



Global Panel
on Agriculture
and Food Systems
for Nutrition



TECHNICAL BRIEF No. 2 | October 2015

**Improved metrics and data are
needed for effective food system
policies in the post-2015 era**

ABOUT THE GLOBAL PANEL ON AGRICULTURE AND FOOD SYSTEMS FOR NUTRITION:

The Global Panel is an independent group of influential experts with a commitment to tackling global challenges in food and nutrition security. The Global Panel is working to ensure that agriculture and food systems support access to nutritious foods at every stage of life.

GLOBAL PANEL MEMBERS:

John Beddington (Co-Chair), Former UK Chief Scientific Adviser

John Kufuor (Co-Chair), Former President of Ghana

Akinwumi Adesina, President of the African Development Bank

Tom Arnold, Interim Coordinator, Scaling Up Nutrition (SUN) Movement; and Director General, Institute of International and European Affairs (IIEA)

Maurício Antônio Lopes, President, Brazilian Enterprise for Agricultural Research (Embrapa)

José Graziano da Silva, Director General, Food and Agricultural Organization (FAO)

Mahabub Hossain, Former Executive Director, BRAC

Rachel Kyte, Vice President and Special Envoy, Climate Change Group, World Bank Group; and Chair of CGIAR Fund Council

Srinath Reddy, President, Public Health Foundation of India

Emmy Simmons, Board Member, Partnership to Cut Hunger and Poverty in Africa/AGree

Rhoda Peace Tumusiime, Commissioner for Rural Economy and Agriculture, African Union Commission

© 2015 by the Global Panel on Agriculture and Food Systems for Nutrition. This report may be freely reproduced, in whole or in part, provided the original source is acknowledged.

This publication is a product of the Global Panel on Agriculture and Food Systems for Nutrition, supported by the Panel Secretariat. This publication was peer-reviewed. The findings, interpretations and conclusions expressed in this work

do not necessarily reflect the views of the organisations or the governments the Global Panel members represent.

RECOMMENDED CITATION: Global Panel. 2015. Improved metrics and data are needed for effective food system policies in the post-2015 era. Technical Brief. London, UK: Global Panel on Agriculture and Food Systems for Nutrition.

Executive Summary

Most low and middle income countries are burdened by persistent undernutrition as well as by rapidly growing overweight, obesity and diet-related non-communicable diseases. It is widely accepted that agricultural and food system policies must make a greater contribution to enhancing diets and hence to improving nutrition if these challenges are to be addressed. However, existing tools which measure the outcomes of agricultural and other food policy interventions relevant to nutrition capture only some elements of food systems, such as agricultural output, total food supply, and food prices. These provide a partial assessment of actual food and nutrition needs of vulnerable populations, dietary quality, or the drivers of food choices. Consequently, decision makers only have fragmented evidence on which policies and interventions work best to enhance food value chains for nutrition.

Since good evidence lies at the core of effective policy action, it is difficult for governments to intervene effectively when needs are poorly understood and impacts inadequately measured. New metrics are therefore needed to measure diet quality and sufficiency, as well as food system efficiency and sustainability, and the processes that link various points across food system domains.

Progress is needed in six key areas:

- 1) Improving the quality and quantity of data on food intake among different sectors of the population.
- 2) Reaching agreement on how to measure diet quality.
- 3) Developing metrics that measure women's roles in dietary choices.
- 4) Designing metrics to measure the 'food environment', including how different food system domains are linked

to, and interact with, the food environment in which dietary choices are made.

- 5) Devising metrics that measure the healthiness of food systems, all the way from agriculture through markets to people's actual food consumption.
- 6) Developing metrics that measure people's ability to access food of sufficient quantity and quality.

This Technical Brief is aimed at analysts, statistical experts and decision makers who use evidence to guide their policy choices. It argues that the research community and governments need to work together to develop robust mechanisms to collect better food system-wide data to help them design and evaluate the nutritional impacts of food policy interventions.

The Global Panel recommends four main actions:

Governments should assume responsibility for:

- 1) Measuring impacts of national policies across all domains of a food system.
- 2) Enhancing national statistical capacity to generate the disaggregated data needed to support domestic and global development goals and the timely assessment of policy impacts.

The global research community, including scientists from low and middle income countries, should actively:

- 3) Fill knowledge gaps and data deficiencies that have been identified in the six areas identified above.
- 4) Define appropriate metrics that support measurement of progress in achieving food system efficiency and healthy diets, both locally and globally.



Introduction

No government in the world can take good nutrition for granted. Every country is burdened with some form of malnutrition, whether it be undernutrition, micronutrient deficiencies, or growing obesity and diet-related non-communicable diseases.¹ It is widely accepted that if national governments are to address all of these forms of malnutrition simultaneously, agriculture and food system policies must make a greater contribution to improving diets. High income countries, as well as low and middle income nations, should seek to combine higher productivity in agriculture, sustainability of food systems, quality of diet, and better informed consumer food choices to support enhanced nutrition. Concerted policy change is needed across a range of sectors to achieve this by linking production, marketing, processing and consumption of high quality foods more effectively together for a healthy diet.²

The development and implementation of effective public and private sector policies in agriculture and food are much more likely to be achieved if their outcomes can be measured accurately across all domains of interest. However, few tools exist for measuring the combined or net effects of agricultural and food interventions on nutrition and health along the value chain from production, through marketing and processing, to consumption.

Governments have relied on national estimates of agricultural production and food availability, coupled in many cases with assessments of children's weights in recent decades, to gauge

their country's food security level and nutritional status. Measuring the effects of any food policy intervention on any nutrition outcome, like child stunting, is challenging because there are many other determinants, such as health and hygiene which are likely to be influential. In addition, policy interventions in one part of a food system, for example a price subsidy on a targeted staple food commodity, may have unintended impacts elsewhere. For instance, negative impacts of a subsidy could include the suppression of demand for other more nutrient-rich foods, which would in turn reduce the incentive for producers to supply foods that have enhanced dietary quality among vulnerable consumers. Thus, the development and use of diet quality indicators that span the entire food system could support an improved understanding of diverse policy impacts on nutrition, and generate better evidence on which effective policies can be based.³

This Technical Brief is aimed at analysts, technical experts, government advisers and policymakers who want to use sound evidence to inform their decisions. It identifies critical data needs for decision makers who want to strengthen the roles played by agricultural and food systems in terms of impacts on diets, food consumption choices, and nutrition. The Brief highlights recent initiatives aimed at generating consensus on data needs and on novel metrics, especially in the context of the Sustainable Development Goals set for the next decade. It recommends a greater focus on the collection of essential dietary data so that food policies can be better designed and evaluated.



Measuring healthy food systems and diets

In identifying the appropriate empirical evidence needed to support effective policy actions across sectors, governments face three inter-connected problems:

- Few countries currently collect the agricultural and food system data necessary to measure nutrition and health outcomes effectively.
- Few if any statistical systems currently collect or analyse data which link information across the various domains of food systems from production through to consumption.
- No countries are currently using empirical data to measure the nutritional impact of national agricultural and food policies and other interventions, with sufficient accuracy.

Policymakers have limited tools to measure healthy diets directly. Numerous measures have been used over the years to assess the nutrition and health status of children and adults, as well as the macro-level availability of agricultural output and commodity trade, seed storage, and aggregate levels of food marketing and waste. However, most of these measures tend to capture only one or other domain of the food system and are linked mainly to production. *Figure 1* illustrates the range of domains where policies can influence the food environment, which can be characterised as a dynamic space in which a range of food options open up to consumers based on food availability, accessibility, affordability, and appeal.

For example, while indicators of agricultural production are necessary to monitor progress in enhancing agricultural output and efficiency, they do not provide an adequate picture of

agricultural diversification, women's roles in farm and non-farm livelihood activities, or policy support for smallholder production through improved access to inputs and public extension services.

Similarly, while imports and exports of agricultural commodities and many food products are tracked and reported at national level, patterns of consumer demand, and how these are affected by prices and convenience, is poorly monitored. Measures of industrial food transformation are almost non-existent. There are few data on how the private sector is influencing diets and diet quality through food processing, fortification, marketing and pricing. Policymakers need a much better understanding of the growing role of commercial food transformation as it influences what the majority of the world's citizens are already eating.

It is difficult for governments to make improvements in areas that are not well understood or well measured.⁴ Proposals for mandatory taxes on categories of food to dis-incentivise demand, policies to incentivise demand for 'healthy foods', restrictions on the acquisition of some foods in safety net programmes, and price support to farmers fuel robust debate about potential effects on diets and on individual producers or consumers. But few of these debates are informed by current data or by any assessment of the potential impacts of policy on the various domains of the food system. Recognition of this weakness in most countries' decision-making processes has led to some recent initiatives aimed at defining evidence gaps and promoting improved metrics.



Figure 1: How agricultural and food system policies link to diet quality as a measure of good nutrition (Global Panel, 2014)

Identifying data gaps on diets and food systems



In the four major food system domains highlighted in Figure 1, the focus of data collection has been on agricultural production and on how trade policies on commodities may affect farm households. This focus on commodity output, productivity and imports/exports is critically important to sustaining the supply of agricultural products and to enhancing the efficiency of production. That said, it tells us little about how such products are consumed, or by whom, or how production links to consumption through marketing, processing, retail and consumer choice. In other words, it tells us little about the links between and among food systems domains. For example, a recent modelling exercise to assess global food demand by 2050 acknowledged that the use of a metric of food energy supply per capita “captures only one dimension of human diet” and “does not fully address shifts in diet preferences with income growth.”^{5,6}

The lack of data on diets as actually consumed, and on dietary deficiencies of all key macro and micronutrients is especially important given new research in East and Southern Africa which shows that middle class households in rural areas now purchase between 60-83% of their food.⁷ About three-quarters of this total comes in the form of processed foods which are primarily local in origin (rather than imported from higher income countries). In other words, long-standing assumptions about diets in rural Africa (and Asia and Latin America) are being challenged by studies suggesting rapid, dynamic change that is not being captured by national statistical systems.⁸ A better understanding of how preferences, and cultural, and social norms affect food consumers’ choices in low and middle income countries is increasingly relevant in describing food systems.

Novel approaches are likely to be needed to address these information gaps across the food system.^{9,10} This will require the collection and collation of linkable inter-domain metrics.

In other words, representative surveys should not only collect production data or health and nutrition data (as has been common in the past), but also link them. For example, the inclusion of anthropometric data (measures of the physical growth of individuals, which indicate nutritional status) in the World Bank’s multi-country Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA) is an important step in the right direction. The adoption of additional dietary measures, including share of total expenditure on food, in regular demographic and/or health surveys, such as the Demographic Health Surveys, would represent a similarly important step to capture the characteristics of the food environment more effectively.

To better assess the impact of policies in increasingly heterogeneous settings, where different food systems serve different regions and people, disaggregated data should be collected both at the geographical level and across different dimensions. In addition to aggregate national indicators, there is a need for data, wherever feasible, to be stratified by sub-region, gender, age and socio-economic status, to more effectively guide policy. For example, a life course approach to the study of consumption patterns would need information on the consumption patterns of adolescents, rather than just adults and children under five.

New metrics are needed to measure diet quality and sufficiency (especially in the context of rapid shifts towards processed and packaged foods), as well as food system efficiency and sustainability. The limitations of existing indicators is encouraging a search for alternatives.⁹

Recent reviews of commonly used metrics relating to food and nutrition generally concur that improvements are needed in six key areas:

- 1) Improving data on actual food intake. There is a huge gap in food policy statistics relating to food consumption patterns, trends, and dynamics.^{3,11,12} This represents a serious limitation to policymakers’ understanding of what should be changed, how to bring about change, and whether or not changes linked to policy initiatives have been implemented as intended.¹³ For example, one recent assessment of the reliability and relevance of 100 national-level household surveys in low and middle income countries found that less than 10% could be used for estimating the quantities of individual foods consumed or micronutrient insufficiencies.¹⁴
- 2) Reaching agreement on how to measure diet quality and the development of novel metrics to assess different quality dimensions. Measurements of ‘dietary quality’ are increasingly recognised as an area that requires much more rigour. However, there is as yet no consensus on what metrics are most appropriate to capture the full range of dimensions

of quality which goes beyond diversity to include sufficiency, safety, and desirability. Nor is there agreement on how this can be tracked for vulnerable individuals versus households, and whether metrics of diversity and quality in other domains (production, marketing, retail) equate with diversity and quality of diets as consumed.^{10, 15-17} One step in this direction would be the Minimum Dietary Diversity measure applied to women (MDD-W), which could be collected globally as a proxy for a household's dietary quality. Another would be more attention to the diets in relation to nutrient needs of young children aged 6 to 24 months, for whom nutrient density and overall diet quality are critical as they move from exclusive breast-feeding to eating family foods. In assessing dietary quality, more robust, comprehensive and national-represented food composition tables are also needed for governments to be able to assess the nutritive value of foods consumed in their country. These tables would also need to take into account the specialised complementary (young child) and other processed foods which are increasingly purchased rather than prepared in the home. Without these more detailed metrics it will remain very difficult to assess the quality of diets.

- 3) Developing metrics that measure women's roles in dietary choices. Women play a key role in producing, selecting and preparing the foods that nourish households and particularly children. There are no standardised or validated ways of assessing the role of women in influencing food environments, or how policies affect their involvement in dietary choices.¹⁸ Women's roles are often heavily circumscribed by economic circumstance, cultural norms relating to the age at which girls are married, religious restrictions on their engagement with society labour burdens and opportunity costs of time, as well as knowledge and skills relating to food choices, nutrition and health.^{19, 20} If women's time for food preparation or child care is constrained by lack of access to food markets, clean water, fuel or a need to earn cash income, their dietary choices will inevitably be circumscribed. A lack of real choice, which reflects high opportunity costs to their time, typically leads to cheap, conveniently procured and rapidly prepared meals of sub-optimal nutritional quality. Thus, data collection systems and metrics are needed on activities and household decision-making in which women play a predominant role, and in which choices and behaviours have a major impact on both dietary patterns and nutrition outcomes.
- 4) Developing metrics to measure the 'food environment', including how different food system domains are linked to, and interact with, the food environment in which dietary choices are made. While different aspects of the food chain are often assessed individually, an integrated understanding of the dynamics of how choices made within the food environment are linked to processes in each of the broader food domains is still lacking.¹⁰ There is an urgent need for the

creation and validation of appropriate methods that measure food availability, accessibility, affordability, and appeal as a set of interlocking metrics.²¹

- 5) Developing metrics that measure the healthiness of food systems. Few attempts have been made to measure how diets are affected by policy interventions which influence the dynamics of processes along the food chain, from production through marketing, retail and consumption, or how food choices affect those dynamics.^{9, 22} There are no indices or metrics that integrate these elements, or which seek to measure the food environment as the locus of processes that together define who actually consumes a healthy diet. In measuring a 'healthy' food system, there is also a need for a better understanding of how to minimise degradation of the environment and ecosystems while improving dietary quality and nutritional status. The development of causal frameworks underpinning the viability and healthiness of food systems that can be tested through empirical measurement is therefore critical. This would provide information to policymakers on how to influence key processes through system-wide or domain-specific food policies.
- 6) Developing metrics that reliably measure people's ability to access food of sufficient quantity and quality. Monetary poverty is one of the conditions that constrains access to adequate diets and therefore careful attention to the role of factors such as economic growth, income distribution, and effective demand for quality diets is required. But a household's purchasing power is not the only relevant aspect in determining how policies will influence food system domains. It has been recently demonstrated, for example, that the prevalence of food insecurity, as assessed through experience-based food security scales, can play a significant role in explaining rates of child mortality (taken as an overall indicator of development) across 150 countries, above and beyond what may be captured by extreme poverty. Determining locally appropriate combinations or interactions of policies, and hence of metrics used to measure such policies, would enhance our knowledge of how non-health related interventions can affect nutrition positively.



Why filling data gaps matters for policymakers

A major weakness in policy formulation relevant to diets and food systems is the lack of critical data on which to base important decisions and design interventions.^{1,6,23} Of course good data collection in low income countries presents many challenges to local capacity.²⁴ For example, a set of six global nutrition goals was established by the World Health Assembly in 2012.²⁵ However, more than half of the countries in the world do not collect the statistics which are needed to assess whether or not they are making progress towards those goals.¹ Furthermore, roughly 40% of the countries that do collect necessary data rely on surveys that typically take place only once in a decade. As such, the UN has called for a 'data revolution' that can guide necessary government actions and enhance accountability,²⁶ including improved metrics for nutrition-sensitive agriculture, value chains and healthy diets linked to improved nutrition outcomes.¹

There is potentially a role here for the food industry, locally and globally, to share more of the data that it collects on patterns of food purchases, consumers' willingness to pay for different products, and food demand trends by market location. A linking of publically available and private sector sources of data on food acquisition patterns across food systems could add significantly

to policymakers' understanding of where and how to intervene in order to enhance the food environment in which dietary choices are made.

Investments in high quality data collection, analytical capacities and database construction remain a priority if global progress is to be tracked effectively. They should include the introduction of additional monitoring to ensure the accuracy of data and provide the right incentives to avoid biases.²⁷ The importance of collecting reliable data regularly provides governments with opportunities to make more cost-effective and impactful choices, and to be more accountable. This should include disaggregated data, both at the geographical level and across different segments of populations. Data should be made as widely accessible as possible to allow researchers to further analyse trends, patterns, and causal pathways. The Food and Agriculture Organization FAO-supported Food Security Information Network is currently undertaking an extensive inventory and assessment of all existing indicators for food and nutrition security, while seeking to determine the value of various combinations of indicators and remaining knowledge gaps.²⁸ Other initiatives, seeking to define novel metrics to address data deficiencies in the six key areas identified on page 7 are summarised in the Box on the next page.



Emerging food system metrics

The Center for Integrated Modelling of Sustainable Agriculture and Nutrition Security (CIMSANS), a collaboration with researchers, academia, and industry partners, is developing a set of household-level metrics to capture seven linked facets of the food system: dietary adequacy (a consumer-focused perspective), environmental sustainability (ensuring that food production can be maintained), affordability and accessibility of food (key elements relating to purchasing power), cultural appropriateness (an under-valued aspect of consumer choice and perceptions of dietary quality), resilience of the food system (beyond the production base), food safety (a new dimension of diet quality), and waste/loss minimisation (which reflects a need to protect the availability of food in the system all along the food chain).²⁹ The goal of this activity is to generate consensus around the seven 'topic areas' as an appropriate characterisation of 'sustainable and nutrition-supporting food systems', leading to the adoption of metrics that will represent each and serve as a combined set.³⁰

Bioversity's initiative on indicators of Sustainable Diets and Food Systems.^{11,31} The main aim of this initiative is to generate metrics to support decision making related to food system policies (particularly where food systems are vulnerable to shocks and chronic degradation), and to allow for a tracking of their impacts. Although the stakeholders' consultations are still in progress, seven indicators have been suggested covering a range of dimensions, from the environmental impact of the foods produced (irrigation water efficiency index, water footprint of an average diet, percentage share of diets locally produced), to diet (nutritional functional diversity, household dietary diversity score), income (percentage share of household food expenditure), and health (prevalence rate of overweight and obesity). The choice of indicators aims to detect and track casual pathways towards food system's outcomes in a perspective of food system vulnerability and resilience.

FAO - a new Food Insecurity Experience Scale (FIES).

The Food and Agriculture Organization of the United Nations (FAO) recently launched a Food Insecurity Experience Scale (FIES), to be used annually to monitor the prevalence of food insecurity in over 140 countries. The FIES is an adaptation of a metric first used in the 1990s to measure household perceptions of, and responses to, hunger and food insecurity in the United States, which was subsequently adapted and validated for use in developing countries.³² It uses people's responses to a set of questions regarding, for example, worrying about not being able to get enough food, having to compromise on variety or quality of foods consumed, reducing quantity of food eaten or skipping meals, and experiencing hunger. To make this possible, FAO contracted the Gallup® World Poll (GWP), a branch of Gallup, Inc., to collect FIES data as part of GWP's annual nationally representative surveys in over 140 countries.³³ Inclusion of the

FIES in annual GWP surveys and other national-level surveys will allow FAO to collect standardised country-level estimates on food insecurity that go beyond national food supplies.

The food environment policy index³⁴ is an initiative that seeks to rank policies relating to the food environment. Designed to assess the healthiness of food environments, it captures the extent of government implementation against international best practice. The current pilot project gathered a panel of 52 public health experts to rank 42 indicators of food environment policy and infrastructure support in New Zealand, based on documented evidence. With appropriate modification, this methodology could be expanded to low and middle income countries. It has the potential to increase accountability of governments, stimulate government action, and support civil society in its advocacy efforts.

While these ongoing initiatives will contribute to filling various information gaps relating to diet quality and food systems, they are as yet unconnected activities that do little to inform each other. They are mainly still in the development phase (meaning that validation and replication still have to be done), and none has yet gained global traction among policymakers or analysts. What is more, these existing initiatives only partially address the major data gaps that most experts consider to be hurdles to improved policymaking for diets and nutrition.¹⁰



Global Panel recommendations



Government policymakers should:

- 1) Commit to collecting novel metrics that measure the impact of food system policies. In committing to agricultural and food systems policies to improve nutrition, technical specialists and analysts in national governments and international agencies should define what policy and programme interventions are seeking to improve across the food system domains, and how this can be measured in terms of impacts, both nationally and across different segments of the population. High level political commitments to nationally-defined and global targets can only be achieved if appropriate data are agreed upon and generated in a rigorous and timely fashion. This may require scrutiny of the data that are already consistently collected by national statistical systems to determine how they are used to inform policy formulation, and which categories are no longer useful or a top priority for decision making in the post-2015 era.
- 2) Invest in enhancing national statistical capacity which can generate the data needed to support domestic and global priority-setting agendas as well as assessment of policy impacts. National statistical mechanisms that collect and share policy-relevant data in a timely fashion are essential to allow for learning from policy actions which seek to influence multiple food system domains simultaneously. These systems should generate the rigorous locally-disaggregated data on food systems and healthy diets that are currently lacking. These data are critical to support both domestic and global development goals, and to inform choice among potentially cost-effective policy alternatives.

The global research community, including scientists from low and middle income countries, should actively:

- 3) Address knowledge gaps and data deficiencies in six priority areas. Research is urgently needed to define and validate appropriate data systems, and not merely individual metrics, which capture causal relationships across the food system. There is great need for decision makers to gain improved

understanding of the dynamics and linkages at play throughout local and global food systems, and of the potential impacts (positive and negative) of policy interventions at various points along the value chain.

Progress is needed in six key areas:

- Improving the quality and quantity of data on food intake among different sectors of the population.
 - Reaching agreement on how to measure diet quality.
 - Developing metrics that measure women's roles in dietary choices.
 - Designing metrics to measure the 'food environment', including how different food system domains are linked to, and interact with, the food environment in which dietary choices are made.
 - Devising metrics that measure the healthiness of food systems, all the way from agriculture through markets to people's actual food consumption.
 - Developing metrics that measure people's ability to access food of sufficient quantity and quality.
- 4) Define appropriate metrics that support measurement of global and local progress in achieving food system efficiency and healthy diets. Building national and subnational capacity to collect, analyse and disseminate data that address persisting knowledge gaps on the functioning of food systems is crucial to setting and evaluating each government's policy priorities.

In the decades ahead, governments will be challenged to generate rigorous evidence of effective policy actions linking agriculture, food systems and nutrition. Indicators for both national goals and the Sustainable Development Goals (SDGs) will also require appropriate data gathering capacity at the sub-national level. Support for strong local research and data analysis capabilities is therefore an essential element of effective policymaking.



References

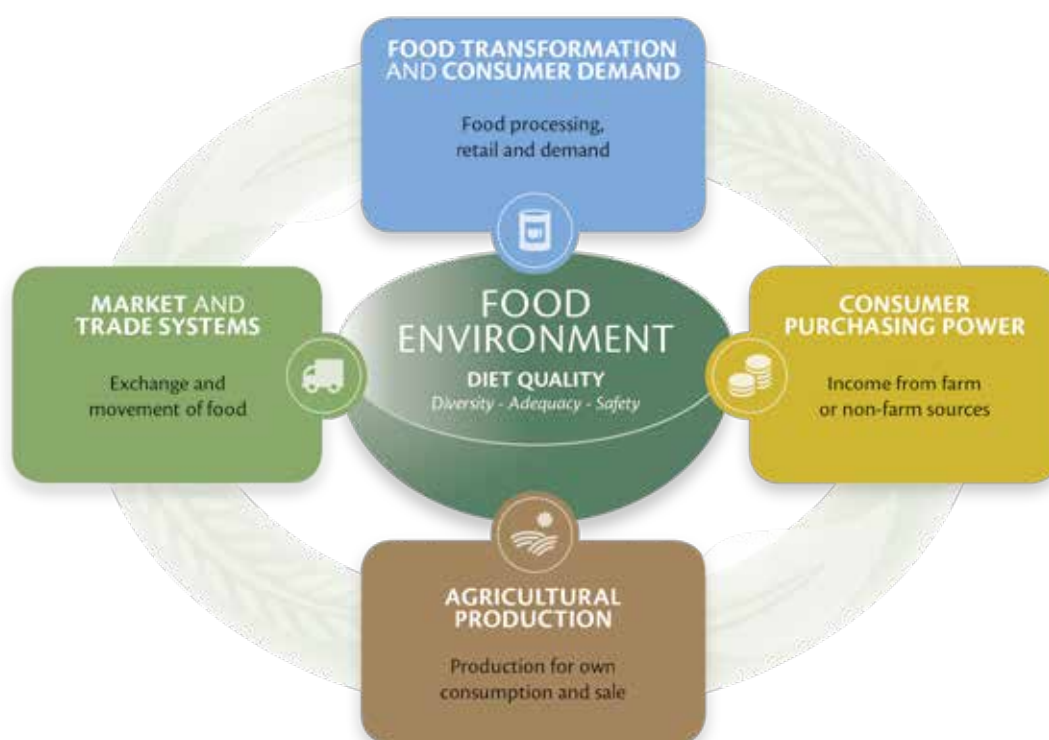
1. IFPRI, Global Nutrition Report 2014: Actions and accountability to accelerate the world's progress on nutrition. 2014, Washington DC (USA): International Food Policy Research Institute.
2. Global Panel, How can Agriculture and Food System Policies improve Nutrition? 2014, Global Panel on Agriculture and Food Systems for Nutrition: London (UK).
3. Pingali, P.L. and K.D. Ricketts, Mainstreaming nutrition metrics in household surveys-toward a multidisciplinary convergence of data systems. *Annals of the New York Academy of Sciences*, 2014. 1331(1): p. 249-57.
4. Héry, I. What Gets Measured Gets Managed. 2015 [cited 12 April 2015]; Available from: <http://www.behindthatquote.com/what-get-measured-get-managed/>.
5. Keating, B.A., et al., Food wedges: Framing the global food demand and supply challenge towards 2050. *Global Food Security*, 2014. 3(3-4): p. 125-132.
6. Herforth, A., Access to adequate nutritious food: new indicators to track progress and inform action, in *The Fight Against Hunger and Malnutrition: The Role of Food, Agriculture, and Targeted Policies*, D. Sahn, Editor. 2015, Oxford University Press: Oxford (UK). p. 139.
7. Tschirley, D., et al., The Rise of a Middle Class in East and Southern Africa: Implications for Food System Transformation. *Journal of International Development*, Forthcoming.
8. McCullough, E., P. Pingali, and K. Stamoulis, *The Transformation of Agri-Food Systems: Globalization, Supply Chains and Smallholder Farmers*. 2008, London (UK): Food and Agriculture Organization of the United Nations/Earthscan.
9. Masters, W.A., et al., Agriculture, nutrition, and health in global development: typology and metrics for integrated interventions and research. *Annals of the New York Academy of Sciences*, 2014. 1331(1): p. 258-69.
10. Herforth, A., et al., Toward an integrated approach to nutritional quality, environmental sustainability, and economic viability: research and measurement gaps. *Annals of the New York Academy of Sciences*, 2014. 1332(1332): p. 1-21.
11. Fanzo, J., B. Cogill, and F. Mattei, *Metrics of Sustainable Diets and Food Systems*. 2012, Bioversity International: Rome (Italy).
12. Van Heerden, I. and H. Schönfeldt, The lack of food intake data and the consequences thereof. *South African Journal of Clinical Nutrition*, 2011. 24(1): p. 10-18.
13. Faber, M., et al., Presentation and interpretation of food intake data: Factors affecting comparability across studies. *Nutrition*, 2013. 29: p. 1286-1292.
14. Smith, L., O. Dupriez, and N. Troubat, Assessment of the Reliability and Relevance of the Food Data Collected in National Household Consumption and Expenditure Surveys, in *International Household Survey Network Working Paper*. 2014.
15. Mabli, J., et al., *Food Expenditure and Diet Quality Among Low-Income Households and Individuals*. 2010, Mathematica Policy Research: Washington, D.C. (USA).
16. Griffith, R., M. O'Connell, and K. Smith, *Measuring the quality of people's diets: a comparison of intake and purchase data*. 2012, Institute for Fiscal Studies: London (UK).
17. Working Group on Infant and Young Child Feeding Indicators, *Developing and Validating Simple Indicators of Dietary Quality of Infants and Young Children in Developing Countries: Additional analysis of 10 data sets*. 2007, Food and Nutrition Technical Assistance Project/FHI 360: Washington, D.C. (USA).
18. Frongillo, E.A., et al., Measures and indicators for assessing impact of interventions integrating nutrition, health, and early childhood development. *Annals of the New York Academy of Sciences*, 2014. 1308: p. 68-88.
19. Lawrence, W. and M. Barker, A review of factors affecting the food choices of disadvantaged women. *Proceedings of the Nutrition Society*, 2008. 68(2): p. 189-194.
20. Pingali, P., *Westernization of Asian diets and the transformation of food systems: Implications for research and policy*. *Food Policy*, 2007. 32(2): p. 281-298.
21. Herforth, A. and S. Ahmed, The food environment, its effects on dietary consumption, and potential for measurement within agriculture-nutrition interventions. *Food Security*, 2015. 7(3): p. 505-520.
22. Turner, R., et al., Agriculture for improved nutrition: The current research landscape. *Food and Nutrition Bulletin*, 2013. 34(4): p. 369-377.
23. Webb, P., H. Lou, and U. Gentilini, *Measuring Multiple Facets of Malnutrition Simultaneously: The Missing Link in Setting Nutrition Targets and Policymaking*. *Food Security*, 2015.
24. Jerven, M. and D. Johnston, *Statistical Tragedy in Africa? Evaluating the Data Base for African Economic Development*. *The Journal of Development Studies*, 2015. 51(2): p. 111-115.
25. de Onis, M., et al., The World Health Organization's global target for reducing childhood stunting by 2025: rationale and proposed actions. *Maternal and Child Nutrition*, 2013. 9: p. 6-26.
26. UN, *A New Global Partnership: Eradicate Poverty and transform Economies through Sustainable Development*. Report of the High Level Panel of Eminent Persons on the Post-2015 Development Agenda. 2013, United Nations, New York, NYC (USA).
27. Sandefur, J. and A. Glassman, *The Political Economy of Bad Data: Evidence from African Survey and Administrative Statistics*. *The Journal of Development Studies*, 2015. 51(2): p. 116-132.
28. FSIN Technical Working Group on Measuring Food and Nutrition Security, *Inventory and Assessment of Existing Indicators for Food and Nutrition Security*, in *FSIN TWG Expert Advisory Panel (FAO)*. 2015: Rome (Italy).
29. Acharya, T., et al., *Assessing Sustainable Nutrition Security: The Role of Food Systems*. 2014, The International Life Sciences Institute, Research Foundation, Center for Integrated Modeling of Sustainable Agriculture and Nutrition: Washington, DC (USA).
30. Chicago Council, *Healthy Food for a Healthy World: Leveraging Agriculture and Food to Improve Global Nutrition*. 2015, Chicago Council on Global Affairs: Chicago, IL (USA).
31. Allen, T. and P. Prosperi, *Metrics of Sustainable Diets and Food Systems*. 2014, Bioversity International & CIHEAM-IAMM: Montpellier (France).
32. Webb, P., et al., *Measuring Household Food Insecurity: Why It's So Important and Yet So Difficult to Do*. *Journal of Nutrition*, 2006. 136(1404-1408).
33. Ballard, T., A. Kepple, and C. Cafiero, *The food insecurity experience scale: developing a global standard for monitoring hunger worldwide*. 2013, Food and Agriculture Organization of the United Nations: Rome (Italy).
34. Vandevijvere, S., et al., *The healthy food environment policy index: findings of an expert panel in New Zealand*. *Bulletin of the World Health Organization*, 2015. 93(5): p. 294-302.
35. Panerai, R.B., *Validation of indicators for health policy research*. *World Health Forum*, 1998. 19(1): p. 6-11.

How can Agriculture and Food System Policies improve Nutrition?

There is a real opportunity for the research community and governments to work together to develop robust mechanisms to collect better system-wide data on food that support the design and evaluation of the nutritional impacts of food policy interventions.

The multiple burdens on health created today for low and middle income countries by food-related nutrition problems include not only persistent undernutrition and stunting, but also widespread vitamin and mineral deficiencies and growing prevalence of overweight, obesity and non-communicable diseases. These different forms of malnutrition limit people's opportunity to live healthy and productive lives, and impede the growth of economies and whole societies.

The food environment from which consumers should be able to create healthy diets is influenced by four domains of economic activity:



In each of these domains, there is a range of policies that can have enormous influence on nutritional outcomes. In the Global Panel's Technical Brief, we explain how these policies can influence nutrition, both positively and negatively. We make an argument for an integrated approach, drawing on policies from across these domains, and the need for more empirical evidence to identify successful approaches.

Find out more here: www.glopan.org/technical-brief

Download Technical Brief No. 2 here: www.glopan.org/metrics-data

Jointly funded by



BILL & MELINDA
GATES foundation

T +44 20 3073 8325

E secretariat@glopan.org

W glopan.org

@Glo_PAN

This report is based on research funded in part by the UK Government and the Bill & Melinda Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the funders.