GNDR
Global Network of
Civil Society Organisations
for Disaster Reduction

Localising Climate Projections

GUIDE AND TOOLKIT

How local actors can lead climate risk narrative processes

INTRODUCTION

This guide provides practical advice on how to ensure local actors are part of climate change projection processes. Through the meaningful participation of local actors, especially communities most at risk in accessing and using climate projection data, their decision to adapt, or plan for, emerging disasters and complete development actions are significantly more informed. The approach to this climate risk narrative process is guided by GNDR's overarching risk-informed development approach.

By presenting information on key concepts and theory, as well as practical tools and additional resources, the guide aims to ensure a clear process for localising climate projections. Users will be able to:

- Understand key climate concepts and the different sources of uncertainty in managing climate change risk
- Contextualise climate change related risks among other social, economic and governance drivers of risk
- Localise climate change related risks and develop ways to manage these risks
- Establish the partnerships with national meteorological agencies and national research institutions required to address climate-related risks
- Make informed decisions on climate change

What does localising climate projections mean and why is it important?

There are many uncertainties in climate change projections. There is uncertainty in how the atmosphere will react to changing conditions, uncertainty in natural events such as volcanic eruptions and uncertain information from the different climate projection models currently used. Perhaps, the biggest uncertainty is due to the future changes in how much greenhouse gases we produce. Putting these, and other uncertainties together, means we have a range of possible climate futures we need to consider.

However, there are some things we can have confidence in about the future climate. Given ongoing human activity, the climate will get more extreme, leading to more extreme weather events such as hotter days, intense rainfall (flooding or extreme storms), interspersed by periods of no rain leading to increased periods of drought.

Globally, climate-induced disasters accounted for 90 per cent of all major disasters between 1998 and 2017. Climate change threatens to annihilate the development efforts that the world has made. The Intergovernmental Panel on Climate Change (IPCC) reports that "Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability. Some development and adaptation efforts have reduced vulnerability. Across sectors and regions the most vulnerable people and systems are observed to be disproportionately affected. The rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt."[1]

Extreme weather events and rising sea levels are the new norm and the frequency and intensity of the sudden-onset of hazards is predicted to increase, and worsen the impacts of slow-onset hazards. Patterns of weather and rainfall will change around the world with droughts becoming more common and severe in some places, and floods in others. Environmental degradation seen in deforestation, loss of biodiversity, deterioration of drainage patterns, unscientific development and other factors, is increasing risks to society and the land. Climate and environmental risks are clearly priority challenges that drive risk in a multitude of ways: rising sea levels, desertification, wildfires, water scarcity, extreme weather, crop failures, displacement, migration and increased risk of different types of conflict.

Another important uncertainty is how global climate changes translate to local changes. Locally, climate-induced disasters are happening at the rate of one per week, mostly out of the international spotlight. Whilst the IPCC has previously highlighted that limiting global warming to 1.5°C goes hand-in-hand with reaching world goals set for sustainable development and eradicating poverty, its 2022 report sets out the prospect of maintaining 1.5°C is 'far off track' and to achieve this would require that 'the world should peak greenhouse gas emissions in the next three years'.[2]

Indeed, the local impacts of climate change mean that disaster losses are rising. The last 20 years have seen a rise of 251 per cent in direct economic losses from climate-related disasters, and it is the people most at risk who are often disproportionately impacted – particularly those in the global south.

> Localising climate projections means ensuring climate information becomes easily available to local actors so that they can adequately plan for development and contingency actions in crises.

For communities most-at-risk, climate-induced disasters devastate lives, livelihoods, natural resources and intensify complex risk and increase vulnerability.

Local actors, including community members most at risk of disasters, local government representatives, community leaders and civil society organisations are at the frontline of these crises. They know the multiple dimensions of risk communities face and know what the most effective resilience-building activities are. Their inclusion in planning, implementing and reviewing policies and actions that prevent complex risk, leading to complex disasters, is vital. However, 84 per cent of local actors report not being included in assessing threats, preparing policies and plans, and taking action to reduce threats.[3]

For local actors to play their critical role, they need access to climate projections to ensure they are adequately risk-informed in their planning, implementation and review of policies and actions to prevent, mitigate and prepare for complex crises. It is essential to reduce the adverse impacts of climate change on communities most at risk by putting in place such actions. Current decision-making processes by local actors are hindered by climate change as their traditional knowledge on the environment around them is challenged. They need to combine this knowledge with the knowledge of experts on climate change in order to make informed choices on what actions to take in their community.

Localising climate projections means ensuring climate information – that is currently global, highly technical or academic, in languages not understood or not easily accessible (an individual does not know how to access it or is intentionally stopped from accessing it) – becomes easily available to local actors so that they can adequately plan for development and contingency actions in crises. Local actors should have the time, space and capacity to identify solutions that are affordable, relevant, impactful and sustainable within their communities.

By localising climate projections, it is not intended for weather forecasts to become more local in their geographical coverage. Given the nature of an element of unpredictability in weather forecasting, especially for the longer-term and in the midst of changing climate leading to extreme weather events, a local forecast (i.e. in a specific village or district) is not necessarily more accurate.

It is also not intended to ensure all local actors are climate experts. Where capacity exists we capitalise on it and where capacity can be strengthened efforts should be prioritised to achieve it. But different roles, perspectives, knowledge sources and expertise are required within the entire process. It is not intended to replace scientific knowledge with local, indigenous or traditional knowledge. There is a place for both academic or technical and empirical knowledge. Further, local actors should not work alone. There is a need for national actors to contribute to the overall process of localising climate projections by collaboration with local actors.

Through this resource, and through our ongoing influencing actions, GNDR calls for localisation of climate data and projections to build community resilience.

1 "Climate Change 2022: Impacts, Adaptation and Vulnerability", IPCC Sixth Assessment Report – www.ipcc.ch/report/ar6/wg2/ p11 – Summary for policy makers.

2 www.wri.org/insights/ipcc-report-2022-mitigation-climate-change

3 Views from the Frontline 2019 Report – Why are people still losing their lives and livelihoods to disasters? GNDR and its members asked over 100,000 local actors about their perspectives of risk and resilience across 42 countries. https://global-report.vfl.world

OVERVIEW

Who should use this guide?

This guide is primarily for civil society organisations working with communities most at risk from the negative impact of climate change and other risk drivers. They are encouraged to work through the stages and facilitate the discussions and suggested activities with community members and other identified stakeholders to develop actions using climate projections. To achieve this, civil society organisations need to review the time available and existing capacities in the community, in using weather and climate information, to appropriately adjust how the tools and activities are delivered.

The guide requires sourcing country-specific information on existing and future climate risks. While ideally obtained through engaging with national meteorological services and climate research institutions, the reference guide also signposts publicly available sources of this information. Given the resource constraints on operational meteorological services (and other stakeholders), securing their engagement requires contacting them well in advance with a formal request and clear explanation of their anticipated role.

What is included in this guide?

This guide highlights six key stages in localising climate projection processes. It aims to support civil society organisations and communities most at risk to access, use and analyse key climate risk information and knowledge to plan for future development, prevention, adaptation or contingency planning actions – and in doing so effectively, planning to reduce the impacts of future climate risks.

Centrally, it aims for the inclusion of local actors – communities most at risk and the civil society organisations, local leaders and local government units that represent them.

The resource is intended to be foundational, rather than comprehensive. It encompasses guidance on key climate concepts, trends and impacts and underpinning principles for decision-making under uncertainty. The resource includes participatory approaches designed to bring together different knowledge sources and partners essential to developing inclusive and relevant approaches to addressing climate-related risks. It highlights the need to strengthen partnerships between local and national actors, especially the national meteorological office and national climate-research institutions to stay abreast of emerging scientific understanding and strengthen preparedness and adaptive capacities with local communities.

CONTENTS

GLOSSARY

Adaptation
The process of adjustment to actual or expected climate and its effects. Activities need to be flexible to respond to changes in the conditions, whether hazard patterns, emergence or new important actors, political, economic changes, etc.

Atmosphere
The layers of gases surrounding the earth and other planets. The Earth's atmosphere is composed of about 78 percent nitrogen, 21 percent oxygen, and one percent other gases.

Climate
Average weather over a long period of time, typically 30 years.

Climate change[4]
A change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean (average) and/or variability (average degree to which each number is different from the mean) of its properties and that persists for an extended period, typically decades or longer.

Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use. Note that the Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.' The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition and climate variability attributable to natural causes.

Climate risk management
Managing the impacts of future climate change. This includes a process of identification and understanding of climate risk and using it as an inclusive expression that designates prevention, reduction, mitigation and response.

Climate risk narrative
Descriptions of a context of events that can threaten the stability of humankind and the environment under different plausible climate futures

Downscaling
The process and methods of deriving climate information at a higher spatial resolution (i.e. a smaller geographical area) than that produced by global climate models

El Niño Southern Oscillation (ENSO)
An irregular periodic variation in winds and sea surface temperatures over the tropical eastern Pacific Ocean which affects the weather conditions across the tropics and subtropics.

Exposure
The presence of people, livelihoods, species or ecosystems, environmental functions, services and resources, infrastructure or economic, social, or cultural assets in places and settings that could be adversely affected by climate phenomena.

Forecast
The prediction of weather conditions for a certain place and period (typically short-term: days to months that make up a season) through scientific data and observations

Fossil fuels
Fossil fuels are made from decomposing plants and animals. These fuels are found in the Earth's crust and contain carbon and hydrogen, which can be burned for energy. Coal, oil and natural gas are examples of fossil fuels. When these fuels are exploited from the soil as a source of energy, they increase greenhouse gases which leads to climate change.

Global Climate Model
A statistical model of atmospheric and/or oceanic processes that is able to project future conditions (typically set with a level of uncertainty but this is improving over time with new models).

Greenhouse gases
The Earth's greenhouse gases trap heat in the atmosphere and warm the planet. The main gases responsible for the greenhouse effect include carbon dioxide, methane, nitrous oxide and water vapour. These gases exist naturally but increase because of human activity. Fluorinated gases are man-made gases that can stay in the atmosphere for centuries.

Impact-based forecast
A forecast that provides information on what the weather will do. It is the likelihood of a particular adverse impact as a result of weather conditions, rather than a conventional weather forecast which gives an indication of what the weather will be.

Mitigation
The lessening or minimising of the adverse impacts of a hazardous event, for example the process of acting to reduce the severity of, or impacts of, climate change.

It should be noted that, in climate change policy, mitigation is also defined as the reduction of greenhouse gas emissions that are the source of climate change.

Ocean acidification
Ocean acidification reduces the amount of carbonate, a key building block in seawater. This makes it more difficult for marine organisms, such as coral and some plankton, to form their shells and skeletons. Existing shells may begin to dissolve, affecting the natural ecosystem of the ocean and lead to decreased fishing and shellfish production.

Projection
Simulations or scenarios of what future climate will look like (currently normally produced by global climate models).

Representative concentration pathways (RCP)
A RCP is a greenhouse gas concentration (not emission) trajectory. Four were used for global climate modelling and research. Different RCPs reflect the fact that future climate will depend on human behaviour and the extent of our greenhouse gas emissions.

Risk
The potential of adverse impacts on the lives and livelihoods of communities or on ecological systems, determined by the threats people face, their vulnerability and their capacity.

Risk drivers
Established and emerging threats and challenges that affect the lives, livelihoods and environment of people and continue to amplify a particular risk. They can largely be described as social (for example gender inequality, forms of discrimination), economic (for example finance instability) and governance factors (for example approaches to political systems). Natural hazards, climate change, pandemics, terrorism and transnational criminal networks, cyber fragility, geopolitical volatility and various forms of conflict are all risks in themselves, as well as driving other risks to form complex or multilayered risk. Six interconnected drivers of risk are emphasised by GNDR – climate change, conflict, gender inequality, food and water insecurity, urbanisation and forced displacement.

Vulnerability
The probability to be adversely affected by risk (in the context of this guide, by exposure to climate phenomena).

Weather
The state of the atmosphere at a particular place and time (including temperature, humidity, windspeed, presence or otherwise of rain, etc.).

4 IPCC - https://www.ipcc.ch/sr15/chapter/glossary

The climate and why it is changing

> Climate is what we expect, weather is what we get.[5]

Have you ever wondered how science can tell us what the climate will be in 2050? For many people forecasts of the weather for the next week are not very reliable. How are we supposed to believe what scientists tell us will happen with the climate 30, 50 or even 70 years ahead? Well, the answer lies in the difference between the weather and the climate.

Look outside your window and you could probably describe the weather. In scientific language 'the daily local weather is determined by large-scale factors such as global atmospheric circulation, and small, chaotic factors such as storm activity at a particular time and location' (IPCC, 2007, FAQ 1.2). Weather is something we directly experience as variations in the atmosphere. By contrast, the climate is a statistical representation of the average and variability of weather over a set time period, typically 30 years. As such, it is not something we can typically experience or comment on. Again, in scientific language 'climate represents average weather. It is usually described in terms of the mean and variability of temperature, precipitation and wind over a period ranging from months to millions of years, but typically the period is 30 years' (IPCC, 2007, FAQ 1.1).

This difference explains how we can say something about climate change while having limited confidence in weather forecasts a week, or two weeks, ahead of time. Whilst it is hard to believe anyone stating exactly what the weather will be outside my window in exactly two weeks time (to the minute, hour or day), there is an ability to have confidence in predicted trends such as the temperature being warmer or a predicted cyclone on its way across the country.

The atmosphere is a layer of gases that surrounds the earth. The atmosphere is highly sensitive to the initial temperature conditions of the Earth's air, sea and land. Small differences in these conditions lead to changes in the weather. Because these changes are so sensitive and somewhat chaotic in the different types of weather produced, it is only possible to attempt to predict the weather two weeks in advance.

However, the climate is driven by large-scale factors such as the level of radiation received from the sun, the atmospheric composition and movement of currents in the ocean, such as the El Niño Southern Oscillation. These factors vary much more slowly than the atmosphere and so we can predict how they will change and by extension the general atmospheric conditions we can expect (such as warming temperatures).

> Human activity is changing the amount of greenhouse gases and therefore the natural and expected climate.

> We have a range of possible climate futures we need to consider.

Future changes in the climate[6]

The Earth's greenhouse gases trap heat in the atmosphere and warm the planet. The main gases responsible for the greenhouse effect include carbon dioxide, methane, nitrous oxide, and water vapour (which all occur naturally), and fluorinated gases (which are man-made gases that can stay in the atmosphere for centuries). Human activities produce these gases through such processes as burning fossil fuels (coal, oil and natural gas), manufacturing and agriculture.

Climate change is a reality. Human activity is changing the amount of greenhouse gases and therefore changing the natural and expected climate. Communities are already seeing hotter temperatures leading to drought, more rain leading to flooding and extreme weather events - "once in a generation" storms, cold waves and heat waves are becoming far more regular.

Currently human activity has produced greenhouse gases trapped in the atmosphere that has led to 1 degree of warming since pre-industrial time (1820). Highlighting the sensitivity of the atmosphere, two degrees of warming was decided as the boundary between dangerous (crises, disasters, significant risk) and non-dangerous (manageable, less risk) climate change.

Significant strides have been made by the governments around the world in agreeing to limit how much greenhouse gases will be produced and emitted into the atmosphere in the future. However, according to projections of future climate, there is still only a 50 percent chance of keeping global warming to below 2 degrees (Meinshausen et al. 2022). However, this threshold has changed recently to 1.5 degrees as it is clear that the risk of catastrophic impacts of climate change are already emerging.

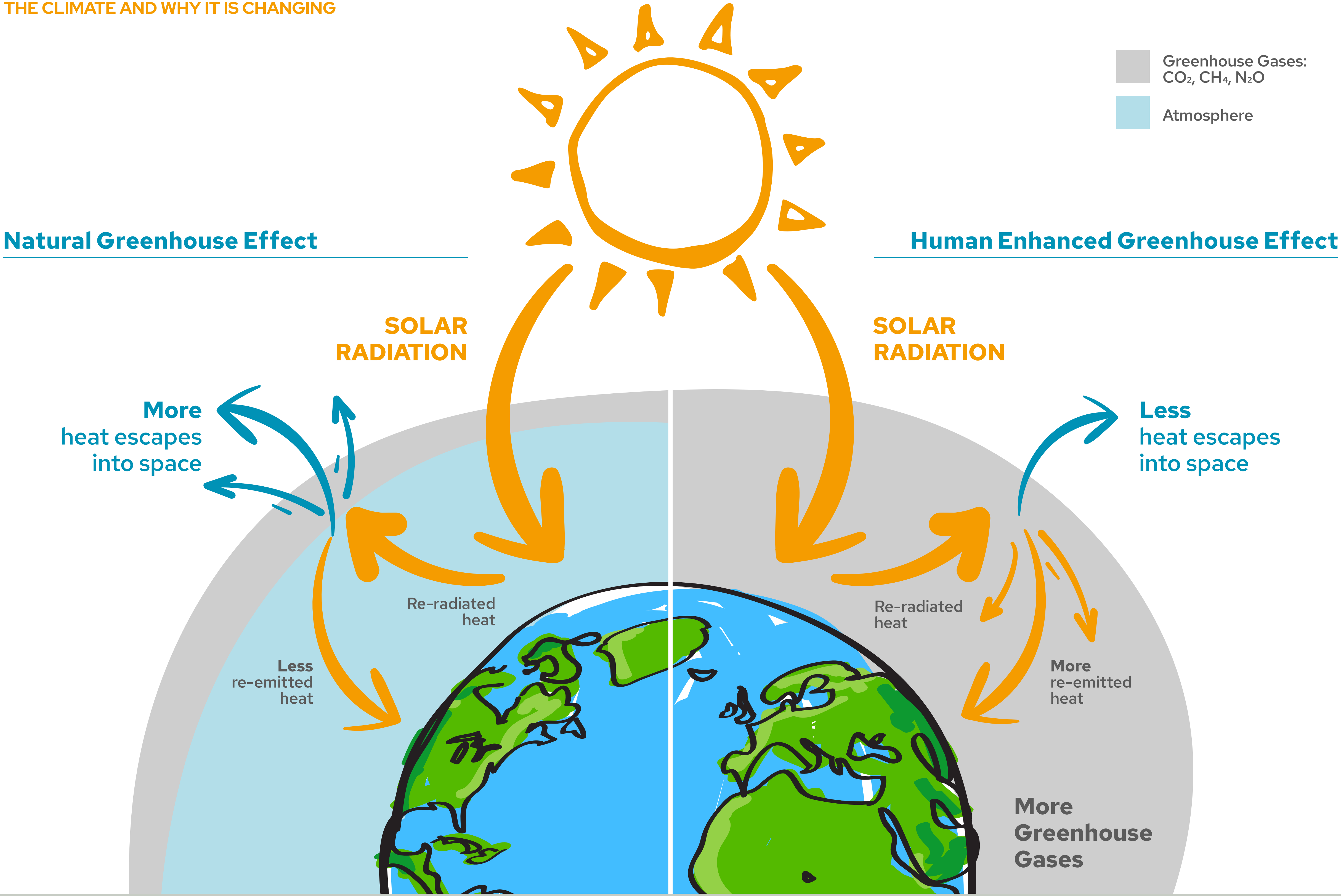
In questioning just how bad the future climate might be, we still need to remind ourselves that there is much uncertainty in projecting the future climate. For example, there is uncertainty due to the chaotic nature of the atmosphere. There is uncertainty according to natural events such as volcanic eruptions. In understanding future climates, there is also uncertainty from the different climate models used. Probably, the biggest uncertainty is due to the future changes in how much greenhouse gases we produce. Putting these and other uncertainties together means we have a range of possible climate futures we need to consider. Another important uncertainty is how global climate changes translate to local changes.

However, given these uncertainties there are some things we can have confidence in about the future climate. Given ongoing human activity:

- The concentrations of greenhouse gases will keep increasing
- These will cause global temperatures to keep going up (getting warmer)
- As snow and ice over land melts and the sea warms, sea levels will keep rising
- The carbon dioxide in the atmosphere will increase
- The oceans will become more acidic affecting sea life
- The climate will get more extreme, leading to more extreme weather events such as hotter days, intense rainfall (flooding or extreme storms), interspersed by periods of no rain leading to more drought

5 Mark Twain

6 Meinshausen, M., Lewis, J., McGlade, C., Gütschow, J., Nicholls, Z., Burdon, R., Cozzi, L. and Hackmann, B., 2022. Realization of Paris Agreement pledges may limit warming just below 2° C. Nature, 604(7905), pp.304-309.



Greenhouse Gases: CO_2, CH_4, N_2O
Atmosphere
Natural Greenhouse Effect
Human Enhanced Greenhouse Effect
SOLAR RADIATION
SOLAR RADIATION
More heat escapes into space
Less heat escapes into space
Re-radiated heat
Re-radiated heat
Less re-emitted heat
More re-emitted heat
More Greenhouse Gases

STAGE 1

How to engage communities most at risk in climate projections

The starting point of the localising climate change projections process is capturing local knowledge to better understand the localised implications of various global and local climate factors. In order to be effective, any action to engage with communities most at risk from climate change should involve the following principles:

- **Put people at risk at the centre:** Building trust, accountability and positive relationships with them. Civil society organisations have a role to facilitate an enabling environment that sees local actors and those most at risk taking the lead.
- **Prioritise local perspectives of risk:** Local considerations of risk have to be taken into account to inform and hold to account local, national and international disaster risk management processes.
- **Build relationships with communities most at risk:** Listening, connecting, consulting with and encouraging ideas/actions from community members as to what actions they want to lead, is essential.
- **Ensure inclusion:** Identifying the most at-risk groups and ensuring their meaningful participation and contribution to any action.
- **Ensure collaboration with multiple stakeholders:** identify local partners and institutions that can support the localising climate projections process – whether academic, private, government or other civil society groups.

Practical ways to engage communities at the start of localising climate projection actions include:

- Identify key at-risk groups and local leaders
- Prepare and mobilise communities for the localising climate projections process
- Introduce global climate trends to them in order to facilitate learning around the need for climate projection, and the understanding of the facilitators of prioritised risk factors and local context from lived experience of those most at risk to local impacts of global climate trends
- Create a joint vision with them
- Continue to involve them as central decision makers in the process

STAGE 1

TOOL 1

Explore different knowledge sources through knowledge timelines[7]

Introduction

This tool will explore the different types of knowledge about the weather and climate that people use to make decisions and consider their similarities and differences. It will also identify practical ways in which GNDR members can strengthen their partnerships with, and support the work of, national meteorological agencies, climate research institutions and other climate services or government departments (at local or national level).

Knowledge about the weather, climate and their impacts originates from diverse sources, some local based or cultural interpretations of natural phenomena, some from science and some from everyday experience.

The Knowledge Timelines exercise can build an understanding of the types of weather and climate information which a community currently uses, strengthen understanding of the different sources of weather and climate information currently available at different timeframes and geographic scales, and support transparent discussion about the levels of accuracy across both local and scientific sources.

STEP 1

Encourage the audience to remember a past climate event using non-climate events to prompt their memory. For example, identify a period when there was significant flooding and some locally relevant social or cultural events that were also taking place at this time.

STEP 2

Ask about the different information that people had on the climate/weather event before it occurred, and at what times this was available.

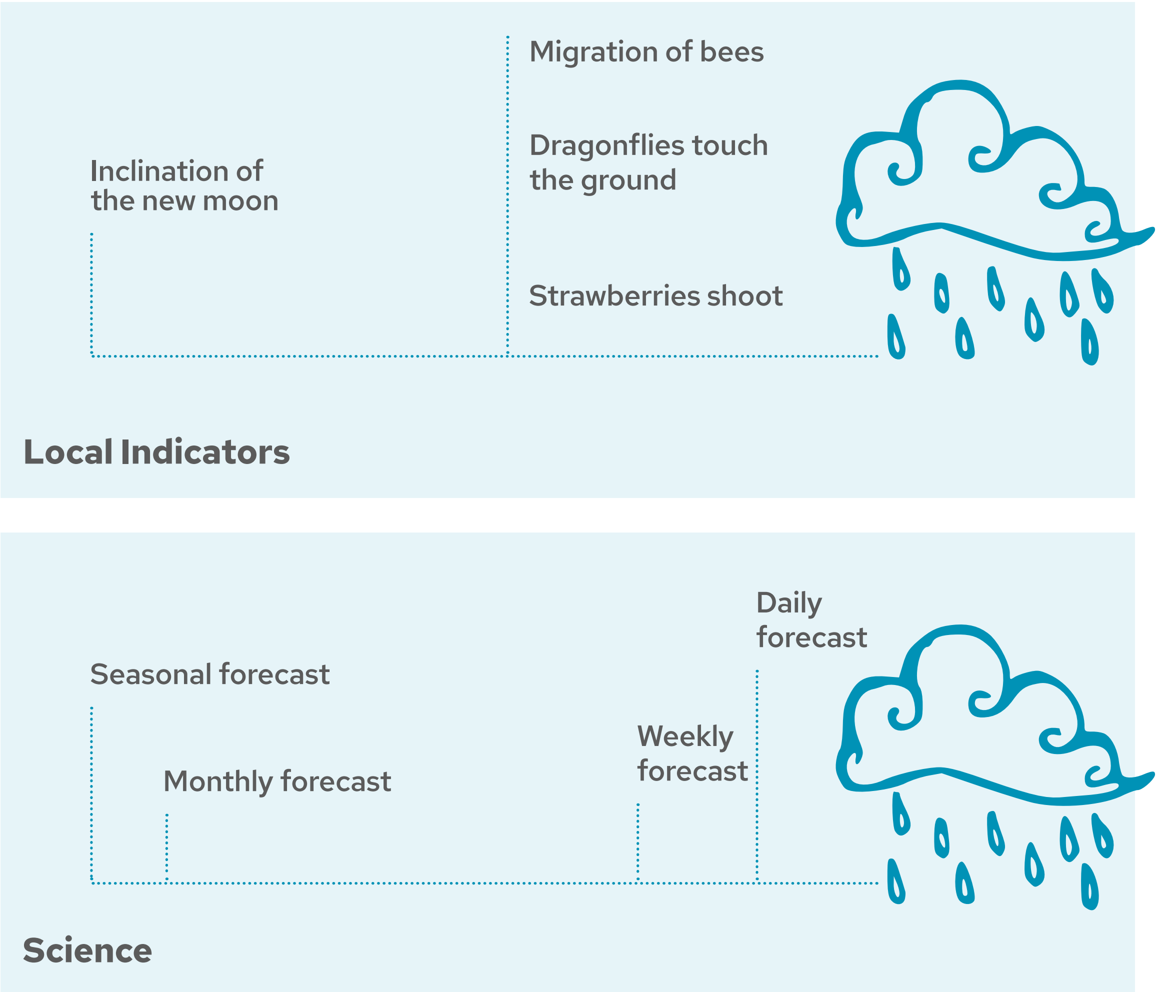
STEP 3

The national meteorological agency representative or climate researcher describes the scientific information available on this event. The representative or researcher then describes the uncertainty and confidence in this scientific information as a function of forecast time and space.

STEP 4

Ask the audience to describe the confidence and uncertainties they have in the information they use. Ask them to describe the basis of their assessment. Then compare and contrast the features of each knowledge type. Additionally, the timeline could be extended to consider climate information at longer time frames.

Example of knowlege timelines in regards to when it will rain



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The diagram above depicts discussion from the use of the Knowledge Timelines amongst farmers' groups in Mbeere, Kenya. While local forecast indicators will be specific to each community, levels of accuracy and challenges in scientific forecasts are, for the most part, shared across regions and dependent on emerging scientific understanding of weather and climate.

Additional resources

Risk-informed development guide - engaging with communities most at risk

The "Risk-informed Development Guide" highlights how to engage with communities from a risk-informed development perspective. The approaches suggested should be connected to the localising climate projection process and include visioning to ensure that communities most at risk of climate-induced disasters lead the necessary work.

7 Daraja, 2020, DARAJA Impact Results Learning-review-deck_master-.pptx (live.com) https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.resurgence.io%2Fwp-content%2Fuploads%2F2019%2F01%2FLearning-review-deck_master-.pptx&wdOrigin=BROWSELINK

Kniveton, D., Visman, E., Tall, A., Diop, M., Ewbank, R., Njoroge, E., and Pearson, L. 2014. Dealing with uncertainty: integrating local and scientific knowledge of the climate and weather. Disasters, 39(S1), S35–S53. https://onlinelibrary.wiley.com/doi/10.1111/disa.12108

Kniveton, D., 2013 Knowledge Timelines, Dialogues for disaster anticipation and resilience Dialogues for disaster anticipation and resilience (tumblr.com) https://dialoguesforresilience-blog.tumblr.com/post/86490291440/case-study-2-knowledge-timelines-exploring

8 Knowledge Timelines: comparing local and scientific sources of information about the onset of seasonal rainfall in Mbeere, Kenya (Source: Dialogues for Disaster Anticipation and Resilience, Kniveton 2013 Dialogues for disaster anticipation and resilience (tumblr.com) https://dialoguesforresilience-blog.tumblr.com/post/86490291440/case-study-2-knowledge-timelines-exploring

Knowledge about the weather, climate and their impacts originates from diverse sources

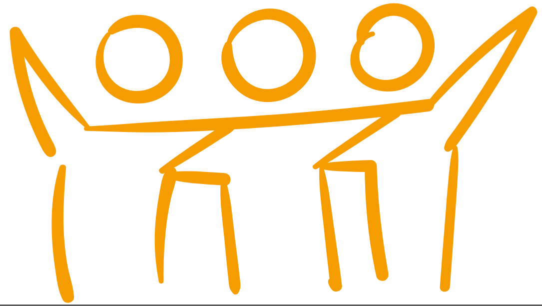
STAGE 2
Collaborate with climate stakeholders

This stage of the localising climate projections process involves organising around the vision of the community most at risk. Once their vision is created, time for the community to organise themselves to work together, connect with existing organisations and initiate communication to gather information on climate projections and plan ahead is essential.

It is also crucial to begin gathering knowledge and data – both traditional/indigenous and academic/technical – so that, in the latter steps of the process, the community and local actors are able to make informed decisions.

Additional support or collaboration from other stakeholders (like National Meteorological Office, climate centres or think-tanks, universities and other organisations with expertise in weather and climate – as well as other local and national groups addressing the impact of climate change) should be sought. In doing so, a process of beginning to explore knowledge between different stakeholders and build partnership between them is achieved.

> Speak with community members and gather their traditional knowledge of the environment, climate and weather



Practical ways to organise around the vision of the community most at risk include:

- Ensure it is their vision you are organising around
- Bring existing community representatives and leaders to the forefront of the process; encouraging them to take decisions about their roles in the overall planning process
- Create and identify collaboration opportunities with various stakeholders
- Speak with community members and gather their traditional knowledge of the environment, climate and weather

STAGE 2

TOOL 2

Collaborate with national meteorological partners

Introduction

Engaging the national meteorological agency and climate research institutions in your work, and engaging in their work by bringing perspectives of local actors, offers opportunities to discuss how you can effectively work together.

Some of the ways disaster reduction organisations can actively support the work of national meteorological agencies and climate researchers include:

- **supporting** more inclusive reach of national public weather and climate services
- **co-producing** services to ensure they are relevant for at risk people living
- **assessing** the accuracy of their forecasts (forecast verification), and
- **providing feedback** on forecast use and resulting impacts

It is important to invest in ongoing dialogue to build the trust and the individual and institutional linkages required for sustained partnership

You can work with national meteorological agencies to jointly identify potential improvements in the format, communication and content of the services they provide. This will, in turn, require that you have established a common understanding of your respective aims and ways of working and identified areas of shared concern.

A vital first step is ensuring sufficient appreciation of core climate concepts and how to appropriately use weather and climate information both amongst the at-risk groups you work with a nd for your own disaster reduction organisation. It is equally vital to strengthen forecasters', and climate researchers', understanding of the specific local contexts that weather and climate information seeks to inform.

It is important to invest in ongoing dialogue to build the trust and the individual and institutional linkages required for sustained partnership.

Sustained partnership allows your organisation to stay abreast of emerging scientific understanding on the climate. It also enables national meteorological agencies and climate researchers to demonstrate the tangible benefits of their work, deepen their contextual understanding of climate-related risks and localise forecast impacts and research on climate-related risks. Crucially it will support them in understanding any gaps or barriers in making these studies and findings available to civil society and, hopefully, allow them to address this for improved accessibility and useability where needed.

Feedback on forecast use and resulting impacts: Disaster reduction organisations can use their existing monitoring systems to demonstrate changes in access to, use and benefits of climate services. Sharing the approaches you use to monitor the impact of your work, you could discuss with the national meteorological agency and national climate researchers where these could support their work. It is also useful to discuss the benefits of both qualitative and quantitative approaches. While surveys can, for example, demonstrate the economic benefits of strengthening use of climate services, personal testimonies are powerful communication tools for both policy makers and people living in similar contexts.

Key points in strengthening partnerships with national meteorological agencies and climate research institutions

Experience has highlighted the importance of:

- Formalising relationships through MOUs or letters of intent to clearly specify areas of collaboration
- Ensuring the involvement of National Meteorological Services and/or climate researchers at project development phase to enable initiatives to be undertaken in sustainable and impactful ways
- Investing in co-developing training to strengthen:
- Disaster reduction partners' appreciation of climate services and how they can appropriately support decision-making
- National meteorological services and climate researchers' appreciation of the decision-making contexts that climate services seek to support

Jointly identifying how collaboration may support the National Adaptation Plan and implementation of the National Framework for Weather and Climate Services.

Additional Resources:

What information are you looking for?

Where to find weather and climate information (includes observational data, short-term weather and long-term climate information)

How to interpret weather and climate information (including the probabilistic nature of information and forecast skill)

Tools for using climate information in decision making (including serious games, narratives, participatory scenario/contingency planning, participatory impact pathways analysis and the FREE framework)

Ways of working with decision makers to localise information (including risk reduction, agriculture, cities, planning)

Co-producing decision-relevant climate information (including co-production case studies and integrating scientific and traditional knowledge)

Where to find weather and climate information

Observational data
Global: KNMI Climate Explorer
https://climexp.knmi.nl
National: World Bank Climate Knowledge Portal
https://climateknowledgeportal.worldbank.org
Sub-national: CSAG Climate Information Portal
https://cip.csag.uct.ac.za/webclient2/app

Short-term (weather-seasonal)
Sub-national: Columbia Climate School
https://iri.columbia.edu/our-expertise/climate/forecasts

Long-term (climate projections)
Global: KNMI Climate Explorer
https://climexp.knmi.nl
Global: IPCC Regional and cross-cutting Fact Sheets from the 6th assessment report. Fact Sheets | Climate Change 2022: Impacts, Adaptation and Vulnerability (ipcc.ch)
www.ipcc.ch/report/ar6/wg2/about/factsheets
National: World Bank Climate Knowledge Portal
https://climateknowledgeportal.worldbank.org
Sub-national: CSAG Climate Information Portal
https://cip.csag.uct.ac.za/webclient2/app

Risk-informed development - organising around a community's vision

Stage Two of The Risk-informed Development Guide has more information on tools on how to achieve this on a general level.

How to strengthen collaboration

The "How to Strengthen Collaboration Guide" highlights how CSOs can strengthen their partnerships with other local actors. This should be considered when working with climate experts and other planning agencies in regards to accessing and using climate projections.

Advocating for access to information

If civil society organisations face difficulties in accessing information, the National Advocacy Toolkit can be adapted and used to influence policy change in order to release climate projection information to local actors.

STAGE 3

Climate risk management with the local community

It is necessary to contextualise information gathered to understand how climate risk and resilience affect development in the specific community's context. The links between various local, regional or global factors, and how these affect different people, communities, places and social or physical systems should guide what action to take. In doing so, a process of analysing the knowledge offered from the different stakeholders is achieved, thus supporting communities and CSOs to interpret existing weather data within their local context.

Understanding and managing the impacts of future climate change is often referred to as 'climate risk management'. Scientifically, uncertainty is inherent to projecting changes to climate in the future. There is also uncertainty from a lack of knowledge of the extent to which future populations will be exposed and therefore vulnerable to these climate changes.

The Intergovernmental Panel on Climate Change reports on the main risks from climate change at the global level. The suggested information can be used in engaging communities in topics that affect them based on their context:

- **Global:** Hazards, key vulnerabilities, key risks and emergent risks
- **Global:** Key sectoral risks from climate change and the potential for reducing risks through adaptation and mitigation
- **Regional Level:** Key risks from climate change and the potential for risk reduction through mitigation and adaptation in Africa
- **Regional level:** Cross-cutting fact sheets

Information ecosystem mapping

Some practical ways for supporting dialogue between communities most at risk, civil society organisations and national meteorological offices include information ecosystem mapping to support inclusive communication of climate services:

- Survey populations that are directly impacted by climate-related risks to identify the sources of information they commonly use and the channels and networks through which they receive it, as well as the climate services they currently receive. GNDR uses Views from the Frontline as one methodology for this
- Placing the populations at risk in the centre, map out the survey results
- Request the national meteorological agency to map out the channels and networks through which their forecasts are currently shared, if possible through associate CSOs or NGOs at national or international level
- Identify key gaps and challenges in ensuring their services reach those populations most directly impacted
- Assess how you could support communication to ensure more timely and inclusive reach to those people most impacted by weather and climate

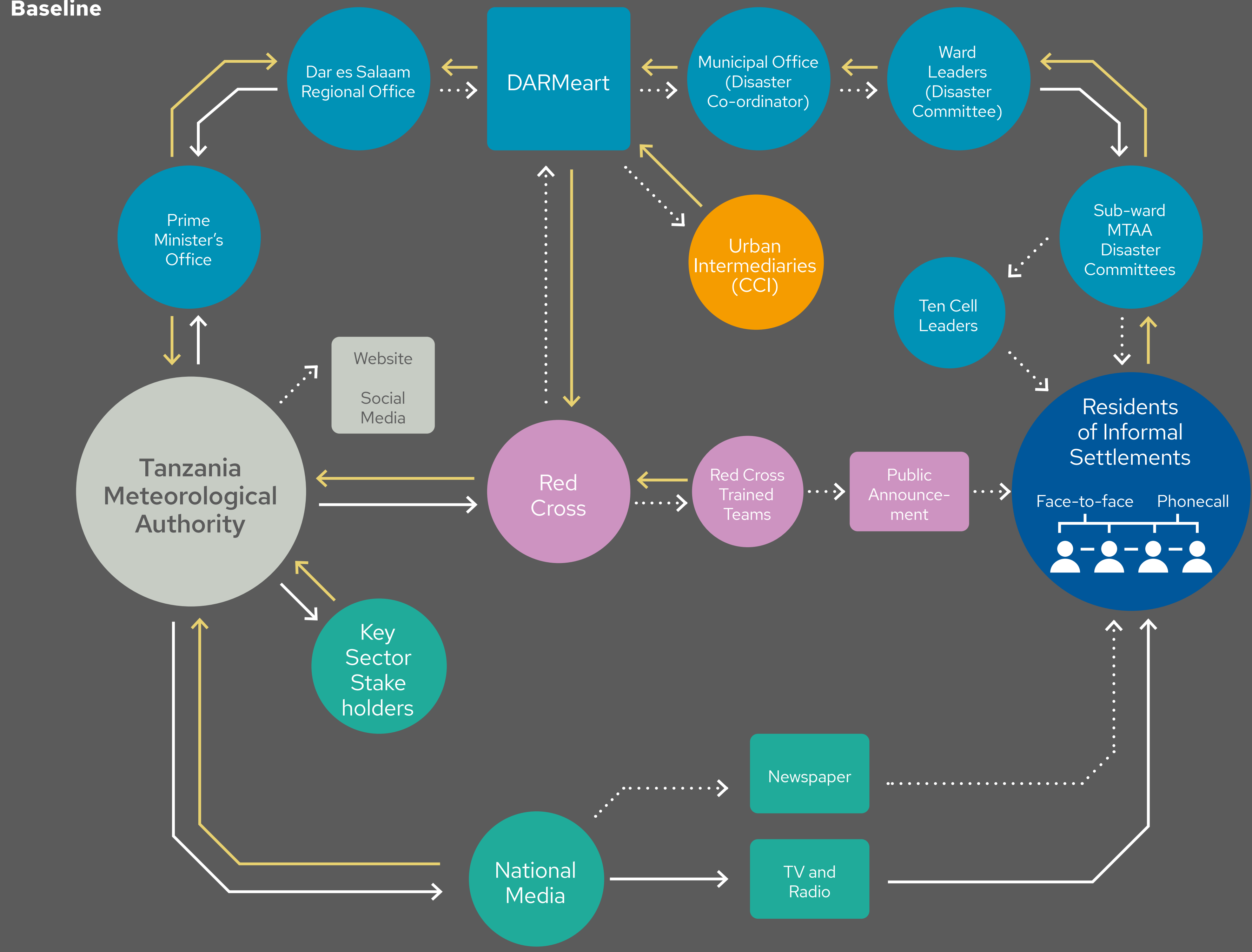
STAGE 3

Case study: information ecosystem mapping in Tanzania

This figure illustrates the use of information ecosystem mapping in the DARAJA project in Dar es Salaam, Tanzania. Here, the Centre for Community Initiatives worked with the Tanzania Meteorological Agency (TMA) to extend the reach of their services to residents of the city's informal settlements.

The diagram shows the reach of TMA's severe weather warnings at the start of the project.

Dar es Salaam: Severe Weather Warnings Baseline

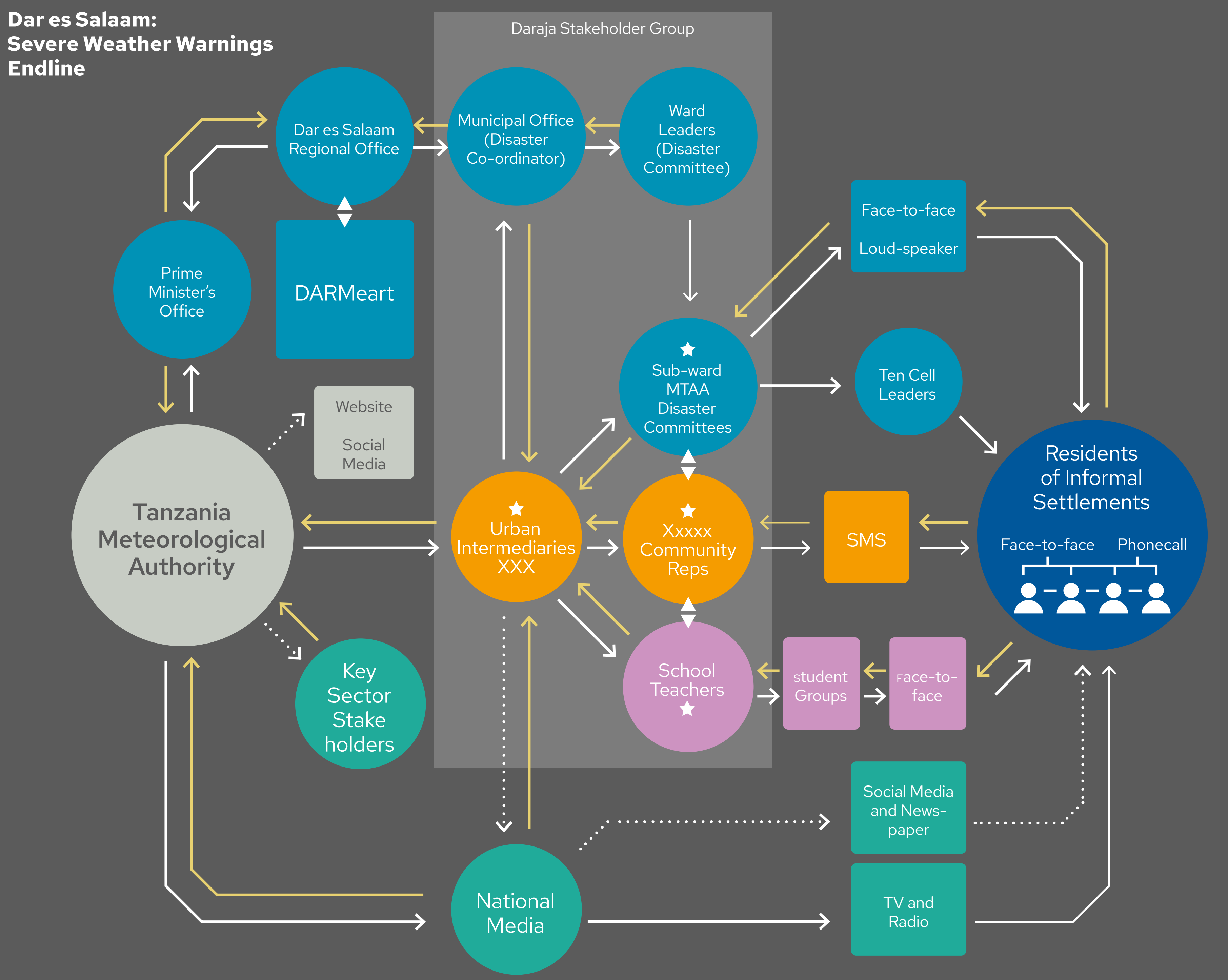


- Value Added to Information
- Actor
- Information Channel
- Feedback Flow
- Less Dominant Flow
- Dominant Flow

STAGE 3

The second diagram shows the extended range of channels reaching to, and allowing feedback from, at risk residents supported through the project.

The diagram shows severe weather warnings for residents of informal settlements in Dar es Salaam, Tanzania, living in flood-prone areas of the city, comparing baseline and endline to identify the extended reach and feedback enabled through the project.[9]



9 DARAJA, 2020 Learning-review-deck_master-.pptx (live.com) https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.resurgence.io%2Fwp-content%2Fuploads%2F2019%2F01%2FLearning-review-deck_master-.pptx&wdOrigin=BROWSELINK

Additional Resources

Climate context and risk analysis options

Forecast-Based Financing And Early Action For Drought
www.forecast-based-financing.org/wp-content/uploads/2020/06/1.-Guidance-Notes-A-Report-on-FbA-for-Drought.pdf

Integrating Climate Change Adaptation Into Secure Livelihoods
www.christianaid.ie/sites/default/files/2016-03/climate-change-adaptation-toolkit-framework-approach-oct-2010.pdf

Climate Vulnerability and Capacity Analysis Handbook (CVCA)
https://careclimatechange.org/cvca/#:~:text=The%20Climate%20Vulnerability%20and%20Capacity%20Analysis%20%28CVCA%29%20is,communities%20in%20increasing%20their%20resilience%20to%20climate%20change.

How to interpret weather and climate information

The probabilistic nature of information

SHEAR, BRACED, WISER. A Practical Guide to Seasonal Forecasts.
www.climatecentre.org/downloads/files/A%20practical%20guide%20for%20seasonal%20forecasts_SHEAR.pdf

Forecast skill

- Met Office videos on seasonal forecasting, particularly: Introduction and Parts 1 to 4
  www.youtube.com/watch?v=CucEP23gWfU&list=UUSW7Jij3hIcz9EXZSxUZauw
- ENSO blog about monitoring and forecasting El Niño, La Niña, and their impacts.
  www.climate.gov/news-features/blogs/enso/betting-climate-predictions
- The Red Cross Red Crescent Climate Centre game "Paying for Predictions"
  www.climatecentre.org/resources-games/games/2/paying-for-predictions
- A brief discussion of forecast reliability
  www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/user-guide/interpret-reliability
- Comprehensive summary of all commonly-applied forecast verification metrics
  www.cawcr.gov.au/projects/verification
- EUMETSAT training course on forecast verification
  www.eumetrain.org/data/4/451/english/courses/msgcrs/index.htm

Integrating scientific and traditional knowledge

- Ambani, M., Shikuku, P., Maina, J.W., and Percy, F. 2018. Practical guide to Participatory Scenario Planning: Seasonal climate information for resilient decision-making.
  https://careclimatechange.org/wp-content/uploads/2019/06/Practical-guide-to-PSP-web.pdf
- CONFER, 2021, Integrating diverse knowledge types in the development of climate services for improved agro-pastoral community resilience. CONFER Policy Brief - ICPAC
  www.icpac.net/publications/confer-policy-brief
- Crowley, F. Audia, C., Visman, E., and Pelling, M. 2018. Interactions between local and scientific knowledge systems for weather and climate services. BRACED Learning paper #9. King's College London.
  www.braced.org/contentAsset/raw-data/381de69d-73c8-41c7-87c1-a3a5d-8d13d87/attachmentFile
- Kniveton, D., Visman, E., Tall, A., Diop, M., Ewbank, R., Njoroge, E., and Pearson, L. 2014. Dealing with uncertainty: integrating local and scientific knowledge of the climate and weather. Disasters, 39(S1), S35–S53.
  https://onlinelibrary.wiley.com/doi/10.1111/disa.12108
- Onyango, L., Owuor, J., Oloo, P., Kiprop, J., Kniveton, D., Visman, E. and Carswell, O. 2020, Integrating Scientific Knowledge and Traditional Knowledge in Impact Weather Forecasting
  www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/business/international/wiser/highway-wiser-research-fellowship-full-report.pdf
- Visman, E., Pearson, L., Murphy, R (2014) Dialogues for Disaster Anticipation and Resilience. Accessible through individual case studies of approaches to support dialogue at Dialogues for Resilience – Humanitarian Futures
  www.humanitarianfutures.org/library/dialogues-for-resilience
- Ziervogel, G. and Opere, A. (editors). 2010. Integrating meteorological and indigenous knowledge-based seasonal climate forecasts in the agricultural sector. International Development Research Centre, Ottawa, Canada. Climate Change Adaptation in Africa learning paper series.
  https://idl-bnc-idrc.dspacedirect.org/handle/10625/46185

Risk-informed development: Context and risk analysis

Stage three of The Risk-informed Development Guide suggests participatory relationship mapping exercises to help communities better understand complex linkages between context and risks in development planning. Tools such as transect walks, observation and mapping; focus group discussion, household interviews and Views from the Frontline methodology; storytelling and local, traditional or indigenous knowledge gathering also support this process.
www.gndr.org/resource/risk-informed-development/understand-context-and-risks-in-development

STAGE 4

Mess mapping to prioritise climate risks

For communities most at risk, it is vital for them to prioritise risks and consider impact assessment within their context. Communities at risk engaging in a strengthened understanding of the impacts of climate change will support the process of them prioritising critical or complex/multiple risks in order for them to take decisions that will improve development, adaptation or contingency actions and build resilience.

Key ways to do this include:

- Consolidating information
- Consulting with experts
- Setting up collaborative assessment processes
- Participatory analysis of general situations
- Resilient infrastructure/ ecosystem analysis

Specifically for localising climate projections, Mess Mapping is recommended. It is also recommended that stakeholders identified (for example the National Meteorological Services and/or national climate research institution) can provide a summary of key climate trends in the national context. A discussion can be held with them on which trends are already impacting the community context.

> Mess mapping is one approach for addressing complex challenges that persistently, negatively impact the community

STAGE 4

TOOL 4

Mess mapping

Introduction

Mess mapping is one approach for addressing complex challenges that persistently negatively impact the community and seem to have no perfect solution for addressing them. However, just because there is not one solution, it does not mean that action cannot be taken to reduce the problem.

Understanding complex problems requires a holistic approach and systems perspective, which takes into account the knowledge and lived experiences of multiple stakeholders and disciplines. Mess mapping allows for multiple perspectives to come together in a collaborative process that seems messy but is actually a structured way of making sense of complexity. Mess mapping provides a means for identifying and connecting drivers and processes so that they are made explicit and transparent.

STEP 1

Participants agree on a significant challenge or issue within their local context (for example water insecurity, unemployment or health crises, etc.) The issue of focus might need to be negotiated/prioritised amongst participants. This could occur through soliciting ideas from the group and then collaboratively prioritising each of the issues. For example, one could ask participants to spend a few moments thinking about developmental issues that worry them most and to write these issues down on a post-it note. These post-it notes could then be arranged into themes and these themes presented back to the group for validation. Once the set of themes are finalised, a voting process can help to prioritise the most prominent issue across the group. This issue is written in the centre of a large flip chart paper. It will act as the starting point from which participants will consider the social, economic, environmental, climate and/or political drivers of this issue in the area.

STEP 2

In one colour, start mapping secondary issues that link to the main issue, or make it worse. For example, for water insecurity, linked issues might be affordability of water, distance to the nearest water source, poor water quality etc. Allow everyone to map their ideas on to the central issue until the ideas are exhausted.

STAGE 4

STEP 3

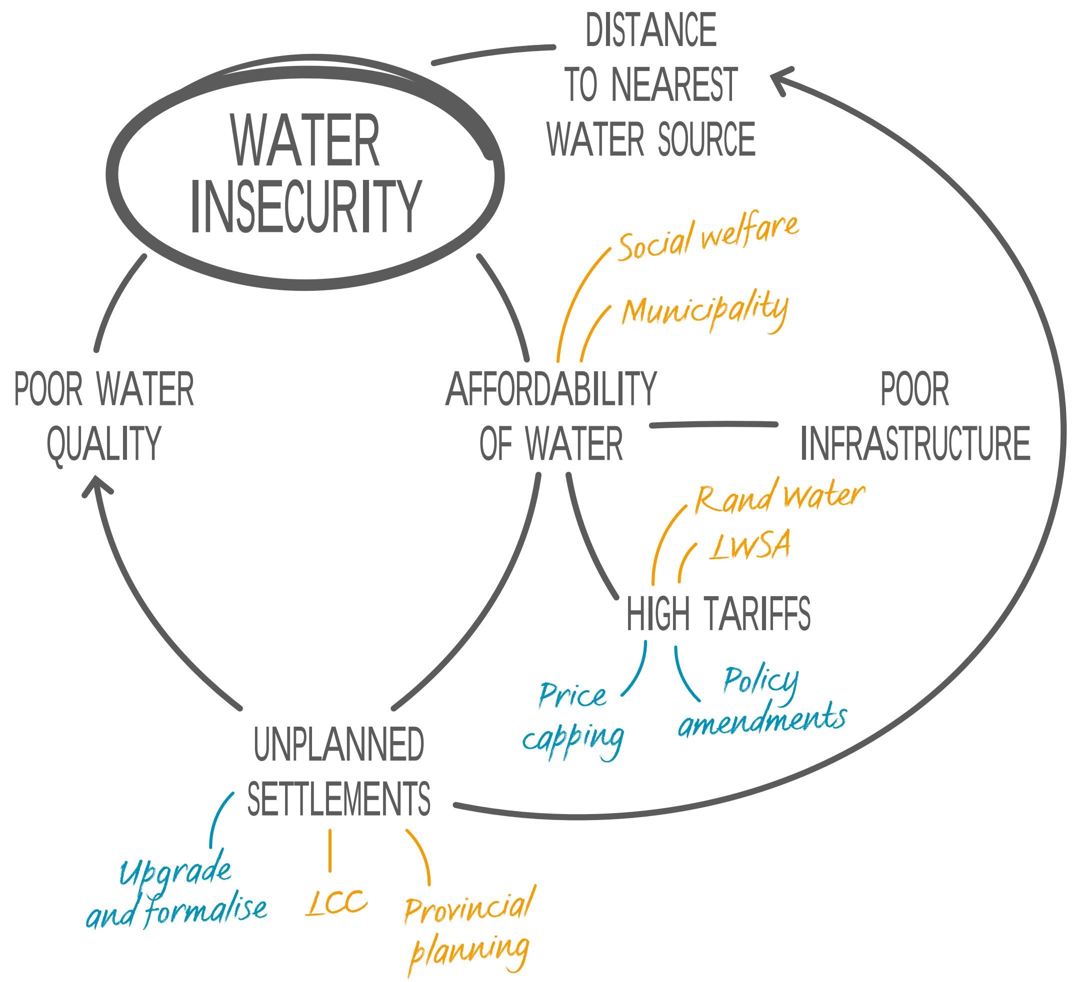
Expand mapped issues to the second or third degree because not all issues link directly to the central issue. For example, affordability of water is linked directly to water security. Linked to affordability of water is high water tariffs, bad infrastructure, unplanned settlements etc. Again, allow everyone to map their ideas until the ideas are exhausted

STEP 4

In a new colour, add the actors who have a role to play in each of the issues. There may be more than one actor linked to each issue and/or one actor may be linked to several issues. Where the latter is the case, the mess mapping process allows for these "central" actors to emerge.

STEP 5

In another new colour, the final step allows participants to add potential solutions to emerging problems next to each area and start to draw feedback loops (positive or negative) between solutions.



THE RESULT

Once the mapping process is finalised (it will never be fully finished because of the nature of complex problems), the map should indicate prominent issues, drivers of these issues, responsible actors in the landscape and potentially how the issues, solutions and actors link together. The mess map can provide a basis for deciding on pathways forward and solutions that cut across multiple issues in the landscape. Once you have completed your mess mapping, the next step is to reflect on how climate impacts on the risks you have identified.

Refer back to this 'messy map' throughout the process of next steps that consider various future projections.

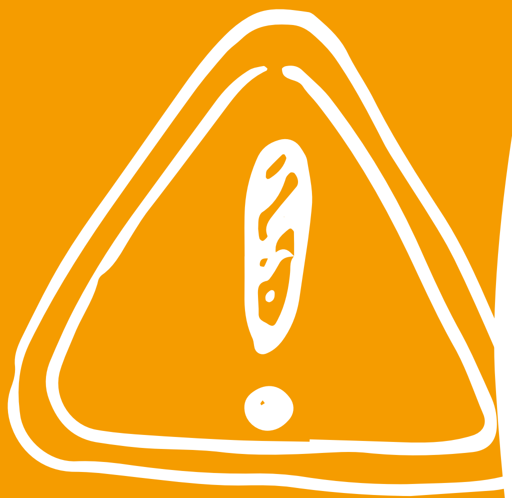
Additional Resources

Risk-informed development - risk prioritisation

Stage Four of the Risk-informed Development Guide highlights prioritising risk or creating impact assessments through consolidating information gathered and setting up a collaborative analysis process with the community and identified stakeholders, as well as completing a process of analysis to begin to prioritise issues and make decisions on what challenges to focus on – therefore what climate projection data, forecasting or climate action needs to be taken. www.gndr.org/resource/risk-informed-development/risk-prioritisation-and-development-impact-assessment

STAGE 5

Climate risk narratives



Exploring what is happening in the wider society and trying to foresee the many different plausible futures from multiple emerging trends allows communities most at risk to shape their risk-informed development plans.

Horizon scanning and recognising mega-trends can help inform and capture new risk drivers and other external forces of change. It can also help capture the changing nature of climate, and other risk drivers, in the context of the community at risk.

The climate risk narrative (CRN) process is suggested as the main method to achieve this.

TOOL 5

Climate risk narrative (CRN) process

Introduction

Climate risk narrative (CRN) processes bring together stakeholders to analyse different types of evidence (including scientific climate information, practical and experiential knowledge, local and traditional knowledge and perspectives from different stakeholders) to consider a range of potential climate futures.

CRN does not seek a perfect solution to complex climate issues, but should spark important conversations that can inspire climate planning and action. The collaborative co-production of CRNs enables a process for exploring elements of socio-ecological systems, including current (and potential future) drivers of climate risk. Moreover, these co-production processes can help to identify information gaps that undermine resilient planning (e.g. scientific climate change projections), as well as mechanisms for plugging these gaps.

Guiding principles:

Co-production is key to extracting valuable information from the mix of evidence available to scenario plan and eventually inform decision making and action. This co-production is founded on three core principles:

- **Humility:** Being willing to acknowledge ignorance while not withholding expertise and to recognize knowledge and expertise in those outside of the science community.
- **Dialogue:** conversations between equal partners are critical and ensure fair consideration of all perspectives in decision making
- **Trust:** Knowing and trusting each other's roles and contributions to the process

STAGE 5

CRNs base their scenario planning on three key concepts that provide a framework for the information that is presented:

- **Added value:** Not all facts, knowledge, understanding and expertise, adds value to a particular context. In particular, being a "scientific result" does not automatically add value. Value must be placed on other types of knowledge as well (if it is relevant to the discussion)
- **Assumptions and choices with consequences:** Building on the principle of transparency and provenance, a rigorous interrogation of assumptions and choices made, and unpacking of the potential consequences
- **Good enough:** In direct response to "decisions are urgent", a consideration of what amount of knowledge or information is sufficient to inform a decision is important. Related to added value in that more, or "better" information, may not substantively add value to a decision, group agreement on sufficient or "good enough" information to proceed is needed

STEP 1

Collectively identify a "significant issue" that resonates with all stakeholders

While a key value of CRNs is building a systemic picture of change, it is important to start the process by identifying a key development issue or challenge that resonates with all stakeholders. Just as with the Messy Map, this issue can have multiple facets. For example, flooding can be a significant issue but have multiple facets ranging from infrastructure through to health and livelihoods.

Gather a variety of issues from the group and then prioritise the most urgent of these issues through participatory processes. To do this, ask participants to spend a few moments thinking about development issues that worry them most (at this point in time), then to write them down (one per sticky note). Arrange these sticky notes into themes and present these themes back to the group for validation. Once the various themes are agreed on, use a voting process to prioritise the most prominent issue across the group.

It is also sometimes helpful to use processes like "voting with your feet" where you ask participants to position themselves in the room based on which significant issue they mostly strongly align with. You can assign ends of the room or corners of the room to different issues and then ask people to try to position themselves according to their priorities. This can help create a collaborative dynamic.

STAGE 5

STEP 2

Participatory process to identify key systemic risks

Through methods such as mess mapping[10] unpack the significant issue into different facets or elements, and points of concern, including how these elements interact with each other. This mapping should include both natural/physical elements as well as social/institutional elements such as key institutions, policies, plans, etc.

The process is messy because there will be multiple perspectives on how elements interact and which are the key points of concern. While conversations around these are very valuable, the objective should not be to eliminate diverse perspectives but rather to incorporate them into the uncertainties captured by the CRNs.

Participants should come up with a messy map that has different factors, institutions and elements that relate to the significant issue, including descriptions of key divergent or diverse perspectives.

STEP 3

Participatory exploration of plausible climate futures

A useful starting point for investigating plausible future climate is to think about past climate events and how they have impacted elements on the significant issue. Building a table such as the one below can help to capture the evidence in a structured way.

	WEATHER EVENT e.g. late onset of rainfall or heavy rainfall event	**RESULTING IMPACTS** e.g. Crop yields reduced, crops destroyed	**CONSEQUENCE** e.g. needed to rely on food aid for the season, insurance claims, malnutrition
Weather event 1	Flooding in January 2022	Crop was destroyed before it could be harvested	Forced to import food at higher costs
Weather event 2	Multi-year drought	Urban water supply constrained	Businesses forced to close, jobs lost

STAGE 5

STEP 4

Introduce broad scale and high level climate change narratives

Adding possible narratives such as higher temperatures and decreased rainfall, higher temperatures and increased rainfall, etc. into the process, will help participants to think through all possible scenarios relevant to the local context. You may want to focus particularly on climate indices that have had an impact on the significant issue in the past (although be careful not to neglect other climate indices that may be yet to result in impacts in your local area).

Initially, climate projections can be high level messages from IPCC WGII reports (https://www.ipcc.ch/report/ar6/wg2/) or the regional fact sheets (https://www.ipcc.ch/report/ar6/wg2/about/factsheets). Identify where these changes have the potential to impact the key points of concern identified in step 2 and what the key uncertainties are. For example, if rainfall decreases this could drive increased failure of ground-water sources, forcing people to seek other sources of water that may have health impacts.

While there are always uncertainties involved, the focus must be on identifying critical uncertainties that require engagement with significantly different futures. For example, some uncertainty in temperature increases is often much less important than large uncertainties in changes in rainfall. This step should result in descriptions of key climate futures and critical uncertainties being set out.

STEP 5

Participatory exploration of non-climate uncertainties

Often, non-climate uncertainties are as important, or more challenging than climate futures. These include urban population growth, rural-urban migration, economic and livelihood shifts, globalisation of food systems, policy and governance trajectories, etc. GNDR set out five risk drivers alongside climate change. Similar to exploring climate impacts on the significant issue, past shifts or events can be used to explore the impact of non-climate elements on the significant issue. While there are always uncertainties involved, the focus must be on identifying critical uncertainties that require engagement with significantly different futures. This discussion should result in non-climate factors being added to the CRN.

STEP 6

Collectively identify three plausible futures

Integrate and collectively deliberate over the climate and non-climate futures and critical uncertainties and identify three plausible futures that span the most critical uncertainties that are internally coherent or plausible. For example, a future characterised by strong rural-urban migration but minimal urban growth is likely not to be coherent or plausible.

STEP 7

Narrative writing and refinement of climate and non-climate evidence

Collaboratively write (initially in a small group then refined by a larger group) three text narratives that describe each plausible future in the present tense and certain terms (see examples below).

The writing process provides another opportunity to collectively construct coherent statements about each future. Writing in the present tense and certain terms is important as it avoids future discounting bias and diluting of statements with opaque uncertainties.

While written narratives are recommended, it is understood that this way of documenting the narratives may not suit everyone. In that case there is potential to explore alternative means of documenting the narratives such as drawing, theatre, oral storytelling etc.

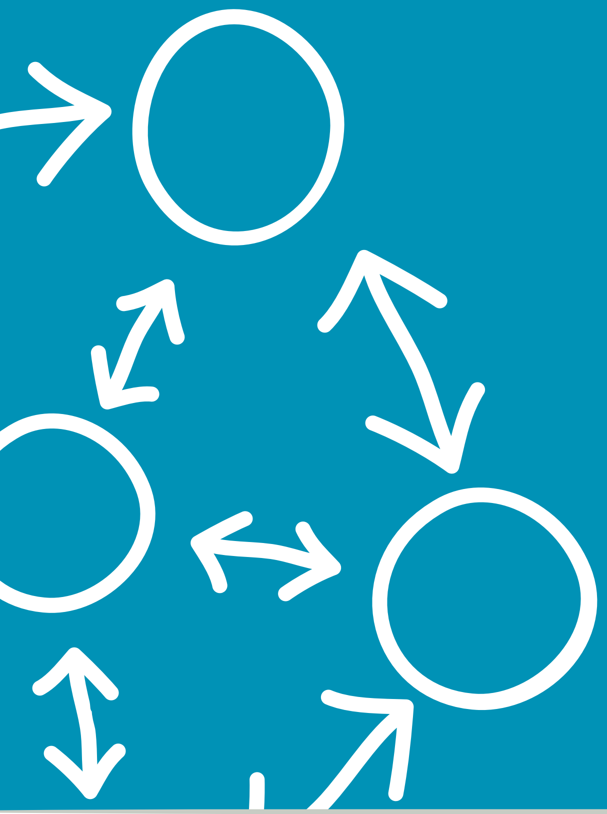
Engagement with stakeholders and disciplinary expertise (e.g National Met Service or other climate service provider, other local experts), refine each narrative to ensure both plausibility and depth. For example, identify and construct supporting evidence for shifts in seasonal onset and the impact on agriculture.

Climate Risk Narratives Maputo, Mozambique

	Scenario #1 HOTTER & DRIER	Scenario #2 WARMER & NO RAINFALL CHANGE	Scenario #3 WARMER & MORE EXTREME RAINFALL
Climate System	Extreme hot days and intense heat waves become more frequent More frequent and severe drought events	Warmer on average Continued risk of flooding and drought events Coastal flooding from rising sea levels	Less predictable rainfall, with more intense wet and dry rainfall seasons Frequent floods and more intense droughts
Impacts	Water shortages Hydropower? Food supply?	Food supply? Hydropower?	Displacement of people due to flooding and droughts Crop failures?
Societal Consequences	Hunger/famine Humanitarian crisis Political instability and conflict	Health impact?	Health impact?
Responses	Adapt agricultural systems Develop adequate building design standards Use alternative energy sources Alternative water technology	Adapt agricultural systems Develop adequate building design standards Use alternative energy sources Alternative water technology	Adapt agricultural systems Develop adequate building design standards Alternative water technology

Note to facilitators: While these steps are presented sequentially in this document, some might need to be revisited as more evidence and knowledge surfaces, or is made available, through engagements with stakeholders, research processes and/or experiences. Ideally, the co-production of CRNs occurs iteratively over time as new evidence is collaboratively explored and integrated.

A range of participatory approaches for managing climate risk have been developed, including climate risk narratives developed by the University of Cape Town. The following website and the resource guide signpost other approaches you might try Novel Approaches to Research and Engagement.[11] https://impact-relevance.futureclimateafrica.org/novel-approaches



10 See tool four

11 Audia, C., Visman, E., Fox, G., Mwangi, E., Kilavi, M., Arango, M., Ayeb-Karlsson, S. and Kniveton, D., 2021. Decision-making heuristics for managing climate-related risks: introducing equity to the FREE framework. In Climate Risk in Africa (pp. 57-76). Palgrave Macmillan, Cham.

Braman, L.M., van Aalst, M.K., Mason, S.J., Suarez, P., Ait-Chellouche, Y. and Tall, A., 2013. Climate forecasts in disaster management: Red Cross flood operations in West Africa, 2008. Disasters, 37(1), pp.144-164.

IFRC (2008) 'International Federation launches emergency appeal for floods preparedness in West and Central Africa'. 11 July. http://www.ifrc.org/fr/nouvelles/communiques-de-presse/general/international-federation-launches-emergency-appeal-for-floods-preparedness-in-west-andcentral- africa/

> Ideally, the coproduction of CRNs occurs iteratively over time as new evidence is collaboratively explored and integrated.

Additional Resources

Serious games

- Red Cross games; www.climatecentre.org/resources-games

Climate risk narratives

- Jack, C. and Jones, R. 2019. Climate Risk Narratives – "Humble" science. www.fractal.org.za/wp-content/uploads/2020/03/IS4-Climate-risk-narratives-humble-science.pdf
- Waagsaether, K.L., McClure, A., Steynor, A. and Jack, C. 2021. Climate Risk Narratives: Co-producing Stories of the Future. https://futureclimateafrica.org/coproduction-manual/downloads/WISER-FCFA-coproduction--case-study-6.pdf

Participatory scenario/ contingency planning

- Ambani, M., Shikuku, P., Maina, J.W., and Percy, F. 2018. Practical guide to Participatory Scenario Planning: Seasonal climate information for resilient decision-making. https://careclimatechange.org/wp-content/uploads/2019/06/Practical-guide-to-PSP-web.pdf

Risk-informed development: scenario planning

Stage five of The Risk-informed Development Guide also offers general guidance and tools on strategic foresight and scenario planning that include horizon scanning, mega-trend analysis, scenario planning and back-casting to the community's vision.

STAGE 6

Make decisions with communities at risk in uncertain times

Reflecting on all the information and CRNs or scenarios gathered, considering their context and vision in this sixth stage of localising climate projections allows communities to make informed decisions about the way forward.

Alongside communities most at risk, it is important to consolidate the decisions they have made to design appropriate and viable development actions, strategies or interventions around development, that build a sustainable and resilient future. The best course of action to address risk should be anchored in the mitigation or adaptation of that risk.

However, climate change remains uncertain. Change is taking place but the direct consequence of that change and how the climate will continue to change will not be known until the weather is forecast or more certainty on the trends and impact is given. It is necessary to consider principles and approaches for planning under uncertainty and rethink some of the normal 'rules' we use to make decisions. How do we reduce greenhouse gas emissions and human activity that is negatively disrupting the natural balance of the atmosphere (mitigate) and plan for a new climate norm (adapt) when the full picture of climate change is not confirmed?

Decisions are often made on a cost-benefit basis – comparing the benefits of actions to the costs of undertaking them. Unfortunately, we cannot do this with climate change as the uncertainty means we cannot be sure what the future benefits will be. The linear cost-benefit analysis approach does not work within complex climate risk. A new set of rules to guide decision making under uncertainty is suggested - FREE.

Decisions made within localising climate projections should be made on a basis that is:

Flexible - open and reactive to new information as it emerges

Robust - open to a range of plausible futures

Economic - not wasting money in a "no regrets" approach as we try out new solutions

Equitable - the actions taken to reduce personal/local risk do not increase the risks for other people or communities.

An example of a flexible, robust, economic and equitable plan for seasonal climate risk comes from West Africa in 2008. In this case, the International Federation of Red Cross and Red Crescent Societies (IFRC) used a seasonal forecast to implement an Early Warning, Early Action strategy for enhanced flood preparedness and response. Historically, severe floods in West Africa had killed thousands of people and caused significant material damage in Central and West Africa (IFRC, 2008). Indeed, just the year before, in 2007, the region had experienced the worst flooding in decades. As a result of these floods more than 300 lives were lost and more than 800,000 people were affected (Braman et al., 2013).

A forecast gave a 50% probability of above average rainfall, a 35% probability of average rainfall and a 15% probability of below average rainfall for the upcoming wet season. The forecast can be summarised as suggesting there is an increased likelihood of above average rainfall and this might be considered to infer a higher likelihood of flooding. However, it cannot be said exactly where and when this flooding might occur and there is a sizeable chance that the rainfall might indeed be average or below average, with less likelihood of flooding than normal.

This level of confidence might be thought of as similar to a climate change projection. The FREE type response to this was to preposition non-perishable food items at transport hubs. In particular, the positioning of food at transport hubs meant that the food could be distributed quickly, as information came in about when and where it was needed. The non-perishable nature of the food meant that the action was economic, or a low or no regrets action, as the food could be used the next year. Further, the action is equitable in that IFRC used its capacity to take on the potential risk, and committed to providing impartial support to the at risk populations. As such, IFRC avoided displacing the risk to people or institutions who lacked the means to shoulder both the risk and its potential future impacts.

Additional Resources

Participatory Impact Pathways Analysis and FREE Framework

- Audia, C., Visman, E., Fox, G., Mwangi, E., Kilavi, M., Arango, M., Ayeb-Karlsson, S. and Kniveton, D. 2021 Decision-Making Heuristics for Managing Climate-Related Risks: Introducing Equity to the FREE Framework https://link.springer.com/chapter/10.1007/978-3-030-61160-6_4
- Fox, G. and Kniveton, D. 2019. People, participation and pathways: Supporting the integration of climate information into decision making in west Africa. www.amma2050.org/sites/default/files/TR%208.%20People%2C%20Participation%20and%20pathways.pdf

Ways of working with decision makers to localise information

Risk reduction

Forecast-based Financing practitioners manual. https://manual.forecast-based-financing.org/en

Agriculture

Dorward, P., Clarkson, G. and Stern, R. 2015. Participatory Integrated Climate Services for Africa Field Manual. A step by step guide to using PICSA with farmers. https://research.reading.ac.uk/picsa/wp-content/uploads/sites/76/Manuals-Resources/PICSA-Manual-English.pdf

Cities

Taylor A, Siame G and Mwalukanga B, 2021. Integrating Climate Risks into Strategic Urban Planning in Lusaka, Zambia in Conway D and Vincent K (eds.), Climate Risk in Africa, 115-129 https://doi.org/10.1007/978-3-030-61160-6_7

Planning

Kniveton, D., Visman, E., Daron, J., Mead, N., Venton, R., Leathes, B (2016) A practical guide on how weather and climate information can support livelihood and local government decision making: An example from the Adaptation Consortium in Kenya (Met Office) www.adaconsortium.org/images/publications/CIS-Improved_livelihood_and_decision_making.pdf

Co-producing decision-relevant climate information

- Carter, S., Steynor, A., Vincent, K, Visman, E., Waagsaether, K.L. (2019) Manual: Co-production in African weather and climate services, WISER/FCFA. https://futureclimateafrica.org/coproduction-manual/downloads/WISER-FCFA-coproduction-manual.pdf
- Vincent, K., Steynor, A., McClure, A., Visman, E., Waagsaether, K.L., Carter, S. and Mittal, N. 2021. Co-production: Learning from Contexts. In Conway, D. and Vincent, K. (eds) 2021. Climate Risk in Africa. Adaptation and Resilience. Palgrave. p37-56. https://doi.org/10.1007/978-3-030-61160-6_3
- Visman, E., Audia, C., Crowley, F., Pelling, M., Seigneret, A., Bogosyan, T. 2018. Underpinning principles and ways of working that enable co-production: Reviewing the role of research, KCL/BRACED Learning Paper #7 www.braced.org/contentAsset/raw-data/cbca239a-a485-47dc-9dfc-fe07d811afd1/attachmentFile

Co-production case studies

- Co-developing climate information for decision making through podcasts: Experience from 9 southern African cities www.youtube.com/watch?v=y-5wSmuXnlk
- Carter, S., Steynor, A., Vincent, K, Visman, E., Waagsaether, K.L. (2019) Manual: Co-production in African weather and climate services, WISER/FCFA. https://futureclimateafrica.org/coproduction-manual/downloads/WISER-FCFA-coproduction-manual.pdf

Risk-informed development - strategising with the community most at risk

Stage Six of The Risk-informed Development Guide highlights general strategic decision making processes.

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