BUILDING RESILIENCE FOR FOOD & NUTRITION SECURITY

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MEASURING RESILIENCE IN A RISKY WORLD

WHY, WHERE, HOW, AND WHO?

CHRISTOPHER B. BARRETT AND DEREK HEADEY

INTRODUCTION

Much of the world's chronically poor and malnourished population lives in an increasingly volatile world. The dangerous nexus of climate change, rapid population growth, conflict, and economic stagnation has already pushed several poor regions into states of permanent crisis, even as the rest of the world has enjoyed unprecedented progress against poverty. This disturbing state of affairs, along with our expanded knowledge of the intimate interactions between short-term shocks and long-run development, has catalyzed widespread interest in resilience building and in what a resilience framework implies for our understanding of the causes and consequences of acute vulnerability to natural and man-made disasters. We propose that the development community invest in a new multicountry system of sentinel sites to undertake long-term, high-frequency measurement and analysis of individual, household, and community resilience in the world's most vulnerable regions.

WHAT IS RESILIENCE?

The development resilience framework offers three key conceptual strengths.

First, resilience incorporates important *dynamic* concepts of human well-being measured against normative standards—the dynamics of moving in and out of poverty, hunger, and malnutrition—that few other frameworks can.

Second, resilience relates to the capacity to maintain well-being in the face of *risk* manifested in a range of anticipated or unanticipated shocks and stressors, be they biophysical, economic, or sociopolitical in origin.

Third, the framework focuses our attention on the way in which social, economic, and ecological *systems* interact with one another.

The resilience framework therefore necessitates a focus on complex human welfare dynamics that is especially appropriate for contexts in which chronically poor and vulnerable populations confront varied and prominent economic, social, and ecological stressors as well as frequent and intense exposure to shocks.

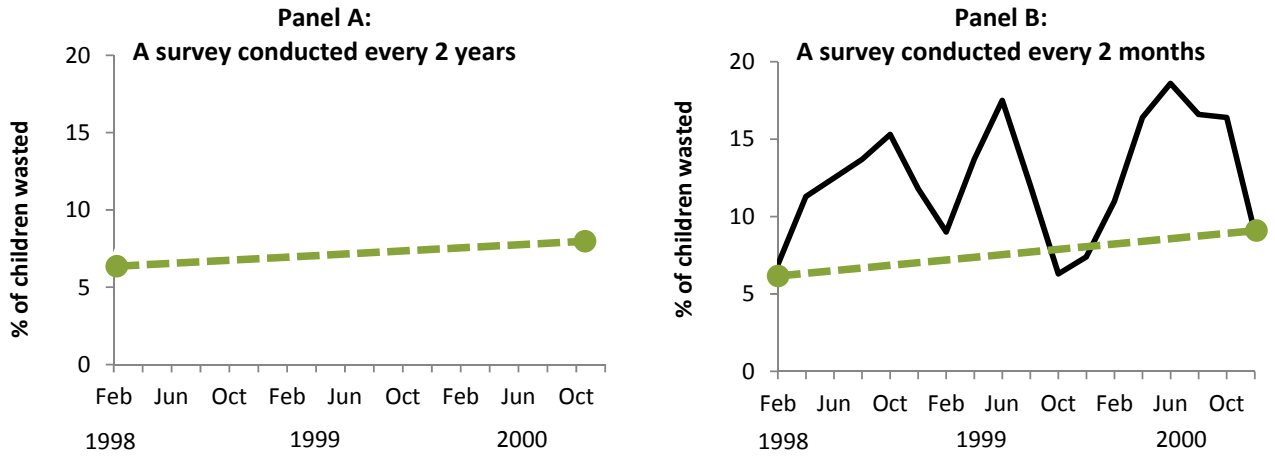
WHAT DOES THIS CONCEPT IMPLY FOR MEASUREMENT AND ANALYSIS?

Good measurement of resilience must be the foundation for early and accurate diagnosis of problems; for mobilizing and targeting short-term resources; and for designing, implementing, and evaluating appropriate long-term resilience-building strategies. But what does good measurement mean in the context of the conceptual foundations of resilience: risk; vulnerability; chronic and transient poverty and food insecurity; and complex interactions between shocks and stressors at various scales and between households and their social, economic, and biophysical environments?

First, resilience measurement *must* involve measurements that are conducted at a ***higher frequency*** than the current norm of surveys only every 3–5 years. This is because resilience relates to the likelihood of avoiding poverty, hunger, or malnutrition *over time*. Figure 1 demonstrates this point with a rare example of high-frequency measurement at scale from Helen Keller International's (HKI's) Nutrition Surveillance Program (NSP) in Bangladesh, the original version of which ran from 1990 to 2003.[1] Panel A reports observations of child wasting (low weight-for-height measures) from two surveys, one conducted in February 1998 and the other in October 2000. Child wasting was essentially unchanged over this period and relatively low: 8 percent in the 1998 round and 9 percent in the 2000 round. Panel B supplements with bimonthly data from the same NSP survey instrument. These higher-frequency data tell a different story: from troughs of 6–8 percent in the December to February period, child wasting *doubled* every monsoon (June to August) to levels of 15–18 percent. The magnitude of this severe seasonal variation is not discernible via infrequent snapshots. Similarly dynamic changes would occur with many other welfare indicators and many other shocks. Indeed, the frequency and severity of these events in Bangladesh were the main reason HKI originally elected to engage in higher-frequency surveillance. Of course, what "high-frequency" means will likely be context specific. In extremely volatile environments it could mean measurements conducted several times a year; in other environments it may mean only twice a year. Cost considerations must be weighed against the added vulnerability that comes from less frequent measurement.

Second, resilience demands ***repeated measures*** over the ***long term***. Resilience is a dynamic concept and is not just concerned with shocks and their immediate impacts, but more fundamentally requires understanding the longer-term stressors that create vulnerabilities to shocks and the ability to withstand or bounce back from them. But shocks are unpredictable. Resilience-building interventions need evaluation over longer time scales in order to reliably establish whether interventions have the intended effects and whether these effects are sustained beyond the period of intervention. Third, resilience measurement requires ***sufficiently sensitive indicators*** of stressors, shocks, coping strategies, and human welfare, collected using a variety of qualitative and quantitative methods. Fourth, resilience needs to be ***measured at multiple levels:*** for individuals (particularly nutritional status), households, and communities, but also for local economies and ecologies. There remain unnecessary disconnects in the analysis of these different units. The systems origins of the resilience

Figure 1 The difference between low- and high-frequency measurement: child wasting in Bangladesh, 1998–2000



Sources: Authors' construction using data from Helen Keller International Nutrition Surveillance Program[2]

framework demand greater integration across scales of analysis.

Fifth, while measurement needs to follow best practices wherever possible, understanding resilience in diverse environments will require ***context-specific measurement*** and the right mixture of quantitative and qualitative approaches, with the latter particularly important for understanding the social and political dimensions of resilience.

A PROPOSAL FOR A MULTICOUNTRY SYSTEM OF SENTINEL SITES

This conceptualization of resilience measurement—combined with the sheer scale of the resilience-building challenge—leads us to propose a new multicountry system of sentinel sites in the world's most vulnerable regions. Although new, such a system would be built on some established measurement platforms and based on lessons from past experiments with surveillance systems. Economic surveys designed to measure poverty, or health surveys designed to track nutrition, are too infrequent to either measure or help us understand resilience dynamics. Conversely, the often higher-frequency surveys used to conduct randomized controlled trials are inadequate because they typically lack the scale required for genuine program evaluation and because they typically do not extend beyond the short-term project evaluation cycle. Early warning systems fall short as well, since they usually do not collect individual and household-level indicators and have only narrow policy objectives rather than aim at diagnosis of the causal drivers of household and community-level resilience, let alone long-term policy, program, or project evaluation objectives. And while the sentinel system we envisage would bear some affinity to, for example, the nutrition surveillance systems of HKI in Bangladesh, what is now required is a much more systematic multicountry and multidisciplinary effort built up with pilot projects in each of the relevant countries or subnational regions, first to improve the survey instruments and data collection processes, and then to be scaled up as methods become refined with practice.

The costs and challenges associated with developing and maintaining such a system will be substantial. Yet, if implemented well, the benefits would be immense, multidimensional, and multisectoral. Such a system would offer a rigorous means of monitoring vulnerability and resilience in the world's most volatile regions. It would bolster existing early warning systems by complementing them with household-level indicators, including subjective assessments of risks faced and available coping mechanisms, as well as longer-term data analysis. It could improve the mobilization and targeting of emergency resources by helping to overcome political and bureaucratic constraints. It would be instrumental for diagnosing the underlying sources of vulnerability, for identifying key thresholds of resilience, and for designing appropriate resilience-building strategies. This system would provide a foundation for large-scale experimental and nonexperimental evaluations of resilience-building activities, thereby fueling the learning process critical to long-term development.

WHERE SHOULD WE MEASURE RESILIENCE?

To contain costs, it will be important for a multicountry system to focus on the most vulnerable countries and subnational regions. As a first stab at identifying these countries, we examined data for five different national-level indicators of vulnerability: exposure to disasters; past emergency assistance levels from the international community; and child stunting, child wasting, and infant mortality rates. These five indicators capture different dimensions of vulnerability. The disaster and emergency aid variables capture both exposure and vulnerability to disasters; child wasting and mortality are good indicators of exposure to severe shocks, including seasonal problems; and stunting is a good catch-all indicator of the myriad problems that create chronic malnutrition.

In order to prioritize country vulnerabilities, we ranked all countries according to each indicator, isolated the 30 most vulnerable countries according to each indicator, and identified the frequency with which each country appeared in these five different rankings (Table 1). We classified the 11 countries that appeared four times as "extremely vulnerable" and the 16 countries that appeared three times as "highly vulnerable." Our list of 11 "extremely vulnerable" countries consists solely of countries in the Sahel, Horn, and central Great Lakes regions of Africa. The group of 16 "highly vulnerable" countries is more diverse but contains another 11 African countries, plus Bangladesh, Cambodia, Haiti, Sri Lanka, and Yemen.

Table 1 The most vulnerable countries according to five indicators

Extremely vulnerable (*n* = 11)	Highly vulnerable (*n* = 16)	
Niger	Angola	
Chad	Central African Republic	Bangladesh
Sudan	Kenya	
Eritrea	Liberia	Sri Lanka
Malawi	Madagascar	
Burundi	Mali	Cambodia
Democratic Republic of Congo	Mozambique	
Ethiopia	Nigeria	Haiti
Somalia	Sierra Leone	
Djibouti	Uganda	Yemen
Mauritania	Zambia	

Source: Authors.

Notes: See the full background paper for details.[3] Classifications are based on country rankings among five indicators: child stunting, child wasting, infant mortality, exposure to natural disasters, and dependence on emergency assistance. Extremely vulnerable countries are vulnerable in at least four indicators, and highly vulnerable countries are vulnerable in at least three indicators.

This identification of vulnerable countries involves important nuances. First, many of these countries are fragile states, with implications for how surveys should be implemented and who should implement them. At first glance, political fragility and lack of domestic capacity appear to be insurmountable obstacles to monitoring vulnerability and resilience in fragile states. But many international institutions, such as the World Food Programme, already have a permanent presence in fragile environments. Unfortunately, such institutions are typically not well enough funded to implement and analyze higher-frequency surveys. While lack of domestic capacity may prove to be a near-term constraint in some countries, the long-term focus of this system would demand that implementing agencies build up local capacity in both the government and nongovernment sectors, and throughout the "value chain" spanning measurement design, data collection, analysis, evaluation, and policy advice.

Second, this identification exercise is preliminary only. Decisions on where to implement these kinds of programs require more detailed subnational data analysis. Countries that may not appear vulnerable in aggregate often have regions that are highly exposed to shocks. Importantly, we emphasize that sentinel sites do not always need to be nationally representative; they can be targeted toward more vulnerable subnational regions.

Third, the choice of specific sentinel sites should be motivated not only by current or recent vulnerability but also by the need to strategically sample different agroecologies and economic environments in order to generate analyses with adequate external validity. Both researchers and practitioners must be able to make reasonable inferences for populations beyond the sentinel sites based on comparisons with similar agroecologies and socioeconomic conditions.

WHAT SHOULD THESE SURVEYS LOOK LIKE? SOME ISSUES OF MEASUREMENT DESIGN

Long-term, high-frequency, multidisciplinary surveys integrated with biophysical observations and structured qualitative assessments pose significant financial, logistical, and technical challenges. These surveys must be efficiently designed to meet the system's main objectives under constrained budgets. Should they be repeated cross-sections or panel surveys? How frequently should data be collected? And what sorts of technologies will increase the speed of the collection, cleaning, and analysis of data?

We favor a hybrid approach to survey design that can keep costs down while generating widespread benefits. Similar measurement efforts have typically collected repeated cross-sections on the grounds that nutrition entails targeted sampling of only the youngest children because young children quickly age out of the 1,000-day nutrition window in a standard panel survey. But a more interdisciplinary system for resilience measurement would benefit substantially from collecting individual and household-level panel data, particularly for understanding well-being dynamics and for conducting rigorous program evaluation. In our full background paper[4] we outline a hybrid sampling strategy that is partly panel (a core group of households that are tracked consistently over time) and partly a repeated cross-section that entails an oversampling of households with young children or pregnant women.

Second, we propose a mixture of "thick" and "thin" rounds of data collection to increase the breadth of variables collected while keeping costs manageable. Thick rounds would consist of the full range of relevant indicators, while thin rounds would more narrowly focus on the subset of indicators that are likely to vary more over time, such as food and nutrition security indicators, coping strategies, and so on.

Third, the use of the latest information and communication technologies is essential. Electronic data collection is fast becoming the norm in large-scale surveys, and these technologies offer tremendous potential for near-real-time collection and analysis of household data. Among other benefits, this means of collection would bolster existing early warning systems, which currently mainly focus on more aggregate indicators. Furthermore, the proliferation of mobile phones—even in some of the harshest and most remote areas—also offers substantial scope for higher-frequency collection of basic self-reported indicators, though further trialing of these approaches is still needed.

WHO SHOULD BE FUNDING AND IMPLEMENTING A MULTICOUNTRY SYSTEM OF SENTINEL SITES?

Finally, we consider who should lead and contribute to this ambitious but important effort. Since this system would benefit a wide range of institutions, and since the costs of a long-term commitment to a multicountry system of sentinel surveys

would be prohibitively large for any single agency, we propose a broad consortium of bilateral donors and foundations, multilateral organizations, national and subnational governments, major international and local nongovernmental organizations, and leading international academic institutions.

This consortium must first identify which countries and regions most need sentinel sites. It should then focus on establishing partnerships with national governments and make solid financial commitments to *long-term* resilience monitoring, analysis, and domestic capacity building. This consortium must then identify and contract with implementing partners with a permanent presence on the ground, as well as international organizations with the requisite technical expertise, for the purposes of a coordinated survey design and biophysical monitoring. Over the longer term, this system should institutionalize and finance not only data collection but also analysis and research using these data and the dissemination of findings based on the data, since lack of analysis and timely dissemination has arguably been the Achilles' heel of many past efforts.

Ultimately, this kind of cooperative commitment to high-frequency, long-term monitoring and evaluation can provide a crucial scientific evidence base for diagnosing and resolving the most troubling problems of hunger, poverty, and malnutrition and of building sustainable resilience. The status quo is simply not enough.

Christopher B. Barrett (cbb2@cornell.edu) is the David J. Nolan director and Stephen B. and Janice G. Ashley professor in the Charles H. Dyson School of Applied Economics and Management, as well as professor in the Department of Economics, Cornell University, Ithaca, NY, US.
Derek Headey (d.headey@cgiar.org) is research fellow in the Poverty, Health, and Nutrition Division of the International Food Policy Research Institute (IFPRI), Washington, DC. The brief is based on *Measuring Resilience in a Volatile World: A Proposal for a Multicountry System of Sentinel Sites*, 2020 Conference Paper 1, prepared for the 2020 conference "Building Resilience for Food and Nutrition Security," May 15–17, 2014, Addis Ababa, Ethiopia.

NOTES

[1] M. W. Bloem, R. Moench-Pfanner, and D. Panagides. 2003. *Health and Nutritional Surveillance for Development.* Singapore: Helen Keller Worldwide.

[2] Ibid.

[3] C. B. Barrett and D. Headey. 2014. *Measuring Resilience in a Volatile World: A Proposal for a Multicountry System of Sentinel Sites.* 2020 Conference Paper 1. Washington, DC: International Food Policy Research Institute.

[4] Ibid.

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