



GUIDANCE DOCUMENT **on People-Centered Risk-Informed** **Early Warning Systems**



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GUIDANCE DOCUMENT

on People-Centered Risk-Informed Early Warning Systems



ACRONYMS

CEWS	Community Early Warning Systems
CREWS	Climate Risk and Early Warning Systems
CRN	Climate Risk Narratives
DRM	Disaster risk management
DRR	Disaster risk reduction
ENSO	El Niño-Southern Oscillation
EVCA	Enhanced vulnerability and capacity assessment
FCFA	Future Climate for Africa (FCDO programme)
FFWC	Flood Forecasting and Warning Centre
GCF	Green Climate Fund
GIS	Geographic Information System
IAP2	International Association for Public Participation
IFRC	International Federation of Red Cross and Red Crescent Societies
INGO	International Non-Government Organisation
IT	Information Technology
ITU	International Telecommunication Union
KenGen	Kenya Electricity Generating Company
KMD	Kenya Met Department
LDC	Least Developed Countries
LGU	Local Government Unit
M7E	Monitoring and evaluation
MHEWS	Multi-Hazard Early Warning Systems
NAP	National Adaptation Plans
NDC	Nationally Determined Contributions
NDMO	National Disaster Management Offices
NFCS	National Framework for Climate Services
NMHS	National Meteorological and Hydrological Services
PAGASA	Philippines national meteorological office
PIPA	Participatory Impact Pathways Analysis
PSP	Participatory Scenario Planning
PVCA	Participatory Capacity and Vulnerability Analysis
REAP	Risk-Informed Early Action Partnership
RIMES	Regional Integrated Multi-Hazard Early Warning System
SIDS	Small Island Developing States
SMS	Short Message Service
SPREP	South Pacific Regional Environment Programme
SUFAL	Supporting Flood Forecast-based Early Action and Learning
UK Met Office	UK Met Office
UN	United Nations
UNDRR	United Nations Office for Disaster Risk Reduction
WB/GFDRR	World Bank/Global Facility for Disaster Reduction and Recovery
WISER	Weather and Climate Services for Africa (FCDO programme)
WMO	World Meteorological Organization

CONTENT

1. INTRODUCTION	6
Climate Risk and Early Warning Systems (CREWS) initiative	6
Rationale for People-Centered Risk-Informed Early Warning Systems	6
Structure and how to use the guidance document	8
2. PEOPLE CENTERED EARLY WARNING SYSTEMS IN PRACTICE	10
2.1 Define the goal, scope and scale	10
2.2 Identify and Engage Actors	14
2.3 Co-create a collaborative design process and build common ground	20
2.4 Co-explore, Co-develop and Co-deliver solutions	26
2.5 Capacity building and Learning	36
2.6 Monitoring and Evaluation	38
3. REFERENCES AND RESOURCES	41
CREWS and CREWS Implementing Partner Resources	41
Resources on Principles for people centered risk informed approaches	41
Resources on good practices, learning and evidence on people centered risk informed early warning systems	41
Resources and Guidance on co-production and forecast based action	42
ANNEX 1. EXAMPLES OF POTENTIAL PEOPLE CENTERED ROLES	44

1. INTRODUCTION

CLIMATE RISK AND EARLY WARNING SYSTEMS (CREWS) INITIATIVE

This Guidance document aims to inform and give practical suggestions for the integration of people centred risk informed approaches in the design, implementation and monitoring of early warning system initiatives. The Guidance document is developed by and for the **Climate Risk and Early Warning Systems (CREWS)** initiative, however it is targeted towards all actors engaging in people-centered, risk-informed early warning systems.

CREWS demonstrates a commitment to people-centered, risk-informed early warning systems in the **CREWS Operational Plan: Delivering at Scale 2021-2025** which states that: “People-centered approaches involve the people and communities that most require warnings – the end-users – in each of the four elements required for effective impact-based multi-hazard early warning systems” and “Local organizations and communities are listened to and engaged so that investments are co-developed and driven by the needs of those dependent on timely and accurate warnings and climate information, especially vulnerable people.”

CREWS has developed its Operational Procedure Note No 5: People-Centered Risk-Informed Early Warning Systems to support operationalisation of this important aspect of the CREWS value proposition in all its projects and programmes. The Operational Procedure outlines roles, responsibilities and recommendations for action by the CREWS Steering Committee, CREWS Implementing Partners (World Meteorological Organization (WMO), the World Bank/Global Facility for Disaster Reduction and Recovery (WB/GFDRR) and the United Nations Office for Disaster Risk Reduction (UNDRR)) and CREWS Secretariat.

The development of the Operational Procedures builds on CREWS formal commitments to people-centered, risk-informed early warning systems and involved studying the literature, consultations and workshops with CREWS partners and associated stakeholders, in particular project counterparts, the **International Federation of Red Cross and Red Crescent Societies (IFRC)** and other members of the **Risk-Informed Early Action Partnership (REAP)**, with opportunity for comments to draft documents. As a result of this inclusive process and the necessary involvement of a wide range of actors in a people-centered approach to early warning systems, CREWS decided to create a separate and more detailed Guidance document for sharing among all CREWS partners and associated organisations and networks engaged in early warning systems.

The Guidance document is conceptually underpinned by CREWS’ value proposition, the four elements of Early Warning Systems (See Figure 1) and literature on co-production¹ in climate services and early warning systems (See Figure 2). It draws substantially on the **Multi-hazard Early Warning Systems Checklist** which serves as an important and complementary document.

RATIONALE FOR PEOPLE-CENTERED RISK-INFORMED EARLY WARNING SYSTEMS

Early Warning Systems involve the systematic collection of data and disaster risk assessments for the analysis and forecasting of potential hazards, their translation into warnings, timely dissemination and use for early action. For early warning systems to be effective, the often technical scientific agencies who create hazard warnings, and the representatives of community groups and other actors who make up the end users requiring warnings so as to act in time to save lives and assets, must work hand in hand and understand their respective expectations. Early warnings failing to be available, accessed and understood by those most at risk, or failing to result in early response and action have been seen in widely differing contexts – for example in the devastation in Southern Africa caused by

¹ See reference list for co-production resources

Cyclone Idai in 2019, in the Caribbean and United States of America during Hurricane Ida in 2021, and in the volcanic eruption and tsunami in Tonga in 2022. At the same time the urgency and importance of effective actionable systems is escalating with the increasing frequency, severity and geographic scale of climate change impacts and extreme events. For example, Madagascar experienced four years of drought leading to widespread dependence on food aid at the end of 2021 only to be hit by 4 tropical storms/cyclones within one month in January to February 2022.

This is the challenging context within which early warning systems are called upon to provide timely and actionable information and impact-based advisories which enable effective early responses to multiple hazards affecting the same area, often with overlapping timescales. CREWS recognises that early warning systems are more likely to result in their goal of early action and saving lives and livelihoods when the people and organizations that need to receive and act on warnings are actively involved in the design and implementation of the systems. The principle that early warning systems are people-centered and driven by the needs of end-users are reinforced and further elaborated through CREWS other principles: that programmes are country-driven and target the populations most at risk from climate change impacts and disasters and that projects are gender-responsive and engage women and girls.

CREWS considers all four elements of early warning systems to be equally important for ultimately reducing the social, economic and environmental impacts of extreme events. The CREWS national and regional outputs are aligned with the early warning elements and provide some examples of what is involved, as shown in Figure 1.



Figure 1. Four elements of Early Warning Systems with CREWS outputs (Source: CREWS Secretariat Results Monitoring Framework)

In a people-centered approach, each element, whether applied alone or together with other elements, involves the participation of people and organisations at risk in differing ways directly or indirectly and/or is informed by robust knowledge of people at risk including those most at risk.

All early warning initiatives have the ultimate purpose of enabling early action to save and protect the lives, livelihoods and assets of people at risk of specific hazards in a particular geographical area whether local, national or transboundary. Involving end users through the above actions and through co-production processes helps to localise the system in the place where it creates impacts, strengthen relationships among users, service providers and producers and ensure the system is known, effective and used. End user participation improves reach, access, communication, understanding, trust, relationships, interest, capacity and ultimately effective early action. Beyond participation, a people-centered approach aims to ensure that effective early action is locally defined, can be resourced and applied in the right time, is inclusive and results in tangible changes and benefits to people who would otherwise suffer when hazards do strike.

Ultimately an early warning system is only effective when it responds to a need or demand and is acted upon; use of warnings and action is only possible when people know about the system and what it can do.

STRUCTURE AND HOW TO USE THE GUIDANCE DOCUMENT

This Guidance document presents suggestions for ensuring that an early warning system project of any scope and scale is consciously connected to the people it ultimately aims to serve. It focuses on people-centered and risk-informed aspects of early warning systems.

The Guidance document aims to provide process direction, practical steps and illustrating examples of good practices. It aims to stimulate thinking for designing initiatives, approaches and methodologies which are explicitly people-centered and risk-informed, together with concerned stakeholders at all relevant levels, and which aim to achieve the goal of early action where and among whom it is needed.

Section 2 presents practical approaches to integrating a people-centered approach into the design, implementation and monitoring of risk informed early warning systems. Programming and design considerations – around five co-production building blocks² – describe the steps involved in integrating people-centered, risk-informed approaches into early warning system project design and implementation in more detail. Box 1. introduces the co-production approach.

People-centered, risk-informed early warning system approaches are described in six chapters:

1. Defining the goal, scope and scale of people-centered early warning systems
2. Identifying and engaging actors (building block 1)
3. Co-creating a collaborative design process (building block 2)
4. Co-exploring, co-developing and co-delivering solutions (building block 3)
5. Capacity building and learning (building block 4)
6. Monitoring and evaluation (building block 5)

Each one is elaborated in detail, with a short description, steps to take, their purpose, success factors and practice examples. The chapters can be applied in parallel, in any order and at different stages of the project cycle. They are intended to be adapted and tailored to fit the project context.

Section 3 is a list of useful resources structured by topic for ease of reference

CREWS Implementing Partners and other organisations engaged in early warning systems have their own programming procedures and tools. This Guidance document is intended to give some direction and ideas for integrating a people-centered approach more explicitly, into already established organisational procedures. As such the Guidance does not cover all aspects of programming and design

² See Box 1 and Carter, S., Steynor, A., Vincent, K., Visman, E., and Waagsaether, K. (2019) 'Co-production of African weather and climate services'. Second edition. Manual, Cape Town: Future Climate for Africa and Weather and Climate Information Services for Africa (<https://futureclimateafrica.org/coproduction-manual>)

and should be used as an additional resource and reference. It is not intended to be comprehensive, prescriptive, technical or a blueprint for all early warning systems projects. It does not replace other guidance documents and the actions listed are not requirements in CREWS projects. It aims to complement available guidance by following the standard early warning system elements and co-production approaches widely used in climate services.

It is recommended that the Guidance Document and the [Multi-hazard Early Warning Systems Checklist](#) are used hand in hand by project designers and implementers to provide a comprehensive and holistic approach to early warning systems which are robust, people-centered and risk-informed.

Box 1. Co-production in people centered risk-informed early warning systems

Co-production of climate services and early warning systems enables a people-centered process by identifying and involving all relevant actors including ultimate beneficiaries. The co-production process applies to all project phases after the goal and the broad parameters of the project have been defined. Figure 2 presents co-production building blocks in a cycle where they interact and are mutually reinforcing.

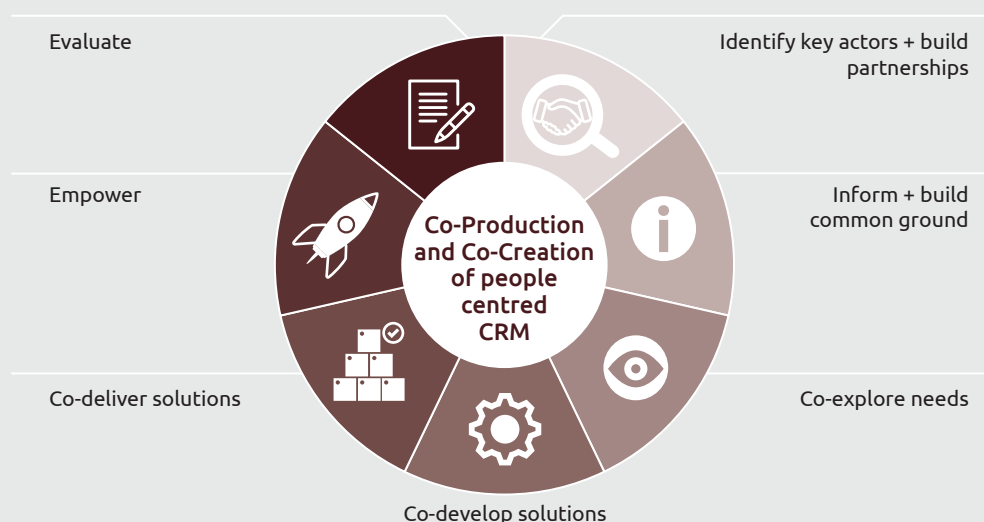


Figure 2: Bapon Fakhruddin. Co-production and co-creation of people-centred climate risk management (Based on IAP2, WISER and other good practices for co-production and co-creation)

According to the project purpose, context and the design plan the building blocks can be:

- conducted in sequence or in parallel
- implemented in full or only those that are relevant, used flexibly and to different extents
- conducted in any order and merged together as needed
- repeated in different ways and levels of detail
- used in any phase of a project - design, implementation and monitoring
- applied across one, more or all of the early warning system value elements and value chain

Empowerment of all actors including end users, strengthening their capacity, ownership, organisation and agency in relation to early warning and early action is a considered a pre-condition for success across all the blocks.

The WISER/FCFA [Manual on Co-production in African weather and climate services](#) uses a similar cycle to describe coproduction building blocks and includes 24 case studies illustrating the process. Case studies 5, 6, 8, 11, 19, 20 and 21 illustrate coproduction approaches to climate services for early warning and action and provide a useful resource to inform and inspire coproduced early warning systems in CREWS projects. Some are referenced as practice examples in this section.

2. PEOPLE CENTERED EARLY WARNING SYSTEMS IN PRACTICE

There is no single approach or blueprint to designing and implementing inclusive, people-centered, risk informed early warning systems. Approaches are evolving, context-specific and require innovation and testing new ways of working. Putting people at the centre is not a separate or isolated activity, rather it informs the way in which an early warning system and relevant elements of the system are implemented in a particular context. The following chapters present process guidance and examples to support project teams in their strategic thinking and planning towards increased impact.

2.1 DEFINE THE GOAL, SCOPE AND SCALE

Developing a broad, high-level goal sets stage for project design. The goal is agreed with the intended main implementing partners and is informed by the need or demand that has led to the decision to develop a project. Key parameters include the risks and hazards to be addressed, geographical scope and early warning system elements to be focused on. The intended end-users of the early warning system and the early actions and tangible benefits for users that the system will lead to, whether directly or indirectly, should be identified and articulated. The goal statement can include the project intentions to ensure it is both people-centered and risk-informed.

Early warning systems are most effective when they are an integral part of broader mainstream systems or services of national institutions such as national meteorological and hydrological services (NMHS) or national disaster management offices and are integrated into national and local development plans and budgets. Having knowledge of the broader policy context and related programmes is important for alignment and leveraging the most people-centered risk informed impact.

Exploring and aligning with organisations and ongoing systems has multiple benefits. It:

- creates buy in and synergies among relevant sub-national, national, regional and project organisations by aligning with their priorities
- enables project leads to trace and understand the pathways and connections between the intended project scope and ultimate early actions it will lead to
- informs which actors and processes the project can work directly with by identifying the ones engaged in early warning down to end user level and understanding the linkages between them
- clarifies how the project will engage, collaborate with or influence the actors and processes required for success but which the project will not be directly involved with
- helps identify the gaps the project will bridge and added value it will bring
- helps to avoid designing isolated or disconnected activities which risk useful products being available but not being known or used for action, or activities which are high cost but lead to highly localised impacts
- helps to identify economies of scale, routes to leveraging impact and additional resources and scaling of systems and impacts

The scope and scale of the people-centered focus of a project is determined at the start. It requires understanding how and where in the early warning system value chain the project will add value and how it will connect with and complement existing systems and services. Most early warning system projects cannot address all requirements of people-centered risk-informed early warning services alone, or cover all of the early warning system value chain and elements. Figure 3 presents a few examples of people-centered actions which are specific to a single early warning element and actions that cut across all elements and can be applied in a single element or to more than one in a coordinated way, or in order to address the full value chain and connections between elements.

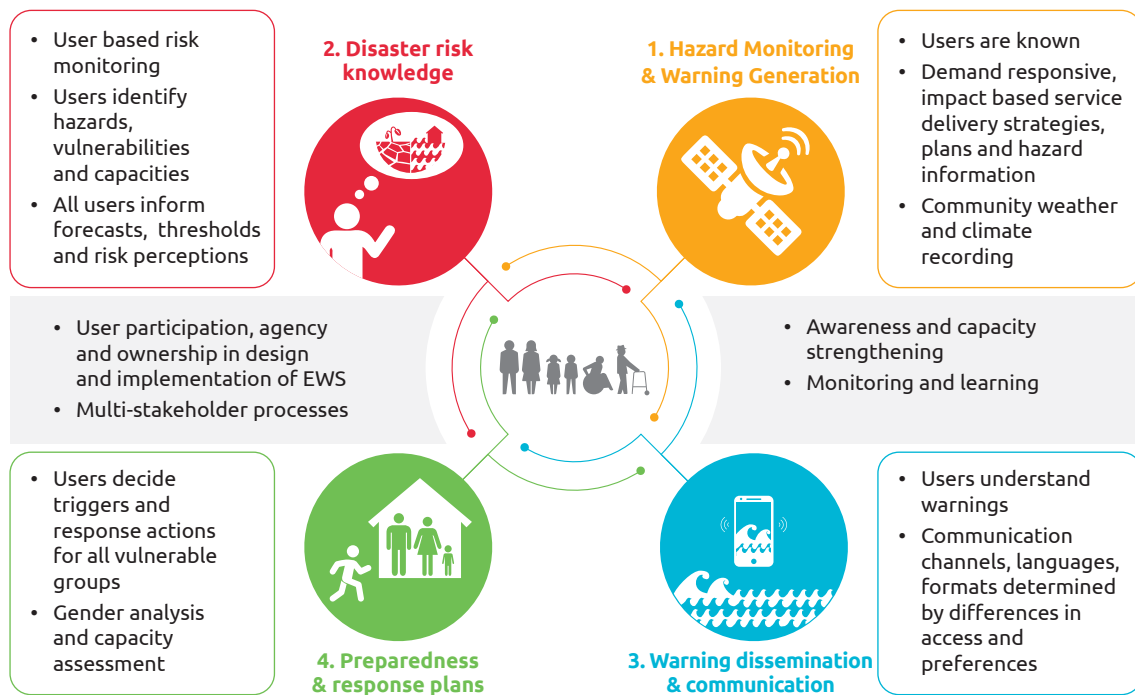


Figure 3. Examples of People Centred activities related to Early Warning Systems Elements

Two scenarios are provided to help in making decisions on scope and scale

a) Locally led or community based early warning systems projects

Projects that directly involve early warning users or first responders can apply all people-centered approaches and principles. Most often these projects focus on 3. Warning communication and dissemination and/or 4. Preparedness and response plans, but locally led projects are not limited to these two elements – for example see Practice Example 2. SUFAL Project. Good practices for effective people-centered, risk-informed approaches in community-based projects include:

- Carefully plan for end-users' explicit involvement in co-production, planning and decision making and organisation across the early warning systems value chain and across the project cycle of design, implementation and monitoring.
- Integrate needs assessments and activities which strengthen local participation, voice, capacity, organisation, ownership and agency for effective early action, which in turn increases sustainability of the system.
- Understand differences among the people at risk so that the system is designed to be accessible and beneficial to all. Gender, age, disability and other factors affect knowledge and perceptions of vulnerability and risk, decision making power and capacity to act
- Involve local actors and their knowledge (see Box 2) in design and planning meetings. Avoid elite capture and find ways for the poorest, the least educated and the most vulnerable to contribute. Invite civil society, community-based, indigenous and marginalized groups and representatives of various ages and disabilities to join planning meetings, baseline activities, official project launches, together with government institutions and other partners.
- Ensure that service providers, intermediaries and producers are engaged with people at risk in a coordinated way through multi-stakeholder platforms or participatory local development planning processes.
- Where the project focuses more on dissemination and response, ensure access to early warning products is reliable, systematic, accessible when needed and connected to producers at an appropriate level.

- Identify relevant organisations to engage with (community associations, government, non-government, private sector) at local to national level to support design and implementation, connect between levels and to mainstream systems. This will help towards sustainability, replication and scaling of the system and approach.

For more information:

Networks such as IFRC and their 192 National Societies and other members of REAP which have both global reach and local presence can be effectively engaged throughout the process to support people centred aspects of the project.

Daraja is a good example of a locally led people centered early warning system.

Practical Action and Early warning projects provide multiple examples and evidence of impact.

Box 2. Value of local knowledge and participation of end users.

Local knowledge and participation contribute to developing:

- location and hazard specific, risk informed impact-based forecasts
- likely impacts and probabilities of anticipated risks for different people at risk
- channels for communication which are locally preferred and accessed
- advisories and protocols for early action and response to be taken by different groups at different lead times.
- the way in which forecasts, impacts and advisories are presented and communicated – with easy to understand symbols or voice messages in local languages.

b) Early warning systems projects focused at regional and national level

Early warning system projects do not always have direct engagement with end users especially if their focus is in improving warning data and products, or limited to only one or two of the four elements, or target national to regional systems and actors. Most often these projects focus on elements 1. Hazard Monitoring with early warning detection, analysis and forecasting and 2. Disaster Risk Knowledge. Projects may also focus on influencing or building capacity of national systems, coordinating Multi-Hazard Early Warning Systems (MHEWS) across sectors, strengthening the strategic direction, capacity and project portfolio of regional climate centres, National Meteorological and Hydrological Services (NMHS) and National Disaster Management Offices (NDMOs), supporting coordination or delivery of end to end MHEWS, or strengthening a specific aspect or gap.

However, to be used and effective, early warning products, systems and support functions need to at the least be informed by knowledge of the ultimate end users. Even in a limited very technical project (such as “building a regional rainfall grid”) end users’ knowledge could be key to actual uptake of the resulting system and services despite end users being far ‘downstream’ of the project actions.

Good practices for integrating effective people-centered, risk-informed approaches in national and regional projects include:

- Take time to understand what is already in place, the pathways for early warning systems to ultimately lead to early action by at-risk people, and how the project connects through other early warning elements and actions being undertaken by other stakeholders.
- Access information on the targeted group of people at risk directly or indirectly at least at design stage, for example by studying existing vulnerability and risk assessments and understanding the different needs, perceptions and capacities of targeted users.
- Explore the different ways people at risk or organisations representing them could be engaged in developing forecasting systems, designing products and dissemination systems.

- Identify relevant organisations to partner and collaborate with that are working closer to end users and can connect the project to sub-national levels, targeted users and to mainstream systems.
- Explore existing and potential for greater mainstreaming of people centered processes in policy and plans, looking at how they support in-country capacity, commitment and sustainability.
- Include a sub-component of the project in which people-centered organisations engage user representatives for testing the systems and feedback mechanisms.
- Use coproduction processes to bring producers, intermediaries, service providers and user representatives together for dialogue on the project goals and relevance at a relevant level and at key points in design and implementation and to inform decisions on products and the system elements to be developed. Planning meetings, baseline activities, official project launches are all opportunities to engage a wider range of actors including end users.
- Ensure that early warning systems developed at national and higher level include and apply mechanisms to monitor not only their reach but also people's access, use, actions taken and impacts - and ensure the system is having an impact.

For more information:

CREWS project in Burkina Faso: [Strengthening National Capacities for Early Warning System Service Delivery](#) is an example of this kind of project.

[National Frameworks for Climate Services \(NFCS\)](#) and National Adaptation Plans (NAPs) provide important opportunities for connecting projects with mainstream people centered and co-production approaches.

Allocation of resources available is a critical decision element that influences the scope and scale of putting people at the centre. The greater the awareness and perceived public utility of an early warning system the more likely it is to attract the human, technical and financial resources required to sustain it. Scarce time and financial resources need to be targeted towards building effective demand, creating more sustainable, "locally owned" early warning systems and achieving early action.

Issues to consider in making resource decisions:

- Assess 1) the different characteristics and value added of respective early warning elements and 2) differences in expected level and scale of impact or benefit with respect to the cost. (Table 1.) That is, aim to balance scope, scale, transaction costs and impact over time³.

Table 1. Scope and scale considerations

Scope and scale	Impact	Transaction costs
<ul style="list-style-type: none"> • Localised warning system • Geographic, hazard or sector specific • Often small 	Empowers people at risk in specific contexts and locations to reduce and avoid multiple hazards and risks effectively and sustainably.	High up-front time and financial costs. High return on investment long term
<ul style="list-style-type: none"> • National to regional level early warning systems • Often Hazard specific • Large scale 	Broad reach, often challenges to assess actual access and use Warnings are not locally specific and potentially less impact in saved lives and reduced losses over time.	Lower cost and efficient relative to reach

3 World Disasters Report 2018 Leaving No-one Behind IFRC. <https://www.ifrc.org/document/world-disasters-report-2018>

- How to move investments more towards active user demand responsiveness while continuing to invest in upstream products, capacities and systems and strengthening one aspect in ways that create more investment opportunity for the others.
- Ensure sufficient investment in the set-up of early warning early action systems, readiness for early action and pre-positioning (i.e. funding for implementation of early action itself is not sufficient; in order to function, time and resources are needed to set up the systems for local communities and local actors to be ready to implement early action).
- Allocate sufficient and explicit time and financial resources for participatory, co-produced decision-making processes and actions in design, inception and implementation phases.
- Use multi-stakeholder co-production processes as an overarching design and implementation approach and avoid siloing people-centered aspects and duplication of effort.
- Adapt timelines for design, inception, implementation and monitoring phases to allow for sufficient levels of consultations, engagement of at-risk people, local organisations and actors across the early warning systems value chain in developing, implementing and monitoring warning systems and respecting and responding to their priorities over time.
- Include resources for building capacity to implement and sustain people-centred risk informed approaches, and for monitoring the impact of these aspects for continual improvement. This includes capacity of all actors depending on need – for example: producers to be more connected and responsive to users, users to have a meaningful voice and engagement, intermediaries to facilitate more effective co-production processes and connections between actors.
- Institutions and development partners working on the projects may need to adapt their operational procedures to allow for a greater people-centered focus.

2.2 IDENTIFY AND ENGAGE ACTORS

“People” in early warning systems include a wide range of groups that play central and leading roles in our societies, some highly at risk, as well as institutions representing and providing services to them. They require targeted and adapted information and/or warnings that lead to early action, aiming to leave no-one behind.

People in early warning systems include:

- 1) producers or forecasters
- 2) intermediaries, service providers and practitioners with multiple roles
- 3) users of information (first responders / end users and other decision makers such as policy makers), each with differing and connected roles.

Actors in all of these categories can be from regional, national, sub-national, local and community level and from government, civil society and private-sector. A project may work primarily with only one of these categories, however to be people-centered the design must know the range of actors and look at how the project will connect to those not directly engaged. In other words, a whole of society approach is the aim, where actors are recognised for the role they can play and the risks they are facing and engaged in a systematic way.

The WMO/UNDRR **Multi-hazard Early Warning Systems: A Checklist** describes relevant types of actors for each early warning system element in detail.

Mapping of who is vulnerable, at risk and in need of early warnings in a particular context is an important step for ensuring that the system is all inclusive and leaves no-one behind. People at risk are likely to be users of information, but may also be intermediaries or producers. Box 3 lists characteristics of different people at risk.

Box 3. Who are the people at risk in people-centered, risk-informed early warning systems?

People at risk and who face disproportionate risk may include, but are not limited to:

- Risk based on gender and age differences: women, men, youth, children, especially girls and young women, older persons
- Persons with disabilities
- People facing cultural, legal or other discrimination, indigenous people, ethnic minorities
- Poor, marginalised or geographically isolated people
- People living in exposed locations, sensitive to context specific, localised hazards and without resources to respond (urban or rural)
- People whose livelihoods depend on climate sensitive natural resources (eg farmers, pastoralists, forest dwellers)
- Displaced people and refugees
- Community based or local organisations and leaders representing the above people at risk
- Organisations providing vital but at-risk services that become challenged or impossible when hazards strike
- Community micro and small to medium enterprises, and local private sector businesses in at risk contexts or working in at risk sectors
- People and organisations having local knowledge, relationships and capacity that are essential to inform, support, implement and sustain early warning systems effectively but at risk of hazards

Coproduction activities for identifying and engaging actors

a) Stakeholder / Actor mapping across the early warning system value chain.

Stakeholder and actor mapping enables identification of all actors, how they are connected to each other - in relation to the project goal - and insight into which actors are most important for the project. The analysis is useful in making decisions on which actors to engage from the start, where and how the project will intervene, bridge gaps, contribute and add value and identify potential for leveraging other sources of finance.

Purpose:

- Identify people who require early warnings and need to take early action:
 - Users / first responders - which population groups face disproportionate risks, who and where (eg, in what hotspot high risk areas) are the people who need to take early action to save lives and assets?
- Identify people and institutions that support people to access warnings and take early action:
 - Providers of impact-based forecasts, data, climate risk knowledge and warnings
 - Intermediaries enabling co-production, media communications, disaster risk management (DRM) such as National Red Cross and Red Crescent Societies, resilience and other sectors and services, or connecting all actors
- Identify people and institutions that are not currently involved in early warning and early action systems but have the potential capacity to add value and strengthen the system. For example, people and institutions that can advocate and influence on the need for resources for early warning-early action such as the government planners, private sector, finance Ministries etc.

In practice, actor mapping⁴ may be done in many ways, one example is given below.

✓ **Success factors:**

- Integrate actor mapping into the project design process early on, focus on the project purpose and people-centered aims, and involve existing partners and known important actors.
- Use well known mapping methodologies: Stakeholder mapping is a key step in **Outcome mapping** to identify actors who are core implementers and therefore have control in the project, those who the project will work with directly and be able to influence and those who the project is interested in having an impact on (such as people most at risk) but have no direct engagement or influence. **Stakeholder influence mapping** can help to understand relative influence and power of different actors which may help to prioritise partnerships, collaborations and target organisations.

PRACTICE EXAMPLE 1. ACTOR MAPPING: DARAJA INFORMATION ECOSYSTEM MAPPING TOOL

Map the information ecosystem that connects responders to warnings:

- Map from at-risk people (users) backwards to identify the community level leaders, champions and organisations who help them to access information and enable action; the institutions providing the systems and services they depend on for accessing, trusting and acting on warning information (intermediaries), the sources of the information those services use, and the original information underlying these (providers).
- Include local knowledge and information.
- Map existing early warning systems - at national level but also Community Early Warning Systems (CEWS - and where those CEWS exist and why (e.g. if the CEWS don't reach those areas)) and their connection to early action
- Map the connections between all the actors operating across all early warning system elements, the levels of operation: local, sub-national, national or regional.
- How is information shared among them at different levels? Eg.
 - Does NMHS consult with, learn from or train civil society groups, or provide services targeted to various communities?
 - If not, which organisations do?
 - Who is not currently engaged in consultations and outreach?
 - Which organizations/agencies reach out throughout the early warning system chain: For risk assessment? Warning dissemination? Emergency preparedness? Disaster risk reduction? Contingency / business continuity planning? To get feedback after warnings? (eg do forecast verification mechanisms exist?)
- Build on existing actor mapping information. Combine actor mapping at local level with climate risk, vulnerability and capacity assessments.

Resources:

Mapping Tool: <https://darajacommunity.net/toolbox-resources/information-ecosystem-mapping/>

Video: <https://www.youtube.com/watch?v=W4DXxzNCu6k>

Impact: <https://darajacommunity.net/projects/completed/dar-es-salaam/impact/>

Example: https://internews.org/wp-content/uploads/legacy/resources/Internews_Mapping_Information_Ecosystems_2015.pdf

⁴ This **GUIDE TO ACTOR MAPPING** presents a detailed practical methodology

b) Identify partners and partnership modalities

Purpose:

- To enable projects to work across levels, disciplines and the relevant early warning system elements through relevant organisations with needed expertise.
- Select partners to be part of different phases of the project formally and informally. See Box 4 for examples
- Agree roles and relationships of project leads and project partners and how they will be coordinated.

Box 4. Potential partners:

- Organisations which are present and trusted at local to national level from government, civil society /non-governmental organisations and private sector
- Organisations able to connect to first responders, engage with all sectors, with non-government actors, down to community level in early warning systems and related goals of disaster risk reduction, climate change adaptation, resilience etc
- Organisations and networks already leading on people-centered co-production and knowledge brokering processes and/or have potential and presence in the targeted project locations (e.g., IFRC/ National Red Cross and Red Crescent Societies, REAP members, local non-government organizations, local private sector, agriculture and 'business continuity planning' organisations, community based and women's organizations and associations, groups and organizations of persons with disabilities).
- For CREWS projects, traditional CREWS project operational partners engaged in early warning system and related systems, services and projects (eg WMO links with NMHS, UNDRR with disaster offices, World Bank with sectoral line ministries)

✓ Success factors:

- Select partners early in the design process, based on actor mapping, the participatory co-design process, agreed project purpose and location, early warning system elements to be covered, mix of expertise needed, historical and new collaborations, capacity assessments.
- Select interdisciplinary / cross sectoral partnerships and partners that have local presence and knowledge and expertise in people centered co-production processes
- Assess capacity of potential partners in relation to people-centered expertise.
- Allocate sufficient financial resources and take time with a series of interactions and repeated engagements in a flexible, iterative process at relevant levels and multi-level (regional, national, sub-national, local) in order to develop equitable, trust-based relationships, to form an effective basis for co-production and make collective decisions on partners and their roles.
- Formalise partnerships through Memorandum of Understanding (MoU), Standard Operating Procedures (SOPs), Service Development Teams (SDTs) or other acceptable mechanism.
- Develop partnership modalities such as direct grant access at local level, project coalitions and private – public partnerships for joint action across traditional boundaries, sub-contracting of new local / non state / non-traditional partners with necessary budgets and control, within lead partner procedures.
- Aim for partnerships which also build capacities and linkages, for example, national to regional forecast capabilities to link across other early warning elements, better connecting climate risk information services to early warning system user groups and responders.
- Include the proposed partners, roles and institutional relations in the project proposal / presentation note.

PRACTICE EXAMPLE 2. PARTNERSHIPS: SUPPORTING FLOOD FORECAST-BASED EARLY ACTION AND LEARNING (SUFAL) PROJECT, RIMES BANGLADESH

Through multi-disciplinary partnerships, communities at risk of river flooding in Bangladesh are developing Early Action Matrixes with defined triggers and associated early actions for different warning levels and lead times. CARE Bangladesh, Islamic Relief Bangladesh, and Concern Worldwide are partnering with the Regional Integrated Multi-Hazard Early Warning System (RIMES) in the SUFAL project, supporting the Flood Forecasting and Warning Centre (FFWC) and Bangladesh Meteorological Department to increase the reach and lead times of flood forecasts. The SUFAL partners collaborate with the Department of Disaster Management (DDM), Department of Agricultural Extension (DAE) and Department of Livestock Services (DLS) to prepare flood early warning and advisory messages, which are broadcast as voice messages to district, upazila (sub-district), and union (village) level disaster management committees, local administrators, sector focal points, union disaster volunteers, and community members in districts that were at risk (a total of 25,000 recipients). The INGO partners work with these local actors to develop early action matrices with thresholds for action in each location along the river. The FFWC forecasts are used to trigger preparedness actions in a combined effort by the local government, SUFAL project, and the communities, coordinated by Disaster Management Committees (DMCs) at district, upazila, and union levels to ensure synergy and optimum use of resources. Through the SUFAL partnership and RIMES technical support, the Bangladesh Meteorology Department have increased lead times from 7 to 15 days and high community engagement has resulted in early action being taken.

SUFAL Resources:

SUFAL project: <https://www.rimes.int/?q=node/601>

SUFAL impacts: <https://www.carebangladesh.org/media-center-view-details.php?type=Story&id=115>

Other Partnership Resources:

IFRC-CREWS joint report on People-centred Early Warning Systems: Learning from Red Cross and Red Crescent Societies: https://www.ifrc.org/sites/default/files/2022-03/220111_CREWS-IFRC_People-centred%20EWS_report_designed.pdf

c) Co-Define roles, pursue active collaboration between all early warning system actors

People-centered, risk-informed early warning systems involve multiple different roles and relationships, which may also evolve over the course of a project. Co-defining roles and relations is in practice a consultative consensus-building process which may re-define some roles, shape some new roles, and co-define relationships as the details of the new or strengthened early warning system is worked out in the project.

Purpose:

- Ensure the knowledge, concerns and potential contributions of partners and all actors are incorporated early on.
- Agree provisional roles of each main actor and type of engagement/relationships between them in relation to the four early warning system elements as relevant.
- Agree on how and when roles and responsibilities will be regularly discussed, reviewed and updated and how actors will be held to account

Box 5. Multiple Roles of People at risk in early warning systems

People and organisations who face risks directly need to receive and act on warnings. They play multiple roles as recipients or end-users of early warning systems. They:

1. **contribute to observation, data and local forecasting knowledge**, help identify practical multi-hazard impact-based forecasts and warnings with and for different end user groups and share feedback to inform continual improvement of the system (monitoring)
2. **participate in risk assessment and contribute knowledge** and capacity on risks, how they are perceived and the drivers and barriers to early action (risk)
3. **receive, access, translate and act on warnings as first responders**
4. **disseminate warnings**, increase reach and access and inform choice of formats, languages and channels of communication (dissemination)
5. **build trust and understanding** in warnings received, ensure planned actions are relevant and feasible for all vulnerable groups including those most at risk, take early and timely action themselves and organise for action by others, and overcome resistance or delay in taking action (response)
6. **help to make connections** between the elements so that they are coherent and mutually reinforcing and feedback on their experience, actions and benefits are available to improve the system as a whole and the way in which each element operates.

✓ Success factors:

- Define roles together with expected partners and end users in a multi-stakeholder process, recognising the multiple roles end users may play (see Box 5).
- Include discussions with main actors on roles and relationships throughout the participatory co-production design process and during implementation so they are developed collectively and iteratively linked to a clear understanding of the rationale and intended goal of the project.
- Involve communities and intermediaries in deciding how they will be engaged and empowered in each step of planning, implementation and evaluation, including reporting back so that their perspectives, experience and actions continue to shape the project activities.
- Define accountability: match key actors to the defined project outputs and activities and develop their specific proposed roles and responsibilities. Use the human rights-based approach and its principles of accountability, participation and inclusion, transparency, equality and non-discrimination. Develop agreed principles and ways of working together which respect the different mandates, values and inputs of each actor.
- Agree collectively on coordination mechanisms that will enable strong partnerships according to the level and purpose of the project.
- Identify relevant existing multi-stakeholder coordination mechanisms involving government, private sector and civil society through which people centered early warning systems could be mainstreamed. Support regular cross disciplinary and multi-stakeholder interaction, to strengthen connections as well as roles.
- Explore integration in or strengthening of existing platforms or if necessary establish new platforms for regular interaction and collaboration to help strengthen relationships, communication, collaboration and understanding between all main actors including early warning providers and the actors who ultimately make decisions to take early action. See Box 6.
- Continue conversations on roles and responsibilities throughout design and during implementation as details of the operation become more visible and in response to changes among institutions or creation of new entities and opportunities to align with.

Box 6. Opportunities for strengthening roles and relations

- Connect to the National Framework for Climate Services (NFCS), Nationally Determined Contributions (NDCs) and/or National Adaptation Plans (NAPs).
- Use the Project Steering Committee to include representative membership from communities and local actors, ensuring diversity of the community is represented
- Create project task forces or inter-ministry committees which will also raise awareness across sectors and help to break sector silos.
- Learn from the REAP marketplace for matchmaking between partners; matching civil society and community-based organisations with local government and NMHS.

For more information:

See Annex 1 for examples of the multiple potential people-centered roles for producers, intermediaries, policy makers and users.

2.3 CO-CREATE A COLLABORATIVE DESIGN PROCESS AND BUILD COMMON GROUND

Collaborative design engages the range of actors in project design. Building common ground through the design process ensures that the participants in the project are aligned around a common goal and clear on their contribution to the co-production process. Collaborative design activities both inform and are informed by the roles of and relationships between actors in chapter 2.2, so may be conducted at the same time. Actors involved include selected partners, collaborating organisations and the range of actors targeted for supporting implementation and benefiting from the project.

Collaborative Design Tools and Principles

Context specificity. Key to design of people-centered, risk-informed early warning systems is that they are context specific and there is no blue print. Context ranges from national socio-economic status, climate vulnerability, specific ecosystems, locations and hazard hotspots within a region or country; specific groups of people at risk; etc. A collaborative thought process with the right group of actors including project implementers, partners and other stakeholders is necessary to determine the specific focus of the project and the larger context within which the incremental contributions of the project fit. The project design will describe how the planned actions and their results will link directly or indirectly to the ultimate goal of effective early action when and where it is needed. It will show how the project supports and promotes people centred early warning for early action whether or not it has activities directly involving vulnerable people; which early warning system elements the project will focus on and how people-centered and co-production processes will be applied.

Value local knowledge. Work with and listen to communities and local actors: learn from holders of indigenous, local and elder knowledge and from the experiences and expertise of at-risk groups, communities and local actors. Plan and include these knowledge holders in exercises to blend traditional and scientific knowledge during the coproduction process.

Theory of Change⁵, Participatory Impact Pathways Analysis (PIPA) or outcome mapping processes are recommended to collaboratively develop a project design. These tools support collaboration in agreeing a final goal and long term desired impact relating to early action by at-risk people and local actors (first responders), developing pathways to reach the goal, deciding main actors involved, the expected outcomes and outputs of the project in relation to the pathways, expected level of engagement at regional, national and subnational level and geographical scope of early warning system coverage to be sustained beyond the end of the project. (See Figure 4 for an example Theory of change.)

5 See [What is Theory of Change?](#) and [THEORY OF CHANGE UNDAF COMPANION GUIDANCE](#)

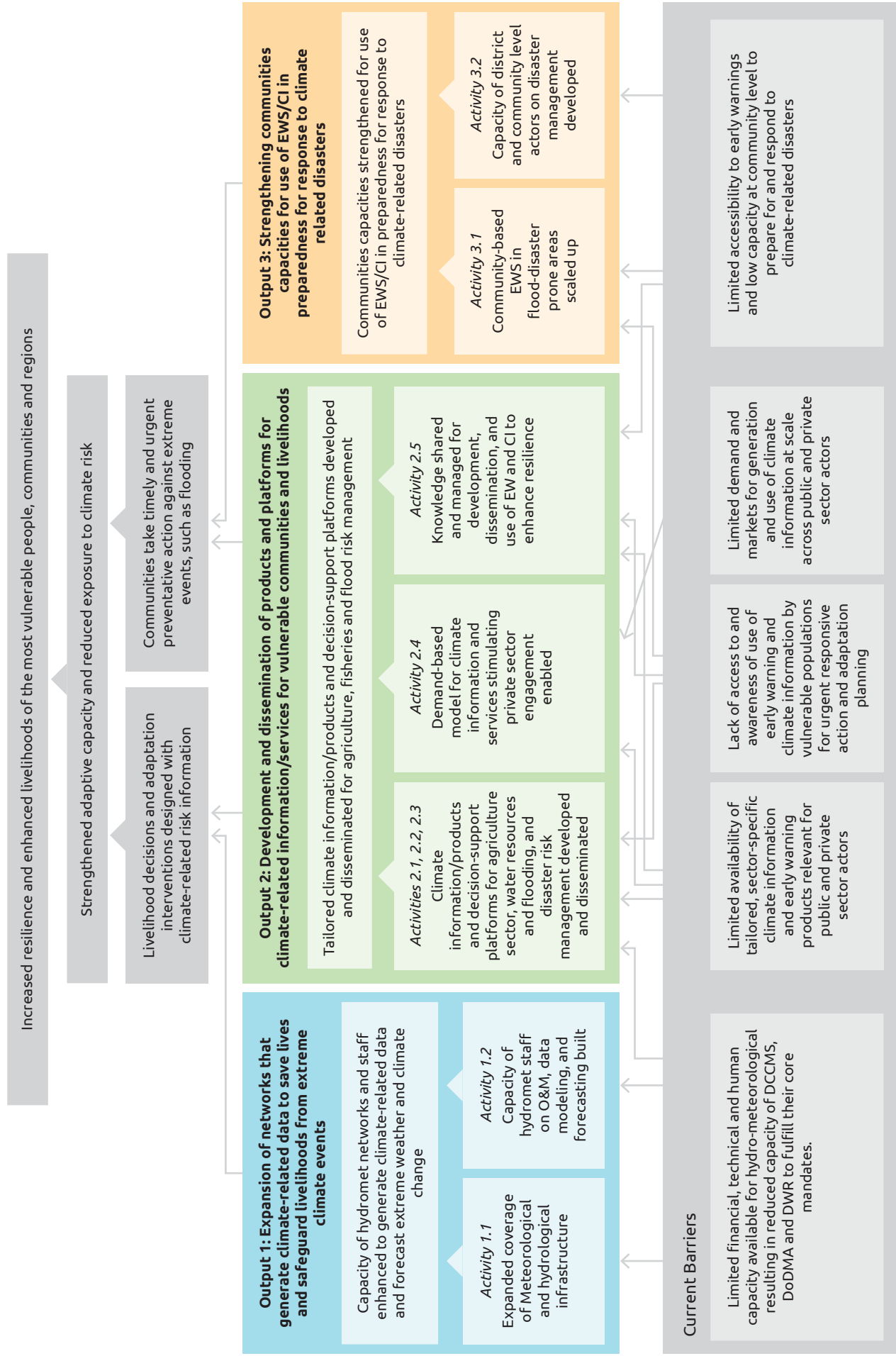


Figure 4. Theory of Change for Green Climate Fund Project FP002: Scaling Up of Modernized Climate Information and Early Warning Systems in Malawi, 2015.

Follow Principles for good design and principles that underpin people-centered programming. People-centered and locally led action have become pillars across climate change and disaster risk reduction related disciplines. The list presented in Box 7 have been widely endorsed as important underlying principles and are drawn from a range of sources⁶. The International Federation of Red Cross and Red Crescent Societies has outlined additional important principles for projects engaging directly with end users in their **Community Early Warning Systems: Guiding Principles. The Pro-Poor Principles** of the InsuResilience Global Partnership cluster a larger set of principles into 5 key areas: Impact, Quality, Ownership, Complementarity and Equity. See Box 8 to learn about potential design challenges.

Principles can be used as a checklist for checking and measuring how well the project is applying a people-centered, risk-informed approach when starting a project development process, when making decisions during design and during implementation.



Togo women building stoves © Agence Nationale de Protection Civile (ANPC)

⁶ Sources: Locally Led Adaptation (GCA 2019), IFRC CEWS Guiding Principles (2012), Grand Bargain, Sendai framework, UNFCCC Paris Agreement Article 7, REAP, START Network, Practical Action, Anticipation hub, **InsuResilience Pro-Poor Principles**, Adaptation Research Alliance. See also Reference list.

Box 7. Principles for effective people centered and locally led design and action:

1. **Focus on systemic change** – to better connect those who “observe and generate risk information” with those who “receive and respond”
2. **Tailor to context, take a multi-hazard approach and address complexity** by remaining flexible and adapting according to learning
3. **Build a robust understanding of climate risk and uncertainty**, including cascading impacts, compounding of multiple hazards, differing perceptions of risk and thresholds for action, across timescales
4. **Respect local knowledge**, perspectives and priorities and bridge across science, local knowledge, policy and practice
5. **Involve people most at risk**, local communities and businesses/livelihoods and local organisations; consider and respect their inputs, roles and differences in gender, age, disability, cultural diversity, livelihoods, ethnicity and others
6. **Build trust, transparency and accountability** to the people affected
7. **Leave no-one behind**. Enhance inclusive, multi-stakeholder participation and empowerment of people, communities, sectors and organisations most at risk to engage, act, respond and save lives and assets
8. **Ensure effective governance** and institutional arrangements for collaborative action and investment
9. **Build local institutional capacity**, decision making and shared ownership across levels

Design for Sustainability and scaling. An exit strategy for how the project outcomes (early warning system and its components) will be handed over or carried forward beyond the close of the project being developed and how the outcomes could be replicated or scaled should be considered from the outset of the design drawing on the discussions and interactions of the people centered approach, and integrated as part of implementation.

Box 8. Design challenges to avoid:

- Preconceived ideas of priorities and capacity or lack of capacity prior to consultations with users, intermediary stakeholders, producers and partners
- Overburdening resource poor people with heavy demands on their time, or conversely, neglecting to include people based on assumptions they are too busy or limiting community representation to elites or a subset of all groups
- Overlooking locally present organisations and networks that can be engaged to support people-centered approaches
- Communities adopt early warning systems but lack human, technical and financial support to sustain warning infrastructure or to act early
- Using examples as blueprints / avoiding creativity
- Ignoring the complexity of the context
- Assuming costs of localised early warning systems are too high and the scale of impact too low
- Assuming people-centered early warning systems can only function at a highly localised scale

Assess risks and select at risk target group and location for early warning systems

Climate risk, vulnerability and capacity assessments are commonly used to inform disaster risk reduction, adaptation and resilience projects and a wealth of participatory approaches are available. IFRC's **Enhanced vulnerability and capacity assessment** (EVCA) is an excellent tool for projects that will invest and engage directly at the community level. Risk assessments may be used as part of the baseline as well as a monitoring tool to measure change over time.

Purpose:

- Understand multi-hazard risk, risk perceptions, vulnerabilities, and the barriers, drivers and capacity to act early of the range of people at risk.
- Use risk knowledge to determine target vulnerable groups and locations, and priority needs for an early warning system.

✓ Success factors:

- Study existing documentation of climate risks, hazards, hotspots, vulnerabilities and plan to fill gaps. Follow national standards for the systematic collection, sharing and assessment of needed hazard and vulnerability data developed, and standardized with neighbouring or regional countries, where appropriate.
- National and regional projects can access direct risk information through a sample of end users, and/or indirectly through existing knowledge, local partners and available studies.
- Combine risk assessment with actor mapping at the local level to create interactive stakeholder spaces that will continue to support local-level engagement during implementation.
- Include multi-dimensional analysis and assessment of the wider context including factors affecting the politics of decision-making for early warning systems and disaster risk reduction (DRR) investments, the level of poverty and extent of marginalization and exclusion of target populations, long term climate projections and future uncertainty etc .
- Recognise the complexity of climate and disaster risks, which involve drivers at multiple spatial and temporal scales, and strong interlinkages across sectors (e.g. water, agriculture, health) and between people and the ecological systems. It may not be possible to build a complete understanding of a risk context.
- Focus risk assessments on the target locations and timescales and /or sectors relevant to the hazards experienced and anticipated in future. National risk assessments may not be useful at local level; sectoral assessments are difficult to use when hazards affect multiple related sectors.
- Design a flexible and iterative process, including monitoring and learning of how risk knowledge informs warnings, early action response and leads to risk reduction over time.
- Use participatory climate or disaster risk and vulnerability assessment tools and implement them with the diversity of stakeholders.
- Include in the assessment:
 - who are most at risk and vulnerable to multiple hazards in a given context and location – including differences related to gender, age, disability, wealth and other factors (option to combine with gender analysis)
 - differences in people's perceptions of risk, early warnings, participation and their access to organisations and linkages
 - differences in aspirations, needs and capacities of different groups
 - what motivates or prevents different people at risk to take early action.
 - local traditional knowledge on all of these
- Create or use an existing mechanism to store and enable wide access to information on hazards, disaster risk and vulnerabilities. Eg. add to a central 'library' or GIS database.

PRACTICE EXAMPLE 3. RISK ASSESSMENT: PARTICIPATORY VULNERABILITY AND RISK ASSESSMENT TOOLS

Example of People centered assessment questions:

- who and where are the people who need to take early action to save lives and assets? Include demographic information, eg. population size, rural/urban, geographic features.
- how do they perceive past, current and future climate and disaster risk?
- what multiple hazards and impacts have the different vulnerable groups faced?
- who among them are already taking early action and what actions?
- what triggers or prevents different people at risk from taking early action? What forms of discrimination or inequality exist and what is their source? What are the underlying factors? What and how are current external interventions contributing to early action being taken?
- who has access to early warnings (e.g., people with disabilities...)?
- what information do they access (e.g., impact-based forecasts, advisories, hindcasts for agriculture, flood alerts, local knowledge forecasts, non-climate/disaster information that is important for decision making...) and at what timescales or lead times?
- how do they access the information (e.g., radio, mobile, TV, social media...)?
- what information do they need which is not accessible?
- who do they trust to convey information (e.g., sports celebrities, radio, local leader)?
- how is community information and local knowledge integrated in each early warning system element (e.g., in risk assessment and warning dissemination)?
- how are the warnings received understood differently by different groups?

Oxfam Australia Participatory Capacity and Vulnerability Analysis (PCVA) Toolkit is a risk analysis process designed to engage with communities vulnerable to disasters and climate change to:

1. Analyse vulnerability to climate change and disasters at the community level, and the potential capacity within the community for dealing with climate change and disasters.
2. Combine community knowledge and scientific data to gain understanding about local risks.
3. Directly inform local level action plans to reduce the risks from disasters and climate change impacts.

The analysis is done in stages, with participation of key actors down to community level:

Stage 1 Preparing for PCVA

Stage 2 Collecting secondary data

Stage 3 Generating a community view

Stage 4 Understanding vulnerability to hazards and stresses

Stage 5 Livelihood analysis

Stage 6 Analysing future uncertainty

Stage 7 Governance Analysis

Resources:

Oxfam Australia PVCA: https://unfccc.int/files/adaptation/cancun_adaptation_framework/adaptation_committee/application/pdf/pcva_toolkit_oxfam_australia.pdf

UNDRR WMO MHEWS Checklist: [Multi-hazard Early Warning Systems: A Checklist: Outcome of the first Multi-hazard Early Warning Conference](#)

IFRC Enhanced vulnerability and capacity assessment (EVCA): <https://www.ifrcvca.org/>

2.4 CO-EXPLORE, CO-DEVELOP AND CO-DELIVER SOLUTIONS

A core aspect of coproduction is to collectively explore needs and priorities for early warning systems with the relevant actors already identified and ensure the system will respond to priority risks and hazards and known demand. Through this:

- end users have the opportunity to voice their perspectives, better understand risks they face, analyse their needs and priorities and strengthen access and relations with producers
- producers are guided by end users as to which types of warnings are needed when, which type of products have been and will be useful and can work with end users to develop localised products which integrate local knowledge and systems and respond to agreed priorities.
- intermediaries are guided by end-users and producers on development of systems and activities for the translation, presentation and communication of warnings as needed to trigger early action
- all actors work together to agree on thresholds and triggers for early action, organisation and coordination mechanisms that will support reach, access, interpretation, communication, trust, understanding and response to warnings.

a) Co-explore need

Purpose:

- Understand priority needs and demand for specific early warning systems and for early action
- Understand the available warning data, observation and monitoring systems and capacities and communication channels and determine how they will connect to priority needs
- Strengthen the link between early warning and early action

✓ Success factors:

- Utilise and build from the results of risk assessments.
- Co-explore needs in relation to specific types of risk, hazards, warning and impact information, governance of early warning systems, understanding and communicating technical information, timing of the information, preferred source, language, format and channel of communication, early actions, lead times and the drivers and barriers to successfully taking early action.
- Design coproduction activities so that the interactions also build relationships, trust, collective decision-making and local ownership.
- Design place based, use specific pilots in specific contexts (rural, regional, urban, sector) which also help generate learning and create the basis for future scaling.
- Include local organisations representing different vulnerable and at-risk groups and use a human rights-based approach. Build on risk assessments and actor mapping and strengthen local participation in and platforms for identifying and prioritising needs and developing solutions to meet them.
- Use participatory planning approaches with local actors in the lead, for different community first responders to map and rank needs. Useful tools include: problem trees, ranking and scoring, focus group discussions, key informant interviews, doer/non-doer analysis, trials of improved practices, vignettes, gamification).
- Enable people most at risk to contribute to analysis, identifying actions and formulating recommendations (as well as being a source of data and knowledge).
- Involve local government, media, civil society and private sector organisations throughout the process, and actively support ongoing listening, feedback and two-way communication.
- Box 9 gives examples for projects that do not have direct involvement of people at risk.

Box 9. Co-exploring in national and regional projects

If the project is regional or national and will not directly reach or engage the intended final beneficiaries of warnings:

- include local level assessments and dialogue in the design, possibly through local level partners, while managing expectations that the project will not include any direct follow up.
- develop actor maps that show how the project work connects into the broader architecture of early warning systems and request partners or collaborating organisations with the closest links to end users to represent them and their needs to the extent possible.
- invite representatives of end users to project planning and design meetings.
- search for and use existing studies, local knowledge and evidence of user needs, priorities and engagement in implementing early warning systems and early action to inform project decisions.
- build relationships and feedback systems with local organisations to monitor and ensure warnings are linked to demand and ultimately early action.

PRACTICE EXAMPLE 4. CO-EXPLORE NEED:

i) Climate Risk Narratives, FRACTAL project, Southern Africa.

Climate Risk Narratives (CRNs) are stories told from the future of a changed climate and associated impacts. They are developed by climate scientists as plausible stories about the future climate based on evidence from regional climate projections and observations which form the basis for discussions with users. CRNs are a useful tool to use in iterative co-production processes as a way to promote dialogue and understanding, identify climate knowledge that is relevant to a specific locations climate risks, their potential impacts and suggested societal responses, and support decision-making. FRACTAL used CRNs in a city context.

CRN demonstrates how scientists can be more flexible and responsive to input from consultations. Rather than scientists deciding on the kind of events they will forecast, based on up-front consultations forecasting efforts focus on different hazards, levels of extremity raised by users of the system. This could include everything from the length of heatwaves to forecasting seasonal hydrological floods rather than pixel-level tercile seasonal forecasts. It could include enabling a community vulnerable to flooding from moderate rain to issue a localised (unofficial) early warning for itself on the basis of a forecast that will not meet the higher threshold for an official warning at national or regional or even local authority.

Resource: <https://www.fractal.org.za/wp-content/uploads/2020/03/IS4-Climate-risk-narratives-humble-science.pdf>

PRACTICE EXAMPLE 4 CO-EXPLORE NEED:

ii) High Impact Weather Lake System (HIGHWAY) project – East Africa

In workshops, space was given to stakeholder representatives to share their experiences of how severe weather affected their lives and livelihoods and how they made decisions related to their work. National Meteorological and Hydrological Services representatives were encouraged to explore with the stakeholders what information was available to meet their needs, and how this could be best presented by providing impact information as well as meteorological variables. Use-cases for the product were developed using real-life examples of the experience of severe weather; impacts were discussed in detail and advice statements were written, suggesting practical mitigation actions.

The discussions and outputs were facilitated using a range of techniques, including traditional classroom-style training, round tables, serious games as well as guided and open plenary sessions. Early in the workshops, principles of participation were agreed, such as: everyone has an equal voice, the approach to disagreements and the mechanisms for those who felt less confident to contribute in open sessions.

Resources:

HIGHWAY project: <https://public.wmo.int/en/projects/high-impact-weather-lake-system-highway-project>

Coproduction case study: <https://futureclimateafrica.org/coproduction-manual/book/text/case-study-21.html#highway-co-produced-impact-based-early-warnings-and-forecasts-to-support-fishing-communities-on-lake-victoria>

b) Co-develop solutions

Following co-exploration of need, multi-stakeholder discussions and activities continue for the development of solutions and interventions which could meet the needs. Options may emerge within any one or more of the early warning elements and/or for strengthening the enabling environment for early warning through policy, institutional strengthening, research or other initiatives. Any of these can be developed into solutions for projects to take up using a coproduction multi-stakeholder approach. Inclusion of the right stakeholders and end users or their representatives continues to be important.

Purpose:

- To collectively create or improve people-centered, risk-informed multi-hazard early warning systems with participation of all relevant actors (including people most at risk) and/or based on their contributions
- To ensure the project addresses an agreed need and contributes effectively to early action at the level and scale needed.

✔ Success factors:

- Use Multi-stakeholder approaches to move from the identified needs and priorities towards joint agreement on the solutions and interventions a project can support. Explore and support existing multi-stakeholder platforms, decision making systems and communication preferences, build on them and avoid duplicating efforts. Invest in enabling spaces for dialogue, interaction and implementation by all actors including communities, local media, NGOs, government and private sector.
- Analyse the full early warning system value chain and knowledge gained from first responders, risk assessments, co-exploration and baseline context to map out each element and the connections between elements and ultimate successful early action by people to multiple hazards in the proposed locations. Pay attention to gender and other differences such as disability, access to infrastructure, economic diversity and environmental sensitivities.
- Link joint analysis of priority needs, opportunities, challenges and gaps to joint planning and organisation and in so doing, strengthen roles, ownership and relationships.

- Connect coproduced planning of the early warning system into the broader context of ongoing humanitarian and sustainable development actions (DRR, climate resilience and adaptation, community and sector development, livelihoods, natural resource management etc).
- Support local knowledge brokers, trusted champions and intermediary agencies to lead the coproduction process to connect providers with users and authorities, communication agents and communities, to facilitate blending, translation, interpretation and validation of science and community knowledge and to strengthen capacity of local actors to contribute and implement.
- Encourage innovation at all levels and early warning system elements and explore use of digital innovations and platforms for product development, communication, dissemination, feedback mechanisms etc.
- Create systems for awareness raising and promoting a culture of accessing and responding to alerts and warnings, with clear protocols and preparation for what early actions to take and who should do what. For example, a high threshold for national action may mean that warnings and requirement for response occurs very rarely and the likelihood of local level access and response is low. At the local level, people may wish to act on a lower threshold level and access warning information accordingly more regularly. If this is supported, people are aware of the value of warnings and will pay more attention and be better informed to act in response to a higher- level alert. For an example, see the SUFAL Practice Example 2.
- Communicate final design, solutions, expected results and outcomes of the project with the wider group of intended first responders and associated intermediaries, eg during an official launch.

PRACTICE EXAMPLE 5. CO-DEVELOP SOLUTIONS:

i) B READY approach in the Philippines, Sudan and Indonesia

B READY (Building Resilient, Adaptive and Disaster Ready Communities) is an anticipatory action approach that combines three innovations:

1. Impact-based disaster forecasting – predicting the next crisis, before it hits
2. Pre-emptive action, through cash transfers – getting the money to those who need it the most before the crisis hits so they can prepare better
3. Shifting from humanitarian response after disaster to pre-emptive response – investing in communities’ resilience and in preparedness, so the crisis becomes less of an emergency before it even happens

The first step of the B READY approach is to work with climate vulnerable populations – those in places that are most at risk of a disaster. Then using data from global, satellite networks with community’s knowledge of the lived disaster experiences in their history, an impact based forecast model is developed to predict how the next disaster will look like from scientific data, combined with community identified “triggers” indicating how and when people react when they know a disaster will be serious. Having communities merge their knowledge with climate data gives everyone a better understanding of what to prepare for and when. When the ingredients for a climate disaster or “triggers” are spotted (for example, high winds speeds or water levels), cash transfers are triggered pre-emptively for families that are the most vulnerable to future impacts. Having the cash on hand allows people to prepare for what they need – like food, medicine, water, protecting their assets, bolstering their homes or even transport to safety. This prevents from them from needing to be rescued or worse. B Ready also contributes to humanitarian reform by working towards making anticipatory action a norm rather than an alternative response model, through an accessible community-based approach. Working with partners and communities provided the local knowledge of disasters that is missing from climate data, and gives the investment and ownership of communities to understand anticipatory action and adapt it into their community.

PRACTICE EXAMPLE 5. CO-DEVELOP SOLUTIONS:

ii) Participatory scenario planning (PSP) for seasonal forecasts

The Participatory Scenario Planning process brings together meteorologists, traditional forecasters, researchers, community members, local government from all sectors available to attend, private sector actors, local NGOs and media, with a strong emphasis on ensuring women's participation. The PSP two-day workshop, held at local government level, places all actors and their knowledge on the same level. Meteorological departments present scientific forecasts and learn what information is needed by different users. Traditional forecasters present forecasts based on local observations and knowledge. Community members review the past season and shape the forecast information into scenarios and advisories for the coming season to ensure it is contextualised, timely and packaged in locally usable formats. NGOs and researchers share experiences linking climate information and adaptation and resilience initiatives. Government sectors inform sector analyses and develop sector advisories integrating the climate scenarios. The private sector shares the types of forecasts and details needed to inform business and investment decisions. Media help guide the process of packaging and communicating climate information to the different users according to their language and format preferences.

Resources:

Co-production manual Case study 5 PSP: <https://futureclimateafrica.org/coproduction-manual/downloads/WISER-FCFA-coproduction--case-study-5.pdf>

PSP Practical guide: <https://careclimatechange.org/practical-guide-to-participatory-scenario-planning-seasonal-climate-information-for-resilient-decision-making/>

Related participatory planning guidelines:

- International Association for Public Participation, IAP2 Spectrum of participation and guidelines: https://cdn.ymaws.com/www.iap2.org/resource/resmgr/pillars/Spectrum_8.5x11_Print.pdf
- Participatory Learning and Action (PLA): <https://www.iied.org/participatory-learning-action-pla>

iii) Developing Risk and Forecast Awareness through Joint Action (DARAJA)

Daraja improved access to, and enhanced the use of, short term weather and climate information by residents of informal settlements in Nairobi, Kenya and Dar es Salaam, Tanzania. An inclusive forecasting service, operating at city scale and localised using symbols to informal urban settlements by the NMHS working with community based organisations, and an early warning service co-designed with community members and a range of local media, enables residents to plan and be better prepared to take adaptive and anticipatory measures.

Resources:

Co-production manual Case study 19 Daraja: <https://futureclimateafrica.org/coproduction-manual/book/text/case-study-19.html#daraja-co-designing-weather-and-climate-information-services-for-and-with-urban-informal-settlements-in-nairobi-and-dar-es-salaam>

Daraja: <https://www.metoffice.gov.uk/about-us/what/working-with-other-organisations/international/projects/wiser/daraja>

c) Co-produce tools, data platforms, warning and alert systems

A people-centered approach connects the producers leading on monitoring and forecasting to end users and ultimate action. Tools, capacity and data platforms to monitor, forecast and aggregate risk data are needed that respond to priority needs, are adapted to the local context and support targeted, risk informed warning dissemination and anticipatory decision making and action. Countries can benefit from existing technologies and related expert advisory services. Despite the increasing existence and accessibility of early warning data, information, knowledge and expertise, risk information and warnings do not always effectively reach them. Forecasts may fail to be converted into understandable warnings, or warnings exist but may fail to reach the populations most at risk or trigger appropriate or timely response.

Purpose:

- To create early warnings that are scientifically rigorous and timely, respond to localised demand and are translated and tailored to user need and feedback.

✓ Success factors:

- Build on existing tools and relations with regional and global climate centres to continuously strengthen NMHS capacity at national and sub-national level to improve the observation network, produce localised data and utilise and adapt tools.
- Connect development and improvement of data and tools with information on hazards, risk, risk perceptions, development of thresholds and triggers for early action, communication channels, decision support systems and planned early actions.
- Develop systems for collaboration between science, citizen science and community level innovation and support a range of solutions including community-based systems.
- Develop demand responsive, impact-based, risk informed, simple, accessible, quality and timely warning products and tools that can be understood and readily applied by the user, and enable access to follow-up professional advice.
- Develop decentralised community-managed forecast tools and methodologies that empower local responders and utilise local institutional capacities and agency of at-risk people. For example, community managed rain gauges or flood monitors with recording and communication systems in place increase local ownership and motivation to link with producers.
- Work with communication and dissemination systems to tailor messages for communicating warning products meaningfully and comprehensively so they can be accessed and understood by end users (e.g. mobile phone voice messaging, radio or television for those with access; sirens, warning flags or messenger runners for remote communities).
- Develop systems for systematic feedback on access, understanding, use and impacts by end users to producers so that products and systems can be improved and remain responsiveness as needs, demand and use change over time.
- Advocate for open data production, sharing and access through platforms and regulation
- Review and utilise the producer roles in Annex 1

PRACTICE EXAMPLE 6. CO-PRODUCE WARNING TOOLS AND DATA:

i) Nepal: Installation of low-cost rainfall and water level sensors, data analysis, hydrological and hydraulic modelling in flood and landslide prone areas of far western Nepal. Blending of

- a. strategic, high-tech, high-cost monitoring of major rivers;
- b. simple, low-cost, community-based, manual monitoring of rivers downstream of high-tech stations, providing local information and feeding back into the national system;
- c. low-cost automatic monitoring sensors for medium-sized and small rivers, providing real-time data.

Resource: Practical Action <https://floodresilience.net/resources/item/monitoring-rivers-for-flood-early-warning-nepal-s-ingenious-solutions/>

ii) Global: DisasterAWARE and DisasterAlert applications are used globally including by Disaster Management Offices and private citizens. Local languages and norms are melded with WMO and ITU standards to ensure early action, early warning and consistent messaging.

Resource: <https://disasteraware.org/tutorial/system-requirements/>

iii) Niger: SLAPIS, a Local Flood Early Warning System in the Sirba catchment area integrates a hydrological model and the observations of the local population (notably using staff gauges). The population was involved in the development of the system (in particular with traveling seminars before the rainy season), received several training sessions and contributes to its operation. The information (levels, risks and measures to be taken) is available locally as well as on an IT platform.

Resource: https://www.researchgate.net/figure/Structure-of-the-SLAPIS-monitoring-and-warning-services_fig5_339618432

iv) East Africa Hazards Watch is a multi-hazard interactive forecasting tool hosted by ICPAC's disaster situation room. It is under continuous development to respond to highly specific user data requirements, overlaying forecasts with hazard and risk information for different sectors. ICPAC's dedicated situation room monitors hazards and issues early warnings with an Eastern Africa regional road map for anticipatory actions.

Resource: <https://eahazardswatch.icpac.net/map/ea/>

v) Regional Early Action Rainfall Watch, Pacific. FINPAC project working with the South Pacific Regional Environment Programme (SPREP) and other partners providing NMHS with the capacity and tools to deliver and communicate accurate, appropriate and timely weather and climate services to rural communities and working with communities to strengthen their ability to use and apply meteorological data and information and to develop appropriate plans to address climate change and disasters.

Resources: <https://eird.org/americas/caribbean-early-warning-system-workshop-in-barbados/docs/presentations-web/Session-1/04-Pacific.pdf> and <https://library.sprep.org/content/regional-early-action-rainfall-watch-monthly-seasonal-rainfall-watch-february-april-2022>

PRACTICE EXAMPLE 6. CO-PRODUCE WARNING TOOLS AND DATA:

vi) Strengthening Climate Information Partnerships – East Africa (SCIPEA)

SCIPEA aim was to co-develop and implement an additional, operational, seasonal forecast bulletin for the October–December (short rains) season, issued annually in August and conveying forecast information specific to the needs of Kenya Electricity Generating Company's (KenGen) hydropower planning. To respond to tabulated needs identified by KenGen and develop potential forecast solutions, Kenya Met Department (KMD) and two other science partners undertook a one-month science 'retreat' at the UK Met Office. Solutions were shared with KenGen, and the products to be included in a prototype bulletin were agreed together. For example, it was decided that, in addition to predictions of reservoir inflow, predictions of season onset timing were also required, but that suggested predictions of rain-day frequency were not needed. The prototype, trialled and refined in 2017 and 2018 became a focus for capacity building of KenGen staff, providing the opportunity to increase understanding of the methods used, as well as helping to reduce jargon and improve the content, design and understandability.

Resource: [Strengthening Climate Information Partnerships](#)

vii) Climate action: Examples from the Red Cross Red Crescent and partners

A wide range of concrete examples over a decade of climate action spurred by the global [Partners for Resilience](#) (PFR) alliance.

Resource: <https://reliefweb.int/report/world/climate-action-examples-red-cross-red-crescent-and-partners>

viii) Global Risk Modelling Alliance

The GRMA brings access to climate and disaster risk insight where it is needed. It offers open risk management tools, data and access to operational risk finance expertise, working side by side with officials and local experts in ministries and mayoral offices. The GRMA's service stresses the integration of valuable local research and experience into the analysis, but adds key global inputs such as climate scenarios and global hazard models.

Resource: <https://www.grma.global/reports-publications>

d) Co-deliver solutions

Co-production continues as a project moves from design into delivery, to ensure that all actors are implementing their agreed roles, connections between them are functioning (often with support from intermediary knowledge brokers) and feedback mechanisms and monitoring are operational to inform learning and early warning system improvements.

Purpose:

- Solutions developed for early warning systems are implemented with continued involvement of all actors in line with agreed roles and responsibilities

✓ Success factors:

- Prioritise and strengthen early warning system models and approaches that support people centered approaches such as:
 - Impact based forecasting
 - Forecast based early action / anticipatory action / financing
 - Participatory early action protocols / plans development
 - Simulation exercises and drills
 - Participatory scenario planning
 - Community based early warning systems and disaster risk reduction, community weather recording and messaging
- Co-develop early action plans with first responders, linked to response delivery mechanisms such as shock-responsive social protection, humanitarian cash programming, adaptation and disaster risk management projects. These are mechanisms that can be triggered to provide support to households and individuals most at risk, so that they can take anticipatory action and better cope with disasters and crises.
- Ensure that project implementers know what existing delivery mechanisms could be built upon that a range of actors already know - to ensure coherence and relevant links with other efforts.
- Ensure that the system does give alerts for priority hazards identified by users - there is often a disconnect between what people want to know and what the current warning system tells them.
- Improve the design and implementation of models by referring regularly to people-centered and locally led principles, the MHEWS checklist and integrating feedback from users.
- Support NMHS and other national / subnational organisations to play a lead role in decision making, product development and connecting with intermediaries and users, building on and strengthening their existing capacities.
- Develop project management systems that promote project coalitions, implementation and monitoring of partner roles and relationships, regular convening of partners and other key actors and collaborating across systems, sectors, levels and disciplines to overcome existing silos.

PRACTICE EXAMPLE 7. CO-DELIVER SOLUTIONS:

i) Philippines: Localization of Climate Services for early warning systems and adaptation in agriculture

Rice Watch Action Network (R1) in the Philippines is capacitating local governments (LGUs), which include agriculture services, to adopt climate services for use as early warning systems and climate change adaptation. LGUs perform local weather and hazard monitoring, impact assessment, advisory generation and risk communication, supported by the national meteorological office, PAGASA. The LGUs translate PAGASA's forecast products (10 day weather, seasonal forecasts, TC advisories, ENSO warnings, etc) into potential impacts on local livelihoods and develop advisories for farmers and rural communities. The LGUs communicate risk warnings through bulletins, SMS, climate fora, a Climate-resiliency Field School, and community radio. Local weather observation and impact monitoring strengthens their early warning as they are better able to understand thresholds to certain disasters. Impact recording is a critical part of the work to continuously improve early warning system services. The aim is to help reduce losses and damages to community livelihoods and avoid expensive rehabilitation costs.

Resource: <https://www.christianaid.org.uk/sites/default/files/2017-11/Developing-Climate-Services-Philippines-report-July2016.pdf>

ii) Integrating Forecast based Action in an Existing Early Warning System. Drought decision making in the ForPAC project in Kitui Kenya employs Participatory Impact Pathway Analysis (PIPA) to link county level met services and drought management authorities.

Resources: <https://www.forecast-based-financing.org/wp-content/uploads/2020/04/Integrating-Forecast-based-Action.pdf> and

WISER case study 20 ForPAC: <https://futureclimateafrica.org/coproduction-manual/book/text/case-study-20.html#how-was-co-production-done>

iii) Burkina Faso: Early warning advisories for farmers

In Burkina Faso, the CREWS project supports provision of advanced weather advisories to small-scale rural farmers in three pilot sites. The weather bulletins are included daily as part of the regular local radio broadcast, and specific advice for farmers is provided every 10 days. These early warning weather advisory services are customized for three pilot areas. Direct training was provided to more than 1,100 farmers so that they understood the weather and climate advisories, and how to adjust their farming practices in response to these advisories to optimize field cropping calendars.

Resource: <https://www.crews-initiative.org/en/news/crews-burkina-faso-%E2%80%93-climate-predictions-support-farmer-decision-making>

iv) Impact-based Forecasting Guide, Red Cross Climate Centre and UK Met Office.

Resources: <https://www.ifrc.org/forecast-based-action> and https://www.climatecentre.org/downloads/files/Impact%20based%20forecasting%20Guide_Final.pdf

2.5 CAPACITY BUILDING AND LEARNING

People centered early warning systems are hindered by institutional and sector silos which can disconnect NMHS, scientific data and warnings from people at risk and the location-based realities they face, and disconnect early warnings from early action, disaster risk management, adaptation and resilience building efforts. .

Capacity, empowerment and learning activities for all early warning system actors from providers to first responders can help address these disconnects and generate new insights and knowledge.

Purpose:

- Improve users' ability to participate in all aspects of early warning systems, act on and benefit from them..
- Improve producers and intermediaries' ability to learn from and integrate people-centered risk informed approaches in project design, delivery and monitoring.
- Improve intermediaries' ability to enable and support the connection between providers and users, and the translation of early warning to early action.

✓ Success factors for capacity building:

- Include plans and resources for capacity needs assessments, strategies, capacity building and learning activities to ensure all actors are equally able to play their assigned roles with confidence in projects and are able to sustain early warning early action activities, roles and relationships post project.
- Conduct comprehensive capacity needs assessments covering the four early warning system elements as well as supporting capacities such as community capacity to self-organise, identify impact triggers, plan and implement early actions, make informed decisions and enhance access to external resources and capabilities.
- Strengthen capacity for understanding how differences in vulnerability (such as gender, age, disability, ethnicity, language etc) influence risks, impacts and access to and use of warnings in different ways. Include gender responsive and transformative approaches in capacity building programmes.
- Capacity development may include community and volunteer education and training programmes, public awareness and education campaigns tailored to the specific need of different audiences (e.g. users, emergency managers, media).
- Combine participatory coproduction processes with strengthening local or community level capacity to access and use community based early warning systems and drive early action, to fill gaps and/or support local level implementation of distant national systems.
- Strengthen NMHS incentive structures, technical capacity and skills for people centered, risk informed, impact and action-based forecasting responsive to expressed demands and providing customer services.
- Strengthen NMHS capacity for pro-active engagement and relationships with early warning systems actors across all elements and levels, eg including national and local government planners, drought, flood or disaster risk management officers as well as climate resilience, disaster risk management, adaptation, development and humanitarian actors.
- Develop capacity building materials, mainstreaming guidelines and training resources with capacity to adapt them according to different identified capacity needs.
- Engage local training institutions, local experts and community-focused organizations for long-term, sustainable training, integrating early warning systems and early action into their curricula.
- Include traditional and indigenous knowledge and materials in training activities.

PRACTICE EXAMPLE 8. CAPACITY BUILDING:

Training and capacity building resources are available for early warning systems but given the range of actors and diversity of capacities required there is no definitive approach or example. The Red Cross Red Crescent Forecast-based Financing approach sets aside funding for capacity building, planning, preparedness and pre-positioning.

Resources:

Creating Accessible and Sustainable Climate Services Through Capacity Development of NMHS.

<https://www.csag.uct.ac.za/wp-content/uploads/2021/08/WISER-Policy-Brief-4.pdf>

IFRC Community Early Warning Systems (CEWS) Training Toolkit – Field Guide <https://reliefweb.int/report/world/community-early-warning-systems-cews-training-toolkit-field-guide>

Forecast-based Financing manual

<https://www.forecast-based-financing.org/tag/fbf-manual/>

Anticipation Hub learning resources

<https://www.anticipation-hub.org/learn/learning-resources>

✓ Success factors for project level learning:

- Plan for and allocate time and financial resources for multi-stakeholder learning and documentation during project design.
- Create and resource opportunities for joint multi-stakeholder learning among all actors – including people and institutions providing, receiving and using early warning systems, peer-to-peer and cross project learning on coproduction between involved actors. For example between NHMS, NDMO, intermediaries, local humanitarian actors working on anticipatory action / forecast-based action (e.g Red Cross Red Crescent National Societies).
- Design interactive learning opportunities in which the context and knowledge of all participants are actively shared and respected.
- Collect, compile and share case studies and good practice examples illustrating how partnerships have been successfully created at different levels, how coproduction has been used and how projects have employed people-centered approaches to guide and inform ongoing efforts and new plans.
- Evaluate and analyse lessons learned from individual projects and seize opportunities for cross-fertilization and learning from communities.
- Incorporate lessons learnt into future capacity building strategies.
- Design project learning events and documentation to contribute knowledge on what works and new innovations; generate evidence, insights and learning on good practice and enable development and dissemination of knowledge products.
- Participate in and contribute to relevant national, regional and global forums where knowledge sharing and learning can extend beyond the project to contribute to the body of knowledge on early warning systems, encourage replication and scaling and leverage finance. For example, the Global and Regional Dialogue Platforms on Anticipatory Humanitarian Action, the Anticipation Hub, REAP events, regional Climate Outlook Forums and many more.

PRACTICE EXAMPLE 9. LEARNING:

Learning Labs, Dialogues and Embedded Researchers in Southern African Cities, FRACTAL

The Learning Labs and Dialogues are co-production spaces for stakeholders within cities to gather, get to know each other and share and develop knowledge. Dialogues are smaller, more focused gatherings aimed at unpacking particular elements of a broader, complex issue defined in the larger Learning Labs. Both are periodically convened in the three Future Resilience for African Cities and Lands (FRACTAL) cities to understand the socio-economic context of these urban areas, unpack how climate change might intersect with these dynamics and co-produce knowledge that will contribute to climate resilient development.

Having a transdisciplinary co-production approach has changed mindsets and led to a recognition of the value of other disciplines, other industries and other people and to an awareness of the importance of collaboration. Relationship building is a key benefit. Because people are heard, they want to continue engaging and thus see value in these learning processes. Learning is a key benefit of participating in the process. Gaps in knowledge for climate-resilient decision-making have been filled through conversations and interactions among climate scientists, governance researchers or decision-makers themselves, producing tailored, tangible knowledge outputs through climate change conversations in the Learning Labs and Dialogues.

Resources: <https://futureclimateafrica.org/coproduction-manual/book/text/case-study-09.html#fractal-learning-labs-dialogues-and-embedded-researchers-in-southern-african-cities>

City Learning Lab Approach: <https://www.fractal.org.za/wp-content/uploads/2020/03/IS1-FRACTAL-city-learning-lab-approach.pdf> and Embedded Researcher Approach: <https://www.fractal.org.za/wp-content/uploads/2020/03/IS5-ER-approach.pdf>

2.6 MONITORING AND EVALUATION

The measure of success of people centered risk informed early warning systems is seen in effective early action being taken by people at risk, responders and local organisations and the resultant savings and reduced losses in lives, livelihoods and assets. Such measurement can be challenging particularly when a project engages in only one or two of the early warning system elements. MHEWS, UNDRR, CREWS, REAP and others are in process of developing fit for purpose and actionable monitoring and evaluation (M&E) systems which address the challenge.

M&E also tracks the accountability of the multiple actors involved in people centered early warning systems in delivering on their agreed roles.

Purpose:

- To collect and analyse information on the effectiveness of the project, the use of early warning for early action and the impact in terms of lives and assets protected and saved.
- To make adjustments and improvements to the project, coproduction processes and roles, people-centered, risk-informed approaches and early warning system elements based on robust feedback.

✓ Success factors:

a) M&E system set up:

- Include participation, as relevant to the project context, by people at risk, local actors and project partners in agreeing to and implementing the specific measures of success, the design of M&E systems and indicators and agreement on common standards. This may include feedback on effectiveness and value of their participation and the approaches used to include them.

- Tailor M&E systems to context, with integration of relevant local knowledge. Set up the system during project design, with indicators directly related to the Theory of Change impact pathways
- Explore and test interactive, multi-stakeholder and community-based systems for people-centered monitoring, evaluation, accountability and learning, for example: use outcome mapping, most significant change approaches, monitoring change in people's perceptions of risk and triggers for action, including access to and ability to act on early warnings, in vulnerability assessments and baselines⁷.
- Define roles and responsibilities, employ household surveys, focus groups, key informant interviews at baseline, midline and endline. Refer to monitoring and evaluation approaches, for example by the [Monitoring & Evaluation framework for the InsuResilience Global Partnership](#) and [REAP Framework for Action](#) (2021).
- Establish systems for regular interaction and accountability of key actors to allow for flexibility and involvement throughout the design and implementation process. For example: regular reviews at different operational and strategic levels; peer reviews of project designs and plans; national level multi-agency task forces with responsibility in project steering committees validation of assumptions and updating / validating the design.
- Track and document stakeholder accountability, for example include a description of who was engaged and how the project design process included a people-centered approach in project proposals; assign budget lines for people-centered activities, record inputs received from local partners, report on the collaborative design process, how people centered approaches are planned and applied during implementation and the agreed outputs and indicators for engaging people at risk and other early warning system users.
- Include systems for regular monitoring against project based and process indicators and also systems that are only applied in the case of an extreme event where the early warning system and early action are fully tested. Desktop simulations could be used to try to estimate the value and impacts of products developed during the life of the project, if there is no extreme event.
- Conduct mid-term, end-term and post-project evaluations to assess sustainability of people centered approaches in design, implementation and monitoring and evaluation systems in continued post project early warning systems, integrated into the project budget and workplans.
- Use innovation in digital applications, social media and mobile phone use for crowd sourced data collection and feedback at scale.
- Explore interlinkages with broader adaptation M&E systems, such as those for national adaptation policies and plans.

b) Using monitoring outcomes:

- Use information from monitoring to design improvements to the system.
- Include learning within feedback mechanisms and monitoring activities so that the information gathered has a value and use to the actors implementing and benefiting from the early warning system. This will help ensure sustainability of monitoring post project.
- Include learning-by-doing and establishment of the assessment methodology as intrinsic to people-centredness and to continual expansion (more hazards and/or more tailored triggers for different users) and continual improvement (adjustment of thresholds for triggers based on effectiveness assessments, which in turn reflect users' changing "appetite for risk").
- Sustain support to countries and partners on what and how to measure early warning effectiveness and participation of people at risk and local organisations in the systems, for example, include M&E and learning systems in national plans, strategies, NFCS and standard operating procedures (SOPs) and implement systematic (after-action) reviews on early warning effectiveness following warnings of a certain level. These can be linked to national government monitoring against the Sendai Framework Targets and more broadly the Sustainable Development Goals (SDGs), National Adaptation Plans (NAPs) and National Determined Contributions (NDCs).

⁷ A useful list of interactive monitoring approaches can be found at [Better Evaluation](#)

c) Monitoring and process indicators of people-centered activities.

- Track and document the links between project implementation of different early warning system elements and the ultimate early actions taken by people most at risk, local organisations and institutions.
- Design indicators and methods to measure perceptions of risk and of value / effectiveness of early warning products and tools by people most at risk.
- Strengthen and standardize indicators and methods for measuring outputs: coverage, reach, access, communication, understanding, trust and interpretation of early warnings, effectiveness, reliability and timing of predictions.
- Strengthen and standardize indicators and methods for measuring impacts: the use of early warning systems, changes in behaviour as a result, benefits gained through early actions and the impact of these actions on the lives and activities of different at-risk groups.
- Establish and sustain feedback mechanisms or two-way communication systems to track and document stakeholder engagement and participation in the design, decision making, delivery and monitoring of the different elements of people-centered risk-informed early warning systems and of implementation of agreed roles by different actors, including different vulnerable groups and institutions. Include indicators for monitoring changes in capacity; access and barriers to participation and giving feedback by different targeted people at risk. It will include indicators to track the improvements made in warning products and dissemination services as a result.
- Use qualitative as well as quantitative indicators and methods and disaggregated data (gender, age, disability⁸, vulnerability etc) for measurement of change, including by the recipients of early warning systems, to understand the drivers and barriers to success as well as scale of disproportionate impact for different vulnerable groups.
- Establish baselines for each of the above parameters at the start of projects, including disaggregation by gender, age and disability.

PRACTICE EXAMPLE 10. MONITORING, EVALUATION, AND LEARNING:

i) NAP Global Network

Guidance and examples for Monitoring and Evaluation in relation to adaptation

Resources:

<https://napglobalnetwork.org/themes/monitoring-evaluation/>

<https://napglobalnetwork.org/2022/09/peer-learning-monitoring-evaluation-and-learning-of-adaptation/>

ii) Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction, UNDRR 2017

Resource: <https://www.undrr.org/publication/technical-guidance-monitoring-and-reporting-progress-achieving-global-targets-sendai>

⁸ For example using internationally validated methodology such as the Washington Group questions: <https://www.washingtongroup-disability.com/>, with inclusion of physical, environmental, information and communication and attitudinal barriers (in accordance with the UN Convention on the Rights of Persons with Disabilities).

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ANNEX 1. EXAMPLES OF POTENTIAL PEOPLE CENTERED ROLES

Sources: CREWS, MHEWS checklist, START network, IFRC World Disasters Report 2020

Note that one actor or organisation may play one, two or all three of the described roles.

Actor: Providers / forecasters
(NMHS, RCCs, global climate centres)

Main role: Establish an effective hazard monitoring and warning service with a sound scientific and technological basis.

Focus on demand responsive, risk informed, impact-based service delivery strategies, plans and hazard information informed by knowledge of and from specific users.

- Develop a more customer-focused service involving strategic engagement with at-risk people and user groups so that they inform the forecast and warning information to develop. I.e. Tailor and disseminate risk information and warnings to the needs and priorities of at-risk people.
 - Increase the availability, quality and accessibility of data on hazards, exposure and vulnerability (at the right scale, granularity and including dynamic changes over time) ideally shared through open platforms (noting legal and privacy constraints).
 - Develop and use tools and capacity to monitor, forecast and aggregate risk data, using technologies adapted to the local context which overlays information about the vulnerable groups of people, environment, infrastructure etc and the potential impact of the forecasted hazards / extreme events and impact-based warnings. Eg., build on tools such as Dewetra, SmartMet, SmartAlert, East Africa Hazards Watch and Flood forecasting services to help systematize the translation of predictions into warnings that are relevant and more accessible.
 - Support other National and local institutions with tools, data platforms and capacity to manage data related to weather and climate predictions, as well as risk and exposure data.
 - Integrate and build capacity for community-based weather and hazard data recording systems - involving users in generating the data and warning information itself.
 - Integrate local / traditional forecasting and early warning early action knowledge and systems with scientific early warning systems, ensuring equal respect for both, blending knowledge and co-generating tailored forecasts and warnings which are practical and contextually relevant for facilitating local action and use user friendly language and formats selected by local actors.
 - Support communication of warnings by the media to include probabilistic impact-based information and uncertainties and avoid deterministic statements and sensationalistic warnings.
 - Provide hazard information to support local development of standard operating procedures (SOPs), thresholds, triggers and impact based early action protocols.
 - Establish systems to provide warnings that respond to locally led early action protocols at the desired lead times and include mechanisms for feedback (feedback loops) as part of the system
 - Through these actions, learn from and better understand people at-risk, and seek to build relationships and increase trust and motivation to act on warnings
-

Actor: Intermediaries / practitioners

(Sector departments, INGOs, early warning systems, DRR, resilience project implementers, National Red Cross and Red Crescent Societies, media and other communicators, private sector etc)

Main role: Risk knowledge; Dissemination and communication; Response capability

Support and facilitate connections across the early warning system value chain and between all actors

- Convene dialogue across all actors, advocating for change
- Facilitate multi-stakeholder co-production processes, and ensuring people-centered approaches are inclusive of all vulnerable groups, gender differences and people with disabilities etc
- Involve users in risk mapping, data rescue, interactions with providers, design and testing of messages, development of warning dissemination strategy, media trainings, preparedness strategy and emergency drills
- Support awareness and understanding of the role of all actors across the early warning system value chain

Establish a systematic, standardized risk knowledge process to collect, assess, and share data, maps, and trends on hazards and vulnerabilities informed by and with participation of at-risk groups.

- Prioritise connecting local at-risk people to forecasting information and focus on impact-based forecasting
- Develop innovative partnerships with international organisations and national agencies to reimagine how forecast information and hazard observations can better serve the needs of high-risk people.

Develop communication and dissemination systems to ensure people and communities are warned in advance of impending natural hazard events and facilitate national and regional coordination and information exchange:

- Train local organisations and emergency managers in forecast interpretation to enhance their support to early warning and early action communication to the users they are connected with
- Connect media communication channels with forecasters and at-risk groups to support translation into user friendly information, actionable early warning systems in needed language and format for different groups at risk

Ensure people at-risk are partners in early warning systems and have the capacity to be effective first responders

- Engage users in the design, implementation, testing and validation of early warning system development to ensure messages are actionable and reach everyone
- Support local responders to establish the necessary data, tools, knowledge system and governance structures to build resilience and to plan and carry out anticipatory action.
- Ensure relevant local partners, including women and groups most at risk are engaged in the project design from the start, and their input is collected and integrated

Strengthen the ability of communities to respond to natural disasters through enhanced education of natural hazard risks, community participation, disaster preparedness and set-up of early action systems:

- Strengthen capacity of local organisations working on community preparedness, DRR, resilience and adaptation to support anticipatory action interventions.
 - Enable decentralised, inclusive and participatory planning and decision-making processes for anticipatory action. Specifically:
 - Involve at-risk people in mapping of impacts, defining triggers & early actions
 - Involve at-risk people in identifying vulnerable groups most at risk
 - Support at-risk people to self-determine needs and define acceptable levels of risk (danger level, thresholds and triggers for early action)
-

Actor: Policy makers

(national and local government decision makers)

Main role: Decision making on early warning systems

Promote and support preparedness and early action of local actors and at-risk communities.

- Prioritise partnerships and strategies which seek to build national forecast capabilities and better connect climate risk information services to local actors and at-risk groups
- Strengthen the enabling environment for collaboration and connections between first responders and national forecast & resource providers, and between national and community level early warning systems
- Provide political commitment and/or financial and human resources to communicate and contextualise risk information to make it accessible to at-risk people

Actor: Users / responders

At-risk people, groups and local institutions.

Main Roles: At-risk people, groups and local institutions.

Active participants in early warning systems

- **Contribute knowledge** on local context, traditional forecasts, and information from community-based risk assessments and weather stations.
 - **Contribute to observation, data and local forecasting knowledge**, strengthen relationships with providers, help identify practical multi-hazard impact-based forecasts and warnings with and for different end user groups and share feedback to inform continual improvement of the system.
 - **Participate in risk assessment and contribute knowledge** and capacity on risks, how they are perceived and the drivers and barriers to early action.
 - **Communicate needs and feedback** on current and desired access to, use and impacts of early warning systems and actions.
 - **Disseminate warnings**, increase reach and access and inform choice of formats, languages and channels of communication.
 - **Build trust and understanding** in warnings received, ensure planned actions are relevant and feasible for all vulnerable groups including those most at risk.
 - **Develop, share and implement early action protocols**, take early and timely action, mobilise and organise other users for action, and overcome resistance or delay in taking action.
 - **Help to make connections** between early warning elements so that they are coherent and mutually reinforcing. For example feedback on their experience, actions and benefits are essential for identifying ways to improve the system as a whole and the way in which each element operates.
 - **Help to sustain the system at local level**
-

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