Cyclone Idai, Mozambique, response, 18-20 March 2019
(Denis Onyodi/IFRC-DRK-Climate Centre)

Science for Humanitarian Emergencies

What happens when the very disasters that this science is aiming to reduce occur while research is on-going?

Over the past 4 years, many SHEAR researchers and activities have experienced just this.

As disasters hit, SHEAR projects, although still in progress, were brought in to help, putting the research into practice.

Summary:

Forecasting extreme weather events is one of the main aims of SHEAR

The programme's extensive research has already been put into practice during recent humanitarian emergencies, notably through forecast-based action programmes in the Red Cross Red Crescent.

The stories of SHEAR research being used provides a strong evidence base for the value of such work and collaborations.

Advances in forecasting science can help to greatly reduce the humanitarian impacts of potential disasters. This is one of the main objectives of the long-standing Science for Humanitarian Emergencies And Resilience (SHEAR) programme, which supports research projects throughout Africa and Asia that seek to provide practical scientific knowledge and tools to support practitioners and governments in their disaster risk reduction efforts.

Forecast-based Early Action

Perhaps the most documented case of SHEAR research deployed during humanitarian disasters has been through the development and deployment of forecast-based action programmes within the Red Cross Red Crescent Movement. Through forecast-based action, Red Cross national societies can access funds to support preparedness in response to a forecast of a particularly extreme weather event. The development of these systems uses highly robust science and analysis which enable humanitarian actors and governments to take informed, appropriate actions based on weather forecasts.

The role of physical and social scientists in this regard cannot be understated here, as is demonstrated by all the examples below. Indeed, the development and use of such systems would not be possible without their work to produce understandable, actionable forecasts, and building trust with disaster risk management practitioners. Notably, within SHEAR, the HY-FLOOD, PICSEA, FATHUM and ForPAC projects have been key to setting up forecast-based financing systems in Bangladesh, Mozambique, Central America, and Kenya and Uganda, enabling the release of funds to prepare for forecasted events.

Stories of SHEAR support to humanitarian emergencies

Between March 2019 and December 2020, SHEAR research was put into action in response to five large-scale hydrometeorological disasters: Cyclones Idai and Kenneth and Tropical storm Chalane in Mozambique (March/April 2019 and December 2020), Hurricane Iota in Central America (November 2020), and Cyclone Amphan and severe flooding in Bangladesh (May and June, 2020). Details of these crises, and the support given from SHEAR are detailed in the table below.

General Humanitarian Event Information						Humanitarian Multi-donor Response Instrument Information			SHEAR inputs	
Event	Date EAP approved	Region/ Countries Affected	Event Type	Approx No. of people at risk	Source	Response Instrument	Total Budget	Total people targeted (in funded projects)	SHEAR Projects involved	Principal aspect(s) of SHEAR contribution
Tropical storm Chalane	December 2020	Mozambique	Cyclone / Tropical storm	Unknown	Climate Centre	FbA by DREF	CHF 97.2 million	7,500	FATHUM	Expert advice to EAP development team from FATHUM team.
Hurricane Iota	November 2020	Central America	Tropical Cyclone / Flooding	7.5 million	IFRC	FbA by DREF and DREF Response	CHF 15.5 million	Unknown	FATHUM + HYFLOOD	Production of flood forecast bulletins to support humanitarian agencies.
Floods	June 2020	Bangladesh	Flooding	3.7 million	IFRC	FbA by DREF + CERF	CHF 234K + $5.1 million	16,445	FATHUM + SHEAR SSC	GloFAS forecast evaluation through link with Flood Forecasting and Warning Centre in Bangladesh, use of GloFAS at longer lead times, link between GloFAS model and FFWC model.
Cyclone Amphan	May 2020	Bangladesh	Cyclone	14.2 million	IFRC	FbA by DREF	CHF 433K	7,300	HYFLOOD	Flood Forecast Bulletins produced for FCDO for storm surge.
Cyclones Idai and Kenneth	March 2019	Mozambique	Tropical Cyclone/ Flooding	1.5 million	IFRC	Imminent DREF	£27 million	608,140	FATHUM + HYFLOOD + PICSEA	The use of real-time flood hazard reports by humanitarian agencies in Mozambique following Cyclones Idai and Kenneth was shortlisted for the 2019 Times Higher Education awards.

In addition to these operations, SHEAR research has also supported the development of forecast-based early action protocols for flooding in Zambia and Mozambique which have now been validated by the Red Cross Red Crescent System and are ready to be triggered whenever the risk thresholds are reached. In addition to the validated protocols, the FATHUM and ForPAc projects are continuously contributing to the current development of similar Red Cross Red Crescent programmes for flooding in Kenya, Uganda, and Ethiopia.

Date	Region/Countries Affected	Event Type	Source	Response Instrument	Total Budget	Total people targeted	SHEAR projects involved	Principle aspect(s) of SHEAR contribution
2021	Zambia	Flooding	IFRC	FbA by DREF	CHF 250K	1000 households	FATHUM	FATHUM supporting EAP development, particularly on triggers and thresholds.
2021	Mozambique	Flooding	IFRC	FbA by DREF	CHF 3.4 million	1500 households	FATHUM and HY-FLOOD	Expert advice to EAP development team from FATHUM team to inform flood EAP (Limpopo flooding), FATHUM and HYFLOOD team producing cyclone bulletins for FCDO.

Discussion and Lessons Learned

SHEAR presence at the forefront of anticipatory action demonstrates the importance of the programme's mission to bring together the academic and humanitarian sectors to create usable science and develop effective relationships.

SHEAR projects contributed to increasing the skill of weather forecasts, to the development of thresholds and triggers for Early Action Protocols, and in the evaluation of their implementation. Through these, over 640,000 people have been directly reached with support to prepare for and respond to disasters, reducing the time and costs involved in responding to a disaster after it occurs, and increasing the impact of humanitarian action on lives and livelihoods.

Many impacts of the specific interventions have yet to be properly evaluated, so are not captured in this figure, which nonetheless indicates the potential value of these mechanisms and of the scientific innovations SHEAR is leading.

Lessons learned from the SHEAR-related programmes will be the subject of much discussion as the programme concludes in 2021-2022, which will be documented for future use and discussion.

Next Steps

The deployment (or triggering) of forecast-based action programmes is therefore one of many areas where the impact of SHEAR can already be seen, despite the fact that the projects are not yet finalised, and present a major achievement and concrete proof-of-concept of the importance and value of such research.

These early action protocols are also poised to be a major legacy of SHEAR. Forecast-based action is changing the ways in which disaster risk reduction and response are conceptualised, and will continue to use the research developed and lessons learned under the SHEAR projects, ensuring that the science is disseminated, accessible, and made usable beyond the lifetime of the programme.

For more information, contact the Red Cross Red Crescent Climate Centre and SHEAR Knowledge Broker consortium.