



Photo: Drought in the Ewaso Ng'iro River Basin in central Kenya, 2017, by Denis Onyodi/KRCS.

Improved decision-making to act in anticipation of hazards

SHEAR research outcome

The Science for Humanitarian Emergencies and Resilience (SHEAR) programme worked with stakeholders at all levels and across sectors to improve anticipatory capacities and decision-making processes to enhance action in the face of future hazards. This brief outlines advances made in decision-making for disaster preparedness, response and recovery.

Summary

SHEAR has shown that it requires dedicated processes to support stakeholders in vulnerable areas to access, understand and plan for action in the face of (upcoming) disasters.

The fundamental work of SHEAR projects on the forecasting of extreme hazards included developing the long-term capacity of local stakeholders to act upon forecasts for disaster preparedness. Confident action grows from trust in the accuracy of forecasts; the ability of decision-makers to understand and act on warnings; collaboration between key stakeholders; and using decision-relevant tools and products.

SHEAR has also improved targeted disaster response, using learnings to support decisions about the mobilization of resources and actions to take during disaster response and recovery.

Introduction

Forecasts can significantly strengthen preparedness, response and recovery, which saves lives and protects the livelihoods of disaster-affected populations. The translation process to make forecasts actionable across sectors, however, is often underestimated. Preparedness, disaster risk management and response involve numerous stakeholders, complex systems and a challenging data and information landscape. Stakeholders at all levels need to make life- and livelihood-saving decisions, often in extremely short timeframes, with scarce resources as well as incomplete information about the hazard, exposure and vulnerability. Coordinating the planning and implementation of preparedness, response and recovery also requires navigating different roles, responsibilities, mandates and capacities. SHEAR projects have been supporting decision-makers to address many of these challenges.

Defining decision-making

Many people, roles and titles can be encompassed in the term “decision-makers”. In this instance, we can define decision-makers as government agencies, civil society and community members who have the authority to make choices about disaster risk management (in its multiple forms) at various stages and based on the knowledge and information available to them. In the case of SHEAR, these decision-making processes are related to the multiple forms and stages of disaster risk management, with the overall aim to facilitate better access to information relating to the hazard risk, exposure and vulnerability.

Decision-making for disaster preparedness

Taking actions in advance of hazards is a key component of disaster risk management, which is increasingly recognized in international, national and local policy frameworks and strategies. Appropriately planned preparedness actions can reduce the impact of the hazard and meet people’s dire needs. Incorporating disaster preparedness into long-term development plans is integral to its sustainability and effectiveness. SHEAR projects successfully worked with decision-makers across levels and sectors to support disaster preparedness. Developing the long-term capacity of local stakeholders to act upon forecasted extreme hazards and weather events has been fundamental to the SHEAR programme.

About SHEAR

The SHEAR programme (Science for Humanitarian Emergencies and Resilience) carried out innovative research, in some of the most hazard-prone parts of the world, to better understand and forecast disasters, and minimize the risk they pose to vulnerable communities.

SHEAR cutting-edge research aimed to enhance the quality, availability and use of risk information and early warning systems.

SHEAR research brought together the unique knowledge and skills of stakeholders in physical and social sciences, disaster risk management practice, and policymaking. Effectively managing this range of expertise enabled SHEAR to deliver holistic cross-disciplinary, high-impact work on disaster risk and resilience.

For further information please see the [SHEAR Knowledge Product Directory](#).

Acting with confidence

With the greater accuracy, detail and certainty of forecasts, early warning and early action can be implemented effectively for vulnerable populations. SHEAR projects are working with national and regional forecasting agencies to build capacities by sharing knowledge and skills, and co-developing tools and processes. For example, the Kenya Red Cross Society (KRCS) – a partner of the [Forecast-based Preparedness Action \(ForPac\) project](#) in the country – is now accessing multi-model forecasts rather than relying on a single forecast. ForPac co-developed multi-model forecast products with the key mandated agencies in the country. With the work of ForPac, these forecast products are available at different lead times and with skill assessments, enabling institutional disaster risk management planning to be staggered, responding to changes in conditions and needs over time. In 2020, KRCS was able to start planning for a drier than usual October–December season as early as July, based on the provision of ForPac early forecast products and in the knowledge that these forecasts are skilful from as early as May.

Monitoring data is also crucial for preparedness. The Department of Water Affairs (DWA) in Botswana is applying SHEAR learning to its planning – the [CONNECT4 Water Resilience project](#) has developed new approaches to monitor groundwater downstream of the Gaborone Dam, which supplies water to the entire capital city of Gaborone. The monitoring data is being used by the DWA to adapt its policies and new projects, supporting preparedness decision-making for flood and drought hazards.

Bringing stakeholders together

SHEAR programmes have brought stakeholders in the disaster management space together, which has resulted in various partnerships that have enhanced national and regional capacity for decision-making. The collaboration of [LANDSLIP](#) with the Geological Survey of India (GSI) has provided the GSI with knowledge and tools, which has supported GSI to be able to establish the first National Landslide Forecasting Centre in India. The Centre is led by GSI and brings together expertise from India's Department of Space, the India Meteorological Department, the National Centre for Medium-Range Weather Forecasting in India and the country's National and State Disaster Management Authorities. These stakeholders will collaborate to develop a national landslide early warning system and issue daily landslide forecast bulletins for decision-makers at the district level.

Creating decision-relevant tools and products

A direct result of the co-development of forecasting science, data collection processes and tools with key stakeholders and end users has meant that decision-relevant metrics and user-friendliness were at the core of the design. [SatWIN-ALERT](#) (index-based drought insurance) developed a decision-support tool that has already reached over one million farmers across Ghana, Kenya, Nigeria, Rwanda, Senegal and Zambia. The tool provides key information about forecasts of agricultural and meteorological drought, supporting farmers to make decisions about planting dates based on estimated crop yields. This enables them to prepare for the season ahead, and avoid critical loss of, or damage to, crops caused by drought and the related loss of income and weakening of resilience to future hazards.

Further example: Innovative decision-support

The Web-Based Natural Dam-Burst Flood Hazard Assessment and Forecasting System ([WeACT](#)) is introducing an innovative modelling tool for glacial lake outburst flooding and is conducting training for local research institutions and government agencies to support uptake in Nepal. This will enable stakeholders to identify and prepare for flood risks and to mitigate those risks.

Recognizing the need to strengthen meteorologists' capacities to effectively engage with decision-makers in developing services that can better meet their specific needs, the [SHEAR-funded Learning to Co-Produce initiative](#) brought together the experiences of partners across projects based in East and West Africa and the UK to jointly develop and pilot online training with eight African meteorological training institutions across East and West Africa.

Decision-making for disaster response

In disaster anticipation and response, a range of stakeholders at all levels need to make critical decisions about the mobilization and allocation of assistance as well as the selection and delivery of relevant forecast-based actions. This information is drawn from a wide range of complex data, based on monitoring and forecasting of the hazard itself as well as data about key assets and infrastructure exposed to the hazard, and the vulnerabilities and capacities of at-risk populations. The [Towards Resilience Project](#) has developed a model that identifies priority areas for evacuation, guiding decision-makers in a more targeted response. The model identifies buildings within the flood hazard zone and flags these for evacuation, adapting these flooding maps based on the given rainfall event.

Over the last four years, SHEAR projects have been working to understand decision-makers' needs and to distil and communicate useful information from this data, so that stakeholders can take effective action quickly and efficiently. For example, the [Improving the Role of Information Systems in Anticipatory Disaster Risk Reduction \(IRIS\) project](#) has been working with members of the Start Network – a network of international, national and local humanitarian organizations working to deliver locally led early action for improved emergency response. IRIS has developed briefings for Start Network members, providing guidance on how to use forecasts to respond to heatwaves in Pakistan and cyclones in the Philippines. This guidance enables these organizations to act in advance of crises, while consolidating sustainable forecast-based finance and anticipatory funding initiatives.

Decision-making for disaster recovery

Bouncing back better after disasters is crucial for affected populations. The recovery phase requires institutions across sectors to protect development gains, prevent compounding impacts and losses, and build resilience to future hazard events by learning from the past and anticipating the future. SHEAR projects are working with decision-makers to improve such recovery processes:

- [Mitigating Basis Risk](#) improved the provision of crop insurance for smallholder farmers, with enhanced monitoring of crop development and yields. With this safety net, farmers can recover from shocks to their expected yield and income, and invest in the next planting season without relying on negative coping mechanisms that would reduce their wellbeing and resilience.
- The [National-Scale Impact-Based Forecasting of Flood Risk in Uganda \(NIMFRU\)](#) project worked to quantify the economic impact of hazard events on households. Local authorities in Katakwi District were able to use this tool to assess flood damage to crops and changes in access to livelihoods, guiding the provision of support for affected households to recover from the loss of and damage to their livelihoods and assets.

Key outcome: Extensive partnerships

Over 68 partnerships with key decision-makers at different scales have been developed by the SHEAR research programmes. This has enhanced both the applicability and application of the science and social science outputs created throughout the programme.

Key lessons identified

At each stage of the disaster management continuum – from preparedness to recovery – stakeholders from a wide range of places, agencies, backgrounds and mandates must make decisions based on available information and tools. Supporting these processes was one of the core aims of the SHEAR programme, and many lessons were identified by the projects to better increase the support academic programmes like SHEAR can offer to decision-makers:

- There is a need for more dedicated resources to support more systematic dialogue between scientists and decision-makers.
- A mechanism to monitor this dialogue is necessary. This dialogue requires clear indicators of success related to users' engagement and actions, with dedicated mid-term reviews to allow adaptation of the dialogues. This will also allow justified investment in strengthening decision-makers' capacities to engage with and appropriately use resilience-related science.
- The development of academic research programmes must allow users to learn from each other across the projects and with local decision-makers.
- Key decision-makers related to academic projects should be funded to be key actors, notably in the review of project results and reflection on future steps.
- Locally available science and indigenous knowledge must be valued as central.

Conclusion

SHEAR projects have demonstrated the importance of investing in dedicated processes to support decision-makers to work with scientific information. SHEAR projects have worked to ensure decision-makers can confidently use robust and targeted information for disaster preparedness, response and recovery. It has shown how the users need to be placed centre stage to allow them to work with potentially life-saving scientific information. By combining co-design, capacity building and local ownership with advancements in forecasting science, monitoring and information dissemination, many SHEAR projects have created lasting impact. All the projects emphasize the need for more dedicated focus and funding to translate available data for and with stakeholders into predefined and tailored actionable information (depending on the hazard), to allow them to anticipate and prepare for disasters as well as to enhance disaster response and recovery. While the process requires time and financial investment, it will pay off in many ways – saving lives and livelihoods and protecting hard-won development gains while reducing poverty well beyond the span of the SHEAR projects.



Photo: Decision-making during the Cyclone Idai disaster response in Mozambique, March 2019, by Denis Onyodi/IFRC-DRK-Climate Centre.