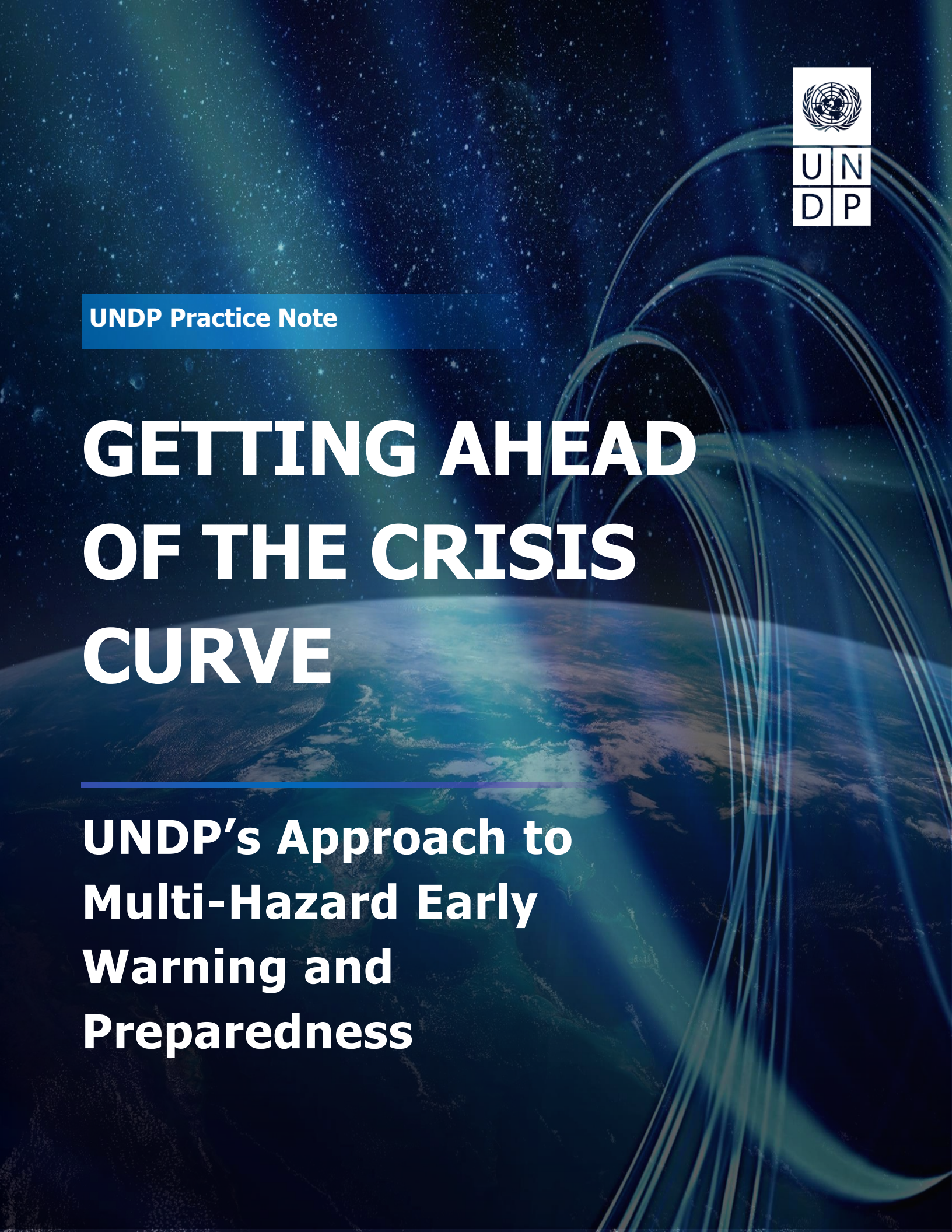

UNDP Practice Note

GETTING AHEAD OF THE CRISIS CURVE

UNDP's Approach to Multi-Hazard Early Warning and Preparedness

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About the United Nations Development Programme (UNDP): UNDP is the leading United Nations organization fighting to end the injustice of poverty, inequality, and climate change. Working with our broad network of experts and partners in 170 countries, we help nations to build integrated, lasting solutions for people and planet. Learn more at undp.org or follow at @UNDP.

Special thanks: We would like to express our gratitude to all colleagues from various UNDP Country Offices, Regional Hubs and Central Bureaux for having provided valuable insight and feedback throughout the development of this Practice Note. We would also like to extend a special appreciation to the Crisis Bureau Policy, Knowledge and Partnerships Team and the Crisis Bureau Anticipation Task Team for their significant contributions towards finalizing this Practice Note.

Citation: UNDP, 2024, Getting Ahead of the Crisis Curve: UNDP's Approach to Multi-Hazard Early Warning and Preparedness.

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Foreword

This UNDP Practice Note champions the critical role of multi-hazard early warning and preparedness in saving lives, safeguarding development gains and building resilient communities. It emphasizes the shift from reactive crisis response to proactive preventative action as a key strategy for building resilience.

Developed with extensive consultations with UNDP practitioners and partners, this note moves beyond viewing disasters as isolated events. Instead, it highlights disaster risk as a complex interplay of factors, including the nature of potential hazards, the exposure of population and infrastructure, people's vulnerability, and the overall capacity to anticipate and respond to crises.

By understanding these interconnected elements, early warning and preparedness can allow individuals, communities, and governments to make informed decisions for timely preventive action. This translates to:

- Reduced disaster risk: Early warning and preparedness helps mitigate the overall likelihood and severity of disasters.
- Lowered impact: When disasters do occur, preparedness lessens their devastating effects.
- Enhanced response and recovery: Early warnings facilitate a more efficient and effective response, leading to swifter recovery.

Going beyond simple advocacy, this practice note provides valuable guidance on how early warning and preparedness initiatives can be integrated into global development agendas like the 2030 Agenda for Sustainable Development, the Paris Agreement, the Sendai Framework for Disaster Risk Reduction, the UN Early Warning for All initiative, along with UNDP's current Strategic Plan and Crisis Offer. It then offers practical guidance to those involved in early warning and preparedness, outlining key principles and critical enablers to strengthen early warning and preparedness initiatives and build proactive capacity to strengthen resilience.

Context and Rationale

Think of crises like a tangled web. Tugging on one thread often tightens the entire web, causing unforeseen consequences across the system. To truly navigate crisis complexities, we need to grasp the root causes of risk and shift our approach from reactive crisis response to proactive multi-hazard early warning and preparedness.

When we talk about risk from a climate and disaster risk reduction perspective, we are not only talking about the likelihood of a hazardous event occurring. Disaster risk arises from the interaction of four elements:

- **Hazard:** This can be a natural phenomenon (e.g. earthquake, volcanic eruption, flood), an extreme weather event (e.g. hurricane, heatwave, drought), or a human-caused event (e.g. industrial accident, technological failure).
- **Exposure:** This refers to the population, infrastructure and assets located in areas at risk from hazards.
- **Vulnerability:** This describes the susceptibility of people, infrastructure, and assets to the harmful effects of hazards.
- **Capacity:** This is the ability of people and institutions to anticipate, prepare for and cope with the impacts of hazards.

Many of these elements can apply to multiple hazards. This is why only by fully understanding the different elements of risk and placing risk at the center of our work can we develop multi-hazard early warning and preparedness initiatives that drive sustainable development and build resilience to future shocks and crises.

> **This Practice Note aims to provide a clear framework for UNDP's multi-hazard early warning and preparedness efforts, which aim to promote effective anticipatory measures to save lives, protect livelihoods, prevent losses and preserve development achievements. It outlines the principles and key actions that climate and disaster risk reduction efforts should promote to enable communities and institutions to understand and predict risks, take early action and minimize the impact of disasters.**

Over the last decade, UNDP has been on the ground improving access to early warning services in over 90 countries and, since 2008, has mobilized investments of over USD $2 billion to support initiatives for early warning and preparedness, enhancing evidence-based decision-making to save lives.[1]

While UNDP and its partners have made enormous strides in improving access to early warning systems and building preparedness for at-risk communities in developing countries, more needs to be done if as a global community we are to achieve early warning for all. Still, one-third of people globally, mainly in the least developed countries and small island developing states, are not covered by early warning systems, and communities and stakeholders continue to lack capacities to anticipate and act upon warnings received.[2] UNDP must scale up early action, leveraging its partnerships to drive multi-hazard early warning and preparedness across the 170 countries and territories in which it operates, ensuring coherence in approaches to address future risks, prevent development losses, and build resilient and stable societies while ensuring that no one is left behind.

In alignment with UNDP's Strategic Plan 2022–2025 and UNDP's Crisis Offer, this Practice Note strives to ensure that anticipation and prevention measures, such as multi-hazard early warning and preparedness initiatives, meet the principles of leaving no one behind (fostering a people-centered approach to empower those most at risk to drive actions to reduce risk), and build resilience.

This note aims to serve as a source of inspiration for UNDP teams who are interested in or working on early warning and preparedness. It provides insights teams can use in their work and starts with a simple explanation of how UNDP can approach disaster-focused early warning and preparedness. Building upon this, it gives a brief overview of how early warning and preparedness fit into UNDP's larger global agenda. The note continues by highlighting key principles that should be considered when developing proactive anticipation that focuses on early warning and preparedness. It concludes with key enablers that can be used to bring about effective early warning and preparedness initiatives.

Box 1

The cost of disasters

In Malawi, storms have long carved a devastating path through lives and economies. Recognizing the need for proactive measures, authorities decided to invest in risk anticipation, early warning and preparedness initiatives, and through the M-CLIMES Project, a comprehensive early warning system has been established. In September 2022, when a powerful storm formed near the city of Karonga, the early warning system sprang into action, providing timely alerts to residents and businesses. Equipped with valuable lead time, the community initiated evacuations in flood-prone areas and secured critical infrastructure. As a result, the storm's effects on people and assets were considerably minimized compared to previous occurrences.

The impact of disasters is immense and on the rise. Such losses impede progress in sustainable development and drive inequality, disproportionately impacting the most susceptible who may not have the necessary knowledge, expertise or resources to respond appropriately. In line with the principles of early warning and preparedness, IFRC's The Cost of Doing Nothing warns that by 2050, climate inaction could double the number of people in need of humanitarian aid and skyrocket response costs. Conversely, investing in early warning and adaptation offers a potent solution.

Early warning and preparedness initiatives have consistently demonstrated significant cost-benefit advantages in disaster risk reduction and emergency management. These initiatives contribute to reducing the impacts of disasters by providing advance notice of potential hazards, enabling proactive actions and enhancing resilience at the individual, community, and societal levels. The economic benefits of early warning and preparedness are evident in the form of reduced recovery and reconstruction costs, saved lives, preserved livelihoods, and sustained economic productivity. By prioritizing risk anticipation and preparedness, societies can make cost-effective strides toward building safer, more adaptive, and economically sustainable futures in the face of various risks and crises.

Despite clear advantages, funding continues to favor crisis response over preparedness. As noted in the OECD's Data on Development (2022), only 3.69% of humanitarian aid goes towards disaster preparedness, while over 95% goes to emergency response. In addition, the Global Humanitarian Assistance (GHA) Report stated that total official development assistance for the purpose of disaster risk reduction decreased by 5% in 2021. This misalignment reflects the broader challenge of undervaluing foresight in tackling complex disasters.

Over the last decade, billions of dollars have been invested in early warning systems around the world. However, as stated in the 2023 Early Warnings for All report, these investments are spread among different sectors and often combined with other initiatives, which could mean that the actual amount spent on early warning systems has been grossly overestimated. Improved collaboration and reporting by multilateral development banks and climate finance mechanisms are needed to enable better analysis and understanding of investment needs. A global taxonomy would enhance understanding of early warning systems investment and funding.

Positioning Multi-Hazard Early Warning and Preparedness in UNDP's Global Agenda

Multi-hazard early warning and preparedness supports the advancement of the 2030 Agenda for Sustainable Development. In particular, early warning systems are positioned as vital tools for decision-makers to progress towards sustainable development – supporting, for example, agricultural productivity, health, safety, overall well-being, poverty reduction and peaceful societies – providing cross-cutting benefits to nearly all Sustainable Development Goals (SDGs). Given coherence across global frameworks, the importance of early warning systems is also recognized within the Paris Agreement and Sendai Framework for Disaster Risk Reduction 2015–2030, the implementation of these agendas in turn expediting progress in achieving the SDGs. Target G of the Sendai Framework explicitly relates to early warning systems, calling "to substantially increase the availability of and access to **multi-hazard early warning systems** and disaster risk information and assessments to the people by 2030". Recognizing their immense value, the UN Secretary-General announced in March 2022 the 'Early Warnings for All Initiative' (EW4ALL), stating that "the United Nations will spearhead new action to ensure every person on Earth is protected by early warning systems within five years". Preparedness is also an integral component of these agendas. All the priorities for action detailed in the Sendai Framework support preparedness efforts, through **understanding risk**, strengthening disaster risk governance to manage risk and investing in disaster risk reduction for resilience.

UNDP is committed to pushing forward these agendas and driving progress in achieving Target G. The UNDP Strategic Plan 2022-2025 [3] contributes to the resilience-building objectives of the 2030 Agenda by committing UNDP to help countries eradicate poverty in all its forms and expand people's choices for a fairer, more sustainable future. Within this, a risk-centered approach focused on building resilience will guide UNDP and its Global Policy Network (GPN) to address the underlying and structural factors that enable crisis, investing in capacities to better prevent, mitigate and respond to diverse risks.

As per UNDP's Strategic Plan, the Crisis Offer outlines UNDP's commitment to helping countries anticipate, prevent, respond to, and recover from crises. To achieve this goal, the Crisis Offer aims to revamp previous approaches by investing in foresight, horizon scanning and early warning. The Crisis Offer focuses on three sets of development solutions that drive transformation (as shown in Figure 1). Although early warning and preparedness are cross-cutting themes, they are primarily addressed in the 'Getting Ahead of the Crisis Curve' programmatic approach, while disaster risk reduction, early warning and preparedness efforts align with Anticipate and Prevent angles of work.

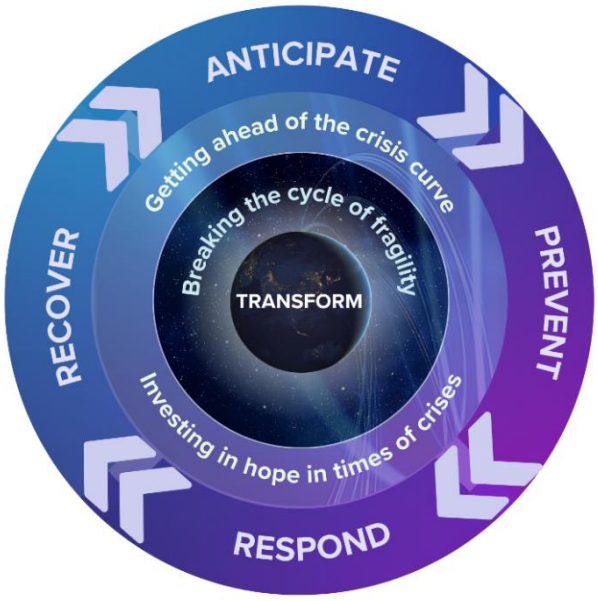

Figure 1: *UNDP's development solutions and programmatic approaches to crisis and fragility.*[4]

UNDP's Approach to Multi-Hazard Early Warning and Preparedness

UNDP supports countries in anticipating, preventing, responding to and recovering from shocks, stresses, and crises.[4]

> **This Practice Note defines early warning and preparedness as a series of integrated anticipatory measures based on a comprehensive understanding of multidimensional risks, enabling individuals, communities, organizations and governments to make informed decisions about potential impacts and take timely and preventive action.[5,6,7,8,9,10,11]**

These actions will reduce the risk potential and level of impact of disaster situations while facilitating effective response and recovery. As such, risk anticipation, early warning and preparedness are among the key components of early action, as shown in Figure 2.

Early warning and preparedness can encompass multiple hazards and threats, including earthquake, volcanic eruption, flood, extreme weather event (e.g. hurricane, heatwave, drought), or a human-caused event (e.g. industrial accident, technological failure). Preparedness actions strengthen capacities across governments, organizations, communities and individuals to understand, anticipate, prevent, respond to and recover from impending or potential future crises. As a pathway to preparedness, multi-hazard early warning mechanisms involve the systematic collection and analysis of data to build risk knowledge, readying stakeholders to make risk-informed anticipatory decisions for timely action ahead of crises. In parallel, as demonstrated in Figure 2 and through the Early Warning for All Initiative, preparedness is also a key pillar of early warning, building capacities to effectively interpret and understand warnings and respond accordingly with early action.

Integrated processes for multi-hazard early warning and preparedness connect people, organizations and risk-tracking systems to hazards, vulnerabilities, capacities and exposures. The processes involved can include a variety of actions that hold importance across various contexts, are relevant to different groups of people, and may have different approaches and methods of implementation. For example, a human rights perspective could be crucial in shaping early warning work, especially for vulnerable communities. By understanding the social, economic and political factors that can worsen vulnerabilities to hazards, a human rights approach empowers marginalized populations and ensures their needs are met in disaster risk reduction efforts. While at other times an environmental perspective could be key to understanding how ecological changes can exacerbate vulnerabilities to hazards, affecting both human and natural systems. This could help inform how climate-driven events, such as extreme weather and rising sea levels, amplify disaster risks, necessitating the inclusion of climate science and meteorological data in early warning systems. Or, if we were to combine the human rights and climate perspective, we could look at how we all have a right to live in a healthy environment, but through the degradation of ecosystems based on economic pressures we often weaken natural buffers against hazards, making communities more susceptible to disasters. Recognizing the multifaceted nature of vulnerabilities leads to more nuanced and relevant early warnings, ultimately saving lives and safeguarding livelihoods in complex disaster contexts.

At their very core, multi-hazard early warning and preparedness efforts need to be people-centered to empower those most at risk to understand risk and through anticipation and prevention act to reduce it. Given their relevance to a broad range of stakeholders, it is important that early warning and preparedness processes strive to be nationally owned and led, accessible and inclusive, with a focus on building capacities at all levels throughout society.

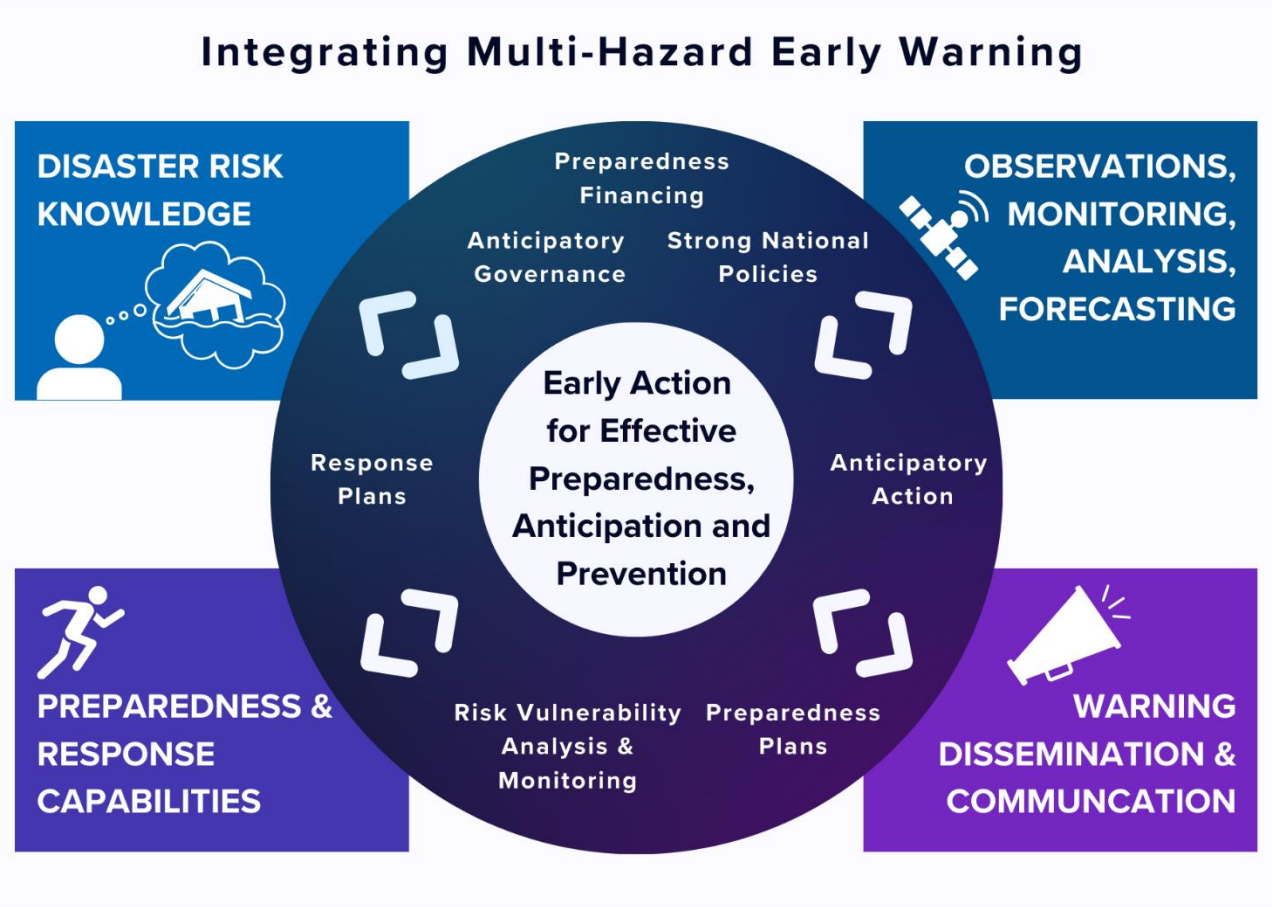

Figure 2: *Anticipation and preparedness mechanisms for effective early action can be seen as falling across all four pillars of the multi-hazard early warning system (Image based on Early Warning for All Initiative Pillars).*

Principles for Effective Action

To ensure effective multi-hazard early warning and preparedness, UNDP promotes the following principles:

Locally led action

Effective muti-hazard early warning and preparedness activities should prioritize meaningful community engagement to strengthen social cohesion throughout the entire process. This involves working with local communities as well as engaging local and private sector organizations. It is important to incorporate informal, community-led processes and local knowledge, including indigenous knowledge, into scientific and technical knowledge where appropriate. It is crucial to ensure that actions are not developed in isolation from the communities and individual people they serve, as they are the ones most impacted and engaged during a crisis. Identifying gaps, promoting active capacity building and encouraging local action are key to enabling community-driven efforts to address the challenges posed by an imminent crisis event. One of many examples of locally led action can be seen through the LoGIC project in Bangladesh, which is a multi-donor initiative that seeks to co-create early warning systems, build local capacity and encourage proactive local action to face climate risks.

Inclusive engagement

Understanding the local context, historical intricacies, social dynamics, and political complexities is fundamental in designing effective early warning systems. These systems should not rely solely on data but must also integrate local narratives and experiences while embracing diverse perspectives. By doing so, early warning and preparedness initiatives can avoid exacerbating existing conflicts and prevent the creation of additional tensions. In times of crisis, understanding the local context and underlying tensions, along with cultural sensitivities, is pivotal. Research shows that certain populations are likely to be disproportionately impacted and face heightened levels of risk.[12] [13] These include women and girls, the elderly, youth, indigenous and minority populations, LGBTI people, persons with disabilities and marginalized communities. It is paramount to include people of all ages, genders, ethnicities, and languages in early warning and preparedness processes, and make efforts to accommodate the needs of persons with disabilities, limited literacy levels, or other barriers to participation.[14] Too often people who are marginalized, vulnerable or discriminated against do not have their voices heard and cannot access early warnings. To address this challenge, and as brought forward in UNDP's A Resilient Future for All, inclusive early warning systems must actively engage these populations, ensuring their needs are met through accessible communication formats, digital systems, and diverse channels like sign language and tactile

Box 2

Empowering communities: EWS 1294 in Cambodia

In Cambodia, EWS 1294 stands as a beacon of effective communication, revolutionizing how communities are informed and empowered. By harnessing this Early Warning System, local authorities (namely the National Committee of Disaster Management and Ministry of Water Resources and Meteorology) and local disaster response teams can swiftly disseminate vital information to vulnerable areas, ensuring timely response during crises. Through automated voice messages, EWS 1294 reaches even the most remote communities, providing essential guidance on natural hazards, weather patterns, and evacuation procedures. This proactive approach not only saves lives but also fosters a sense of security among citizens, enhancing community resilience. By utilizing technology to bridge gaps in communication, Cambodia exemplifies a proactive model, demonstrating the crucial role of Early Warning Systems in building disaster-ready communities.

alerts. This approach fosters greater understanding and ensures everyone can participate in early warning and preparedness initiatives. One such example of people-centered design in practice sits within the Strengthening Climate Information and Early Warning Systems in Cambodia project, which saw the development of a 'Women's Charter of Demands'. The charter prioritized the removal of gender-based barriers to early action, enhancing access to safe areas with adequate resources, access to education and awareness-raising activities, and support for women's advocacy. This initiative gave women an opportunity to share their experiences and shape their own futures for disaster risk management.[15]

Working beyond silos

Sadly, too often, early warning and preparedness initiatives are developed in silos, lending to blind spots and cognitive biases which could hinder early or preventive action. As muti-hazard early warning systems should be developed as comprehensively as possible, it is crucial to involve the communities they will serve, as well as different local, national, and regional stakeholders and, when applicable, the private sector and transboundary perspectives. To avert ill-fitted outcomes, policymakers should be encouraged to involve multiple diverse actors throughout the lifecycle of early warning and preparedness initiatives to utilize enhanced collective intelligence whenever possible. An interesting example of collective intelligence, though not directly linked to early warning, is how the UNDP North Macedonia Accelerator Lab and the country's Democratic Governance Unit (DGU) are adopting a whole-of-society approach to redesigning the public policymaking process. Led by a quadruple helix model that emphasizes the interaction between government, civil society, academia and the business community on development challenges, the Lab and DGU seek to overcome blind spots caused by working in silos within government institutions, to develop future strategies that are agile and anticipatory.[16] Such approaches, if appropriately applied to early warning and preparedness initiatives, could help to alleviate undesirable cognitive biases and prevent important policy decisions from being distorted by limited perspectives or incomplete information. By bringing together actors from various parts of society, policymakers can increase the diversity of perspectives and information available, evolving early warning and preparedness to include an enhanced, whole-of-society approach.

Risk-informed and forward-looking

In an era of escalating complexity, the significance of multi-hazard early warning systems in deciphering risks is paramount. It forms the bedrock of informed decision-making, enabling increasingly accurate prediction of potential hazards and their impacts, and plays a pivotal role in understanding the intricate nature of hazards, uncertainties, and vulnerabilities. By proactively dissecting these elements, these systems can facilitate the anticipation of forthcoming challenges and bolster resilience in the face of emergent threats. Understanding these complex linkages empowers strategic preparedness and informed decision-making. A notable example of this can be seen through Bangladesh's Disaster and Climate Risk Information Platform. By adopting sustainable development practices that account for potential uncertainties and future implications, UNDP can adeptly prepare for risk and minimize its impact on development.

Comprehensive, accessible data

Timely, meaningful action is only possible when all actors have access to accurate and reliable data which allows them to make informed decisions. In most instances, data should be disaggregated by gender, age, disability and socio-economic status, and encompass multiple risks to enable targeted actions, address inequalities, promote inclusive decision-making and planning, and facilitate monitoring and evaluation. In line with UNDP's Digital Strategy 2022–2025, it is important that data access considerations, particularly barriers such as language, are reflected in early warning and preparedness planning so that stakeholders at all levels can make use of the information. This is relevant for sharing data across local, national, regional, and global systems. Digitization overcomes some barriers to sharing plans and data, however it is important that this does not result in local information being stored only at national level – broad levels of access and cross-

border data sharing that respect data protection rights, are key. Inclusive access is also vital for ensuring information is not siloed across sectors, such as accurate population data existing in isolation from local health infrastructure or climate model information.

One such example of comprehensive, accessible data is the Data in Climate Resilient Agriculture (DiCRA) platform, facilitated by UNDP Accelerator Labs in partnership with India's State Government of Telangana. Powered by artificial intelligence (AI), it provides vital data and analytics to farmers on geographic locations that are resilient to climate change and those that are highly vulnerable. This leads to enhanced, targeted preparedness efforts to mitigate the deteriorating impacts of climate change on livestock and crop yields, and innovative solutions for strengthening food security. In addition, DiCRA is becoming a digital public good that is not only available for Indian farmers, but with its inclusion in the Digital Public Goods Registry, aims to scale up the initiative globally. This one-of-a-kind platform provides accessible data for all and facilitates data-sharing across government entities, research organizations and data scientists, seeking to build livelihoods resilient to shocks and stresses.

Frequently, data is based on past occurrences, such as the severity of a hazardous event and the resulting human and financial consequences. Relying solely on historical data to make decisions in the present assumes a degree of predictability and repetition which largely disregards uncertainty, and often leads to reactive risk management. As outlined in UNDP's Choosing Your Tomorrows Policy Brief, to move from reactive to proactive risk management – which involves anticipating and preparing for emerging and future risks – past data (hindsight) should be considered alongside systemic risks and vulnerabilities within the present system (insight), and an exploration of multiple possible futures (foresight). Foresight methodologies and tools (outlined in UNDP's RBAP Foresight Playbook) such as horizon scanning, backcasting or scenario planning can produce valuable, actionable data on signals of change, including a consideration of potential threats and opportunities. Combining hindsight, insight, and foresight can inform more anticipatory policymaking and decision-making in the present, thereby steering progress towards a sustainable future. As part of this, an ability to navigate uncertainty is key.

Box 3

Applying foresight to embed anticipation in UNDP Country Office policy and programming

Integrating foresight into UNDP Country Office policies and programs aligns with the core principles of early warning and preparedness. This strategic approach empowers proactive response to emerging risks and uncertainties in an increasingly complex and dynamic world.

Regional initiatives like the UNDP Asia-Pacific Regional Horizon Scanning Initiative 2.0 (HS 2.0) played a pivotal role in engaging Country Offices as "signal scanners" and "sense-makers". This initiative laid the groundwork for long-term futures thinking, fostering collaboration between country and regional teams.

Building upon this foundation, the UNDP Futures Portal has emerged as a robust system designed to activate the "noticing" capacity of UNDP colleagues across the globe. By surfacing insights and sparking conversations, the platform facilitates collective sense-making of emerging trends and signals. This collaborative intelligence has informed the development of global initiatives like the UNDP Signals Spotlight 2023 and UNDP's 2024 Trends Report, providing valuable insights and guiding adaptive approaches to policy, programming and governance, key for preparedness.

Furthermore, the "What If…?" Blog Series encourages Country Offices to move beyond mere trend analysis by envisioning various future scenarios. This "futures thinking" exercise cultivates a forward-thinking mindset, mirroring the anticipatory nature of early warning systems. By strategizing for potential challenges before they arise, Country Offices can enhance their preparedness and resilience.

Robust national policies backed by sustainable financing

At the national level, the foundation for effective early warning and preparedness lies in robust policies backed by sustainable financing mechanisms. This approach, as outlined in Towards an Actionable Framework for Governing Systemic Risk, transcends natural hazard-related disasters and encompasses a holistic view of risk reduction – one that considers risks arising from hazards, epidemics, conflicts and economic shocks, often interweaving to intensify crises with cascading impacts across sectors. This intricate interplay of risks from diverse origins, magnifies the need for effective early warning systems that anticipate and prepare for cascading impacts.

In contexts where fragility prevails, the durability and accessibility of early warning systems is often a critical concern. In many cases, despite multiple early warning initiatives in a country, there is often limited coordination and a lack of long-term sustainability planning for these systems. Thus, prioritizing long-term viability from the outset is imperative for all early warning initiatives. This encompasses a spectrum of financial considerations – from infrastructure investments and continuous capacity-building to system integration costs, sustained maintenance, technological upgrades, multi-agency coordination and public awareness campaigns.

Crucially, early warning and preparedness shouldn't exist in isolation; they must be seamlessly woven into the fabric of legislation. From climate-specific policies like national climate adaptation plans to broader frameworks like labor laws, gender-based violence regulations, and health-related mandates, early warning and preparedness principles should permeate all facets of governance. To secure their lasting integration and impact, these policies should interlink with sustainable financing through the strategic development of Integrated National Financing Frameworks. In Trinidad and Tobago, the CFEWS Project Phase 1, has been working to integrate early warning systems into national development planning and budgetary processes at all levels. The project's aim was to strengthen community and national capacities for anticipatory actions while enhancing interagency coordination through community capacity-building, public officials' training in flood forecasting and modeling, the establishment of a formal flood-management governance mechanism, and improved access to technology for flood forecasting. This project demonstrates how collaboration and foresight can lead to a safer and more resilient future.

Effective operational processes and systems

National policies should be backed up by strong anticipatory systems and processes to preemptively operationalize action plans and measure impact. This is important to ensure decision-makers can take timely action based on up-to-date information. Preparatory steps are essential to develop the tools decision-makers need and ensure they are confident in using them in crisis. Often, this means spending time creating a 'living' framework, which is routinely reviewed and updated through the practice and simulation of aspects such as preparedness and response plans with key stakeholders. A key strategy could be optimizing plans to digitalize elements with automated components. Coordination and cooperation between government agencies (e.g. National Disaster Management Authorities), other relevant government departments (e.g. hydro-meteorological departments), and non-government organizations involved with the different components of crisis management is needed to avoid early warning and preparedness solutions being developed in silos.

One project that supports proactive approaches for timely action is the UNDP-supported Scaling Up the Use of Modernized Climate Information and Early Warning Systems (M-Climes) project. Launched in 2017 in Malawi, this project seeks to increase the resilience of Malawians to climate hazards, overcoming barriers related to weather and climate information by enhancing forecasting capacity through the expansion of hydrological monitoring stations, lake-based weather buoys, and lightning detection sensors. Through these methods, risks – together with their impacts – can be anticipated, allowing communities and government departments to prepare for the changing climate patterns that threaten livelihood opportunities, and protect lives, valuable infrastructure and property from extreme weather events. Furthermore, M-Climes facilitates better decision-making on poverty reduction, economic development and future investment in climate change adaptation.

Enabling UNDP Country Offices to be truly anticipatory

In order to walk the talk, UNDP's risk management processes should enable the organization to ensure an anticipatory and systematic approach to risk and crisis. This requires putting in place specific preparedness measures, understanding emerging risks and hazards, having a clear understanding of the standard operating procedures (such as predefined partnerships and local-level resources for immediate crisis and disaster response) and reflecting on actions post-crisis and post-disaster to continuously improve policies and tools.

To enhance this, through UNDP's Crisis Portal, the UNDP Preparedness Toolkit was launched in 2023. The Toolkit provides a one-stop platform for Country Offices to strengthen their institutional, strategic and operational capabilities for preparedness. This translates to faster and more effective response times, saving lives and minimizing damage. Alongside the Toolkit, the Crisis Risk Dashboard helps UNDP to anticipate and respond to risks at global, regional, and country levels by providing easy access to timely and relevant data visualizations to effectively communicate key trends and risks.

Building upon the Crisis Risk Dashboard, UNDP is also pioneering the development of a Risk Anticipation Hub. This Hub will aim to combine foresight, sense-making, and data analysis to empower UNDP and the broader UN system to navigate the complexities of interconnected crises and move towards achieving the SDGs and Agenda 2030.

Through tools such as these, UNDP Country Offices are more and more able to anticipate risk and prepare themselves for future crisis and disasters.

Box 4

Understanding evolving contextual risks through data: UNDP's Crisis Risk Dashboard

The Crisis Risk Dashboard (CRD) helps UNDP to anticipate and respond to risks at global, regional, and country levels by providing easy access to timely and relevant data visualizations and analysis but, most of all, by telling clear and compelling data stories to effectively communicate key trends and risks. Globally, the CRD combines and visualizes a large set of primarily open-source data, such as that on emerging natural hazards, live global news trends, conflict dynamics, and national development indicators. It allows UNDP to translate a broad range of information into useable, visual formats to facilitate higher-level scanning and understanding of trends and evolving situations.

Examples of how the tool has been customized and used in different country and regional contexts:

- The Venezuela CRD informs the situational and risk awareness of the UNCT, generates early warning alerts, and supports the formulation of appropriate responses.
- In Tunisia, CRD analysis identifies geographic hotspots of unmet needs, which guides the prioritization and allocation of funds for future UN projects.
- In Malawi, the CRD enables comprehensive election monitoring through the analysis of changing rates of hate speech, violence, and law enforcement misconduct, which has effectively informed prevention efforts.
- In Mali, the CRD – which included data on droughts and violent incidents – was used for program development in the design phase of a climate-security project.
- In Sri Lanka, the CRD supports a UN-wide early warning system, monitoring multidimensional risks through insights on a variety of topics ranging from food security to hate speech and religious violence.
- In Papua New Guinea, the CRD was used to track violent incidents ahead of the electoral period to inform early warning and early action by the Country Office

Enablers

UNDP prioritizes a set of critical enablers to strengthen multi-hazard early warning and preparedness action and capacity.

Early warning and preparedness should be centered on the communities they serve

At the heart of preparedness are the individuals who will have to enact the elements of preparedness plans or early warning systems. By adopting a people-centered approach, solutions can be created with the input and involvement of those closest to the problem.

UNDP should:

- ensure a diverse range of people within communities are meaningfully empowered in early warning and preparedness planning processes.
- promote principles of equality and non-discrimination in all engagements to ensure no one is left behind.
- work with governments (at national and sub-national levels) and communities to build capacities and create agency for initiatives, and ensure that key people at national, sub-national, and community levels are equipped with the skills and resources they need to prepare for, prevent, respond to and recover from crises, while understanding the implications of future crises. This should focus on ensuring those with a role in crisis management at all levels have the capacity to grasp the cross-cutting complexities of risk and understand available tools to anticipate and minimize these future risks.
- foster improved relations between public and private sector entities to further enhance early warning and preparedness.
- push for the development of feedback loops and capture lessons learned through every step of early warning and preparedness work to continuously refine and improve existing processes.

Early warning and preparedness should be backed by solid risk governance

Disasters can have varying levels of severity depending on how disaster risk reduction, preparedness and response are managed. Conflicting priorities and human actions – influenced by complex social constructs such as society's perceptions, needs, demands, decisions, behaviors and practices, as well as deeply rooted systemic elements – can lead to inconsistent actions. While anticipatory risk governance focuses on long-term risk management policies, institutions and collaboration among stakeholders, early warning systems and preparedness efforts often concentrate on specific mechanisms within the governance framework that provide timely information to individuals and communities based on their understood threats, vulnerabilities and capacities. Integrating risk knowledge into development policy and planning enhances risk governance, which encompasses the creation of more effective early warning systems. This, in turn, fosters an enabling environment for early warning and preparedness, as risk and hazards continue to evolve.

UNDP should:

- work to foster political commitment and strengthen national and local ownership of legislative, legal, policy and strategy development regarding disaster risk reduction, including for early warning and preparedness.
- work to strengthen institutional and legislative frameworks and networks for early warning systems through intersectoral coordination, and via cooperation across all levels, with representation from all sectors (public, private, and tertiary sector).
- work to enhance preparedness capacity development services by including strategic and policy advice on the institutional, policy and legal framework for preparedness for

response and recovery; engaging the private sector; standardizing capacity-building nationally and locally; and implementing post-disaster needs assessment and recovery frameworks.
- foster horizontal and vertical linkages and the participation of communities at all stages of the early warning and preparedness process.
- work to ensure that early action for effective response and recovery is seen across the four pillars (see Figure 2), rather than as a set of disparate elements.
- support the expansion of state presence and services to understand the root causes of crisis.

Box 5

Supporting local government in Nepal to institutionalize emergency preparedness

Nepal is witnessing rapid urbanization, which has led to increasing levels of exposure to multiple hazards and their impacts. UNDP, with the support of the European Union Civil Protection and Humanitarian Aid Operations Office (ECHO), supported municipal governments through the Reducing Disaster Risks and Enhancing Emergency Response Capacities in Multi-Hazard Risk Prone Urban Areas of Nepal project. This worked with three at-risk municipalities to institutionalize and strengthen emergency preparedness, and to plan and implement coordinated response, helping them fully operationalize policies and programs with effective measures, models and capacities at the local level.

A robust information and knowledge management system needs to be in place

In anticipation of disasters, it is essential to have a dependable and up-to-date information system in place to support multi-hazard early warning and preparedness measures and inform decision intelligence. This system should aim to transcend static data silos by incorporating and overlaying a variety of measurable data, such as hydroclimatic and geological datasets, as well as dynamic datasets that provide fluid updates, such as demographic trends, logistics details, emergency contact information, conflict hotspots and more.

To grasp the full narrative of potential shocks and their ripple effects, quantitative data should be complemented with qualitative data. Qualitative data enables decision-makers to keep track of social trends, community resilience capacities and peace and security undercurrents, to understand fully the consequences of potential future risks, including those triggered by disaster risks. Moreover, it is important that information systems are inclusive and easily accessible to help decision-makers receive timely and effective early warnings, and prepare accordingly. This is where decision support systems (DSS) and tools like AI can start to take root. UNDP should promote policies that define which data is considered vital for effective early warning and preparedness, how this data can best be presented or made accessible, and how and when key data should be updated.

UNDP should:

- use its role as a convener to ensure national information management systems are not developed in silos, but rather bring together data sources from various bodies by collaborating with and across different institutions and the private sector.
- continue to expand its capacity to support County Offices to analyze risk, review existing portfolios, and develop new programs that promote multi-hazard and integrated early warning systems.
- work to support national and local authorities to build capacities for early warning decision intelligence by offering a wide array of risk information services, for instance: the institutionalization of damage and loss accounting systems; social risk tracking and trends; multi-hazard and multi-sectoral disaster risk assessments; and enhanced monitoring of disaster risks through the digitalization and institutionalization of risk information processes (generation, analysis and converting to action).
- enable local access to key information through its global network of partners, and support decision-making and the application of information for anticipatory early warning and preparedness actions.

- promote opportunities to collect disaggregated data by gender, age and disability to support comprehensive understanding and informed decision-making that ensures women form an active part in shaping early warning systems as well as benefitting from them.
- support national counterparts to develop formal information sharing systems which are inclusive and accessible to all, from small communities including indigenous communities and grassroots organizations, to regional and global bodies.
- push for information sharing platforms to feed into other regional and global information management systems.

Early warning and preparedness should be leveraged by crisis modifiers and forecast-based financing

In support of early warning, crisis modifiers and forecast-based financing can enable us to be more proactive in our response to evolving risks. It is important to acknowledge that risk is a complex issue with multiple factors involved. By integrating proactive actions into frameworks, we can create early warning systems that can adjust to the dynamic nature of crises.

UNDP should:

- develop comprehensive data management systems that integrate crisis modifiers, forecast-based financing data and other relevant information sources. This integration will help gain a holistic understanding of evolving risks, allowing for more accurate proactive measures and early warnings.
- invest in training programs that enhance the capacities of local communities, government officials and relevant stakeholders. These programs should focus on understanding and effectively utilizing crisis modifiers and forecast-based financing tools. By building local expertise, we can ensure that proactive responses are well-informed and executed at the community level.
- create forums where local communities can actively participate in decision-making processes related to early warning systems. Feedback from these engagements can inform the refinement of measures, making them more responsive to community needs.
- advocate for the integration of crisis modifiers and forecast-based financing strategies into national and local policies related to disaster management and risk reduction. This advocacy ensures that proactive approaches are embedded within the legal and policy frameworks, enabling systematic and sustained implementation.
- support research initiatives focused on understanding the intricacies of risk factors and their interactions. Investing in innovative technologies and research methodologies can lead us to develop advanced tools for analyzing complex risks. This knowledge-driven approach will enhance the design of proactive measures and early warning systems, making them more adaptive to the changing nature of crises.

Box 6

Modernizing climatic data for early warning in Burkina Faso, Ghana, and Kenya

The joint UNEP/ UNDP CLIMWARN project, a partnership with entities in Burkina Faso, Ghana, and Kenya, has replaced rudimentary meteorological methods with a more sophisticated system. This information management system combines data on hazards and vulnerability from across three countries to show risk scores for individual areas. It enables formal sharing of this information with rural communities through SMS and email, alerting them to potential risks such as floods to aid better preservation of their crops and livelihoods.

Financial resources should be allocated to support early warning and preparedness

It is vital that resources are available to enable tangible proactive measures at national and sub-national levels. The scope of these measures may vary greatly and could include hard infrastructure, technology-based early warning systems, or community-led preparedness initiatives. Factors such as infrastructure in relation to numerous hazards and the cross-cutting implications of risk should be considered.

UNDP should:

- advocate for continuous investment in building local capacities which enable people and communities to enhance their levels of preparedness.
- encourage investment in preparedness actions at national and sub-national levels, and in line with national financing frameworks which are based on a detailed understanding of a location's risk profile, that take into consideration both social and economic perspectives. This includes integrating forecast-based financing strategies into these frameworks to ensure adaptive financial responses to imminent risks.
- advocate for the operation and maintenance of early warning systems to be streamlined into national and administrative financial allocation processes.
- foster connections between public and private sectors to create continual resource mobilization for early warning, preparedness initiatives and forecast-based financing. Collaborative efforts between these sectors can enhance financial support structures, ensuring swift and effective response to emerging risks.
- encourage investment in information management systems and processes that enable informed decisions, support timely action and facilitate forecast-based financing strategies. This includes investing in both the development of these systems and the necessary hard infrastructure to enable their seamless operation.

Box 7

Harnessing early warning systems: Kyrgyzstan and Georgia's resilience journey

Kyrgyzstan and Georgia are leading the way in proactively shaping their resilience journeys by utilizing early warning systems and engaging with their communities.

The Kyrgyz Republic witnessed a milestone on May 12, 2023, as the initial "Dolon" avalanche monitoring station initiated operations through a tripartite partnership between the Ministry of Emergency Situations, Japan and UNDP. Cutting-edge technology empowers these stations to provide real-time, accurate data, enhancing avalanche risk awareness and early warning among communities. The collaborative effort exemplifies the fusion of technology and community involvement in bolstering public safety. Amid Kyrgyzstan's strides in disaster risk reduction, additional stations are under construction and set to open throughout 2023 and 2024.

In Georgia, flood and hazard preparedness is being transformed by early warning systems. In 2012, after years of devastating floods, UNDP partnered with government agencies and local communities to establish a flood management and forecasting system that utilizes real-time data streams from meteorological stations. The system, developed in the Rioni River Basin from 2012 to 2017, paved the way for its expansion to 11 other basins across Georgia, starting in 2019. Beyond just flooding, the current system includes a comprehensive database on mudflows, avalanches, landslides, droughts, hail and strong winds, which allows officials to anticipate these hazards, and for communities to build comprehensive risk management plans and practice sustainable hazard management. Tangible benefits include timely and community-driven early warning systems, including evacuation protocols, protection of livelihoods and fostering the protection of 1.7 million people currently at risk from hazards within Georgia.

Key Terms and Phrases

All key terms and phrases within this list have been sources from: Sendai Framework Terminology on Disaster Risk Reduction.

Disaster: A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.

> Disaster damage occurs during and immediately after the disaster. This is usually measured in physical units (e.g. square meters of housing, kilometers of roads, etc.), and describes the total or partial destruction of physical assets, the disruption of basic services and damages to sources of livelihood in the affected area.
>
> Disaster impact is the total effect, including negative effects (e.g., economic losses) and positive effects (e.g. economic gains), of a hazardous event or a disaster. The term includes economic, human and environmental impacts, and may include death, injuries, disease and other negative effects on human physical, mental and social well-being.

Disaster risk: The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.

Early warning system: An integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes that enables individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events.

> Multi-hazard early warning systems address several hazards and/or impacts of similar or different type in contexts where hazardous events may occur alone, simultaneously, cascading or cumulatively over time, and taking into account the potential interrelated effects. A multi-hazard early warning system with the ability to warn of one or more hazards increases the efficiency and consistency of warnings through coordinated and compatible mechanisms and capacities, involving multiple disciplines for updated and accurate hazards identification and monitoring for multiple hazards.

Preparedness: The knowledge and capacities developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters.

Hazard: A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

Resilience: The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

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