

Perspective Piece

Understanding Biopsychosocial Health Outcomes of Syndemic Water and Food Insecurity: Applications for Global Health

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Abstract. Household food and water insecurity often co-occur, and both can lead to malnutrition, psycho-emotional stress, and increased risk of infectious and chronic diseases. This can occur through multiple pathways including poor diet and inadequate sanitation. In this perspective, we discuss the potential advantages of a syndemic approach to understanding the consequences of food and water insecurity, that is, one that makes possible the assessment of their mutually enhancing effects on health. Syndemic theory considers the concerted, deleterious interaction of two or more diseases or other health conditions, such as psycho-emotional stress, that result from structural inequities. We therefore call for an approach that links localized morbidity of individual- or household-level experiences of concurrent food and water insecurity to larger structural and contextual forces/risk environments. Such an approach permits the investigation of food and water insecurity as suites of risk, such that certain disease outcomes serve as signals for interlinked stressors. For example, the use of a syndemic perspective could help explain the persistence of conditions like diarrhea or stunting after food or water interventions; that is, existing approaches may be too narrow in scope to protect individuals from multiple and overlapping environmental and biopsychosocial stressors.

Household food and water insecurity often co-occur, and both can lead to undernutrition, psycho-emotional stress, and increased risk of infectious and chronic diseases.^{1–3} This can occur through multiple pathways, including poor nutrition and inadequate sanitation.⁴ This commentary outlines potential advantages of adopting a syndemic approach to investigating the adverse interactions between food and water insecurity. We call for an approach that links localized morbidity of individual or household-level experiences of concurrent food and water insecurity with larger structural and contextual forces/risk environments. Specifically, we apply a syndemic approach that includes risk environments that result in localized disease,⁵ and broader assessments of food and water insecurity that can account for the consequences of multiple, intersecting, biological, and psychoemotional or psychosocial illnesses.⁶ In this way, we can approach food insecurity and water insecurity as syndemic stressors that encapsulate suites of risk and myriad pathways to specific disease outcomes.

Applying the syndemic framework to global health interventions could allow for a more robust approach to characterizing the multiple stressors that many vulnerable people face. We posit that integrated programming represents one path forward, and that effective impact assessment requires the development of new indicators to capture multiple linkages between food and water insecurity. By conceptualizing food and water insecurity as syndemically linked, we avoid focusing solely on one or the other, for example, food-based interventions to reduce undernutrition that ignore risks of enteric infections.

There are several defining characteristics of syndemics.⁷ First, syndemics reflect and reinforce poverty, and therefore are often associated with structural disadvantage, political exploitation, and social and economic disempowerment. Second, the identification of a syndemic requires exposition of

the pathways through which this political economic context manifests in multiple, mutually reinforcing illnesses. Finally, syndemics are fully embedded in cultural practices and knowledge, shaping people's vulnerability and coping strategies. As such, syndemics result from the interface of biological and social processes (i.e., bio-social interface) as well as significant interactions between biological diseases or illnesses (i.e., bio-bio interactions).⁸ Food and water insecurity result from political economic and social inequity, that is, the bio-social interface, and intersect to drive significant illness through bio-bio interactions of myriad infectious and chronic diseases (Figure 1).

Researchers and practitioners have long connected food insecurity and water insecurity.⁴ Macroscale approaches, for example, the development of drought-resistant crops, can provide partial solutions but may still overlook mechanisms linking lack of food and water to overall well-being. For example, even when agricultural output is sufficient, individuals and households may still face food insecurity.⁹ Indeed, food security is culturally mediated and experienced psychologically, that is, it is broader than malnutrition.

Social scientists have demonstrated that structural inequalities such as poverty result in localized experiences of food and water insecurity, that is, though a biological-social interface.^{2,3,10–12} Survey data from 6,691 households across 27 low- and middle-income sites revealed that households experiencing both reduced water quality and quantity were more likely to also experience food insecurity.² The effects were buffered by higher social status, underscoring how the experience of food and water insecurity is shaped by the social context, evidence for syndemic circumstances. Moreover, in this study, both food and water insecurity were assessed experientially, meaning it was articulated by research participants. Such methods provide insight complementary to measures of agricultural outputs or community water point enumeration. Indeed, these experiences of resource insecurities are shaped by social relations and perceptions of social standing, and are experienced accordingly.

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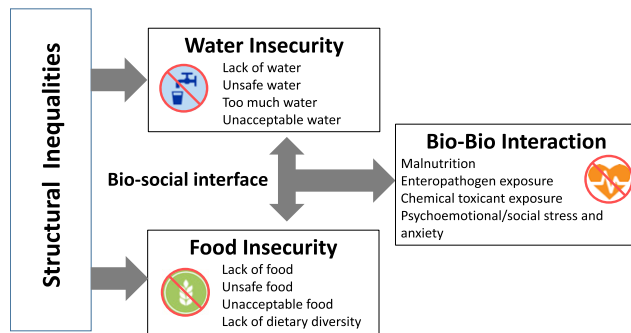


FIGURE 1. Model of syndemic water and food insecurity. This figure appears in color at www.ajtmh.org.

Several studies provide evidence that household food and water insecurity intersect to exacerbate psychoemotional distress. A cross-sectional study of 4,055 households in three Haitian communities found that household water insecurity was associated with additional adverse mental health effects beyond those explained by food insecurity, after controlling for household wealth.¹³ In a longitudinal study in Kenya, food insecurity, water insecurity, and HIV prevalence were all associated with greater depression among postpartum women.¹ Statistical analysis indicated that these stressors interacted (i.e., syndemically) to increase depression symptomology. Similarly, in Lesotho, water insecurity, food insecurity, and HIV/AIDS predicted increased depression and anxiety symptoms, resulting in and from complex household vulnerability.³ Together, these studies indicate that resource insecurity along with infectious disease work in concert to increase psychoemotional distress through a biological–biological interface.

In addition, there are linkages resulting in chronic health problems. Food insecurity not only causes malnutrition but also interacts syndemically with diet-related chronic diseases such as obesity, cardiovascular disease, diabetes, and hypertension, among others.¹⁴ Similarly, the psycho-emotional distress of water insecurity may drive high blood pressure.¹³ As described in the case of immigrant detention in the United States, stigma, dehumanization, and deprivation create a malnutrition and mental ill-health syndemic.¹⁵

Moreover, the co-occurrence of food and water insecurity can result in increased exposure to infectious agents. For example, although irrigation is beneficial for ensuring food security, irrigation with low-quality water poses risks for chemical and microbial contamination of foodstuffs.¹⁶ Water storage for crops or gardens may pose a risk for vector-borne diseases.¹⁷ Limited or unsafe water can shape household food preparation, rendering nutritious foods unsafe or at risk for contamination with enteric pathogens.¹⁸

How these stressors intersect depends largely on structural and social vulnerability, and will manifest differently among the most vulnerable populations. Novel, sensitive approaches are needed to qualify and quantify the multiple interconnections and resultant effects on health to ensure that securing food or water security does not come at the cost of the other. Although food insecurity and water insecurity are driven by poverty, they are not synonymous with poverty. That is, poverty is mediated through both food and water insecurity, and it is necessary to distinguish the many connections and pathways through

which the political economic context is embodied in resource insecurity. Moreover, a too-narrow focus on the economic benefits of water security as poverty reduction may produce unintended consequences, such as reinforcing marginalization and putting undue burden on women to pull their families out of poverty.¹⁹

In this vein, we must be careful with siloed interventions levied at reducing food insecurity in the context of water insecurity and vice versa. In addition to malnutrition, individuals are exposed to enteric illness, which may not only interact to exacerbate—and be exacerbated by—malnutrition, but also result in significant morbidity or mortality overall.²⁰ Thus, ensuring food security is impossible without comprehensive water security that entails sufficient, safe, and preferred water. In these settings, siloed food interventions, such as the provision of foodstuffs requiring water for preparation, may mean that the net effects in very low-resource households do not achieve their given aims in light of competing and overlapping resource insecurities.

Conceptualizing food and water insecurity as syndemically linked conditions—especially for the world’s poorest households—has significant implications for achieving the Sustainable Development Goals (SDGs) of zero hunger and comprehensive water, sanitation, and hygiene coverage.¹⁷ A syndemic view of these two separate challenges (Goals 2 and 6) would suggest that addressing one could also help meet the other. But the dangerous alternative is that addressing each challenge separately fails to address the health-damaging underlying problem of severe household resource deprivation that is in turn being addressed separately by SDG 1 (ending poverty). Moreover, we stress that food and water insecurity can result in both chronic and infectious disease transmission, linkages often missed in narrow approaches to ensuring food security.

Integrated programming of household food and water interventions offers one obvious manifestation of syndemic thinking.²¹ Food and water insecurity interventions must also consider the complex and possibly bidirectional relationships between the two stressors and the resultant suite of interconnected illnesses. Whereas integrated programming is promoted by organizations such as the United Nations and is currently implemented, albeit unevenly, within low- and middle-income countries, the literature suggests two things: 1) the need for broadly available impact assessments of integrated programming and 2) more alignment in metrics and measurements.²² For example, food security is sometimes conflated with agricultural output, with nutrition treated separately.¹²

Improving our understanding of the contexts in which interventions are implemented, and their associated microlevel effects, is critical to characterizing the biopsychosocial effects of food and water insecurity. Specifically, longitudinal research is needed in which food insecurity and water insecurity are monitored in tandem. This will permit the parsing of vectors impacting health and facilitate design of synergistic strategies for food–water interventions. A syndemic research approach will better identify trade-offs as households seek to achieve food and water security. Here, academics have a role to play, supporting practitioners by elucidating mechanisms and substantiating successful integrated programming and interventions. Accordingly, findings should be made available in white, gray, and academic literatures.

In practice, the presence of disease such as childhood diarrhea, which may represent a syndemic disease caused by macro- and microparasitic interactions,²⁰ results from larger systemic interactions of resource and infrastructural insecurity. Such interactions may include, for example, the inability to fully separate humans from exposure to human or animal waste and the inability to secure safe and sufficient foods. Moreover, children presenting with both malnutrition and diarrhea are at increased risk for death, indicating biological interaction as well.^{23,24} Thus, a high prevalence of diarrhea may indicate that interventions are too narrow and that individuals are affected by multiple and overlapping stressors and pathogens related to food and water insecurity.

In sum, we encourage efforts to more fully integrate broad understandings of food and water insecurity as syndemic stressors into development policy and programming with enhanced monitoring and evaluation methods to assess these interconnections (See Box 1). As the human experience of food insecurity entails more than malnutrition, we are now challenged with developing sophisticated, multi-sectoral indicators and targets that capture the multidimensionality of these phenomena. Furthermore, improvement in one sector may necessitate improvement in another and, conversely, a lack of progress toward targets necessitates exploring exogenous factors. A syndemic approach helps us reconsider how the health risks of inadequate food and water are connected within global health efforts. We assert that certain disease outcomes serve then as signals for inter-linked stressors. The presence of specific outcomes such as diarrhea or stunting may, for example, indicate that food or water interventions are overly narrow in scope to protect individuals from multiple and overlapping environmental and psychosocial stressors.

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Box 1

KEY MESSAGES AND RECOMMENDATIONS

Analytic considerations about the syndemic nature of food and water insecurity.

- Food insecurity and water insecurity represent a suite of intersecting morbidities.
- Structural inequalities are mediated through both food and water insecurity.
- Food and water insecurity interact bio-socially and bio-biologically to result in more severe illness and negative health outcomes.

Research practices to help articulate syndemic relationships.

- Improve clarity and precision of metrics and measurement of food and water insecurity.
- Recognize that food and water security are culturally meaningful and affect physical, psychoemotional, and psychosocial health, and can be assessed objectively and experientially through qualitative and quantitative methods.
- Consider problems of both food and water insecurity when designing interventions to mitigate one or the other.
- Evaluate impacts of food and water insecurity in tandem, along with allied health outcomes when monitoring or evaluating program impacts.

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