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Understanding the use of 2015–2016 El Niño forecasts in shaping early humanitarian action in Eastern and Southern Africa

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ABSTRACT

Humanitarian organizations are increasingly interested in using seasonal forecasts to prepare for and mitigate the impacts of potential disasters before they begin. El Niño teleconnections increase the predictability of flooding and drought events in Southern and Eastern Africa, providing humanitarian stakeholders with advanced warning of potential weather events. This study draws on evidence from key-informant interviews with humanitarian organizations and government officials in five African countries (Zambia, Somalia, Kenya, Ethiopia, and Malawi) to better understand how national, regional, and international humanitarian organizations respond to climate and weather warnings. We find that organizations looked to data from past El Niño events to develop contingency plans and gradually implement response activities but that few organizations attempt to monitor and evaluate their activities or use forecasts to help people capture additional benefits. Although they would like greater specificity and higher forecast skill, humanitarians largely trust international forecasts. Access to intermediaries, contextualized data, and flexible funding, and well-established social protection mechanisms facilitate action. Based on these results we recommend that future efforts focus on developing capacities and complementary, localized, information that will help actors translate the forecasts into action. Future research is also needed to understand whether action leads to desired impacts.

1. Introduction

As forecasting capacity has improved in recent decades and concern about climate change has grown, donors and organizations working in the fields of humanitarian aid and development have expressed increasing interest in the use of forecasts to inform their operations. This is part of a broader shift toward investing in disaster preparedness and mitigation [53,87,89] and efforts to connect humanitarian response to longer-term development, such as the Sustainable Development Goals [86], the Sendai Framework for Disaster Risk Reduction [88], the Grand Bargain [52]. There is also widespread belief among practitioners, and mounting evidence, that shifts to mitigation, preparedness, and early action can help reduce the costs of humanitarian response [14,15,46,26]. Likewise, advocates of forecast use believe that monitoring seasonal (3–6 months) and short-term (10 days) forecasts can help humanitarians and disaster managers prepare for and respond to climate-related shocks such as floods as droughts [10,24,45,50] and reduce overall expenditures [46].

The disaster management cycle consists of four phases: mitigation, preparedness, response, and recovery. Mitigation and preparedness occur before disasters, whereas response and recovery take place afterward. Mitigation seeks to increase capacity or reduce vulnerability and exposure in order to reduce impacts once an extreme event hits. Preparedness includes developing plans or early warning systems and refreshing training so that responders are prepared to act when an event hits. Response refers to humanitarian efforts once people are suffering from a disaster. Recovery consists of short- and long-term reconstruction and restoring "normalcy."

The use of forecasts has the potential to influence actions during mitigation and preparedness phases. Long-term climate projections, combined with seasonal and short-term forecasts can be used to identify and execute more targeted, effective mitigation and preparedness measures and to help target early action measures in areas that are most likely to be affected by an extreme event. The Red Cross Red Crescent Movement, African Risk Capacity Facility, START Network, Global

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Parametrics, the United Nations Food and Agriculture Organization (FAO) and other organizations, for example, have been testing trigger-based, index-based (see for example [26]) and forecast-based financing (FbF) as a means of anticipating and initiating early action with an aim to minimize disaster impacts (for further information on FbF see [24]).

In response to growing interest in forecasts from the humanitarian community and beyond, scholars have examined opportunities and constraints to the use of forecasts at the household and individual level (see for example [47,67,77,69,79]). However, at the organizational level, comparatively little is known about how humanitarian organizations respond to seasonal forecasts or about the factors that enable and constrain institutional humanitarian action.

This study begins to fill that gap by examining forecast-based early action in five countries in response to seasonal forecasts issued during the 2015–2016 El Niño. While we do not attempt to assess the skill of forecasts and whether they merited a response, we shed light on the enabling factors for taking early action. Based on interviews with national, regional, and international humanitarian organizations involved in prediction of and response to the 2015–2016 El Niño, this research addresses four primary research questions:

1) How do international humanitarian organizations currently respond to seasonal forecasts?
2) What factors constrain forecast-based early humanitarian action by national, regional, international organizations?
3) What factors facilitate forecast-based early humanitarian action by national, regional, international organizations?
4) What policy implications or lessons for future practice can we draw from these responses, opportunities, and constraints?

1.1. Relevance of the 2015–2016 El Niño

There are two primary reasons that the 2015–2016 El Niño provides an excellent opportunity to understand whether humanitarian organizations are able to take early action based on forecasts and what factors facilitate or hinder action. Firstly, global teleconnections associated with El Niño and La Niña episodes provide intrinsic predictability that increases the skill of seasonal predictions of rainfall and temperature over large regions of the tropics and subtropics during El Niño and La Niña years [4,42,81,94]. The frequency of climate-related disasters does not increase during an El Niño or La Niña years relative to neutral years, meaning ENSO represents a best-case scenario in terms of the ability to forecast seasonal precipitation and estimate likely impacts [42]. As an El Niño or La Niña event becomes stronger, forecast skill also increases because the likelihood of seeing the historically expected impact increases [42]. Better predictive skill and accumulating experience acting on El Niño forecasts has the potential to increase the capacity of humanitarian actors to anticipate—and hence take early action—based on seasonal weather patterns and their likely impacts. As the 2015–2016 El Niño was considered the strongest El Niño event in nearly two decades [58] examining early humanitarian action based on these forecasts sheds light on how organizations respond when skilful forecasts are available.

Secondly, leading up to the 2015–2016 El Niño, forecasters and intermediary organizations made concerted efforts to disseminate El Niño forecasts and impact advisories to governments, and international development and humanitarian organizations around the world with the express purpose of influencing appropriate action. Understanding whether such efforts were fruitful can help to improve forecast production, dissemination, and use during future El Niño or La Niña events.

1.2. Structure of this study

The paper is structured as follows. In order to inform our analysis of responses to the 2015–2016 El Niño forecasts, we begin by reviewing the literature on potential humanitarian responses to forecasts and the relationship between forecasts and decision-making. The literature review demonstrates that there is a wealth of existing lessons regarding the opportunities and constraints of forecast-based decision-making across contexts and sectors. After summarizing our methods for data collection and analysis, we present our results as common themes in how organizations respond to forecasts and the factors that enable and constrain their action. The discussion then highlights the lessons learned from these common themes and their implications for future practice. We conclude with a summary of our results and lessons and considerations for future research.

2. Literature review

The broader literature on science and decision-making has shown that science is only one of many factors that influence decision-making [57,66,70,74,80]. Values, issue framing, and social identity are among the other factors that influence the assimilation of science, and hence people's propensity to act on it [71,97,99,100]. Previous studies demonstrate the multitude of factors that may prevent or discourage organizations, individuals, and households from acting on seasonal forecasting information. This section reviews existing literature on forecast use to provide background for our analysis of humanitarian response to 2015–2016 El Niño forecasts.

2.1. The early action space

According to the existing literature, potential organizational responses to forecasts include updating contingency plans, prepositioning relief items, conducting disaster preparedness trainings, requesting pre-emergency funding, or reallocating development funds to meet emerging needs [9,45]. In addition to these actions, there has also been increasing interest in integrating forecasts with adaptive social protection programs. Adaptive social protection seeks to link various social protection mechanisms with disaster risk reduction and climate change adaptation [1,28,29,32,62,73]. In theory, forecasts can provide such a link by allowing governments and humanitarian donors to expand social protection benefits to additional households or provide additional payments to households in areas that are likely to be affected by future floods or droughts, helping households to prepare or cope with the shock [23,28]. Advocates argue that triggering action based on specific data or indices would lead to faster responses and hence less harm [5,23,28]. Preliminary evidence suggests that indices can be used to trigger early action [5], but no studies have demonstrated that forecasts can be used effectively to trigger social protection benefits before shocks occur.

2.2. Factors influencing individual and organizational early action

Much of the academic literature on the use of seasonal forecasts focuses on individual actions and adjustments to livelihood practices based on forecasts. In contrast, information on humanitarian early action comes largely from grey literature and organizational reports (many of which describe responses to 2015–2016 El Niño forecasts). Although there may be significant differences between individual and organizational responses to forecasts, here we provide an overview of what is currently known about both user groups in order to draw parallels, identify gaps in existing knowledge, and reinforce past lessons.

2.2.1. Access

Although access to forecasts was once an obstacle to early action by governments and humanitarian organizations [8], dissemination and access have greatly increased over the last twenty years [96]. While household users still have varying access to forecast information [3,49], organizations, especially those operating at the global scale with regional presence have access to global level forecasts and support regional and national coordination efforts led by government designated entities.