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Food Security Crises, Climate Change and Population Dynamics

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Introduction

Climate risks disproportionately affect the most vulnerable people, for whom even a small weather event can quickly escalate into a food and nutrition crisis. The poorest people are more exposed than the average population to climate shocks such as floods, droughts, and heat waves, and they lose much more of their wealth when they are hit (Winsemius et al., 2015). Climate-related disasters increase hunger by destroying land, livestock, crops and food supplies, and make it harder for people to access markets and food networks. In Zambia, children born in drought conditions are up to 12 percent more likely to have below-average height and weight than children born in non-crisis years (Gitau et al, 2005). In Bangladesh studies show increased wasting and stunting rates among preschool children after floods, due to reduced access to food, increased difficulties in providing proper care and greater exposure to contaminants (Del Ninno et al, 2003).

Already, more than 80 percent of the world's hungry people live in countries prone to natural hazards with high levels of environmental degradation (Guha-Sapir et al., 2015). Nearly 1.4 billion people live on less than US$1.25 a day. Seventy percent of these people live in rural areas where they depend on agriculture and face increasing climate disasters and risk. Climate change could reduce potential agricultural output by up to 30 percent in Africa and up to 21% in Asia (FAO, 2009). As a result, climate change could increase the risk of hunger and malnutrition by up to 20 percent by 2050 (IPCC, 2014).

The last four years have seen a reversal in decades of progress towards eradicating food insecurity. The latest estimates of global food insecurity suggest that over 821 million people experience food insecurity – compared to 785 million in 2015 (FAO et al., 2019). Perhaps most worrying the prevalence of severe food insecurity has increased from 7.9 to 8.7 percent of the global population (FAO et al., 2019). At the same time, emergency food assistance needs have increased for the fourth consecutive year: over the course of 2020, around 88 million people in 46 countries are projected to require emergency food assistance – representing an increase of 87 percent compared to 2015 (FEWS NET, 2019). This negative trend is primarily the result of protracted conflicts and increased magnitude of extreme weather events (FAO et al., 2019). Within this context, understanding the links between population dynamics, climate risks and climate change and the roles these have in determining food security has never been more urgent. Not only is it essential to better understand how population dynamics affect food crises today, it is also important to look beyond the next few years and better understand the intersection of slow-onset climate change events (e.g. desertification and deglaciation) and food security. I highlight five key points to consider below:

1. **The complex drivers of food crises**

Food crises most often result from the intersection of multiple hazards, shocks and stressors with a context of underlying vulnerability. For example, Afghanistan is currently facing the most severe food crisis it has faced in over a decade. This crisis appears to be the result of multiple years of increased displacement and conflict between 2016 and 2018, exacerbated by drought and La Niña in 2017 and 2018. Many other recent food crises follow this pattern of multiple shocks and stressors affecting populations in series and in parallel, driving food insecurity and other crisis outcomes – an issue we return below in the context of the COVID-19 pandemic. Population data and understanding population dynamics is essential to understand the drivers of food crises. First, we need to know how many people are affected by each specific hazard, whether that hazard is a climate, conflict, market or other hazard. Second, we need to understand the demographics of these populations, including how they access food and income, their expenditure patterns, their asset bases, and their capacities to adapt to shocks and stressors (e.g. by extending seasonal labor migrations). While we have better data on population, their locations, and their movements now than ever before – and we have better household level data on their food security and livelihoods - we still only have a limited understanding of how multiple shocks and stressors over time affect populations and their food security, nutrition, and wellbeing.

2. **Understanding the etiology of food crises and their arc**

A study in 2013 showed that in the Philippines over two decades 15 times as many infants died in the 24 months after typhoons as died in the typhoons themselves; 80 percent were infant girls (Anttila-Hughes et al, 2013). This startling finding is one of a series of consistent findings showing how long it takes for people to recover from climate disasters. The World Food Programme (WFP) found that in Niger the most food insecure households take three years to return to normal consumption patterns and stop distress coping after droughts. These findings challenge our typical notions that people get back to normal after a disaster and that the majority of the losses – human and economic – occur in the immediate aftermath of the disaster. Much better understanding of how the cumulative pressures of multiple shocks and stressors erode resilience and in turn how major shocks precipitate population-level impacts that can last years (e.g., through increased mortality) is needed for us to fully understand the arc of food crises. Climate change brings a new element to the equation by driving more frequent and extreme climate shocks which can leave populations with little or no time to recover and brace for the next.

3. **Severity and duration mask population dynamics**

Over the last two decades famine and food security early warning systems have dramatically improved. For example, recent research shows that Famine Early Warning Systems Network (FEWS NET) medium term projections of food insecurity in the Greater Horn of Africa are accurate between 80 and 95 percent of the time (Krishnamurthy et al, 2020). These projections primarily focus on forecasting the severity of food insecurity. However, recent research on major crises such as the South Sudan 2017 famine illustrate the importance of better understanding the population dynamics of food crises beyond area measurement of severity (Maxwell et al, 2018; Tufts, 2019). During this crisis, while the severity of food insecurity rose to the emergency level or Integrated Food Security Phase Classification (IPC) Level 4, successful humanitarian interventions likely kept mortality and malnutrition rates just under the established thresholds for famine (IPC Level 5). However, the prolonged duration of the crisis resulted in an increasing proportion of the population facing emergency food insecurity conditions. This proportion grew from 20 percent of the population in IPC4 to 70+ percent of the population in IPC4 by the peak of the crisis. While mortality rates in individual surveys hovered below the famine thresholds, the absolute mortality for the crisis was very high. This case has now spurred on an active dialogue among practitioners and researcher on how to expand our understanding and measurements of population dynamics within food crises.

4. Slow onset climate change happens one disaster at a time

Although the current impacts of climate extremes are of critical importance, over the long term understanding the impact of slow-onset climate change events is also critical. In the 2000s and 2010s, we saw a glimpse of the kinds of challenges that climate change creates in pastoral areas of the Greater Horn of Africa. Multiple successive years of drought caused successive food crises and a crisis of pastoral dropouts. Pastoral households lost livestock to the point where their herds were non-viable and soon these households lost their livelihood and migrated to towns and cities in Kenya, Ethiopia, Somalia and Uganda. This slow process was driven by successive shocks leading to dramatic demographic shifts.

Recent work on transformative adaptation in agriculture by the World Resources Institute (WRI) highlights the significant lack of analysis of where and when agricultural systems will fail as the climate changes and in turn how people will be affected and cope (Carter et al, 2018). Migration, shifting cropping and livestock systems to new crops and livestock, and major shifts in the use of agricultural technology are all options. In many places around the world, WRI found autonomous transformative adaptation occurring where communities and countries have the resources. In areas where adaptation deficits prevent people from dealing with their current levels of climate risk, much more will need to be done.

5. The rapid accumulation and changing nature of climate risks

The explosion of people and assets in hazard prone areas is amplifying the risks climate change and climate extremes pose to life, property, food security and sustainable development (UNDRR, 2017). Economic losses due to climate-related disasters now regularly exceed $100 billion annually and are projected to double by 2030. Since 1980, risk of economic loss due to floods has increased by over 160 per cent and to tropical cyclones by 265 per cent in OECD countries. In fact, risk of economic loss due to floods and cyclones in the OECD is growing faster than GDP per capita (UNISDR, 2011).

This increase in risk comes at a time when our capacity to absorb risk may be reducing because of population growth, the limits of agriculture, and many other factors (UNDRR, 2019). Climate change not only increases the risks of individual disasters, it also increases the risks of systemic failures at a global level – something we can all relate to more in the face of the global COVID-19 pandemic. The potentials for global food crises worse than the one we faced in 2007/08, where multiple breadbasket failures coupled with supply chain disruptions and trade restrictions affect an even greater global population, with lower global response capacities (the last 5 years have seen the highest levels of humanitarian need 4 to 5 times levels in the early 2010s), could be catastrophic. Understanding these risks and the role of population dynamics in driving risks and in mitigating, distributing, and decoupling them is more urgent than ever.

Reference List

Anttila-Hughes, Jesse Keith and Hsiang, Solomon M., Destruction, Disinvestment, and Death: Economic and Human Losses Following Environmental Disaster (February 18, 2013). Available at SSRN: http://ssrn.com/abstract=2220501

Carter, R., Ferdinand, T., and Chan, C. (2018) Transforming Agriculture for Climate Resilience: A Framework for Systemic Change, World Resources Institute. Accessed at: https://www.wri.org/publication/transforming-agriculture-climate-resilience-framework-systemic-change

Del Ninno, C., Dorosh, P. A., & Smith, L. C. (2003). Public Policy, Markets and Household Coping Strategies in Bangladesh: Avoiding a Food Security Crisis Following the 1998 Floods. *World Development*, *31*(7), 1221-1238. https://doi.org/10.1016/S0305-750X(03)00071-8

FAO (2009) *How to feed the world in 2050.* Background paper for the High Level Expert Forum. http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf

FAO, IFAD, UNICEF, WFP and WHO (2019). *The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns*. Rome, FAO. https://www.wfp.org/publications/2019-state-food-security-and-nutrition-world-sofi-safeguarding-against-economic

FEWS NET (Famine Early Warning Systems Network) (2019) *Food Assistance Outlook Brief*. August 2019. https://fews.net/sites/default/files/documents/reports/August%202019_FAOB_public.pdf

Gitau, R., Makasa, M., Kasonka, L., Sinkala,M., Chintu, C., Tomkins, A. and Fileau, S. (2005) Maternal micronutrient status and decreased growth of Zambian infants born during and after the maize price increases resulting from the Southern African drought of 2001-2002. *Public Health Nutrition*, 8(7): 837-843.

Guha-Sapir, D., Hoyois Ph., Below. R. (2015) *Annual Disaster Statistical Review 2014: The Numbers and Trends*. Brussels, CRED. http://www.cred.be/sites/default/files/ADSR_2014.pdf

IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp

Krishnamurthy, P. K., Choularton, R. J., & Kareiva, P. (2020). Dealing with uncertainty in famine predictions: How complex events affect food security early warning skill in the Greater Horn of Africa. *Global Food Security, 26*, 100374. https://doi.org/10.1016/j.gfs.2020.100374

Maxwell, D.., Hailey, P., Kim, J. J., McCloskey, E. and Wrabel, M. (2018) *The Constraints and Complexities of Information and Analysis in Humanitarian Emergencies. Evidence from South Sudan.* Medford MA: Feinstein International Center and Nairobi: Centre for Humanitarian Change. https://fic.tufts.edu/wp-content/uploads/SouthSudan-Case-Study-Report.pdf

UNDRR (2017) *Global Assessment Report (GAR) on Disaster Risk Reduction. Atlas. Unveiling Global Disaster Risk.* Geneva, Switzerland, United Nations Office for Disaster Risk Reduction (UNDRR). https://www.preventionweb.net/english/hyogo/gar/atlas/

UNDRR (2019). *Global Assessment Report (GAR) on Disaster Risk Reduction 2019*. Geneva, Switzerland, United Nations Office for Disaster Risk Reduction (UNDRR). https://gar.undrr.org/sites/default/files/reports/2019-05/full_gar_report.pdf

UNISDR (2011) *Global Assessment Report on Disaster Risk Reduction. Revealing Risk, Redefining Development.* Geneva, Switzerland: United Nations International Strategy for Disaster Reduction. https://www.preventionweb.net/english/hyogo/gar/2011/en/home/download.html

Winsemius, H. C., Jongman, B., Veldkamp, T., Hallegatte, S., Bangalore, M., Ward, P. (2015) *Disaster risk, climate change, and poverty: assessing the global exposure of poor people to floods and droughts (English)*. Policy Research working paper; no. WPS 7480. Washington, D.C., World Bank Group. http://documents.worldbank.org/curated/en/965831468189531165/Disaster-risk-climate-change-and-poverty-assessing-the-global-exposure-of-poor-people-to-floods-and-droughts