



FSIN-AUC Technical Consultation Food and Nutrition Security and Resilience Analysis

Are we effectively using the right data?

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Background Discussion Paper



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Do We Have the Right Data? Towards Better Measurement of High Priority Indicators to Eradicate Hunger and Assure Healthy Food for all¹

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1. Summary, Recommendations and Implications for the Future

The independent Technical Working Group (TWG) of the Food Security Information Network (FSIN) has been tasked with assessing existing indicators and to come up with high priority indicators for the use of FSIN stakeholders. Using criteria spelled out in the body of this paper and outlined in detail in the forthcoming Phase 1 report this paper highlights three principles which emerge from the assessment:

- (a) **Measure more than calories**, to capture various dimensions of diet quality, care practices, and other factors behind food insecurity, undernutrition, obesity and diet-related disease;
- (b) **Look over the whole life cycle**, putting the thousand-day period of growth faltering in context through childhood, adolescence, adulthood and old age, identifying the specific needs of particular groups in each stage of life;
- (c) **Use data to mobilize action**, with reliable evidence presented in useful ways to catalyze policy and action. New information can overcome inertia and start new efforts by all stakeholders playing their respective roles which better data can then guide.

While assessing indicators several preliminary insights have emerged:

1. **Engagement of National Policymakers and statistical offices as full partners is of critical importance.** National level policymakers and statistical offices must be involved in this dialogue and concurrently build capacity with the objective of stimulating demand for good data, analysis, and action.
2. **Getting food balance sheets (FBS) right should receive high priority.** FBSs come up in many of the individual indicators we have assessed. Getting them right in all their components (production, trade, storage and losses) is critical for policymaking as well as for monitoring the Sustainable Development Goals (SDGs).
3. **Availability of price data at all levels is of critical importance.** Like the FBS, they permeate many of the indicators we have assessed. There is an urgent need to get “just in time” data for a range of commodities besides the four major crops at multiple locations throughout the world and making it available to all users to avoid the repeat of the 2007-2008 scenario. Silos in price data collection may be inhibiting the provision of this important global public good, which in many ways happily is a lower hanging fruit than getting FBS data right.
4. **Household measurement of food consumption:** This is clearly the biggest focus currently but beyond experienced based measures which have issues of their own, we see huge measurement challenges in individual and household level food consumption estimates obtained in a manner which can be scaled up to get sub-regional, regional or national level estimates on food consumption and its quality. We must continue to endeavor but must have realistic expectations.
5. **Anthropometric data:** These are already being used widely in research and policy discussions. Demographic and Health Surveys (DHS) perhaps provides a very useful model to emulate and

build upon not just for household surveys but in terms of the way they are funded, managed and made widely available to users.

6. **The biggest data problems are in SSA:** The responsibility for developing national FBSs and other data rightly lies with the countries. We cannot imagine any serious monitoring of the SDGs in the world's food and nutrition insecurity hotspots, namely, sub-Saharan Africa, without addressing data issues on a long term, sustainable and predictable basis with clear roles and responsibilities for implementation, training and oversight, financing and clarity in the roles and responsibilities to match the task. The Food and Agriculture Organization of the United Nations (FAO) will need to play a lead role in assisting Africa but even with the proposed partnership with the African Development Bank we are not certain whether FAO's Global Statistical Initiative is adequate in terms of a clear mandate, finances and technical support to address the magnitude of the challenge.

2. Background on the FSIN Technical Working Group on Measuring Food and Nutrition Security in the Context of Economic Growth, Poverty Reduction and Food and Nutrition Security

In November 2014 the Food Security Information Network (FSIN) initiated a technical working group (TWG) to independently assess the existing indicators on food security and nutrition and come up with a smaller set of high priority indicators around which there could be a broad consensus and which would help FSIN stakeholders in their day to day work. The FSIN stakeholders now range broadly from global and national policymakers to program designers and implementers, advocates, and community organizers from the north and the global south. Several previous attempts to come up with a short list of high priority indicators, including most notably the two meetings of experts organized by the Food and Agriculture Organization of the United Nations (FAO) in 2002² and 2012 (FAO 2013) had failed to arrive at such a list around which there could be consensus. Each consultation however contained a good "state of the art" discussion on the types of prevailing indicators and the diversity among them (Lele and Masters 2014).³ Several efforts in between these two consultations including the McCalla-Mock led evaluation (2004) had confirmed that there was no unified approach, no consensus and most importantly no country ownership of the efforts carried out by international agencies.

At the same time international advocacy on nutrition has intensified particularly since 2008 with the launching of the Scaling Up Nutrition (SUN) initiative⁴, a series of Lancet articles on nutrition interventions and outcomes (Lancet 2008, 2011, 2013 and 2015)⁵, the United Nations (UN) Secretary General's Zero Hunger Initiative 2012, the end of the Millennium Development Goals (MDGs) era and

² <http://www.fao.org/docrep/005/y4249e/y4249e00.HTM>.

³ http://www.fsincop.net/fileadmin/user_upload/fsin/docs/Concept_Note-FSIN-TWG-Measuring-Food-Nutrition-Security.pdf

⁴ So far Out of 55 SUN countries, 37 countries are from Africa (i.e., 67 percent), 6 countries from South East Asia, 4 countries from South Asia, 3 countries from Central America, 2 countries from Central Asia and 1 country from Caribbean, South America and West Asia each, following UN Statistics Division regional classification.

⁵ <http://www.thelancet.com/series/maternal-and-child-undernutrition>, <http://www.thelancet.com/series/obesity>, <http://www.thelancet.com/series/maternal-and-child-nutrition>, and <http://www.thelancet.com/series/obesity-2015>

the launch of the Sustainable Development Goals (SDGs) at the UN General Assembly in 2015. There have been simultaneous efforts in Africa to end poverty and hunger.

Relevance for Africa

The Comprehensive African Agriculture Development Program (CAADP)

The Comprehensive African Agriculture Development Program (CAADP) aims to promote economic growth and food security through the transformation of the agricultural sector owned and implemented in Africa. In 2003 African heads of states committed themselves in Maputo to attain an annual agricultural growth rate of 6 percent as a way to alleviate poverty, hunger and improve nutrition, develop regional agricultural markets, integrate farmers and pastoralists into the market economy and achieve a more equitable distribution of wealth. They also made a commitment to allocate at least 10 percent of their national budgets to agricultural development.⁶

The New Partnership for Africa's Development (NEPAD)

NEPAD similarly gives impetus to Africa's development by bridging existing gaps in priority sectors in order to enable the continent to catch up with developed parts of the world. Some of the goals set out in 2001 include achieving and sustaining an average GDP growth rate of over 7 percent per annum for the next 15 years; to reduce the proportion of people living in extreme poverty by half between 1990 and 2015; to reduce infant and child mortality ratios by two-thirds between 1990 and 2015; to reduce maternal mortality ratios by three-quarters between 1990 and 2015. The strategic plan 2014 - 2017 provides a new strategic orientation to spearhead accelerated action towards achieving economic integration and development.

Malabo Declaration

The Malabo declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods⁷ re-enforces 7 commitments to:

1. uphold the principles and values of the CAADP process;
2. enhance investment finance in agriculture by upholding the 10 percent public spending target;
3. pursue Zero Hunger – ending hunger by 2025 and reduce stunting to 10 percent;
4. halve poverty, by 2025, through inclusive agricultural growth and transformation and sustain agricultural GDP at least 6 percent;
5. boost intra-African trade in agricultural commodities and services;

⁶ <http://www.au.int/en/content/maputo-10-12-july-2003-assembly-african-union-second-ordinary-session>

⁷ <http://www.au.int/en/content/malabo-26-27-june-2014-decisions-declarations-and-resolution-assembly-union-twenty-third-ord>.

6. to enhance resilience of livelihoods and production systems to climate variability and other shocks; and
7. commit to mutual accountability to actions and results

Malabo Declaration on Nutrition Security for inclusive Economic Growth and Sustainable Development in Africa

- Reaffirms the commitment to end hunger by 2025 through strengthening of development policies as an effective investment in the human capital in member states.
- Makes a commitment to ending child stunting by bringing down stunting to 10 percent and underweight by 5 percent by 2015 and in particular focusing on the 1000 days as the only window of opportunity during which permanent and irreversible physical and mental damage would be avoided.
- It further commits to the high level positioning of this goal in national development plans and strategies, and to establish long-term targets that give all children equal chance for success by eliminating the additional barriers imposed by child under-nutrition.

Yet observers from McCalla and Mock (2004) to FAO (2013) and the Global Nutrition Reports in 2014 and 2015 (IFPRI 2014 and 2015) note that progress in developing widely agreed upon new measures is slow. Good quality, “just- in- time” data in developing countries are often lacking. Most importantly their influence on actual policies and resource allocation by developing countries themselves is even slower. This is particularly in parts of the world which remain hotspots for food insecurity and under-nutrition, most notably South Asia and sub-Saharan Africa (See Box 1).

Box 1: “Accelerating Progress will Require More and Better Data” says the Global Nutrition Report (2014)

1. People with good nutrition are key to sustainable development. Malnutrition affects nearly every country in the world. Dealing with different, overlapping forms of malnutrition is the “new normal.”
2. The world is currently not on course to meet the global nutrition targets set by the World Health Assembly (WHA).
3. Nutrition needs a data revolution. Of the many information gaps, the ones that most need to be filled are those that constrain priority action and impede accountability.
4. More ambitious targets and indicators (than the simple extension of 2025 WHA) need to be adopted within the Sustainable Development Goal Targets for 2030.
5. A new consensus about what is possible is needed, including an accountability framework.
6. More high-quality case studies are needed to understand why progress has been made in some countries and not in others.
7. Coverage of nutrition-specific programs needs to be expanded to cover more of the people in need.
8. More attention needs to be given to coverage data—an important way of assessing presence on the ground where it counts.
9. A greater share of investments to improve the underlying determinants of nutrition should be designed to have a larger impact on nutritional outcomes.
10. Better guidance is needed on how to design and implement these approaches to improve their

effectiveness and reach.

11. We need to keep tracking the proportion of nutrition resources to these approaches.

12. More must be done to hold donors, countries, and agencies accountable for meeting their commitments to improve nutrition.

13. Stakeholders should work to develop, pilot, and evaluate new accountability mechanisms. Civil society efforts to increase accountability need support.

14. Tracking spending on nutrition is currently challenging, making it difficult to hold responsible parties accountable. Efforts to track financial resources need to be intensified—for all nutrition stakeholders. We need to develop targets or norms for spending on nutrition.

Source: IFPRI 2014.

3. FSIN's TWG Initiative

This Technical Working Group of independent experts was established by FSIN with a concern that there are too many indicators—with different degrees of professional involvement, country coverage, and international legitimacy for their collection around which member countries could be mobilized to collect data and commit their own institutional and human resources. Most importantly these international efforts have lacked member country involvement and commitment and the means to translate that commitment into action. When the Technical Working Group commenced its work, it was confronted with 140+ indicators that were developed and promoted by various individuals, groups, and institutions.

Purpose of TWG and Specific TORs of the Technical Working Group

The TWG was asked:

- to recommend a set of universally applicable indicators of food security and nutrition;
- based on an objective assessment of the quality and utility of existing indicators; and
- provide guidance to policymakers in member countries and their development partners regarding which indicators are most useful for what purposes.⁸

Slow and uneven progress in achieving the MDGs, combined with an increasing focus on results-based management, have reinforced the need for food and nutrition security indicators that can be used at every level of decision-making from individual to global. It is particularly important for these indicators to be developed, owned and used by the decision-makers themselves, in local reporting systems within UN member countries.

Throughout this exercise the TWG's steering group⁹ stressed that the TWG exercise was parallel to the SDG discussions which were underway at the level of the UN Statistical office. The latter have entailed

⁸ See Concept Note for the FSIN TWG on Measuring Food and Nutrition Security; <http://www.fsincop.net/topics/fns-measurement>.

⁹ Luca Russo (FAO), Arif Husain (WFP), Piero Conforti (FAO), Alexis Hoskins (WFP), John McHarris (WFP), Maximo Torero (IFPRI), and Lavinia Antonaci (FAO).

a complex process of negotiations which is still underway. This group urged the TWG to “think outside the box” and consider indicators that can be tweaked/ added to or subtracted from the existing list. The purpose of the TWG has been to use existing work and data, as well as bring in additional innovative approaches.

- The TWG’s recommendations are meant to be tailored for stakeholder ownership and implementation across and within all UN member countries.

The core technical working group besides the two co-chairs consists of four members (Joyce Kinabo, J.V. Meenakshi, Bharat Ramaswami and Julia Tagwireyi), all from developing countries, and each well trained and steeply involved in the issues of measurement, analysis and policy advice in their own countries with a strong understanding of the realities on the ground. We have been supported by two researchers, Winnie Bell and Sambuddha Goswami. The TWG has been fortunate to have a world class team of 14 experts in the areas of food security and nutrition advising them.¹⁰

The Process of Our Work

We have followed an extensive consultative process as follows:

1. Developed an inventory of 140+ indicators;
2. Established the criteria for assessment of these indicators (shown in Table 1);
3. Held weekly teleconferences with the TWG members;
4. Held a face to face meeting of members of the TWG involving FSIN leadership in Rome May 8-9, 2015;
5. Carried out routine consultations with the TWG steering group to report progress and obtain feedback on a regular basis;
6. Held regular consultations with Expert Advisory Panel (EAP) on the Concept Note, the criteria and indicators; conducted an EAP survey to solicit their views; and held a Midcourse Review Meeting with EAP members in Rome June 26-27, 2015;
7. Held two consultations in Milan at the International Agricultural Economic Association meeting in August 7 to 14, 2015;

¹⁰ Awudu Abdulai (University of Kiel), Harold H. Alderman (IFPRI), Zulfiqar A. Bhutta (Aga Khan University), Laura Bix (Bill & Melinda Gates Foundation), Calogero Carletto (World Bank), Jennifer Coates (Tufts University), Cheryl Doss (Yale University), Jessica Fanzo (John Hopkins University), Lawrence Haddad (IFPRI), Nanak Kakwani (University of New South Wales), Elizabeth W. Kimani-Murage (African Population and Health Research Centre, Kenya), Reynaldo Martorell (Emory University), Eunice Nago Koukoubou (University of Abomey-Calavi, Benin), and Ricardo Uauy (University of Chile); For details see: <http://www.fsincop.net/topics/fns-measurement>.

8. Involved the World Health Organization (WHO), the World Bank and the International Food Policy Research Institute (IFPRI) particularly in the process of mounting of the stakeholder survey in Phase 2.

Criteria for the Assessment of the Indicators

The criteria for assessment of the indicators applied to the 140+ indicators is described in Table 1 and the assessment will be detailed in the forthcoming Phase 1 report.

Table 1: Criteria for Assessment of the Indicators

Indicator Name & Definition and Source of Data		
Narrative Assessment		
Criterion		Specific Question to be Answered
Domain	Food security	<i>Does or could it measure availability and access to food in general?</i>
	Nutrition security	<i>Does or could it measure availability and access to healthier foods or non-food causes of malnutrition?</i>
Scale and Scope	Geographic scale	<i>For what areas is/could this measure be most valuable (global, national, and local)?</i>
	Time frame	<i>Over what period is/could this measure be most useful (over years, within years)?</i>
Validity	Scientific validity	<i>Has this measure been /could it be validated against a gold standard?</i>
	Statistical sensitivity	<i>Does/could this measure change when the underlying concept changes? (Type II)</i>
	Statistical specificity	<i>Does/could this measure change when the underlying concept does not? (Type I)</i>
	Transparency	<i>Is/could this measure be clear regarding data sources, weighting and methods?</i>
	Comparability	<i>Does/could the measure conform to international standards?</i>
Difficulty of Data Collection and Use	Cost of collection	<i>What is/can be the relative difficulty of collecting underlying observations?</i>
	Frequency	<i>Is/can the measure be collected often enough to capture temporal variation?</i>
	Spatial density	<i>Is/can it be collected for enough places to capture spatial variation?</i>
	Sustainability	<i>Is/can funding and staffing for data collection & analysis be secured?</i>
	Timely accessibility	<i>Is/can results be made available quickly in accessible form to end-user?</i>
Usefulness of the Indicator	Relevance	<i>Is the concept being measured within stakeholders' scope of responsibility?</i>

	Significance	<i>Does the measure have clear implications for action by stakeholders?</i>
	Ease of interpretation	<i>Is/can the measure be readily understood and communicated?</i>
	Political legitimacy	<i>Is there political support for using this measure? (e.g. World Health Assembly (WHA), Millennium Development Goals (MDGs)/ Sustainable development goals (SDGs))</i>
Covariance		<i>Does information from this indicator correspond with information from other indicators?</i>
Gender/Age Sensitivity		<i>Can this indicator be disaggregated by sex? By age group? Geocoding and small area estimation?</i>

The TWG’s Key Proposed Outputs

They include:

1. **DRAFT First phase and Report** - technical assessment of the indicators (Mid November 2015), the highlights of which are provided in this paper.
2. **Second Phase Report** - based on demand elicitation survey to better understand the needs and perspectives of users of food security and nutrition security (December 2015);
3. **Third Phase and Report** – final report including recommended core set(s) of indicators or dashboard(s) based on Phase 1 and Phase 2. This report will also includes the gaps and areas for future research.

4. Concepts and Terminology

In 1996, the world adopted a broadly agreed definition of food security through a consultative political process of the Committee on Food Security (CFS) consisting of member governments. The reformed CFS modified the concept slightly in 2009. The Global Forum on Food Security and Nutrition (FSN) adopted this definition with four components (availability, access, stability and utilization). The Global Forum on FSN’s wider stakeholder participation involving NGOs, private sector firms, global and regional organizations have different views on how to and the level at which FSN indicators should focus. Aggregate measures of global and national food security, most notably in its widely used iconic measure of the prevalence of undernutrition (PoU) have remained the hallmark of FAO’s contribution to member governments, even though the FAO and others have actively been moving to incorporate many other aspects of food and nutrition security to which professional focus has decidedly shifted. The CFS in its very useful paper “Coming to terms with terminology” (2012) had noted that “currently there is no consensus among member states about the use of the combined term ‘food and nutrition security’; many strongly support the use of the combined term whereas others question it.” We use the term food security and nutrition, since sound nutrition varies widely depending on cultural history. Besides, the three different dimensions of nutrition, namely undernourishment (energy deficit), malnourishment (micro-nutrient deficiency) and over nourishment (obesity) have now become widely accepted in the literature and many different measures are being developed to measure each, including measures of diet diversity and diet quality, although obesity has not received the attention

that it deserves in SDG 2 which focuses rather largely on under-nutrition and malnutrition (Lancet 2008, 2011, 2013 and 2015). Similarly the focus on measurement has decidedly moved from the macro definition of food security based on energy adequacy to the issues of access and utilization, and the units of measurement of growing interest have been households and individuals, both the quantitative measurement of food intake as well as perception based indicators, including particularly the nutritional status of pregnant and lactating mothers, adolescent girls and children. There is also an increasing shift in FAO's own work on combining the macro-measures of under-nutrition discussed below with household and individual access and utilization.

In the meantime in Africa, rapid population and income growth is being accompanied by urbanization, the growth of the middle class, a dietary transition from carbohydrates to higher value commodities, such as meat, fish, fruit and vegetables but also to health damaging sugars, salts and oils through processed foods and drinks. Populations and hence consumption are shifting from rural to urban areas. Value chains are growing rapidly in Africa in terms of what consumers purchase particularly in urban areas. Increased share of the value added in the consumer price comes from trade and food processing. This is a positive development. But to the extent that purchased foods entail increased reliance on energy dense foods (like sugar, fats and oils, and salt), uncontrolled and unregulated their consumption lead to adverse health effects including growing incidence of non-communicable diseases. Therefore not just energy deficit but diet diversity and diet quality matter. Since gender roles are shifting households are increasingly reliant on purchased foods, and incidence of obesity is increasing throughout the developing world including in Africa (Masters et al 2015; Reardon et al 2015; Haggblade, Hazell, and Reardon 2007; and Lele 2015ab^{11,12}).

5. Conceptual Frameworks

The two different strands of macro-level food security and micro level household and individual level food security have historically reflected two major conceptual frameworks, one from FAO and another from the United Nations Children's Fund (UNICEF), each of which has dominated the literature on food and nutrition security. Economists have tended to focus on the FAO definition, and nutritionists on the UNICEF definition or its variants but recently there has also been an increasing attempt to bring them together (UNICEF 1998). There are several such conceptual frameworks and there was no agreement in the External Advisory Panel on the desirability of a conceptual framework. Some thought it was necessary. Others argued indicators are important in their own right and do not need an underlying theory of change, or that the conceptual frameworks would be so location specific as to lack a universally accepted framework. Our conceptual framework presented at the end of this paper (Figure 3) takes into account these two dominant frameworks, while incorporating some of the recently recognized sources of uncertainty in supply, e.g., from climate change and international markets. Our conceptual framework also recognizes that causal chains tend to be less linear and unidirectional as traditionally believed. Hence we have tried to capture the multi-dimensionality in causality through interactions among the various cause and effect phenomena. Thus for example, it is not just that poor agricultural production and availability (either in terms of excessive focus on cereals or on sugars and

¹¹ <http://www.brookings.edu/blogs/future-development/posts/2015/06/15-poverty-hunger-lele>.

¹² <http://globalnutritionreport.org/2015/07/03/the-growing-obesity-epidemic-needs-as-much-attention-as-undernutrition-in-sustainable-development-goals/>

fats) may lead to poor nutritional outcomes (under and mal nutrition, obesity, and non-communicable diseases), but poor nutrition would likely adversely affect labor productivity in agriculture. With the idea that poor nutrition starting in the mother's womb has life cycle effects, nutritionists assert it leads to loss of economic growth at an annual rate of 10 percent (Haddad 2013; and Black et al 2013).¹³ Moreover it is a multi-sectorial phenomenon and hence everyone's business (Lancet 2008, 2011, 2011 and 2015).

Broadening the definition of food security to include nutrition has led to a broad search among many possible indicators, from which a limited number of standardized and validated indicators are beginning to emerge which meet the scientific criteria we applied.

To succeed, measures must be relatively easy to collect, reliable, timely and comparable across time and space. Below we provide a list of 56 indicators using the assessment criteria we used and the 10 early warning indicators.

6. Grouping of Our Short Listed Indicators

We arrived at 56 Indicators including 5 composites, and 3 Experience-based Scales + 11 Early Warning Systems as follows:

- **Early Warning Systems (11)** – These include:
 1. Global Information and Early Warning System on Food and Agriculture (GIEWS) (1975)
 2. Famine Early Warning Systems Network (FEWS NET) (1985)
 3. Emergency Prevention System (EMPRES) (1994)
 4. Vulnerability Analysis and Mapping (VAM) (1994), using several tools:
 - Comprehensive Food Security and Vulnerability Analysis (CFSVA)
 - Emergency Food Security Assessment (EFSA)
 - Food Security Monitoring System (FSMS)
 - Joint Assessment Mission (JAM)
 - Market Analysis
 5. FAO/WFP Crop and Food Security Assessment Mission (CFSAM)
 6. Cadre Harmonisé (1999)
 7. Food Security Information and Early Warning System (FSIEWS) (2000)
 8. Coping Strategies Index (CSI) (2003)
 9. Integrated Food Security Phase Classification (IPC) (2004)
 10. Agricultural Market Information System (AMIS) (2011)
 11. Locust Watch (date).

1. **National (17 indicators, out of them 5 are composite indices)** – indicators that are observed only at the national level, typically because they use national accounts, trade data, or other information that exists only at the country level;

¹³ http://www.developmenthorizons.com/2015/11/bangladesh-can-become-beacon-for-rapid.html?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+DevelopmentHorizons+%28Development+Horizons%29

- 2. Market observations (4 indicators)** – indicators that are observed at the level of a marketplace, especially prices in transactions involving farms, firms and households who may be located elsewhere;
- 3. Household or individual recall (14 indicators, out of them 3 are Experience-based Scales)** – indicators of food purchase and consumption obtained from questions at the level of a family or other unit eating from a common cooking pot, or individuals within the household;
- 4. Anthropometry (7 indicators)** – indicators based on measurement of body size, such as heights and weights, mid-upper arm circumference or waist circumference;
- 5. Biomarkers and clinical data (3 indicators)** – indicators using health-care data obtained from clinical services or samples;
- 6. Breastfeeding and sanitation (4 indicators)** – indicators regarding fluid intake and exposure to disease;
- 7. Other data (7 indicators)** – indicators regarding child spacing, food fortification and disease risks.

The detailed assessment of these indicators including their pros and cons, measurement difficulty and data availability are contained in the Phase 1 report and briefly summarized below.

7. Early Warning Systems

Early Warning Systems have evolved and have already shown that they are critical to prevent loss of life, reduce economic, material and health impacts of disasters and help reduce supply and price variability. A complete and effective early warning system needs to support: 1) Risk analysis, 2) Monitoring and warning, 3) Dissemination and communication, and 4) Response capability. As the number and types of risks are increasing, the global community needs stronger collaboration building on existing systems.

The numerous early warning systems we reviewed are fragmented, with overlap, gaps and competition, for limited aid resources. They are stronger in Asia than in sub-Saharan Africa where they are also dependent on donor funding. Bringing them under a single umbrella, as a one stop shop, even if they maintain their separate identities and activities, will avoid the confusion reviewers of these early warning systems encountered, while searching for the clarity of their missions and objectives, the substantive and geographical areas in which they operate and how and why they differ from others. Joint missions such as those undertaken by the Food and Agriculture Organization of the United Nations (FAO) and the World Food Programme (WFP) should be encouraged to bring greater synergy under these programs, linking them to long term development, particularly countries' own capacity.

8. National Level Indicators

There has been much criticism of Africa's national income account statistics and agricultural statistics, and in the latter case by implication of FAO's data on food and nutrition security (Jerven 2010; and Lipton 2013). Jerven (p. 102) rated Zambia the worst of the 23 statistical services he evaluated in 2007-10, and Uganda the best. Yet Lipton notes that Uganda, with over 70 percent of its workforce in agriculture in 2007 (FAO 2009), 'still [in 2010] had 'no system for regular collection of annual agricultural statistics' (p. 87)" (Lipton 2013). FAO's secretariat for agricultural statistics indicates that 70 percent of the IDA countries in sub-Saharan Africa have had no statistical survey in 15 years (personal communication with Josef Schmidhuber). According to the World Bank, over 70 countries do not meet the criteria of two surveys in a 10-year period at a five-year interval. Many of these countries are in sub-Saharan Africa. The data gap is much larger for food/caloric consumption.

The debates and criticisms have focused on components that go into the FAO's measurement of the food balance sheets, and its iconic measurement of undernutrition, known as Prevalence of Undernutrition (PoU), as well as the measurement of PoU itself and the underlying assumptions, although currently there are few obvious alternatives to this measure.

9. Market Prices and Related Data

Price and market data are being collected at all levels by FAO/WFP/the World Bank from local, regional, national to the global level. In place of today's siloed approach, with today's technology, it is possible to develop a network by which price data would be electronically available at all levels and in all regions of the world. This will require investment in shared infrastructure involving all key international organizations, a global public good. But it will also increase transparency and accountability in markets.

10. Household and Individual Food Intake

Household and individual food intakes are more difficult to measure than measuring income or expenditures. Household surveys used to estimate poverty have often proved inadequate for computing the level of caloric intake and even more inadequate for measuring diet diversity and micro-nutrient intake. In principle, household survey data can be used to estimate the distribution of calories across population groups and income quintiles, but there are at least three challenges.

1. The quantification of calories derived from food that is eaten away from home;
2. Understanding intra-household access to food, particularly by women and children; and
3. The widespread absence of data for national or global estimations.

India's example shows, however, that abundance of data does not automatically lead to improved policy. Vietnam, Bangladesh and Nepal - the latter two with half the per capita income of India - have performed better than India on several health indicators. In India, poverty has declined but the decline has not been commensurate with economic growth. Even where incomes have increased, per capita food consumption has seemingly declined, a phenomenon known as the "Indian Enigma".

Box 2: In data-rich India more questions than answers to improve policy and implementation

India has conducted 14 Nutritional Surveys since 1992 (GNR 2014). They and other sources of data have engendered large debates about relationships between economic growth and poverty reduction, between poverty reduction and food security and between food insecurity and nutrition outcomes. These debates highlight that more data do not always mean better policy unless they contribute to knowledge and the knowledge is used by stakeholders to achieve better decisions. Often the debates are independent of each other and highlight many thorny issues of measurement, politicization of data use, particularly when performance is tied to allocation of public funds. Nobel Prize winning economists, starting with Gunnar Myrdal and Theodore Schultz, to Amartya Sen and Angus Deaton, have made their reputations in part on the measurement and determinants of poverty, food insecurity and small farm agriculture in India. Some examples follow:

- **Whether national income accounts (NAS) provide a better estimate of the reality on the ground** on well-being of people compared to the household sample surveys, which surveys and how they are conducted. Deaton notes the gap between the two has been growing. NSS based consumption estimates were only 5 percent less in 1972-73 to NAS, but they were close to less than 50 percent today, although reportedly they track closely on estimates of cereal production and consumption. (Deaton 2014)¹⁴.
- **Debate between the political right and the political left on how much poverty has declined.** Opposition parties claimed the party in power was trying to overstate decline in poverty to show success of policies. NGOs argued it was to reduce allocation of central safety net expenditures tied to the incidence of poverty provided to the state governments. The dispute went to the Supreme Court since safety net benefits depend on the official poverty line. (Deaton 2014). One of many lessons from India is that data collection can become politicized when its outcome are the basis for allocating g funds.
- **The debate on the recall period in the surveys**, i.e., between 30 days and 7 days (Kakwani 2004)¹⁵. Randomized control trials showed that reported under-consumption increases with 30 day recall period, compared to a seven day period. NSS's own work suggests that the choice of recall period matters for some food items, particularly non-staples, but not for others. So for the last two survey rounds, for food (calorie) intakes, they have been reporting both the traditional 30 day recall period, as well as another survey which relies on 30-days for some items and 7-days for other items.
- **Debate on the remarkable decline in per capita calorie (and protein) consumption.** Besides the estimated consumption has declined more among the economically better off than the poor. A recent UNICEF survey reports reduction in stunting rates in Maharashtra. Meenakshi documents such improvements in other states as well (Meenakshi 2015). A better understanding of the reasons would improve policy and programs.

¹⁴ <http://cep.lse.ac.uk/new/events/event.asp?id=194>.

¹⁵ <http://www.ipc-undp.org/pub/IPCOnePager2.pdf>.

11. Anthropometry and Biomarkers

The Global Nutrition Report 2014 reported on the dazzling advances made by Bangladesh, Brazil, Colombia, Peru, Viet Nam, and the Indian state of Maharashtra in addressing multiple forms of malnutrition. The Global Nutrition Report 2015 similarly report significant progress in reducing malnutrition from Egypt, Ethiopia, Kenya, Nepal, Rwanda, Tanzania, and nearly all of the Indian states. But the GNR also reports in detail the data challenges on nutrition related policies.

FAO's Global Strategy to Improve Agricultural and Rural Statistics

The Global Strategy to Improve Agricultural and Rural Statistics¹⁶ and action plan to improve agricultural and rural statistics aims to strengthen agricultural statistics; key partners are the World Bank, FAO and the United Nations Statistical Commission (UNSC). The bottom line is that improving statistics is a country owned and implemented phenomenon. Development of the Global Strategy, which was initiated by the UNSC, pays allegiance to the "Paris Declaration on Aid Effectiveness" (OECD 2005) and in the "Accra Agenda for Action" (OECD 2008) and is carrying out the plan in coordination with the development of the African Action Plan. Indeed, Africa is the first region to initiate the implementation of the Global Strategy, and it has done so by putting in place a well-developed plan. The new approach to capacity development calls for a systemic perspective that addresses three dimensions: (1) enhancing individual technical capacity; (2) strengthening institutions and organizations; and (3) creating an enabling environment instead of focusing only on a single aspect (FAO 2010). It also recommends embracing flexible planning to adapt to specific country contexts, supporting national processes of knowledge creation instead of knowledge transfer, supporting national staff instead of hiring external consultants to undertake activities, and applying a long-term perspective instead of quick fixes (FAO 2012). But countries will have to take ownership of improving statistics and will have to have access to the best of expertise. The resources needed to implement the plan are \$10 billion annually over ten years. This compares with the \$80 million currently available for diagnostic assessments, development of protocols and training, which are not enough to achieve the desired results of high quality, just-in-time data available in the continent on a consistent, predictable basis.¹⁷

¹⁶ http://www.fao.org/economic/ess/ess-capacity/ess-strategy/en/#.VkDie_krLIU

¹⁷ An unpublished report drawn up by the heads of African NSOs and other partners this year estimates that producing harmonized statistics to track the SDGs costs a minimum of US\$1.54 for every one of Africa's 1.2 billion people. This figure would rise to US\$4.33 per person with efforts to obtain more reliable numbers. It would increase further to US\$8.11 per person in 15 years, when the population is also expected to have grown to 1.6 billion. The expense is only one constraint — consistency, quality and the capacity of NSOs to produce good statistics are others. As a result, the statistics often don't tally for much of Africa (Source: http://www.scidev.net/global/data/opinion/secure-africas-data-revolution.html?utm_medium=email&utm_source=SciDevNewsletter&utm_campaign=international%20SciDev.Net%20update%3A%209%20November%202015) and according to a 2008 report by the UN Food and Agriculture Organization, official submissions of agricultural statistics from African countries were at their lowest level since before 1961 — to the point where only 1-in-4 countries reported basic crop production data (FAO 2008).

Some Examples of Good Practice in Africa on Outcomes:

Kenya has historically had a good statistical system among African countries (personal communication with Michael Lipton). It also shines in outcomes being the only country “on course” for all five World Health Assembly indicators on undernutrition targets (IFPRI 2015).

Tanzania: is making progress on several fronts, three can be easily identified. First, it shows improved outcomes. Rates of child stunting in Tanzania, though still high, have fallen sharply in the past few years. Three national surveys in 2004, 2009, and 2010 showed a static rate of stunting at 44–43 percent, whereas two later national surveys - in 2011 and 2014 - show rates of 35 percent. The average annual rate of reduction in stunting from 2010 to 2014 is approximately 5 percent faster than the nearly 4 percent annual rates required meeting the World Health Assembly target. Second, government spending on nutrition in Tanzania is also increasing rapidly in 2013–2014. Third, Tanzania became one of the first countries to undertake a comprehensive review of public expenditures on nutrition (IFPRI 2015).

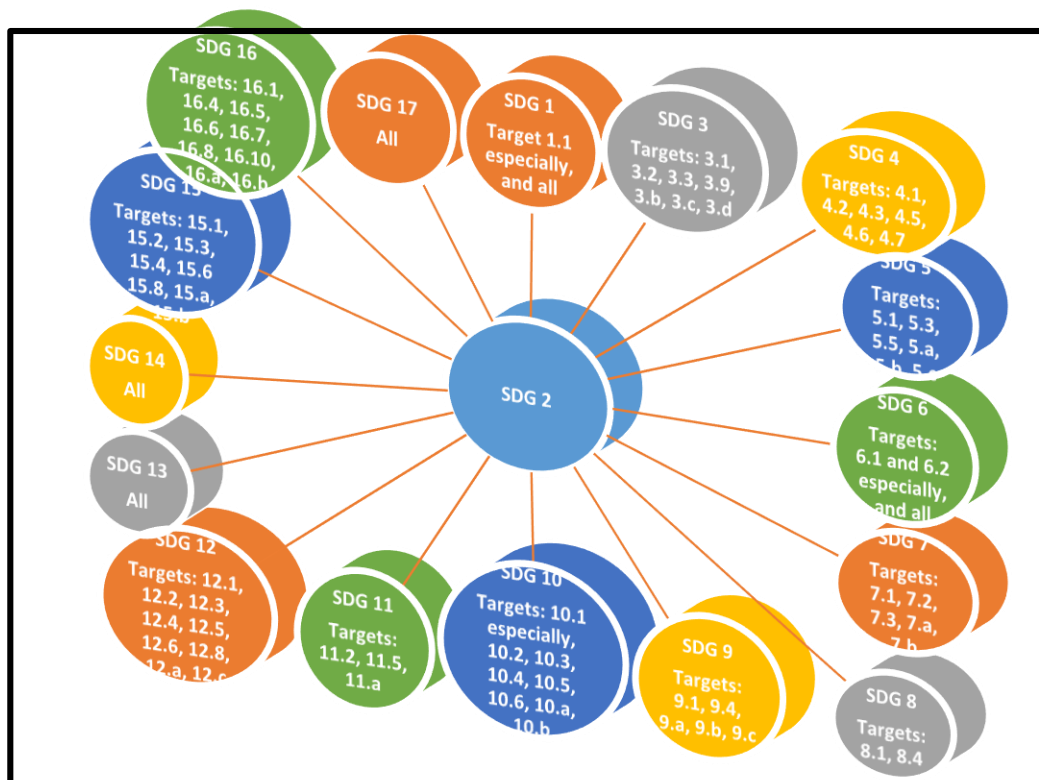
Ethiopia’s example shows how data can be used to improve effectiveness of public expenditures on individual interventions. Ethiopia’s flagship Productive Safety Net Program (PSNP; with an annual budget in excess of \$400 million) has 1.4 million participants and benefits approximately seven million people or approximately 10 percent of Ethiopia’s rural population. In a 3IE (International Initiative for Impact Evaluation) and DFID’s (The Department for International Development) Transform Nutrition funded study, IFPRI and ESSP (Ethiopian Strategy Support Program) included nutritional outcomes as part of the PSNP. Despite the initial absence of interest, in 2012 with international concern to improve preschool nutrition outcomes, and with the development of Ethiopia’s National Nutrition Strategy following extensive consultation, there was a shift to understand the impact that the PSNP had on nutrition. IFPRI and ESSP’s extensive analyses of PSNP nutrition data, and subsequent workshops to present the results, showed that there was no evidence that the PSNP was improving pre-school nutritional status as measured by height-for-age - an indicator of chronic undernutrition, or weight-for-height - a measure of acute undernutrition. This research has been instrumental in rethinking the structure of the PSNP, which now includes nutrition sensitivity as an important objective. IFPRI and ESSP have contributed to the PSNP through: i) supervising data collection processes; ii) conducting analyses of several PSNP survey rounds, demonstrating that the established PSNP improved food security, but did not improve nutritional outcomes; iii) raising international evidence to show that safety nets have had little effect on nutrition, unless through additional interventions; and iv) presenting results at workshops and informal meetings (IFPRI/ESSP).¹⁸

SDG 2 and Relationship to Other SDGs and Targets

Achievement of food security and nutrition depends on outcomes in a variety of sectors. The 17 SDGs contain an overwhelming 169 indicators. Figure 1 below shows the relationship of SDG 2 to several other specific targets in the remaining 16 SDGs.

¹⁸ <http://essp.ifpri.info/>.

Figure 1: SDG 2 and Relationship with other SDGs



Source: Lele and Goswami (forthcoming).

Comparison of TWG Indicators to SDG Indicators Currently under Discussion

Table 2 shows SDG 2 targets under discussion and their correspondence with TWG indicators.

Table 2: Relationship of TWG Indicators to SDG Indicators

TWG Covers	TWG Partly Covers	TWG Does Not Cover
Target 2.1: 2.1.1: Prevalence of undernourishment and 2.1.2: Prevalence of population with moderate or severe food insecurity, based on the Food Insecurity Experience Scale (FIES)	Target 2.a.1. The Agriculture Orientation Index (AOI) for Government Expenditures TWG Indicator: Government Expenditure on Agriculture	Target 2.3.1: Value of production per labour unit (measured in constant USD), by classes of farming/pastoral/forestry enterprise size
Target 2.2.1: Prevalence of stunting (height for age <-2 SD from the median of the WHO Child Growth Standards) among children under five years of age	Target 2.c.1: Indicator of (food) Price Anomalies (IPA) TWG Indicators: Early Warning Systems (GIEWS) and Volatility of food prices [standard deviations of prices over time]	Target 2.4.1: Percentage of agricultural area under sustainable agricultural practices

	<p>Target 3.7.1: Adolescent birth rate (10-14; 15-19) per 1,000 women in that age group</p> <p>TWG Indicator: Birth timing [maternal age at first birth, months between births]</p>	<p>Target 2.5.1: Ex Situ Crop Collections Enrichment index</p>
	<p>Target 6.1.1: Percentage of population using safely managed drinking water services</p> <p>TWG Indicator: Drinking water: use of clean water sources [percent of households]</p>	<p>Target 2.b: 2.b.1: Percent change in Import and Export tariffs on agricultural products and</p> <p>2.b.2: Agricultural Export Subsidies</p>
	<p>Target 6.2.1: Percentage of population using safely managed sanitation services</p> <p>TWG Indicator: Open defecation: Use of toilets [percent of households]</p>	<p>Other SDGs</p>

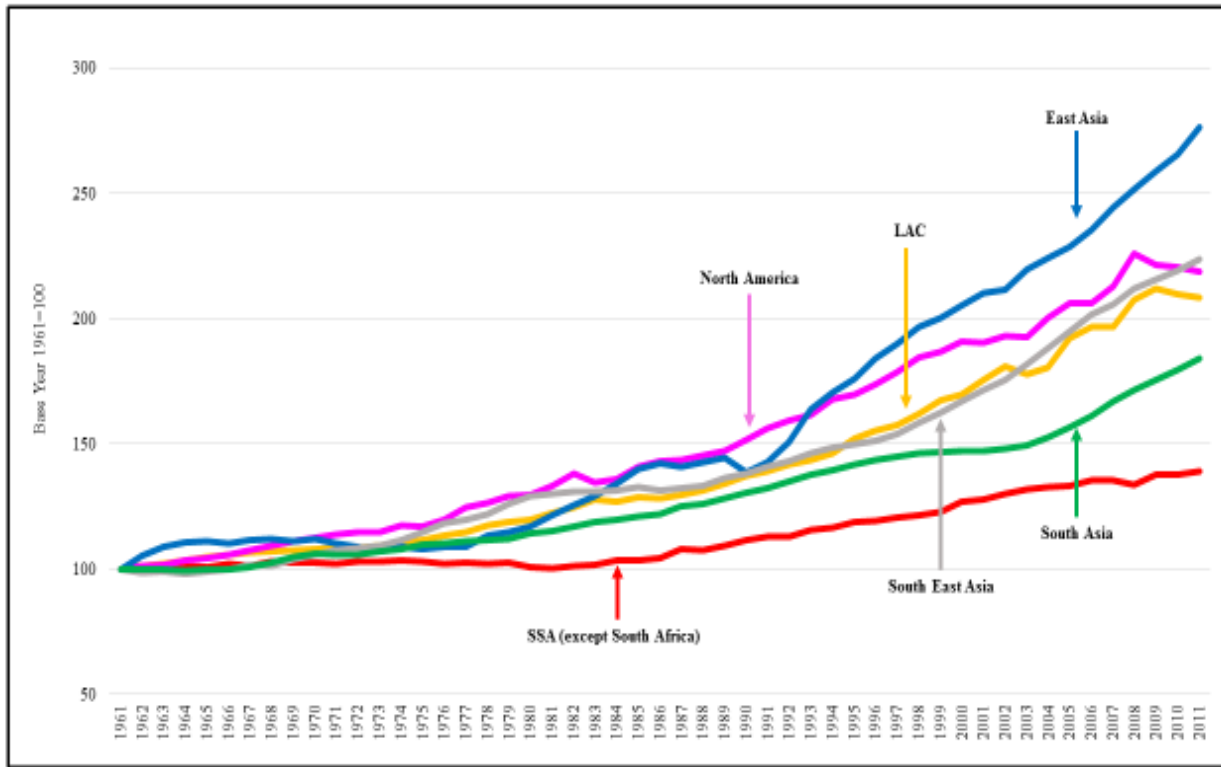
The TWG focused on existing measurable indicators and assessed them. The SDG 2’s environmental targets are not covered in the TWG’s assessment of indicators. Many are hard to measure. There is no universally agreed definition of sustainability which is measureable, no concepts and no data to measure them. The UN processes have not come to grips with the reality. However, it would be possible and desirable to monitor changes in forest cover, soils, water and climate, among other natural factors to better understand whether, in net, agricultural growth is causing more harm than good from a sustainability perspective. New technology – including geographical information system (GIS), remote sensing via satellites and crowd-sourcing are able to monitor changes in natural resources. Both FAO and others are using these new tools to assess the states of forests, water and land use leading to debates of their own. FAO’s initiative to build statistics is realistic in understanding the challenges at the national level. However, a great deal of analysis, particularly in the environmental area, will have to be done at the global level, especially where national capacity to use such tools and analyze data is limited.

Matching Rhetoric on Data Revolution with Finances and Action

Invest Resources for Regular Data Generation

SDG 2 indicators currently are entertaining measuring agricultural labor productivity and Total Factor Productivity, as agricultural productivity is closely related to poverty and nutrition outcomes in low-income countries. The widely used estimates of Total Factor productivity (Figure 2) produced by the USDA’s Economic Research Service (ERS) are based on what data FAO generates. Those estimates compare the growth in agricultural outputs with the use of economic inputs (land, labor, capital and materials). But they do not as yet take into account changes in the environment associated with agricultural production due to measurement difficulties. It would be well worth taking the ERS effort forward working in collaboration with FAO and the CGIAR.

Figure 2: Agricultural Total Factor Productivity (TFP) Index Growths by Region (1961-2011)



Source: Lele, Agarwal and Goswami; based on the ERS international agricultural total factor productivity indexes, available at <http://www.ers.usda.gov/data-products/international-agricultural-productivity.aspx>

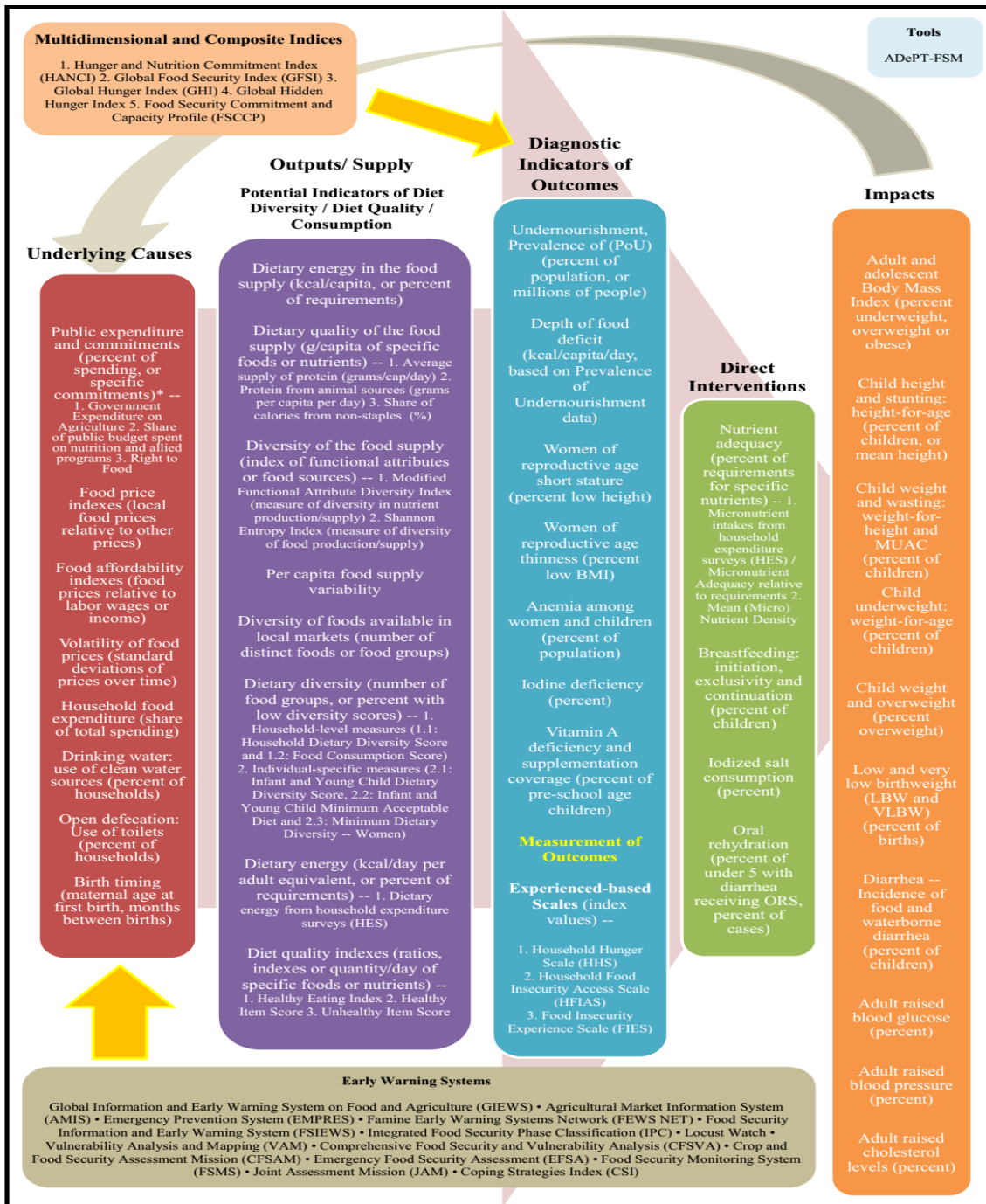
Importance of Building Capacity

TWG's African team members Joyce Kinabo and Julia Tagwireyi emphasize the importance of investing in food and nutrition surveillance systems as being of paramount importance in Africa. Such systems can help monitor the key drivers of food and nutrition security and facilitate taking corrective action to prevent food insecurity and poor nutrition, which lead to stunting, wasting, morbidity and mortality, particularly among children. They also emphasize the need for periodic in depth surveys such as the Demographic and Health Surveys (DHS) or other annual assessments that are currently implemented.

It is likely that data on health outcomes are easier to collect than those on food and agriculture, if the DHS are any indication. The United States Agency for International Development (USAID) supports financing of much of the hard and soft infrastructure for DHS, provides training and financing for collecting data around standard methodologies and protocols (personal communication with Barry Popkin). The DHS program has collected, analyzed, and disseminated accurate and representative data on population, health, HIV, and nutrition through more than 300 surveys in over 90 countries, 37 of which are in sub-Saharan Africa.¹⁹ It is a model well worth expanding to other measurement needs.

¹⁹ <http://dhsprogram.com/#sthash.sW8t8BGS.dpuf>.

Figure 3: Conceptual framework based on FSIN TWG Assessed indicators of Food and Nutrition Security, Phase 1 (Work in progress)



Note: * Public expenditure on health is missing; Source: Adapted from Lele and Goswami (Forthcoming).

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