increase support for safety net schemes. They need to assume shared responsibility and enforce timely actions, including the mobilization of their domestic resources for greater preparedness and early actions, instead of externalizing the problem and relaying their responsibilities to higher administrative bodies. In addition, early warnings should be used to initiate anticipatory action, including shock-responsive actions in the critical time window between forecast and actual disaster, to mitigate the impact of the hazard ahead of time. They need to focus on strength-based (vs-deficit, gap-based) constructs to reduce vulnerability and mitigate risks and, hence, they should take full responsibility to mitigate multi-hazard risks in their Woredas, only requesting assistance from the zonal, regional, or federal government when and if only the disaster becomes beyond their threshold.

## 3.8 EMBRACING TRADITIONAL EARLY WARNING KNOWLEDGE SYSTEMS

Pastoralist and other community traditional knowledge systems must be embraced and harnessed by government-led EWS in order to understand local contexts and analyze existing or potential risks.

## 3.9 ENHANCING ETHIOPIA'S DRM IT CONNECTIVITY AND BROADBAND NETWORK

The next generation of Early warning/DRM practice in Ethiopia requires access to a new public safety communication broadband. More opportunities for developing and providing innovative communications and information-sharing solutions need to be explored, whether at the hardware (devices, machines, sensors, networks, etc.), software (applications, programs, network solutions, etc.), or service (data management, analytics, support, etc.) level. The web portal and digital library portal, which were established at the EDRMC, need to be fully operationalized and further integrated with specific portals such as the early warning and WDRP portals and adequately interfaced with relevant sector ministries responsible for specific early warning components.

This will ensure that early warnings reach all citizens (including the most difficult to access) and that more effective coordination with disaster management institutions can be achieved. This way, early warning information can lead to more effective early action and earlier response to save lives and property.

## 3.10 STRENGTHENING GENDER ANALYSIS AND SOCIAL INCLUSION IN EWS/DRM

Enhancing gender analysis and ensuring the inclusion of the most vulnerable (women, children, people with disabilities, the elderly, and other vulnerable social groups) in EWS and DRM is key for effective targeting, programming, and inclusive DRR work. There should be more and better targeting of women, children, people with disabilities, the elderly, and other marginalized, vulnerable social groups in EWS data collection, analysis, reporting, and messaging, as well as during early action and response. To strengthen the intersection between gender and other axes of social differentiation, Ethiopian EWS must continue to improve and work harder to produce differential risk analyses for the most vulnerable groups and include them in key decision-making platforms.

# 4 RISKS AND RISKS MITIGATION STRATEGIES

**Fragility and Insecurity:** There may be some fragile geographical areas where the capacity of the government at the local level may be too weak to establish an effective EWS. Immediate investment in EWS in some of these fragile contexts may not trigger long-term results. Hence, the government should prioritize its investment in areas where longer-term prospects for peace and development are relatively promising.

**Local Ownership and Commitment of Political Leadership:** Effective and sustainable EWS requires a strong sense of ownership of relevant policies and commitment to its implementation by communities, community leaders, Woreda and zonal administrators, regional presidents, and government departments, as well as federal-level line ministries and agencies. EDRMC needs to capitalize on the Federal Ministerial Disaster Risk Management Council as well as the national, regional, zonal, and Woreda early warning coordination platforms to effectively maintain coordination, mobilize resources, and ensure accountability for the implementation of the roadmap.

# 5 MOVING FORWARD: RECOMMENDATIONS FOR EDRMC AND THE ROAD AHEAD

The implementation of the roadmap requires the participation and contribution of multiple stakeholders from the federal to the community level. The following steps are suggested to operationalize the roadmap:

## 5.1 A LAUNCHING WORKSHOP

It is desirable that the roadmap for a MH-IB-EW-EAS be officially launched in the presence of key stakeholders, including senior political leaders, ministers, heads of relevant government agencies, members of the international community, civil society representatives, and private sector operators. It is advisable that the main purpose of this workshop should be to bring key multi-stakeholders onboard and solicit their technical, financial, and material resource commitments for the implementation of the roadmap.

## 5.2 DEVELOP A TWO-PHASE (EACH FOUR YEARS) PROGRAM CALLED TRANSFORMING ETHIOPIAN EARLY WARNING SYSTEM (TrEES)

As the road map envisions creating more disaster resilient communities in Ethiopia by 2030, it is advisable that the EDRMC crafts a two-phase TrEES program:

**Phase-I**
**Transforming Ethiopian Early Warning System (TrEES) Program: 2023-2026**

The program's first phase will cover a four-year period (2023-2026). This phase will focus on building the basic blocks for the attainment of MH-IB-EW-EAS. It will address critical gaps by prioritizing the most impactful and foundational programmatic interventions. It also believes that the proposed TrEES program has the potential to receive funding and

support from development partners and stakeholders. The main components and key immediate outcomes of the program are listed below:

### Table 8. Key Outcomes for Phase I

| Key Program Areas | Key Outcomes |
|---|---|
| **Overall Outcome** | Comprehensive and automated disaster risk information and knowledge base is constructed for all dimensions of disaster risk |
| Risk Knowledge Increased | • Natural hazard maps for Ethiopia are developed and accessed.<br>• National Disasters database established, maintained, and accessed.<br>• Scalable tech-infrastructure base for a multi-hazard EWS developed.<br>• Pool of disaster risk management professionals and 'community of practice' established.<br>• WDRP for all Woredas completed, refreshed, and digitized.<br>• Early warning data architecture and repository including GIS established.<br>• Woreda-net completed and integrated with Woreda DRM structures.<br>• Mobile-based data collection and big data analysis including GIS mapping, open-source mapping, drones, and satellite mapping are used.<br>• Monitoring tools and networks to ensure the tracking of all national priority hazards set up.<br>• Indigenous/local early warning knowledge is embraced and integrated.<br>• Gender and social inclusion data in vulnerability assessment improved. |
| Detection, monitoring, and forecasting Improved | • Mapping of key agencies for detection, monitoring, analysis, forecasting, and data sharing completed and MOU signed/renewed.<br>• Existing federal EWS technical working group re-strengthened, federal inter-ministerial council and regional governments early warning platforms reconstituted.<br>• Access to hydro-metrological data and metadata is available for validation, research, and other purposes.<br>• Existing hydro-meteorological monitoring/forecast tools (including real-time stations) with a better resolution are in place and made available for users<br>• An agreed threshold in place for analysis of the occurrence of hazards such as composite/overlay analysis<br>• Early warning information exchange and interoperability among early warning sectors improved.<br>• Systems for warning and forecast archiving are in place for all priority hazards. |
| Communication and dissemination enhanced | • All priority hazards, with relevant characteristics are covered by regular system-wide tests, evaluations, and exercises for the warning system(s).<br>• The needs of multi-hazard EWS users, including needs influenced by levels of vulnerability, are researched, and understood for all priority hazards.<br>• A holistic early warning communication strategy (including social media engagement, communication guidelines etc.) developed and strengthened.<br>• Agreements to use private sector resources (e.g., mobile-cellular, satellite, television, radio broadcasting, amateur radio, social media) developed and appropriate warnings disseminated.<br>• Traditional community practices blended with modern communication and dissemination channels is placed at all relevant scales. |

| | |
|---|---|
| | • Advanced, effective, and communication systems and equipment for early warning (Short code hotline and interactive voice recording, early warning information kiosk and drone) acquired and introduced.<br>• Mandated warning service thresholds are well understood by all states, Woredas, and federal government sectors.<br>• All priority hazards attain early warning messages and advice on risk-reduction actions that are understood by everyone, particularly those in vulnerable situations.<br>• Coordination across warning issuers and dissemination channels is ensured at the national, subnational, and local levels by warning communication strategies. |
| **Preparedness, response capacity and early actions strengthened** | • Sustainable financing mechanism for EWS established and promoted.<br>• Gender sensitive and participatory disaster preparedness measures, including response plans, developed multi-hazard risk assessments utilized to develop and design evacuation strategies.<br>• Contingency planning is developed in a scenario-based manner following forecasts or likely scenarios across timescales.<br>• Early action and response options across time and geographical scales are developed and enforced. |
| **Facilitative enabling environment created** | • Federal Ministerial Disaster Risk Management Council activated and functioning well.<br>• National Regional States Early Warning Coordination Platform reactivated and functioning.<br>• Humanitarian donors interest groups for early warning formed and actively engaged in strategic funding of the EWS initiatives.<br>• The design of the national risk financing system completed and become functional.<br>• The legal reform of EDRMC completed and human resources capacity building plan for the commission and line ministries in place.<br>• National Early Warning – Technical Committee's roles refreshed and enhanced. |

## 5.3 LEVERAGE POLITICAL LEADERSHIP

As part of the Federal Ministerial Disaster Risk Management Council, regular meetings should be conducted to track the implementation of the roadmap and ensure accountability among federal line ministries and regional government bodies for its implementation.

## 5.4 ACTIVATE NATIONAL REGIONAL STATES EARLY WARNING COORDINATION PLATFORM

In order to ensure smooth coordination and accountability among all stakeholders in ensuring timely, openly accessible, and appropriate use of early warning data, it is advantageous to establish or activate the functions of regional early warning platforms to engage regional governments and relevant regional line bureaus.

## 5.5 ENHANCE HUMANITARIAN DONOR GROUPS INTERFACE TO ACCELERATE RESOURCE MOBILIZATION

It is advisable that EDRMC establishes key international development partners (humanitarian aid focused donor groups) and facilitates a regular platform for the implementation of the roadmap. This would contribute to the creation of a stronger government-led – early warning focused donor group, laying the ground for collectively engaging the humanitarian community in transforming and building EWS.

It is advisable that EDRMC continue its collaboration with the Ministry of Finance and strengthen its partnership with other stakeholders, including BRE, to complete the mapping and designing of national risk finance mechanisms for early actions or disaster preparedness and response. This may help to accelerate resource allocation and enhance timely utilization of the warning messages at the district or community level.

On the other hand, EDRMC can link resource mobilization and allocation to specific triggers, or where these cannot be agreed upon in advance, it can mobilize swift and light processes based on available evidence and shared analysis. It can also enable the resourcing of specific activities driven by the local contexts instead of adopting a one-size fits all approach. It is important to build transparent and accountable protocols about which resources can be brought to the table in a pre-crisis phase in support of activities within government plans and which surge capacities are present once the government has triggered a response based on the mutually supported EWS and triggers.

## 5.6 CAPITALIZE ON EARLY WARNING – TECHNICAL WORKING GROUP TO MOBILIZE HUMAN RESOURCE CAPACITY FOR EARLY WARNING/DRM AT LARGE

The re-organization of the EW-TWG in recent months proved to have added value to the strengthening of the coordination and functioning of the early warning mission among line ministries, donors, and NGOs.

In light of this, the following actions are recommended:

- Refresh and develop a memorandum of understanding for the day-to-day functions of the TC.
- Develop an operating plan in alignment with the vision, objectives, and milestones of the roadmap.

- Establish a funding model, financing trials, benefits realization plan, and risk register.
- Create a legal framework for intellectual property, data exchange, and usage, etc.
- Introduce a protocol to collect, manage, categorize, store, and utilize early warning data.
- Establish working groups, chairpersons, and associated terms of reference per the roadmap's priorities.
- Build trials to develop new services or to enhance or retire existing ones.
- Formulate monitoring and evaluation tools to assess service progress and improvements.

## 5.7 STRENGTHEN THE EARLY WARNING HUMAN RESOURCES CAPACITY OF EDRMC AND OTHER LINE MINISTRIES

The existing human resources capability and staffing arrangement of early warning departments should be revisited, and their institutional linkages and synergy re-examined to ensure that they can accommodate and promote the changes required for effective implementation and management of the roadmap.

# ANNEX

## ANNEX 1. GLOSSARY

This glossary is provided as a reference for the implementation of this roadmap. Please note that the definitions provided are not intended to modify existing definitions in federal, regional, and Woreda law departments.

**All-Hazards** - DRM adopts an all-hazards approach in every jurisdiction in Ethiopia by addressing vulnerabilities exposed by both natural and human-induced hazards and disasters. The all-hazards approach increases efficiency by recognizing and integrating disaster risk management elements across all hazard types and then supplementing these common elements with hazard specific sub-components to fill gaps only as required. As such, 'All-Hazards' does not literally mean preparing to address any and all potential hazards in existence. Rather, it emphasizes leveraging common synergies across hazards and maintaining a streamlined and robust disaster risk management system. The 'All-Hazards' approach also improves the ability of disaster risk management activities to address unknown hazards or risks.

**Climate Change** - refers to a change in climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere in addition to natural climate variability observed over comparable time periods.

**Critical Infrastructure** - refers to processes, systems, facilities, technologies, networks, assets, and services essential to the health, safety, security, or economic well-being of Ethiopians and the effective functioning of the government. Critical infrastructure can be stand-alone or interconnected and interdependent within and across Woredas, zonal, regional, and federal administrations. Disruptions of critical infrastructure could result in catastrophic loss of life, adverse economic effects, and significant harm to public confidence, e.g., the Great Renaissance Dam.

**Disaster** - essentially a social phenomenon or serious disruption that results when a hazard intersects with a vulnerable community in a way that exceeds or overwhelms the community's ability to cope and may cause serious harm to the safety, health, welfare, property, or environment of people; may be triggered by a naturally occurring phenomenon which has its origins within the geophysical or biological environment or by human action or error, whether malicious or unintentional, including technological failures, accidents, and terrorist acts.

**Disaster Risk Reduction** - the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through the mitigation and prevention of exposure to hazards, decreasing vulnerability of individuals and society, strategic management of land and the environment, improved preparedness for disaster risks, coordinated response and planning, and forward-looking recovery measures.

**Disaster Risk Assessment** - the identification of hazards; a review of the technical characteristics of hazards such as their location, intensity, frequency, and probability;

the analysis of vulnerability, including the physical, social, health, environmental, and economic dimensions; and the evaluation of the effectiveness of prevailing and alternative coping capacities concerning likely risk scenarios.

**Disaster Response Fund** - liquid cash maintained in the form of preparedness to enable a response to the disaster when it occurs.

**Disaster Risk Information** - up-to-date comprehensive or location-based information on all dimensions of disaster risk, including hazards, exposure, gender, vulnerability, and capacity, related to persons, communities, organizations, and countries and their assets. It also includes all climatic data studies, information, and mapping required to understand disaster risk drivers and the underlying risk factors of disaster-prone populations.

**Disaster Risk Profile** - indicative information generated through regular risk assessment and analysis of the vulnerability to disaster or climate change and that shows the situation, patterns, and trends of risk to people in a given geographical or institutional setting.

**Early Warning** - is the provision of timely and effective information through identified and mandated institutions to allow individuals and communities at risk to take early actions that reduce their risk and prepare an effective response.

**Early Warning System** - the set of capacities needed to assess, generate and disseminate timely and meaningful warning information on multi-hazards to enable individuals, including informal settlers where involved, communities, and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

**Emergency** - a present or imminent event that requires prompt coordination of actions concerning persons or property to protect the health, safety, or welfare of people or to limit damage to property or the environment.

**Emergency Management** - the management of emergencies concerning all-hazards, including all activities and risk management measures related to prevention and mitigation, preparedness, response, and recovery.

**Emergency Response** - a series of appropriate actions and precautions, including providing and distributing essential food and non-food items, goods, and services aimed at saving lives, protecting livelihoods, and providing health services, including psychological treatment of the affected population in the event of a disaster.

**Environmental Change** - a disaster risk reduction concept that includes consideration for both the hazard of global climate change, as well as community vulnerabilities, and resilient capacities. Unsustainable alterations to the physical environment and human interactions with it may create or exacerbate risks that exist with or without climate change. As such, sustainable adaptation must be considered both within the context of climate change and the broader hazard scape.

**Evacuation Plan** - the arrangements established in advance to temporarily move people and assets to safer places before, during, or after a hazardous event. It may also include plans for the return of evacuees and options to shelter in place.

**Exposure** - refers to who and what may be affected in an area where hazardous events occur. It is a necessary but not sufficient determinant of risk. It is possible to be exposed but not vulnerable. However, to be vulnerable to a hazard, it is also necessary to be exposed. Exposure is time (t) and space (x) dependent.

**Hazard** - a potentially damaging physical event, phenomenon, or human activity that may cause the loss of life or injury, property damage, social and economic disruption, or environmental degradation.

**Hydro-meteorological Forecast Uncertainty** - refers to the limits of predictability imposed by the state of the science and inherent randomness of the hydro-meteorological system.

**Prevention** - actions taken to avoid negative consequences associated with a given threat.

**Prevention/Mitigation** - actions taken to eliminate or reduce the impact of disasters to protect lives, property, and the environment and minimize economic disruption. Prevention/mitigation includes structural mitigative measures (e.g., construction of floodways and dykes) and non-structural mitigative measures (e.g., building codes, land-use planning, and insurance incentives). Prevention and mitigation may be considered independently or include the other.

**Recovery** - the restoring or improving livelihoods and health, as well as economic, physical, social, cultural, and environmental assets, systems, and activities, of a disaster-affected community or society, aligning with the principles of sustainable development to avoid or reduce future disaster risk

**Rehabilitation** - measures applied after a disaster are necessary to restore a community's normal functioning and build resilience to future shocks in affected areas, communities, and economic sectors.

**Resilience** - is the capacity of a system, community, or society exposed to hazards to withhold, absorb, accommodate, and adapt to disturbances resulting from hazards by persevering, recuperating, or changing to reach and maintain an acceptable level of functioning or the ability to transform, recover, or build back better from the effects of a disaster. Resilient capacity is built through a process of empowering citizens, responders, organizations, communities, governments, systems, and society to share the responsibility to keep hazards from becoming disasters.

**Risk** - the combination of the likelihood and the consequence of a specified hazard being realized; refers to the vulnerability, proximity, or exposure to hazards, which affects the possibility of adverse impact. It is defined as the probability and magnitude of harm attendant on human beings and their livelihoods and assets because of their exposure and vulnerability to a hazard. The extent of harm may change due to response actions to either reduce exposure during the event or reduce vulnerability to relevant hazard types in general.

**Risk-Based** - the concept that sound disaster risk management decision-making will be based on an understanding and evaluation of hazards, risks, and vulnerabilities.

**Risk Management** - the use of policies, practices, and resources to analyze, assess and control risks to life, health, safety, environment, and the economy.

**Sustainable** - a sustainable approach meets the needs of the present without compromising the ability of future generations to meet their own needs.

**Threat** - the presence of a hazard and an exposure pathway; threats may be natural or human-induced, accidental or intentional.

**Vulnerability** - the conditions determined by physical, social, economic, and environmental factors or processes which increase the susceptibility of a community to the impact of hazards. It measures how well prepared and equipped a community is to minimize the impact of or cope with hazards. It can also refer to the susceptibility of exposed elements, such as human beings and their livelihoods and property, to suffer adverse effects when affected by a hazard. Vulnerability is related to predisposition, sensitivities, fragilities, weaknesses, deficiencies, or lack of capacities that favor adverse effects on the exposed elements. Vulnerability is situation-specific, interacting with the hazard to generate risk. Therefore, vulnerability may also be time and space dependent.

**Vulnerable Groups** - individuals or groups that face disproportionate exposure to risk or face differential effects of disaster because of who they are, where they are, or how they live. These may include but are not limited to children, the elderly, pregnant and lactating women, persons living with HIV & AIDS, people with disability, ethnic minorities, occupational social caste groups, migrants, displaced people, landless people, economically poor people, or refugees.

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