

Nutrition in Africa's drylands: A Conceptual Framework for Addressing Acute Malnutrition

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Summary

This brief proposes a renewal of the conceptual framework of malnutrition causality, that elaborates on the drivers² of acute malnutrition in drylands based on new evidence. While the UNICEF framework has been widely adopted across both development and humanitarian spheres, there are key elements that require urgent reemphasis and updating. There are also significant gaps in the framework itself especially related to the basic or more systemic drivers of acute malnutrition, that limit the framework's analytical power to discern correctly the drivers of acute malnutrition in drylands. This explains why the impact of interventions based on an incomplete analysis is severely blunted.

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 go as high as 40 or 50°C. Population distribution is often sparse with communities scattered over vast areas, but with increasing concentrations of former pastoralists and farming women and men, who have dropped out of pastoralism, eeking 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 governance and a plurality of tenure regimes that mean access to natural resources is becoming increasingly insecure, especially for women and youth.
- Rapid demographic change, linked with population growth, migration and displacement.

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² 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 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.

- 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, 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.

These factors have contributed to the increasing scale of humanitarian crises in drylands and massive donor expenditures. For example, 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”³. At the same time there has been growing recognition of acute malnutrition among children under 5 years of age, as a rising global public health problem⁴. A wide range of experts agree that levels of acute malnutrition across the globe are increasing⁵, and a preliminary view of these countries suggests that many are predominantly dryland countries.

The Global Acute Malnutrition (GAM) threshold signifying a humanitarian emergency is 15%, and this level has been found to persist well after the acute phase of a crisis, and even occurs in non-emergency years, 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 Africa⁶.

³ “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”.

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

⁴ Black, R. E., 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.

ENN. The current state of evidence and thinking on wasting prevention: Emergency Nutrition Network (ENN), 2018.

⁵ WHO/UNICEF/WFP, *Global nutrition targets 2025: wasting policy brief (WHO/NMH/NHD/14.8)*. . 2014, World Health Organization: Geneva.

⁶ Young, H. 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. A Feinstein International Center Brief. Tufts University. www.fic.tufts.edu

What are some of the challenges in addressing acute malnutrition?

A UN expert panel acknowledges a lack of effective approaches to address P-GAM⁴, and another expert group is in the process of establishing priority research questions to address this problem⁷. The majority of nutrition programs in developing countries, tend to be dominated by nutrition specific interventions, including treatment, rather than nutrition sensitive meaning more preventative projects. For example, international actions in drylands are predominantly short term humanitarian response aiming at alleviating suffering and saving lives, which means there is considerably less experience of sustainably addressing acute malnutrition. Although there is some research that shows the impact of multi-sectoral resilience programs on both stunting and wasting⁸, the evidence base is slim, the analytical approaches varied, and the composition of interventions diverse, 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 and evidence base remains on treatment rather than prevention, which means 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 this ignores the role of more systemic or basic causes, that drive the underlying causes of malnutrition.

Since the Lancet series in 2008 and 2013⁹, international attention has focused on the impact of interventions with randomized control trials often perceived as the gold standard. More formative research has been harder to promote, as it is widely assumed we have sufficient knowledge to design interventions that address the principle underlying causes of malnutrition. This knowledge is partly derived from the framework itself, as it depicts the main underlying causes, and also from the burgeoning body of ‘best practice’ such as the many agency guidelines and SPHERE Minimum Standards of Disaster Relief. However, in the absence of contextual formative research, or well-designed assessments, program designs cannot know what the localized or contextual drivers of acute malnutrition are. Thus, formative research is needed to inform, influence and fine tune the design and targeting of nutrition sensitive actions.

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

A better understanding must start with taking a fresh look at the UNICEF conceptual framework, and considering its strengths, weaknesses and gaps, and how it might be adapted

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

⁸ Marshak, A., 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*.

⁹ Black, Robert E, Lindsay H Allen, Zulfiqar A Bhutta, Laura E Caulfield, Mercedes de Onis, Majid Ezzati, Colin Mathers, and Juan Rivera. 2008. "Maternal and child undernutrition: global and regional exposures and health consequences." *The Lancet* 371:243-.

Maternal and Child nutrition. Global Nutrition Series. The Lancet, June 6, 2013.

<https://www.thelancet.com/series/maternal-and-child-nutrition>

or further developed for the purposes of understanding and addressing acute malnutrition in drylands today.

The UNICEF malnutrition causal framework (Figure 1) was developed as the UNICEF global approach for nutrition in the nineties and has survived three decades of scrutiny and remains the *sine qua none* or starting point for understanding malnutrition causality¹⁰. Importantly, the UNICEF framework recognizes the need to understand causality at the micro (individual or household) and macro levels (at the level of local communities and society). The micro or immediate causes capture the physiological reasons why an individual child becomes malnourished, while the macro reflects the underlying and basic causes of malnutrition (related to the wider social, economic and system political reasons why a community or household suffers from inadequate household food security, care of women and children, and the health environment and access to health care). By identifying the institutional level at which change is needed, it is possible to identify the precise change or action needed and how that might happen. The framework additionally implies that multiple interconnected actions are needed without dictating what those actions necessarily are.

In parallel with this work on malnutrition causality, there has been a wealth of new developments and even 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 context of policies, institutions and wider processes influencing livelihoods. The humanitarian livelihoods framework took this a step further by analysing the role of violence in humanitarian settings, including protection concerns. The nineties also saw a paradigm shift in our understanding of pastoralism, which recognizes that dryland ecosystems are in disequilibrium, accounting for the extreme climate variability. Pastoralist and other dryland livelihood strategies are carefully adapted to manage the unpredictable distribution of rainfall and associated pastoralist resources (pasture, fodder and water).

In taking forward the UNICEF framework, our strategy is first to preserve those elements that are globally recognized and endorsed, including the nutritional outcomes (acute malnutrition plus other forms) and immediate and underlying causes, while revisiting crucial aspects that have been neglected. The second and more crucial step, involves developing the concepts that encapsulate the basic more systemic drivers of acute malnutrition in drylands.

Areas of the framework requiring renewed emphasis in order to understand drivers of P-GAM in drylands

Two specific areas of the original framework that require renewed emphasis are: first the synergism between immediate and underlying causes, and second clarifying or digging deeper and making more explicit 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

¹⁰ UNICEF, 1992. Nutrition in the Nineties. UNICEF, New York.

between some disease vectors and the disease itself (for example, diarrheal pathogens in water and diarrhoeal 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 linear or short. Unfortunately this interaction was not shown in the recent reproduction of the framework by Black et al 2008, which has since been replicated by researchers frequently. 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 synergism accounts for the sudden rapid deterioration in nutritional status that is sometimes seen during slow onset disasters. This synergism might also explain the occurrence of ‘hot spots’ of extremely high rates of acute malnutrition, as a result of a rapid localized deterioration in nutritional status as multiple drivers coincide, during a protracted crisis for example or rapid population displacement where people no longer have access to their basic needs.

Indeed, the relationship between the three clusters of underlying causes is dynamic and changes seasonally. Understanding seasonality represents a major gap in current frameworks and is critically important for identifying seasonal peaks of acute malnutrition, and in turn for the 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 far less interest (or potentially more controversy) in the depiction of the basic causes of malnutrition as compared to the immediate and underlying causes more variation in. There also appears to be more variation in how the basic causes are presented in the various reproductions of the framework. One reason for this might be that the basic causes have not been sufficiently explained or further developed, and expressed in terms that are easily understood and resonate with issues locally. In this short brief we try to further elaborate and explore the basic or more systemic causes of acute malnutrition in dryland contexts, based on our own experience of research and learning over the past 30 years.

In brief, the basic causes includes three levels; environment and seasonality, systems and institutions and livelihood systems. At the base of the adapted framework 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. On their own, natural hazards or climate shocks do not cause disasters, they can only trigger them. Perspectives on vulnerability emphasise social causation – the role of social and political systems, in bringing about a disaster. Hence any analysis of malnutrition causality must consider how the impact of shocks are mediated at the level of ‘*Systems and Institutions*’ - by the wider systems of governance, and related economic, food and health systems. Included here are gender and other social norms, which have a cross-cutting impact across the framework. Next we incorporate the role of ‘*Livelihood Systems*’, which in turn drive the three clusters of underlying causes. Note we explicitly refer to the resilience and adaptation of livelihood systems, and take into account the impact of both covariate shocks at the systems level and also idiosyncratic shocks at the

local household or individual level. Each of these three areas of our Basic Causes are more fully explained in Box 1.

Box 1 The Basic Causes of Acute Malnutrition in Drylands

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 labour 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.

Systems and Institutions

The representation of systems within causal models of malnutrition has been patchy. Despite a reference to formal and informal institutions in the first iteration of the UNICEF framework, it was dropped in subsequent versions (1992) and references to health systems, economic systems and livelihood systems have rarely, if ever, been incorporated in subsequent adaptations (see for example the Sphere Handbook and the Lancet 2008 series).

Looking beyond specific nutritionally vulnerable groups e.g. less than 1000 days, there is a need to consider implications of gender and age more broadly. For example, boys have generally worse nutritional status in the Sahel compared to girls, despite the long-term vulnerability observed for girls across almost every other characteristic. Gender assumes such an importance, it is worth considering a gender-disaggregated lens when looking at drivers.

Environment and Seasonality

Recent Feinstein International Center research has presented new evidence on seasonality and shockys by highlighting the importance of the basic causes of malnutrition linked to conflict and environmental variables (rainfall, temperature and vegetation), which explain about one-third the variation in GAM and mean weight for height z-score (WHZ) over time¹¹. The study 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 lean 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. It is followed by a slight improvement in acute malnutrition and then a secondary but smaller peak after the lean season. We

¹¹ FAO and Tufts University. 2019. Twin peaks: the seasonality of acute malnutrition, conflict and environmental factors in Chad, South Sudan and the Sudan. May 2019. Rome and Boston.

argue that it is the seasonality of livelihood systems linked with environmental variability and access to natural resources that drives seasonal changes in food security, care and health.

People in dryland regions are continually exposed to a wide range of climate, conflict and other shocks, resulting in acute and chronic humanitarian crises.

Towards a new conceptual framework

While we have tried to remain true to the original UNICEF framework, the adapted version 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 livelihood resilience and adaptation, and on the underlying causes of malnutrition. In reducing vulnerability and building resilience, the role of social and political systems, and within these systems, formal and informal institutions, are given renewed emphasis. **Gender** is further highlighted in the framework not only as a cross-cutting issue, or thematic area, but as a fundamental part of social norms and values at the level of Basic Causes, which play out as part of livelihood systems and the underlying causes of acute malnutrition.

Environment and seasonality shape people's lives and livelihoods, particularly in a dryland's context, given the inherent livelihood adaptation to harsh dryland conditions and resilience to climate shocks. Importantly, 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 realised through a more systemic institutional approach that mitigates shocks and strengthens systems underpinning equitable food security, health and social cohesion.

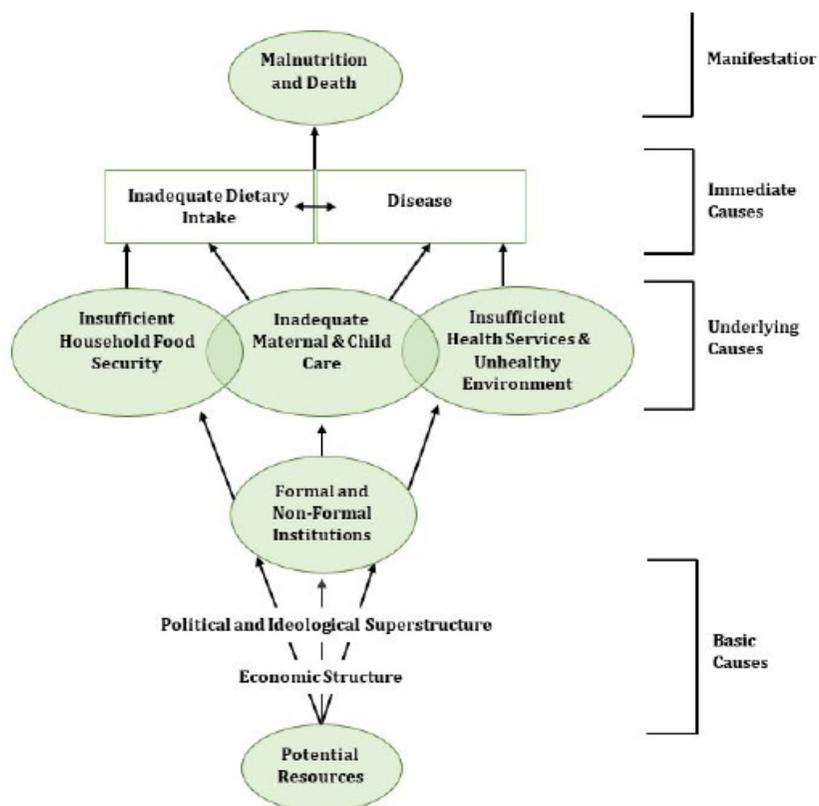
We conclude that gender, livelihoods, seasonality and environment are gaps in the current framework, which represent the key to unlocking the answer to what is driving P-GAM in Africa's drylands. With this new understanding comes a responsibility to expand and deepen our shared analysis of what drives acute malnutrition. For this analysis to be truly groundbreaking 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 was part of the original vision of the UNICEF framework, which we need to resurrect while updating our understanding across all levels of the framework and how they are interconnected.

Figure 1

Unicef Conceptual Framework – Causes of Malnutrition and Death

(Unicef, 1990 and 1992, A Unicef Policy Review. Strategy for Improved Nutrition of Children and Women in Developing Countries, Unicef, New York)

a. Unicef 1990 First Printing



b. Unicef 1992 Second Printing

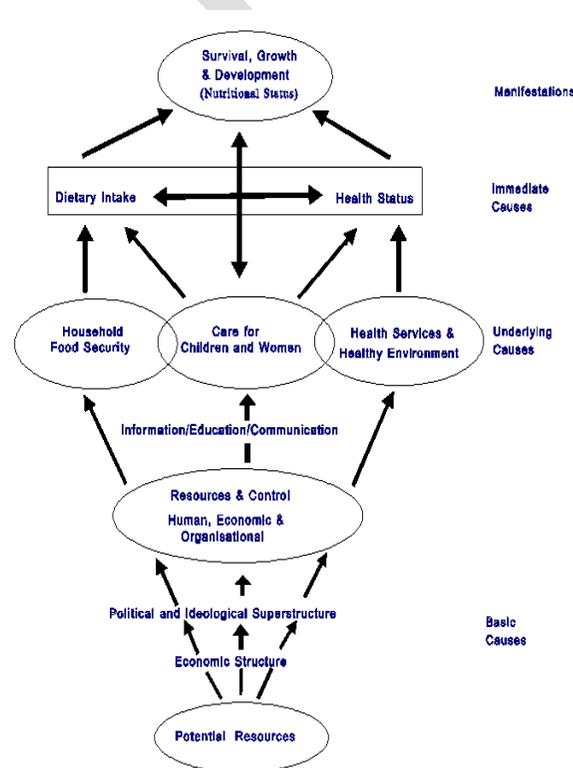
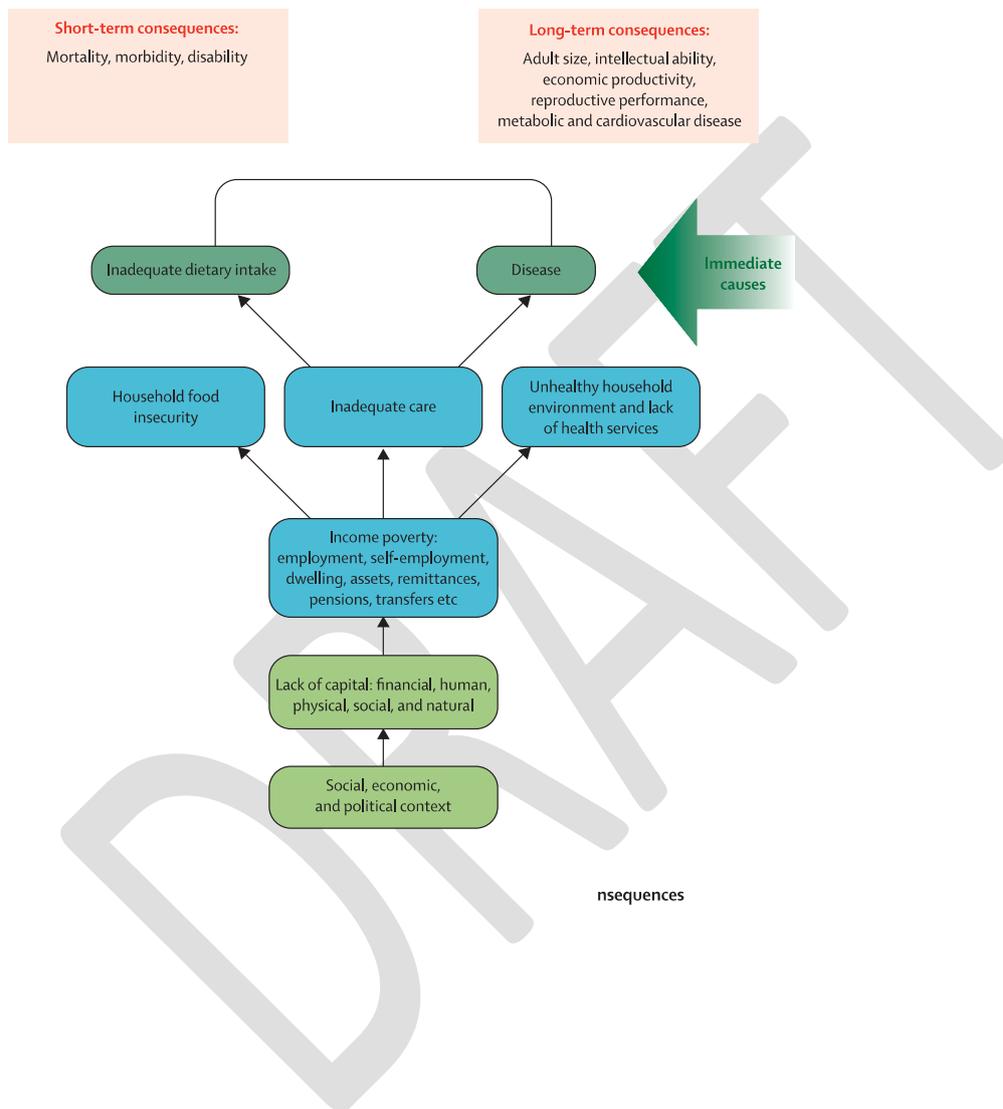


Figure 2 Presentation of the framework of the relations between poverty, food insecurity and other underlying and immediate causes to maternal and child undernutrition¹² (from Black et al., 2008)



¹² From: Black, Robert E, Lindsay H Allen, Zulfiqar A Bhutta, Laura E Caulfield, Mercedes de Onis, Majid Ezzati, Colin Mathers, and Juan Rivera. 2008. "Maternal and child undernutrition: global and regional exposures and health consequences." *The Lancet* 371:243-.

Figure 3 Acute Malnutrition in Africa’s Drylands: A New Conceptual Framework

