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Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
www.AgDevJournal.com

DIGGING DEEPER

Bringing a systems approach to food systems

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The many uses of a new report on food systems assessments

Published online January 26, 2016

Citation: Clancy, K. (2016). The many uses of a new report on food systems assessments. *Journal of Agriculture, Food Systems, and Community Development, 6*(2), 9–12. http://dx.doi.org/10.5304/jafscd.2016.062.006

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A new contribution to the efforts to bring a systems approach to food systems work is the report *A Framework for Assessing the Effects of the Food System* (Institute of Medicine [IOM] & National Research Council [NRC], 2015a). It was released a year ago and became available for purchase in June 2015. I was a member of the committee that prepared and wrote the report under the auspices of the Institute of Medicine and the National Research Council and I want to highlight in this column what I see as the report's multiple uses.

The task presented to the committee was to propose a framework that could be utilized by researchers and stakeholders to assist in food and agriculture decision-making. We were also asked to provide examples of current food system issues for which there are present and future alternatives, and for which the utilization of the framework could be helpful in decision-making. The charge was to develop the framework and not to do any actual analyses of a particular issue.

The framework is intended to be used by researchers and practitioners, but the report is directed to policy-makers and others who must consider a broad range of effects in order to enact useful and relevant laws and regulations. Recognizing that decisions about food policy and practices have both negative and positive unintended effects, the framework offers "guiding principles and practical steps to help stakeholders weigh tradeoffs and choose policies that integrate benefits and risks across various domains" (IOM & NRC, 2015b, p. 1).

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The report follows on two others: *Exploring Health and Environmental Costs of Food* (2012), by the IOM and NRC, and *Toward Sustainable Agricultural Systems in the 21st Century* (2010), by the NRC. Echoing the latter report, the framework committee agreed that "the transformative approach to improving agricultural sustainability… would facilitate development of production approaches…associated with complex natural systems and their linked social, economic, and biophysical systems" (NRC, 2010, pp. 525–526). To develop robust solutions for these challenges, the group also believes it is important not only to identify the effects of the current system, but also to understand the drivers of those effects, including human behavior, market dynamics, and policy issues. Such understanding can help decision-makers identify the best opportunities to intervene and allow them to anticipate potential consequences.

To develop robust solutions for these challenges, it is important not only to identify the effects of the current system, but also to understand the drivers of those effects, including human behavior, market dynamics, and policy issues.

The committee began its work with the recognition that policies or actions that aim for an outcome in one area of the food system can have a range of consequences, often substantial, in other domains. The proposed framework will help identify these unintended effects, as well as promote transparency among stakeholders; improve communication and understanding of differing values and perspectives among scientists, policy-makers, and other stakeholders; and decrease the likelihood that results of a policy analysis might be misinterpreted.

The report is quite long and complex, but thereby offers multiple uses, according to users' needs.

1. The first, obviously, is the framework's use as an assessment tool. It follows the six steps common to assessments, from identifying the problem to reporting the findings. The conceptual illustration of the framework includes four key domains of the food system (environmental, health, social, and economic), along with four dimensions (quality, quantity, distribution, and resilience) within each domain; systems concepts; and data, metrics and methods.

It then offers four principles that guide the steps of the analysis: (1) consider effects across the full food system; (2) address all domains and dimensions of effects; (3) account for system dynamics and complexities; and (4) choose appropriate methods.

2. The second use is as an educational tool for training students and others in complex systems and the utility of frameworks. There is a separate chapter describing food as a complex adaptive system, and the framework chapter includes a description of multiple systems concepts that need to be applied, as well as a variety of models for conducting comprehensive assessments and executing other useful exercises. Appendix B comprises 40 pages of tables featuring selected metrics, methodologies, data sources, and models for assessing effects. Other models appear in different parts of the report. For example, life-cycle analysis is described in the environmental effects chapter.

3. The third use is in teaching food systems. While the overview and effects chapters are not intended to be comprehensive, they are heavily referenced and cover a wide swath of the literature on the evolution of the food system and its health, environmental, social, and economic effects at the present time in the U.S. Time and resources precluded addressing many of the issues in the global food system, but in a number of places global issues are described. These chapters should be useful in food systems courses, and we have heard many reports of this already.

The committee utilizes the broadest definition of food systems, which places the food supply chain within a much larger biophysical, social, and economic institutional context. Each chapter concludes with examples of how the multiple domains interact with each other, so that students can start

seeing how the domains are connected and why they should be observed and studied simultaneously. We did make clear that we understand that only some comprehensive assessments will be undertaken by researchers due to limited time and resources, but at a minimum an analysis should be done to determine the boundaries at the beginning of a study, and questions should be asked regarding all the different domains and dimensions before deciding on a final study design.

4. Reports from readers so far tell us that the examples chapters are very helpful in illustrating how the framework can be used to understand real-world issues and to illustrate many of the principles and concepts from the other parts of the report. Francis and Swoboda (2016) suggest in their review of the report in this journal that the examples reflect short-term thinking, but I disagree, because if the problems and issues raised in the examples are taken into account they offer a very long-term view of the challenges and the type of systems thinking that needs to be put to solving any of these "wicked problems."

The report proved quite helpful to practitioners in Seattle, King County, and Washington state in identifying systems approaches and greatly enriching their strategic and tactical planning.

5. The first application of the report that came to our attention was in strategic planning undertaken by groups in Seattle, King County, and Washington state, who were engaged in efforts to enhance local, regional, and state food system activities. The organizers were asking themselves what type of approach could capture a full range of systems factors, adaptations, and outcomes. The IOM and NRC report proved quite helpful to them in identifying systems approaches, and greatly enriched their strategic and tactical planning (Otten, 2015). I believe that many other practitioners, nonprofit organizations, and funders can benefit from exposure to the framework.

6. Given the report's emphasis on effects and its intent to be useful to policy-makers and policy researchers, it is not surprising that myriad examples of specific policies can be found throughout, including policies related to beginning farmers, commodity subsidies, the U.S. Department of Agriculture's Conservation Reserve Program (CRP) and Conservation Stewardship Program (CSP), environmental pollutants, concentrated animal feeding operations (CAFOs), pesticides, soil conservation, water and air quality, health insurance, foodborne illness, food workers' health and safety, Supplemental Nutrition Assistance Program (SNAP), food security, food advertising, and many others.

Policy is also the focus of the several recommendations made by the committee. One is that Congress and agencies continue funding and supporting the collection of data that can be used in food systems assessments and other studies, and enact new data-collection mandates when needed. Federal efforts to support data sharing and public-private collaboration on data availability should also be increased. The second is that federal agencies should have the analytical capacity to undertake assessments using principles of the framework as they consider domestic and global consequences of proposed policy changes. This means training scientists in academia, the private sector, and government agencies in systems approaches and the use of models.

I believe that the report offers instruction and insight into a large number of the new tools and ideas needed to understand and address pressing food systems issues. I encourage researchers and practitioners to adopt the elements that are most useful to them, thereby enhancing and advancing the systems thinking that will lead to a more resilient future.

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