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Nutrition in Africa's drylands: A conceptual framework for addressing acute malnutrition

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Introduction

This brief proposes a renewal of the conceptual framework of malnutrition causality, one that elaborates on the drivers¹ of acute malnutrition in drylands. While the United Nations Children’s Fund (UNICEF) framework has been widely adopted across both development and humanitarian spheres, there are key aspects of the framework and its application that require urgent reemphasis and updating. There are also significant gaps in the

framework itself, especially related to the basic and more systemic drivers of acute malnutrition. A renewal of the conceptual framework and adaptation to Africa’s drylands aim to support a more comprehensive and meaningful analysis of the drivers of acute malnutrition, as part of a participatory process to develop more appropriate, effective, and sustainable strategies to address malnutrition.

Why focus on drylands?

Africa’s drylands are characterized by low-lying arid and semi-arid areas inhabited mainly by pastoralist, agro-pastoralist, and farming communities whose production systems have evolved to adapt to these harsh environments. Our focus in this brief is the Sahel and East African countries where climate variability is extreme, rainfall erratic, and seasonal temperatures are always above 20°C and seasonally reach as high as 40 or 50°C. Population distribution is often sparse, with communities scattered over vast areas. There are, however, increasing concentrations of former pastoralist, agro-pastoralist, and farming households, comprised of both women and men, who have dropped out of pastoralism and are eking out a living on the edge of market towns, drawn by the limited economic opportunities to diversify their livelihoods.

The worsening problems facing Africa’s drylands include:

- Weak informal institutions such as markets, land tenure regimes, and traditional institutions contributing to increasing farmer-herder conflict and insecure access to natural resources, especially for women and youth;
- Rapid demographic change, linked with population growth, migration, and displacement;

- Increasing livelihood diversification and transformation, which has undermined the former integration between producers and led to increasing competition and farmer-herder conflict;
- Conflict at multiple levels and of increasing complexity;
- Increasing frequency of climate shocks (drought and floods) and increasing temperatures over recent years in the Sahel linked with climate change.

Environment underpins everything that people do in Africa’s drylands—people’s lives and livelihood systems are shaped by the unique characteristics of extreme rainfall variability and unpredictability, seasonal scarcities of water, and high temperatures. This can result in a delayed start to the rains, extended dry spells, local variability or high-intensity rains causing localized flooding. Climate change is likely to exacerbate this variability, with increasing temperatures and increasing frequency of climate-related shocks. Therefore, resilient livelihood (production) systems in these arid and semi-arid contexts must adapt to the unpredictable distribution of rain between years and seasonally.

These factors have contributed to the increasing scale of humanitarian crises in drylands and

¹ We prefer the term “drivers of acute malnutrition” rather than “causes,” as causes imply a simple cause-effect relationship, while drivers suggest a more complex relationship, one with multiple drivers that potentially interact synergistically. Furthermore, current research methods cannot prove malnutrition causality conclusively. However, we are able to identify potential drivers and the strength of their relationship to acute malnutrition.

unprecedented donor expenditures. According to USAID, “over the last decade, international donors have spent roughly \$90 billion in just nine countries with large dryland areas, accounting for almost 50 percent of all humanitarian assistance in the world.”² During this period, there has been growing recognition of acute malnutrition among children under five years of age as a rising global public health problem.³ A wide range of international and regional experts agree that levels of acute malnutrition across the globe are increasing,⁴ and a preliminary view of these countries suggests that many are predominantly dryland countries, although it should be qualified that among dryland countries

there is likely to be variation depending on the basic causes of malnutrition discussed below.

The global acute malnutrition (GAM) threshold signifying a humanitarian emergency is 15%. This high level has been found to persist long after the acute phase of a crisis and commonly occurs in non-emergency years in some areas, which suggests that these emergency levels of GAM are not only due to the emergency or shock. The increasing challenge of persistent global acute malnutrition (P-GAM) among children has been highlighted in the Sahel belt and Horn of Africa.⁵

What are some of the challenges in addressing acute malnutrition?

A UN expert panel acknowledged a lack of effective approaches to address P-GAM,⁶ and another expert group has reviewed and prioritized research questions to address this problem.⁷ The majority of nutrition programs in developing countries tend to be dominated by nutrition-specific interventions, including treatment, rather than nutrition-sensitive interventions, meaning more preventative approaches. For example, international interventions in drylands are predominantly aimed at alleviating suffering and saving lives (humanitarian response) rather than prevention or sustainably addressing acute malnutrition. Although there is some research that shows the impact of multi-sectoral resilience programs on both stunting and wasting,⁸ the evidence base for nutrition-sensitive interventions

and prevention in drylands is slim. Furthermore, the types of interventions are diverse and the analytical approaches varied, making it difficult to draw an overall conclusion on impact.

Although there is a strong international consensus that we need a better understanding of acute malnutrition, the focus of research and the existing evidence base remains on treatment rather than prevention. Hence, the analytical focus is on the immediate and underlying drivers of malnutrition, which operate in close proximity to the child and household. As a result, most analyses ignore the role of more systemic or basic causes, ones that drive the underlying causes of malnutrition.⁹ This may in part be explained by the observation that

2 <https://www.usaid.gov/east-africa-regional/resilience>. Accessed August 1, 2019.

3 R. E. Black, C. G. Victora, S. P. Walker, Z. A. Bhutta, P. Christian, M. de Onis, M. Ezzati et al., 2013, Maternal and child undernutrition and overweight in low-income and middle-income countries, *Lancet* 382 (9890): 427–451. Emergency Nutrition Network (ENN), 2018, The current state of evidence and thinking on wasting prevention.

4 World Health Organization (WHO)/UNICEF/World Food Programme (WFP), 2014, Global nutrition targets 2025: Wasting policy brief (WHO/NMH/NHD/14.8). WHO, Geneva.

5 H. Young, and A. Marshak, 2018, Persistent global acute malnutrition. A briefing paper on the scope of the problem, its drivers, and strategies for moving forward for policy, practice, and research, Feinstein International Center Brief. Feinstein International Center, Friedman School of Nutrition Science and Policy at Tufts University, Boston.

6 World Health Organization (WHO)/UNICEF/World Food Programme (WFP), 2014, Global nutrition targets 2025: Wasting policy brief (WHO/NMH/NHD/14.8). WHO, Geneva.

7 ENN, in press, Prevention of child wasting: Results of a Child Health & Nutrition Research Initiative prioritization exercise.

8 A. Marshak, H. Young, E. N. Bontrager, and E. M. Boyd, 2016, The relationship between acute malnutrition, hygiene practices, water and livestock, and their program implications in eastern Chad, *Food and Nutrition Bulletin* 38 (1): 115–127.

9 See also S. Jaspars, 2019, A role for social nutrition in strengthening accountability for mass starvation? World Peace Foundation, Boston.

most non-governmental organizations (NGOs) tend to be organized and most qualified to address the immediate and underlying causes of malnutrition, which are within their domain of influence (as they occur at individual, community, and the local level, in contrast to basic causes that are operating nationally and internationally). As we shall see later, addressing the basic causes requires influence at the level of governance and policy change by national and international institutions.

Since the *Lancet* series in 2008 and 2013,¹⁰ international attention has focused on a perceived need to define “a minimum package of essential nutrition actions” and to measure the impact of these interventions on nutritional outcomes, with randomized control trials often perceived as the gold standard. According to Bjorn Ljungqvist, one of the original architects of the framework: *“By default (or design?) this effort leads to a focus on ‘immediate causes’ or even a limited focus on treating the ‘symptoms’ of malnutrition, since addressing underlying and ‘basic’ causes inevitably will require context-specific approaches which cannot be standardized and ‘packaged.’ As a result, you will find most countries affected by high levels of (severe) acute malnutrition spending significantly more resources on SAM [severe acute malnutrition] treatment but very little on preventive efforts and, hence, finding themselves in a perpetual and never-decreasing need of new resources for this purpose.”*¹¹

The more formulaic approach of essential nutrition actions based on the UNICEF conceptual framework is associated with *“the misconception that we already know what causes undernutrition;”* hence *“to address undernutrition we need a mix of WASH [water, sanitation and hygiene], food security, health activities leading to implementing generic multi-sectoral programs. I would advocate against this ‘one-size-fits-all’ strategy, as drivers of undernutrition are highly contextual and specific.”*¹² The drivers

of acute malnutrition are highly contextual and vary seasonally as well as socially. The Feinstein International Center, Friedman School of Nutrition Science and Policy at Tufts University has ongoing research in eastern Chad with Concern Worldwide that provides examples of this.¹³ This multi-sectoral approach risks blunting program effectiveness while also wasting limited resources on unnecessary program components.

In this context, more formative research, including a comprehensive contextualized investigation of the drivers of acute malnutrition, has been hard to promote, as research funding bodies frequently assume there is sufficient knowledge to design interventions that address the principal underlying causes of malnutrition. This knowledge is partly derived from the UNICEF malnutrition causality framework, as it clearly depicts three clusters of underlying causes related to food, health, and care, and from the burgeoning body of “best practice” such as the many agency guidelines and Sphere Minimum Standards of Disaster Relief that also focus on the underlying causes. However, in the absence of contextual formative research or well-designed assessments, the design of a program cannot be tailored to the localized or contextual drivers of acute malnutrition. Thus, formative research is essential to inform, influence, and fine tune the design and targeting of nutrition-sensitive actions.

10 R. E. Black, L. H. Allen, Z. A. Bhutta, L. E. Caulfield, M. de Onis, M. Ezzati, C. Mathers, and J. Rivera, 2008, Maternal and child undernutrition: Global and regional exposures and health consequences, *Lancet* 371 (9608): 243–60; and Maternal and child nutrition, Global Nutrition Series, *Lancet*, June 6, 2013. <https://www.thelancet.com/series/maternal-and-child-nutrition>.

11 Bjorn Ljungqvist, personal communication, September 10, 2019.

12 Gwenaëlle Luc, personal communication, September 26, 2019.

13 A. Marshak et al., 2016, The relationship between acute malnutrition. Building on this earlier work, a longitudinal study of acute malnutrition and its drivers is currently underway. Baseline quantitative and qualitative studies have been completed.

Why renew and adapt the UNICEF malnutrition causal framework for drylands?

Improving understanding must start with a review of the original UNICEF conceptual framework, acknowledging its strengths and value, while reflecting on weaknesses in its application and gaps, and how it might be adapted or further developed in order to understand and address acute malnutrition in drylands.

The UNICEF malnutrition causal framework (Figure 1a) was first developed during the Iringa Nutrition Programme and replicated elsewhere, before featuring as part of the UNICEF global approach for their “Nutrition in the Nineties” policy.¹⁴ It has survived three decades of scrutiny and remains the sine qua non and starting point for understanding the causes of malnutrition. Importantly, the UNICEF framework recognizes the need to understand causality at the micro (individual or household) and macro levels (local communities and society). The immediate causes of malnutrition capture the physiological reasons why an individual child becomes malnourished (related to food intake and disease), which in turn are driven by the underlying causes (inadequate household food security, care of women and children, and the health environment and access to health care) as shown in Figure 1, which in turn are determined by the basic causes of malnutrition, as explained below.

In the original UNICEF conceptual framework, the basic causes were primarily focused on “resources” (human, financial, and organizational) as the key determinants of reaching adequacy in the underlying determinants. The official 1990 UNICEF version (Figure 1a) was structured to explain how “potential resources” were transformed into an “entitlement framework” called “formal and non-formal institutions,” which determined how individual families and communities could access the critical

resources needed to fulfill their food, health, and care needs. The “economic structure” and the “political and ideological superstructures” represented the key determinants governing this transformation.¹⁵

Two years later, UNICEF replaced this framework. The immediate and underlying causes were left intact, but the basic causes were replaced with a new version (Figure 1b) that removed the formal and informal institutions, and the economic, political and ideological superstructures, and thereby left a critical gap between the basic and underlying causes with no explanation as to how these were linked. To our knowledge, this shortcoming of the 1992 revision has received little or no attention until now.

The three levels—immediate, underlying, and basic—reflect the institutional or administrative level at which drivers of malnutrition operate, ranging from the individual child, the household, and the local community, and the wider regional, national, or even international level. The framework therefore helps to identify not only the precise change or action needed but also the institutional or administrative level at which it must take place. This latter point is key, as it suggests that it is not enough to identify specific actions; rather, any action needs to be embedded in the relevant systems and institutions to ensure sustainability. The framework additionally implies that multiple interconnected actions are required to address acute malnutrition, without specifying each and every one of those actions prior to the analysis.

In parallel with this work on malnutrition causality, there has been a wealth of new developments and paradigm shifts related to dryland contexts. The Sustainable Livelihoods Framework provided a new lens on household decision-making and management of livelihood assets, in the wider

14 UNICEF, 1992, Nutrition in the Nineties. UNICEF, New York.

15 As explained by Bjorn Ljungqvist, personal communication, September 9, 2019.

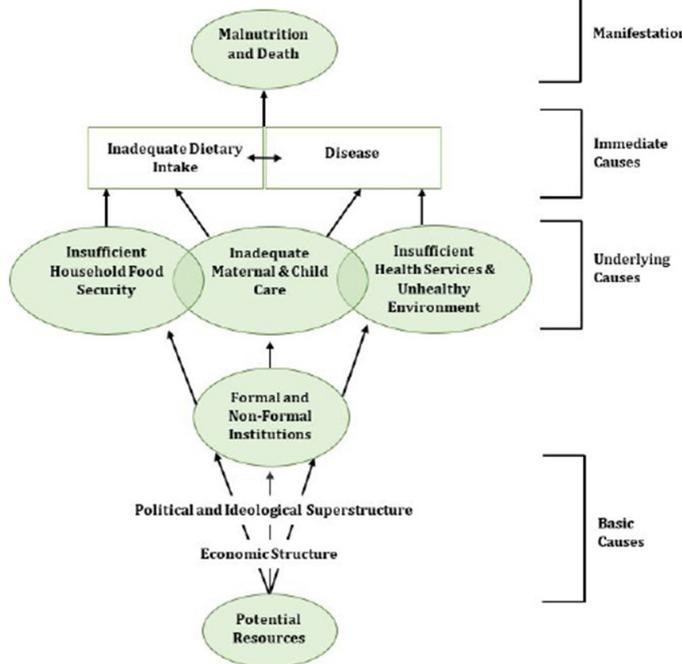
context of policies, institutions, and wider processes influencing livelihoods.¹⁶ The Humanitarian Livelihoods Framework took this a step further by analyzing the role of violence in humanitarian settings, including protection concerns.¹⁷ The work on livelihoods following the famines and droughts of the seventies and eighties subsequently evolved to the point that livelihood interventions are increasingly considered an appropriate disaster response, ones that save lives in the short term and are not only needed to lay the foundations for recovery. The nineties also saw a paradigm shift in our understanding of pastoralism, which recognized that dryland ecosystems are in disequilibrium characterized by variability and emphasized that much can be learnt from the experience of local peoples that has enabled them to design responses

to variability. Pastoralism and other dryland livelihood strategies are adapted to manage the unpredictable distribution of rainfall and associated pastoralist resources (pasture, fodder and water).¹⁸

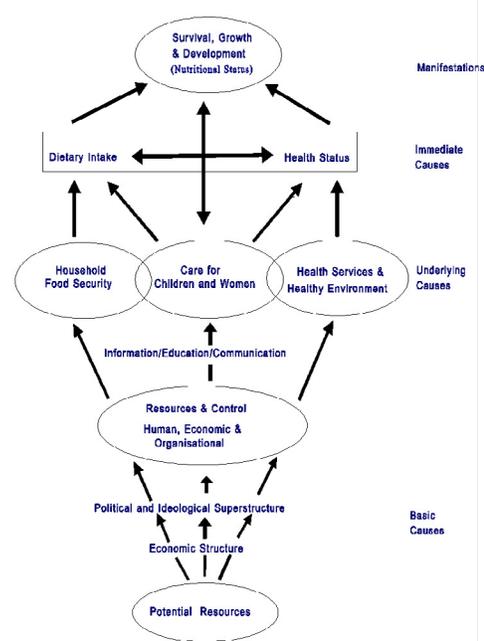
In reviewing and taking forward the UNICEF framework, our strategy is first to reemphasize specific aspects of the original framework that have been relatively neglected or ignored, while also preserving those elements of the framework that are globally accepted and extensively tried and tested (the nutritional outcomes, immediate and underlying causes). The second and more crucial step involves reviewing and developing the concepts that encapsulate the basic, more systemic drivers of acute malnutrition in drylands.

Figure 1. UNICEF Conceptual Framework—causes of malnutrition and death.¹⁹

a. UNICEF 1990 First Printing



b. UNICEF 1992 Second Printing



16 R. Chambers, and G. Conway, 1991, Sustainable rural livelihoods: Practical concepts for the 21st century, IDS Discussion Paper No. 296. Institute of Development Studies (IDS), University of Sussex (Brighton). Scoones, Ian, 1998, Sustainable rural livelihoods: A framework for analysis, Working Paper No. 72. IDS, Brighton.

17 S. Lautze, and A. Raven-Roberts, 2006, Violence and complex humanitarian emergencies: Implications for livelihoods models, *Disasters* 30(4): 383-401.

18 R. H. Behnke, I. Scoones, and C. Kerven, 1993, *Range ecology at disequilibrium: New models of natural variability and pastoral adaptation in African savannas*. London: Overseas Development Institute (ODI) and International Institute for Environment and Development (IIED). I. Scoones, 2004, Climate change and the challenge of non-equilibrium thinking. *IDS Bulletin* 35 (3): 114-19. S. Krätli, 2015, Valuing variability: New perspectives on climate resilient drylands development. IIED. Edited by H. de Jode.

19 UNICEF, 1990 and 1992, A UNICEF policy review: Strategy for improved nutrition of children and women in developing countries. UNICEF, New York.

Areas of the framework requiring renewed emphasis in order to understand drivers of persistent global acute malnutrition in drylands

Two specific areas of the original framework that require renewed emphasis are: first, the synergism between immediate and underlying causes; and second, developing the basic and more systemic drivers of acute malnutrition in drylands, including clarifying the role of formal and informal institutions within the context of wider systems.

Synergism between immediate and underlying causes

Causal pathways to acute malnutrition are often long and complex, with multiple opportunities for interactions, which contrasts with the shorter cause and affect pathways between some disease vectors and the disease itself (for example, diarrheal pathogens in water and diarrheal disease).

The potential for interaction between different drivers is clearly depicted in the overlapping clusters of underlying causes in the original UNICEF framework, which suggests that causal pathways are unlikely to be simple, linear, or short. Unfortunately, this interaction was missing in the recent reproduction of the framework by Black et al. 2008 (Figure 2), which has since been replicated by other researchers.

Furthermore, a combined failure of two or more underlying causes is likely to be synergistic, which would increase their combined impact in driving malnutrition. This potential for a synergism effect potentially accounts for the sudden spikes in acute malnutrition that are sometimes seen during slow onset disasters. This synergism might also explain the occurrence of “hot spots”—very high localized

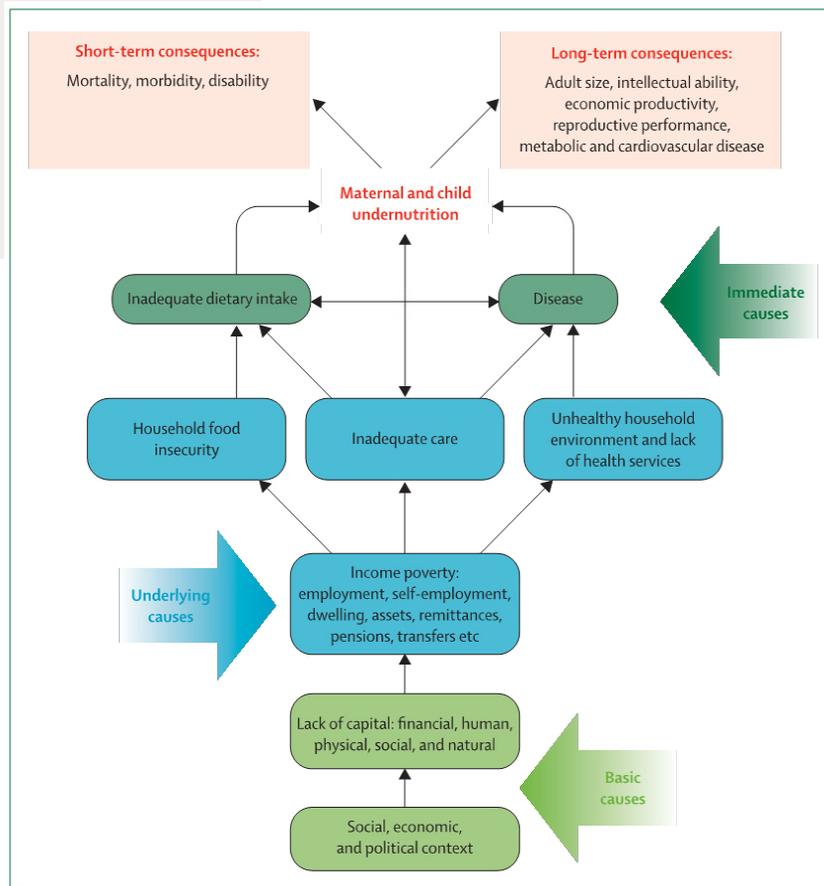
rates of acute malnutrition, as multiple drivers coincide; for example, during a protracted crisis or rapid forced population displacement.

Indeed, the relationship between the three clusters of underlying causes is extremely dynamic and changes seasonally. Understanding the seasonality of malnutrition and its drivers represents a major gap in current frameworks and is critically important for identifying seasonal peaks of acute malnutrition and seasonal drivers, and in turn for the design, timing, and targeting of interventions.

Developing the basic, more systemic drivers of acute malnutrition in drylands

As the UNICEF framework has been adopted and applied over the past decades, it is apparent there has been less attention or interest paid to the basic causes of malnutrition as compared to the immediate and underlying causes. While the immediate and underlying causes have changed relatively little, there have been considerable differences in the depiction of the basic causes, even by UNICEF. For whatever reason, it is evident that analyzing and addressing the basic causes of malnutrition have not resonated or been prioritized by policy makers, practitioners, and scholars to the same degree as the immediate and underlying causes. This is a major gap, and in this short brief we explore and further elaborate the basic, more systemic causes of acute malnutrition in dryland contexts, based on our own research and learning over the past 30 years.

Figure 2. Presentation of the framework of the relations between poverty, food insecurity, and other underlying and immediate causes to maternal and child undernutrition.²⁰

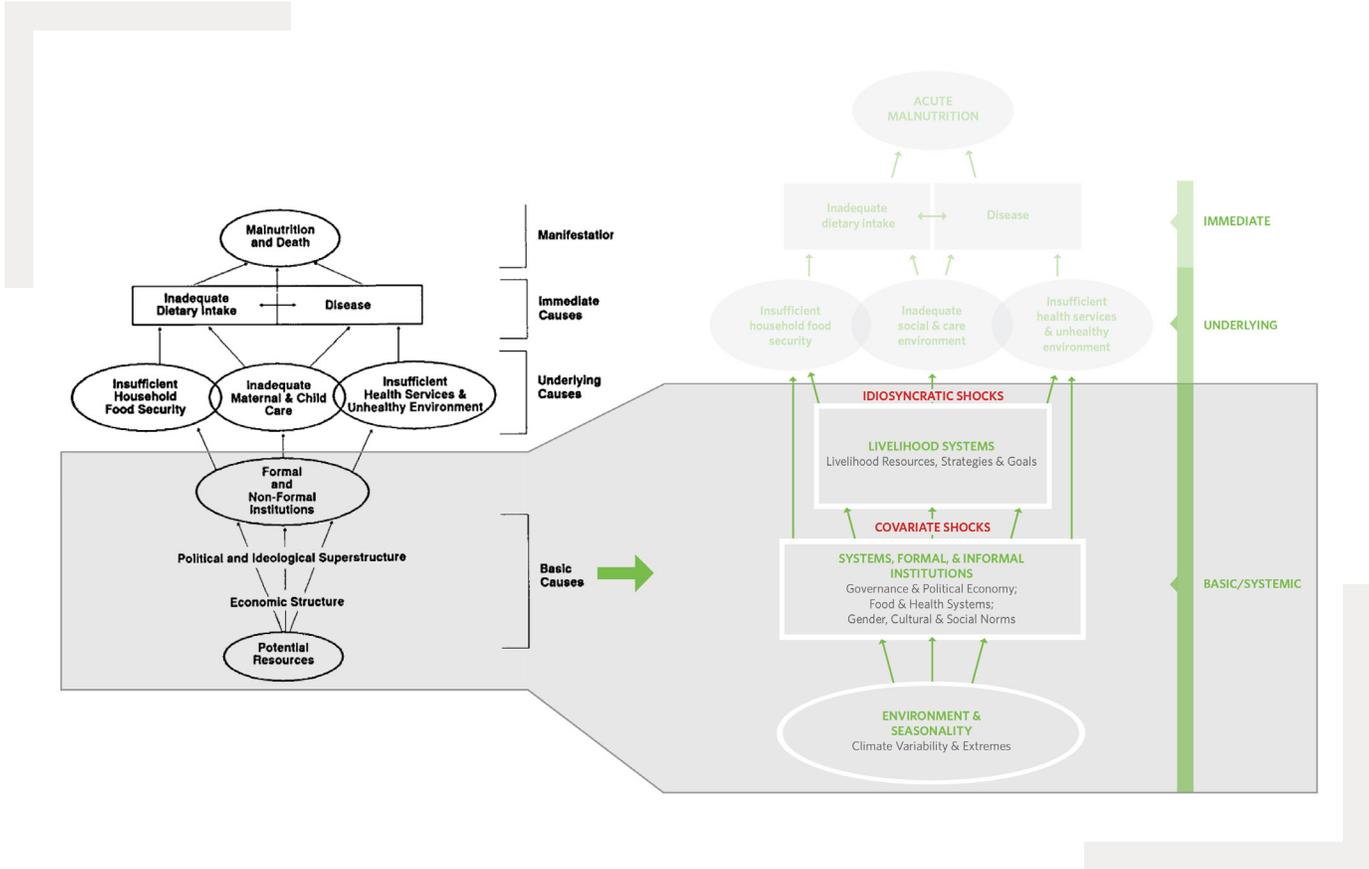


Our proposed basic causes adapted for dryland contexts include three interlinked areas: i. environment and seasonality; ii. systems, formal, and informal institutions; and iii. livelihood systems (see Figure 3). The foundation of the adapted framework for drylands is “environment and seasonality,” which acknowledges the unique climatic and environmental conditions of drylands, including extreme rainfall variability, frequent climate shocks, and increasing temperatures linked with climate change. Natural hazards or extreme climate shocks do not cause disasters on their own; they can only trigger them. Disaster vulnerability is socially constructed, and therefore the role of political systems and institutions are key in bringing about a disaster. An analysis of malnutrition causality must consider the role of governance in shaping the impact of environment on rural livelihoods. Thus, “systems

and institutions” mediate the effects of climate, conflict, and other shocks, including governance and economic, food, and health systems and gender and other social norms. Gender is therefore not confined to the underlying causes and care factors. Rather it has a cross-cutting impact over the entire conceptual framework. Next we incorporate the role of “livelihood systems,” which in turn drive the three clusters of underlying causes. The framework explicitly refers to the resilience and adaptation of livelihood systems and takes into account the impact of both covariate shocks at the systems level and idiosyncratic shocks at the local household or individual level, although the two are often linked. Often how these manifest themselves at community and household level is difficult to distinguish. Each of these three areas of our “basic causes” is more fully explained in Box 1.

20 From Black et al., 2008, Maternal and child undernutrition.

Figure 3. Original UNICEF framework (left) compared with the proposed updated framework (right), in which only the basic causes are changed. See Figure 4 for full sized proposed updated framework.



Box 1. The basic causes of acute malnutrition in drylands

Environment and seasonality

Africa’s drylands are characterized by extreme seasonal and interannual variability in climate, environment, and ecology. Recent Feinstein research highlights the relationship between acute malnutrition and environmental variables (rainfall, temperature, and vegetation) and conflict. Together, these variables explain about one-third of the variation in GAM and mean weight-for-height z-score (WHZ) over time.²¹ The findings also challenge long-standing assumptions about the seasonality of malnutrition. Contrary

to the assumption that in a unimodal rainfall system the peak of acute malnutrition occurs at the end of the rainy season when food insecurity is at its peak, our data show that there are two peaks of acute malnutrition. The first and larger peak occurs at the end of the dry season. This first peak is followed by a slight improvement in acute malnutrition and then a secondary but smaller peak in acute malnutrition after the rainy season as might be expected. We argue that it is the seasonality of livelihoods linked with environmental variability and access to natural

21 Food and Agriculture Organization (FAO) and Feinstein International Center, Tufts University, 2019 (May), Twin peaks: The seasonality of acute malnutrition, conflict and environmental factors in Chad, South Sudan and the Sudan. Rome and Boston.

resources that drives seasonal changes in food security, care, and health.

Apart from these generalized seasonal changes, people in dryland regions are often exposed to a wide range of climate, conflict, and other shocks, resulting in acute and chronic humanitarian crises.

Systems and institutions

The representation of systems within causal models of malnutrition has been patchy. The UNICEF framework published in the UNICEF nutrition for the 1990s strategy document included “formal and non-formal institutions” as the interface between the basic cause “potential resources” and the three clusters of underlying causes (Figure 1a). However, in a second printing of the UNICEF nutrition strategy in 1992 (Figure 1b), “formal and non-formal institutions” was replaced in the framework by “resources and control: human, economic and organizational.” This reformulation of the basic causes in the framework was never explained (to our knowledge). Subsequently, both policy makers and practitioners have paid relatively little attention to the basic causes of malnutrition, while scholars and authors have presented different interpretations of the basic causes, often limited to resource issues and rarely including the role of formal and informal institutions within wider systems (for example, see the *Lancet* 2008 series and the Sphere handbook).

Systems and institutions may be formal or informal. The formal national institutions that make up the system of governance are centrally important and include civic, political, and economic institutions, for example. Informal institutions include markets, traditional institutions, and wider social customs and rules, such as the gender norms and expectations (such as class and ethnicity) that are part of society. These informal social systems determine power relations (what makes people unequal) and

resource distribution between different social groups in society, which in turn determine disaster risk and risk of malnutrition.

This brief urges the reintroduction of “systems, formal, and informal institutions” into the malnutrition causality framework because of the importance of understanding how together these systems manage the unpredictability typical of drylands and thereby buffer shocks, and because of the opportunities this understanding presents to strengthen systems and institutions as a mechanism to sustainably address acute malnutrition.

Livelihood systems

Dryland livelihood systems are adapted to the harsh conditions associated with extreme rainfall variability, seasonally high temperatures, and the ecological diversity affecting water, pastures, forest resources, and crops.

Despite this inherent adaptability, however, worsening conditions linked to climatic shocks, conflict, and the economy, combined with poor governance, have undermined their resilience. Over time, coping responses have transformed livelihoods, leading to increasing labor migration and pastoralist dropouts. These altered circumstances and transformed livelihoods present new challenges for sustainably addressing the drivers of acute malnutrition and need to be understood. Furthermore, there is a strong gender dimension to these transformative processes, as coping is often associated with increasing women’s workloads and increasing dependence on low-return marginal activities.

Understanding the evolving governance and institutional context and its implications for livelihoods and drivers of acute malnutrition is also critical for planning how best to strengthen systems and institutions for sustainably addressing acute malnutrition.

Towards a new conceptual framework

While we have remained true to many aspects of the original UNICEF framework, the adapted version (see Figure 4) aims to bring a new focus on **the importance of climate and environment in drylands in influencing livelihood systems**, while recognizing the deadly and often **transformative impact of conflict and climate shocks** on systems and institutions, livelihood resilience and adaptation, and the underlying causes of malnutrition. In reducing vulnerability and building resilience, the role of social and political systems, including governance, and within these systems, formal and informal institutions, is given renewed emphasis. **Gender** is further highlighted in the framework as both a cross-cutting issue and as a fundamental aspect of social norms and values at the level of basic causes, thereby expanding and deepening its importance, as a basic cause as well as part of the underlying causes of acute malnutrition.

Environment and seasonality shape people's lives and livelihoods, particularly in a dryland context, given the experience of local peoples in designing responses and adapting to harsh dryland conditions and developing resilience to climate shocks. It is rarely acknowledged or understood that no two time periods during the year have identical drivers of acute malnutrition, and unless the seasonal patterns of acute malnutrition and its drivers are well understood, the efficacy of programming to address acute malnutrition will be limited. Furthermore, a sustainable impact on acute malnutrition will be more effectively realized through a more systemic institutional approach that mitigates shocks and strengthens systems underpinning equitable food security, health, and social cohesion.

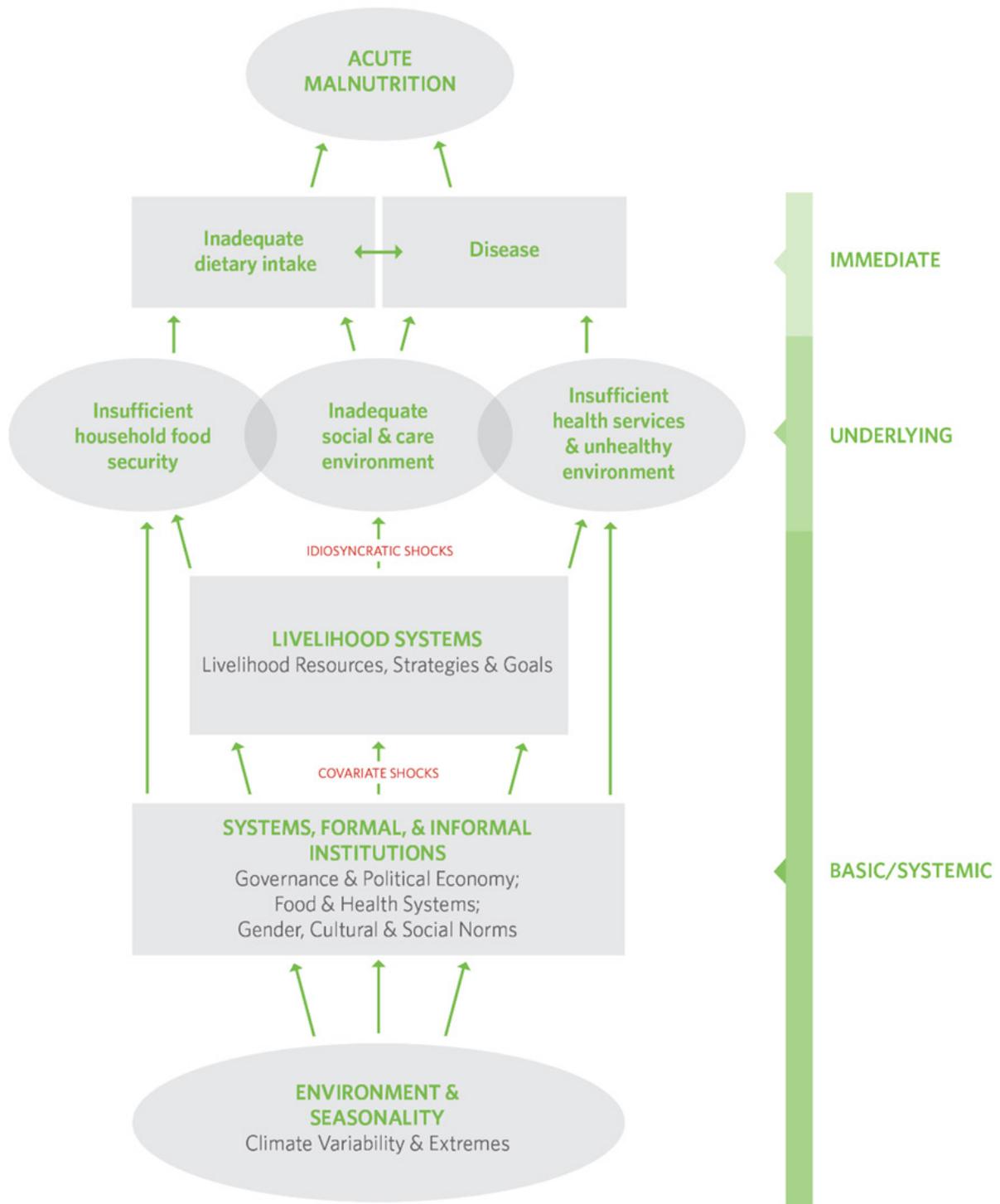
We conclude that gender, livelihoods, seasonality, and environment are gaps in the current framework, ones which represent the key to unlocking the answer to what is driving P-GAM in Africa's drylands. With this new understanding comes a

responsibility to expand and deepen our shared analysis of what drives acute malnutrition. For this analysis to be truly ground breaking and make a real difference, the process and ownership of causal analysis based on this framework needs to be localized by integrating it within the systems and institutions operating at the local level upwards. This idea of community-driven development as encapsulated in the Triple-A Cycle (continuous or repeated assessment, analysis, and action) was the central pillar of the original UNICEF strategy, which states explicitly that *"it is important **not** to interpret this framework as a predictive model."*²² In other words, there is no alternative but to always look for the most recent analysis or—preferably—to undertake an updated analysis that takes into account both scientific evidence and experience from earlier and ongoing control efforts.

We need a similar strategy for collectively and comprehensively analyzing malnutrition and its drivers, one that benefits from the original UNICEF framework while also taking into account the complexities and unpredictability of dryland contexts and the lived experience of local peoples in adapting and coping with this unpredictability, and the implications for the food, health, and care conditions. Ongoing analysis of these dynamics should inform a more systemic and institutional approach that is locally determined, owned, and driven. This approach may take longer to achieve but as a result will be more sustainable.

22 Bjorn Ljungqvist, personal communication, September 9, 2019.

Figure 4. Acute malnutrition in Africa's drylands: A new conceptual framework



Annex 1. Feedback and input on brief

The author solicited feedback on the first draft of the brief and revised conceptual framework through a webinar on October 17, 2019 and through emails to thirteen experts in the field. This annex shows commentary from the webinar panellists and anonymized feedback from experts. The author considered all the feedback when revising the brief but did not incorporate it all.

Comments from the webinar panellists

The October 2019 [webinar](#) featured five experts who discussed the need to update the conceptual framework, particularly for drylands, what specifically needs to be revised and reemphasized, and how to improve the framework. During the webinar, the author also requested that the participants submit feedback. Below are comments from the four panellists who chose to provide written comments for the brief.

Dominique Burgeon, Director of Emergency and Rehabilitation Division, FAO

- The populations of Africa’s drylands rely predominantly on agriculture-based livelihoods—pastoralism and settled farming systems—that have co-evolved to adapt to the harsh environment. These systems are remarkably resilient, but are being eroded by frequent stresses (drought, floods, plant pests, and livestock diseases) overlaid with deepening conflicts.
- Many of Africa’s most food-insecure countries are in the drylands, as demonstrated by recent Integrated Food Security Phase Classification (IPC) analyses; e.g., over 6 million people in IPC 3 and above in Sudan alone.
- In a crisis, attention turns to the treatment of human malnutrition without necessarily addressing its roots. Along with the importance of treatment, it is critical that the prevention of malnutrition is strengthened, from a livelihoods, a food systems, as well as a health perspective.
- FAO contributes to the prevention of malnutrition in humanitarian contexts from two angles: safeguarding and improving the resilience of agricultural livelihoods to enable access to nutritious foods and promote healthy diets; and working with partners to better understand the relationship between livelihoods, diets, and nutrition outcomes to inform improved programming.
- The recent malnutrition seasonality studies by FAO and Feinsein²³ provide strong evidence that climate and ecology are key causes of acute malnutrition, producing two seasonal peaks, one after the dry season and one after the lean season. Data confirm the seasonal predictability of acute malnutrition, mostly linked to the environmental variability that drives seasonal changes in food security, care, and health. (Noting that conflict was also a key driver of malnutrition, particularly in relation to the impacts of climate events.) The study demonstrates the need for a wide range of interventions (including livelihoods actions) to prevent acute malnutrition in dryland contexts.

23 See studies from Mind the Gap: Bridging the Research, Policy, and Practice Divide to Enhance Livelihood Resilience in Conflict Settings here: <https://fic.tufts.edu/research-item/mind-the-gap-enhancing-livelihood-resilience-in-conflict-settings/>

Luka Kuol, Professor of Practice, Africa Center for Strategic Studies, National Defense University

“Institutions as cause of malnutrition and as part of the solution.”

As we are reviewing the drivers of acute malnutrition, I would like to stress, based on my personal experience of the 1998 Sudan famine, that acute malnutrition is a reflection and manifestation of governance-deficit, bad governance, and weak institutions. The Sudan famine of 1998 was largely caused by the denial of humanitarian access by the government of Sudan and food aid diversion by the rebels.

Although the future-challenging environment of the drylands has been attributed to population growth and climate change, the core driver is the quality of governance. There is now a decay, regression, and retreat in democracy in the countries of drylands and the emergence of autocratic governments. If such a trend of regression in democracy persists, we are likely to see increased vulnerability and acute malnutrition in the drylands.

In addition to “bad governance,” the quality of institutions (formal and informal) plays a critical role in driving or mitigating acute malnutrition. The book by Daron Acemoglu and James A. Robinson entitled “*Why Nations Fail*” provides an unambiguous answer about why some nations are not prosperous: “institutions, institutions, institution.”

During the 1998 Sudan famine, I observed clearly how aid intervention undermined local institutions and traditional safety nets. Yet there is a wealth of evidence (United Nations Economic Commission for Africa (UNECA)) that shows the level of resilience of traditional institutions during shocks (I sometimes term them as antifragile institutions). For example, during 1998 Sudan famine, the affected communities established “famine courts” to speedily address the claims of the vulnerable people.

Bjorn Ljungqvist, Nutrition Program Consultant and co-developer of the original UNICEF malnutrition causality framework

As one of the originators of the UNICEF conceptual framework, I have closely followed the extensive use and discourse around this framework for 30-plus years. I welcome the initiative by Feinstein to raise concerns regarding the need to update and better elaborate the framework in general and—specifically—in light of their work in the African dryland areas. The framework, which should more appropriately be called a “conceptual framework for nutrition causality analysis,” was a key part of the UNICEF nutrition strategy launched in 1990, but the version adopted goes back to ideas and experiences gained from nutrition work, primarily in Tanzania, from the late 1970s to early 1980s. As emphasized in the UNICEF 1990 strategy, this causality framework should constitute a part of an ongoing Assessment-Analysis-Action (Triple-A) Cycle since the complex nature (i.e., inherent unpredictability as well as intricacy) of *malnutrition* in society requires frequent as well as comprehensive updates. The Triple-A would also allow for continuous learning about “what works.” Much of this original thinking appears to have been lost in the subsequent process of searching for “quick wins” and implementing rapid “scale-up” as part of global focus on results. These efforts also led to a focus on the “top level” of the causality framework—what is now labelled “nutrition-specific interventions,” while “underlying” and “basic/structural” causes of malnutrition received less attention.

As a result, we now have a situation in which very large amounts of resources are spent every year to treat SAM and on other nutrition-specific interventions while efforts to prevent these problems are neglected. This is, however, not a fault of the conceptual causality framework but of the way it is being used.

I believe the Feinstein group’s work in the dryland areas is further proof of the relevance of the original causality framework and an excellent example how to apply it. This does not mean that we should not seriously consider revisions to the framework if logically consistent and helpful in the understanding and application of nutrition causality analysis. I think the proposed changes need to be further discussed and considered.

Gwenaëlle Luc, Link NCA Advisor, Action Against Hunger

Nutrition-sensitive activities focus mainly on the immediate and underlying drivers of malnutrition. This focus is linked to the temporality and scope of financing, which compromises the sustainability of programming for acute malnutrition. Immediate drivers of undernutrition are subject to seasonal changes and trends over time, and we take these changes into account in our programming and activities. However, we still struggle to grasp how seasonality and trends over time affect the pathways, and modalities of their impact, on undernutrition.

To improve responses to and prevent malnutrition, we must contextualize our responses to the specific problems. This is contradictory to the approach of “scaling up” and “rolling out” cookie-cutter multi-sectoral solutions from one region to another, from one country to another.

The definition of “local” is relative and often presupposes a community homogeneity. Within the Sahel we observe an impressive heterogeneity in agro-pastoral communities. Despite acculturation among communities with histories of pastoral livelihoods and communities with histories of agricultural ones, there are still major differences in how each community accesses land and water; their seasonal mobility; their access to and consumption of milk and crops; and even how women access independent financial resources. Not accounting for these differences might lead to missed opportunities for high impact programming. We need to broaden the scope of our tools for context assessments and monitoring and evaluation (M&E) to include longitudinal, mixed methods, and contextual formative research. This will allow us to bring out specific and different profiles of vulnerability with which we can devise more effective, tailor-made interventions.

We must base our interventions on expressed or induced needs of communities. When we construct interventions from the point of view of the beneficiary, who does not think in silo, we can remove our siloed thinking.

Anonymized written comments

The author received the comments below from a variety of reviewers. We edited the comments but did not change the content. These comments are published with the consent of the reviewers. One reviewer’s comments are not anonymous, per her request.

Reviewer 1 (September 2, 2019)

- Weak informal institutions such as markets and traditional institutions have contributed to the increasing farmer-herder conflict.
- I hope emphasis on environment in shaping rural livelihoods in Africa’s drylands will not undermine the role of governance that shapes the impact of environment on rural livelihoods.
- Generalizations such as P-GAM being more prevalent in dryland regions may not be helpful, as there might be variation according to the quality of governance. The countries may as well be characterized by autocratic system of governance. There is a need dissect the countries according to governance outcomes.
- What is missing is the national level that provides the system of governance that has a profound impact on the rural livelihoods.
- You discuss the role of social and political systems in bringing about a disaster. This is an excellent point, and this can be confirmed by disaggregating countries in the drylands into political systems and the level of malnutrition. The World Bank problem-driven iterative adaptation (PDIA) data will be useful.

- “The framework explicitly refers to the resilience and adaptation of livelihood systems and takes into account the impact of both covariate shocks at the systems level and idiosyncratic shocks at the local household or individual level.” Great point. However, making a distinction between covariate shocks and idiosyncratic shocks is so difficult in rural environments. For example, environmental change or change in the system of government may be covariate but may manifest differently at community and household levels.
- I suggest you present these drivers (causes!) in logical sequence: environment and seasonality, systems and institutions, and livelihood systems. Also include political systems. The system of governance and institutions are gaps as well.
- Systems and institutions—The formal national institutions need to be seen in terms of inclusivity and democratic governance. Informal institutions should include markets, traditional institutions, and informal social safety nets. The centrality of system of governance should be emphasized here.
- Framework diagram—Great that covariate shocks may have direct impact on livelihood outcomes. I suggest “inadequate social and care environment” to include “limited political voice,” and there should be a direct impact arrow from covariate shocks.

Reviewer 2 (September 10, 2019)

- I do not understand and do not agree with your criticism of the UNICEF causality framework and—on the contrary—I find your application of this framework to your dryland areas causality analysis very much in line with the original thinking behind the UNICEF framework. In fact, I find that as you are proposing a new framework you are actually reproducing an almost identical version of the original one (there have been many variations afterwards).
- You note that access to natural resources is becoming increasingly insecure, especially for women. This is also true for youth. Across Africa at present, there is usually an element of rapid population growth and migration/displacement as part of this “larger” picture.
- You state that, “to be resilient, livelihood (production) systems in these arid and semi-arid contexts must adapt to the unpredictable distribution of rain between years and seasonally.” This is absolutely true, and it makes it very difficult and increasingly risky for poor farmers to buy and use modern farm inputs—especially on credit—since they cannot rely on the rains and might lose what they invested.
- You note the amount of money spent on human crises in drylands. I assume that a very high proportion of that money is on ready-to-use therapeutic food (RUTF). RUTF is effective but costly, and the unit cost per child is much lower for preventive infant and young child feeding (IYCF) promotion or even using ready-to-use supplementary foods for children with moderate acute malnutrition (MAM).
- P-GAM and SAM are high in many areas, indicating structural causes are likely to be found in most countries.
- We need to pursue repeated (Triple-A), comprehensive causality analysis of malnutrition—including SAM—to understand and learn and to be able to include new factors as they become important. This was, indeed, the original emphasis of the UNICEF framework. The limitations emerged when “quick wins” became the priority.
- You state that the UNICEF malnutrition causal framework was developed for nutrition in the 1990s. It was actually developed in 1984 and thoroughly “field tested” during the Iringa Nutrition Program and several parallel programs in Tanzania and with a large number of replications elsewhere and continuing up to the present day.
- You note that the framework implies that multiple interconnected actions are needed without dictating what those actions necessarily are. This is correct and this point in particular is essential: the framework does not prescribe the solutions anywhere but offers guidance to find those factors (micro and macro) that are most important in any given situation and context.

- You state that “this synergism might also explain the occurrence of ‘hot spots’—very high localized rates of acute malnutrition, as multiple drivers coincide; for example, during a protracted crisis.” Another well-known example is, of course, displacements of emergency-affected populations in which they lose a whole range of critical “capacities” and endowments.
- You state that “understanding the seasonality of malnutrition and its drivers represents a major gap in current frameworks and is critically important for identifying seasonal peaks of acute malnutrition and seasonal drivers, and in turn for the design, timing, and targeting of interventions.” I fully agree, and this was very evident in the early use of the framework in Iringa, where seasonality “drove” a series of critical “seasonal” aspects at the underlying causes level (food stocks, fresh perishables, workload of women, diseases, even drinking alcohol, and social events).
- The main reason for several versions of “basic causes” has been political. In fact, even in preparing the original UNICEF executive board paper, there was a strong effort to leave out the “basic causes” part of the framework.
- The original conceptual framework was primarily focused on “resources” (human, financial, and organizational) as the key determinants of reaching adequacy in “food, health, and care” (i.e., the underlying conditions for nutrition security). And the official 1990 UNICEF conceptual framework version was structured to explain how “potential resources” were transformed into an “entitlement framework,” called “formal and non-formal institutions,” which determined how individual families and communities could access the critical resources needed to fulfill their food, health, and care needs. The authors used the “economic structure” and the “political and ideological superstructures” to represent the key determinants governing this transformation. I think you are using a very similar logic trying to explain the same transformation from “potential resources,” which you call “environment and seasonality,” into what you call “livelihood systems” through a box called “systems and institutions.” This includes approximately the same economic, political, and ideological determinants as the original conceptual framework. Hence, at the principle level, I still do not see any difference between the original conceptual framework and what you are proposing! The “dryland adaptation” of these general principles is exactly what you are supposed to do as you apply the framework in concrete situations!!
- You state that “gender is further highlighted in the framework as both a cross-cutting issue and as a fundamental aspect of social norms and values at the level of basic causes, thereby expanding and deepening its importance, as a basic cause as well as part of the underlying causes of acute malnutrition.” Of course, and this is reflected in almost exactly the same way in the original framework, where the gender “ideological superstructure” dialectically affects the economic systems and thus contributes to the ensuing “formal and non-formal institutions” to create the conditions of gender inequalities and gender exploitation in defining roles and responsibilities in relation to resource control in fulfilling necessary food, health, and care conditions for nutrition security.
- I thus do not agree that gender, livelihoods, seasonality, and environment are gaps in the original framework. They are all there “in principle,” and it is then up to the nutrition analyst in each case to identify which and how each of these specific causes/drivers affects this particular situation and helps to identify ways to control in order to change the situation to the better in the short and long term. This is exactly what you appear to be doing quite well, but do not accuse the original framework for not providing a specific analysis and solution to the SAM nutrition problems in the Sahel at this particular time!
- I like the “basic causes of malnutrition in drylands” box, which makes it easier to visualize the situation in a didactic sense (i.e., realize that the “big” issues under environment, systems, and institutions create a concrete “livelihood” situation that determines the food, health, and care conditions). The disadvantage is that the “livelihood” should not be seen as a static situation that cannot be influenced in both positive and negative ways and especially if driven by a local awareness that malnutrition is largely “man-made” and is destroying the future of our children and of our community.

Reviewer 3 (September 20, 2019)

- I suggest that you point out the new knowledge that has accumulated in the last three decades on livelihoods. The conceptual developments on livelihoods frameworks and the analytical work on violence need to be married with the UNICEF framework. For example:
 - The livelihoods work initiated following the Sahelian droughts and famines of the 1970s has evolved to the point where livelihood interventions are increasingly considered to be appropriate disaster responses that not only lay the foundation for recovery but also save lives in the short term.
 - Analyses of the nature, logic, and implications of the violence that characterizes protracted crisis.
 - The development of the humanitarian livelihoods framework.

Reviewer 4 (September 27, 2019)

- You note that rainfall variability, seasonal scarcities of water, and high temperatures are linked with climate change. Consider including soil quality and erosion.
- You note that climate change is likely to exacerbate this variability, with increasing temperatures and increasing frequency of climate-related shocks. It is also likely to cause changes in soil quality and access to water.
- You note that “the majority of nutrition programs in developing countries tend to be dominated by nutrition-specific interventions, including treatment, rather than nutrition-sensitive interventions, meaning more preventative projects.” I disagree with this. Most programs today try to be nutrition sensitive and multi-sectoral.
- You state that “although there is a strong international consensus that we need a better understanding of acute malnutrition, the focus of research and existing evidence base remains on treatment rather than prevention. Hence, the analytical focus is on the immediate and underlying drivers of malnutrition, which operate in close proximity to the child and household.” From my perspective, non-governmental organizations (NGOs) are organized and more qualified to address direct or underlying causes than to understand or address root causes. Most NGOs lack the experience and/or resources to address root drivers of malnutrition and therefore do not prioritize them.
- You state that one reason for not addressing basic causes might be that the basic causes have not been adequately elucidated or expressed in terms that are easily understood and resonate with known issues locally. The jump from underlying to basic drivers of malnutrition is huge. Even with studies on basic causes, NGO practitioners often feel helpless to “operationalize” the findings from research on basic causes.

Reviewer 5 – Susanne Jaspars (September 30, 2019)

- I completely agree that in order to analyze and address malnutrition more effectively we need to pay more attention to its basic causes. However, I am not completely convinced that another adaptation of the UNICEF framework is the answer. I think the description of the basic causes in the original framework is actually very good—even if the framework itself is quite basic. The part on the distribution of resources within society is particularly important.
- In my paper, “A role for social nutrition in strengthening accountability for mass starvation?,” I take the following from the original description of the UNICEF framework: “Of critical importance in relation to starvation crimes, is that the framework also shows basic or structural causes, which relate to the unequal distribution of resources within society (ibid.: 21). In other words, what is produced or consumed depends on economic, social, political, and ecological factors. Social conditions include power structures; and political factors include the legal system and the role and power of national

institutions. Historical conditions, external (relating to aid policies) or internal (discrimination of certain groups) also contribute. Formal and informal institutions can be seen as the interface between underlying and basic causes.”

- I really like the description of basic causes of the original framework because it is explicitly political. My fear is that with the new framework there is a danger of de-politicization of the causes of malnutrition (even though I am sure this is not what you intend!).
- In comparing the original framework with the proposed new adapted framework, I find that many aspects of the new framework are actually incorporated in the original one. Climate, environment, and seasonality are part of “potential resources” (UNICEF’s description includes ecological resources). Gender and livelihoods could be included under formal and informal institutions, ideology (gender), and underlying causes (assets).
- Your paper argues that a better understanding of P-GAM must start with a consideration of strength, weaknesses, and gaps in the UNICEF framework. It would be good to have more detail on this. On the one hand, the UNICEF framework remains the sine qua non, but on the other hand many adaptations and basic causes are not examined. It would be good if your paper could include a discussion on the basic causes of malnutrition in the original framework and provide arguments on why it is not adequate. Is it simply because people have not used or endorsed that aspect of the framework? This could also include an analysis of why it has been adapted by a number of different organizations and researchers (i.e., why did the *Lancet* papers authors adapt it? They do not explain at all.) Maybe lack of understanding is one reason why people have not used the basic causes, but there could also be a number of other reasons. For example: nutritionists only assessing what they can respond to, the shift to quantitative methods and the difficulties in proving causality, the political nature of many basic causes (and therefore risks for humanitarian organizations and their ability to maintain a presence in highly politicized contexts), the funding for standardized packages and specialized nutritional products as part of Scaling Up Nutrition—SUN (and the profits to be made). See my paper on social nutrition and mass starvation above, and also **Food aid in Sudan: A history of power, politics and profit**.
- It is not clear whether the new proposed framework is for all contexts or for persistent GAM in drylands and specifically the Sahel. Would it also work for displaced populations or those in acute conflict or famine/mass starvation? Or even in protracted crises, if conflict rather than environment is your starting point? You write that persistent malnutrition is mainly in drylands, but I thought also conflict-affected? As you know, some of the highest rates of acute malnutrition are found in situations of acute conflict and displacement. I am concerned that once you adapt the framework for a particular context (e.g., drylands), it may become less appropriate for others.

Reviewer 6 (October 7, 2019)

- In your list of problems facing Africa’s drylands, I would also include disruption to social connectedness.
- In the arid and semi-arid lands (ASALs) of East Africa, the impact of shocks is cumulative; yet our causal analysis tends to focus on the most recent or current shock. Vulnerability, need, and response analyses need to take into account the impact of repeated shocks. Analysis of trends and changes in the impacts of the shocks/seasonality are also important and often omitted or downplayed.
- You provide an example that “international interventions in drylands are predominantly aimed at alleviating suffering and saving lives.” In fact, in my experience in Kenya, Uganda, Somalia, and Ethiopia arid lands, this type of “on-and-off” program ended 10 years ago. Multi-year “humanitarian/resilience” nutrition programming and consecutive funding are now the norm, albeit with fluctuations in the amount of funding available. What remains is a view that humanitarian activities are necessarily short term despite many programs having been continuous in these areas for the last 10–20 years. I think nutrition partners are still struggling to develop a suite of interventions with their multi-year funding

or to see consecutive funding in the context of a long-term strategy to address acute malnutrition. But progress has been made to move away from the old humanitarian clichés. Donors are increasingly willing to look at a range of activities to address acute malnutrition, especially under the banners of “resilience and/or health system strengthening.” In practice, I don’t think that the nutrition programs are any longer short term and focused only on saving lives, even in complex emergencies such as Somalia.

- I agree that we need a combined and holistic approach to addressing the drivers of acute malnutrition across all the levels of the framework. I agree there needs to be more attention to the lower part of the framework. However, I do not believe that in the last five years we were ignoring this; we were just trying to work out what to do and what works.
- I don’t really see how Sphere is relevant in this context. Sphere is a set of program quality indicators with most relevance for refugee or internally displaced person (IDP) camps, not guidance on best practice.
- While I partly agree that we need more formative research, as you suggest, I think the bigger priority is for action research/operational research/learning and adaptive programming.
- In my eyes, the framework simplifies a complex system of drivers linking all levels from individual to nation. In this case, I think it is unrealistic to imagine that we would find a precise action or institutional change that will make a difference alone. My view is that malnutrition is a complex adaptive system where a linear view of cause and effect does not apply. Consequently, our interventions, our learning about them, and our adaptation of these interventions need to tailor themselves to the characteristics of a complex adaptive system, e.g., emergence, self-organization, and dispersed and decentralized control.
- As a complex adaptive system I think that the arrows in the framework are the most important part of the framework depiction of the malnutrition system. Consequently, I think that all the arrows should be double-headed with between components—basic, underlying, and direct drivers—to show that they influence all the others in a self-organizing and emergent system. Given the framework’s linear depiction of the system, I think the only way to show that it is more complex than cause and effect is to use double-headed arrows. Only the arrows from the seasonality and shock box at the bottom should be single-headed.
- I agree that in the ASALs of East Africa it is very important to understand seasonality’s and climate-related shocks’ role in malnutrition but I think that the focus should be widened to understanding the impact and response to shocks as a whole, considering economic and conflict shocks especially.
- We should be careful not to imply that conflict in arid lands is only climatically driven.
- Formal AND informal systems and institutions are important; too often we concentrate only on one or the other.
- When you describe livelihood systems, do you mean food systems? What about care systems? Do you see “livelihood systems” as being shorthand for livelihood assets or strategies?
- You say that “people in dryland regions are often exposed to a wide range of climate, conflict and other shocks, resulting in acute and chronic humanitarian crises.” I agree and therefore think that the framework should be adjusted to be shock and seasonally responsive, not just seasonally responsive.
- I don’t think that idiosyncratic and covariate shocks can be divided and placed on the framework as they are in the present draft. I understand that you are implying that the higher up the framework you go, the more you are focusing on households and then individuals, and therefore the idiosyncratic shocks apply more at this level. But I think idiosyncratic shocks also impact on livelihood systems, institutions, etc. in such a way that they drive changes in the underlying and direct drivers of malnutrition. Equally, covariate shocks have impacts across the framework, not just the bottom part of the framework.

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