Ending hunger sustainably by 2025: What will it take?

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Towards a Post-2015 Development Agenda

Tremendous progress has been made towards the Millennium Development Goals (MDGs), but progress has been largely uneven, both across regions and across goals. Although the global target of halving the proportion of people living in extreme poverty has been achieved, the target of halving the proportion of people who suffer from hunger is not on track. Nearly 850 million people worldwide still suffer from chronic hunger (FAO et al. 2013). Moreover, more than 2 billion people are affected by deficiencies in essential micronutrients such as iron, vitamin A, and zinc or “hidden hunger” (WHO 2013a).

As the 2015 deadline draws close, policy discussions on how to accelerate progress towards the MDGs and beyond have gained much momentum. The Post-2015 Development Agenda that is being discussed represents a framework for developing the new Sustainable Development Goals (SDGs). Based on a series of consultations, the UN Secretary General’s High-Level Panel of Eminent Persons on the Post-2015 Development Agenda has proposed new goals and targets under this framework.

Certainly, the High-Level Panel’s proposal gives greater attention to food and nutrition security compared to the MDGs, but there is still a lot of ground to be covered before a coherent and holistic framework is reached. While the High-Level Panel’s proposal underlines the need to eradicate extreme poverty, it must be emphasized that the goal of eliminating hunger\(^1\) is equally important and deserves adequate attention. In addition, it is extremely important that discussions on how to arrive at the desired Post-2015 agenda are not focused on the
achievement of environmental sustainability targets at the expense of food and nutrition security targets. The SDGs being developed must thus be people-focused, ambitious, pragmatic, and time-bound with clear targets, and must be facilitated by a global and inclusive partnership.

This paper argues that hunger can be eliminated sustainably by 2025. This goal, which must be featured prominently in the Post-2015 development agenda, is achievable as shown by the successes of countries such as Brazil, China, Ghana, Thailand, and Vietnam. It also argues that the measurement of hunger must be revisited as part of the steps needed to monitor and evaluate progress towards the hunger goal. Given the multidimensional nature of hunger, it is imperative that it is defined to capture both insufficient food intake and undernutrition. Hunger, broadly defined, must go beyond calorie deficiency to include micronutrient deficiency as well as poor nutrition outcomes such as stunting, underweight, and wasting. Accordingly, this paper proposes a set of indicators to capture these dimensions.

The structure of the paper is as follows. First, the experiences of successful countries in terms of strategies implemented as well as trends in hunger and undernutrition are presented. Next, the role of agricultural growth, social protection, and nutrition strategies is discussed to highlight the mechanisms through which these strategies can help to support the elimination of hunger by 2025. In the next section, the role of good measurement in assessing progress towards the hunger goal, including a proposed set of indicators to accurately and timely measure this progress are discussed. The paper concludes with a summary of lessons drawn
from country experiences as well as approaches for future directions in the fight against hunger.

**Ending hunger sustainably by 2025: Why it is feasible**

Country experiences clearly demonstrate that it is feasible to eliminate hunger sustainably by 2025. The strategies employed by successful countries discussed in this paper differ and can be broadly classified as agricultural growth-led or social protection-led and targeted nutrition intervention strategies or a combination of both. In China, Ghana, and Vietnam, for example, success has been primarily driven by an agricultural growth-led strategy. In Brazil, success has been mainly through a strategy that targeted social protection and nutrition interventions to those in need of it the most. Success in Thailand, on the other hand, has been catalyzed by a combination of these two main strategies. The discussions that follow provide an overview of the key elements of strategies employed by these countries in addition to highlights of trends in reducing hunger and child stunting.²

*Agricultural growth-led strategies*

China

China is on track to eliminate hunger by 2025. Between 1990 and 2010, China reduced the prevalence of undernourishment by half from roughly 23 to 12 percent. More impressively, the prevalence of child stunting was reduced by more than two-thirds from 32 to 9 percent between 1987 and 2010. If these trends continue, China will be able to further bring down child stunting levels or even nearly eliminate child stunting.
As Fan et al. (2007) point out, China’s success was catalyzed by the decollectivization of agriculture, in particular, the introduction of the Household Responsibility System for securing land rights; pro-market reforms and the dismantling of state planning and monopolies; as well as the implementation of policies that supported human capital development and rural non-farm economic growth. These reforms, which began in the late 1970s, had a strong initial emphasis on agricultural growth—stimulated by improved incentives in smallholder agriculture—and rural development. According to von Braun et al. (2008), social programs, including interventions in nutrition, health and family planning were also implemented on a large scale. To complement these interventions, investments in education, clean water, and good sanitation were accelerated.

It is important to note that careful experimentation was vital for the design, sequencing, and implementation of successful reforms in China (Fan 2010). To facilitate the flow of information for policymaking, China established a strong monitoring and evaluation system, including an effective data collection strategy (von Braun et al. 2008). In addition, the reforms profited from other factors such as good initial conditions in rural infrastructure, agricultural research and extension services, and institutional capacity.

Vietnam

Vietnam is also on track to eliminate hunger by 2025. Between 1990 and 2000, the prevalence of undernourishment was halved from approximately 48 to 22 percent. The prevalence of child
stunting was also reduced by half between 1989 and 2008 from around 61 to 30 percent. While the prevalence of child stunting remains high, it can still be eliminated by 2025 if the right policies and strategies are designed and implemented.

Similar to China, success in Vietnam has been driven largely by growth in agriculture. In the late 1980s, the government of Vietnam introduced the Doi Moi reforms which consisted of four main elements—equitable land reform; liberalization of agricultural marketing and trade; pragmatic and sequenced liberalization for attracting and benefiting from foreign direct investment; and sustained investment in human development (Vandemoortele and Bird 2011). The government promoted the decollectivization of agricultural land by securing individual property rights while ensuring that it was done in an equitable and sustained manner. The 1993 Land Law that was established allowed for the issuance of land use certificates to all rural households thereby enabling them to inherit, transfer, exchange, lease, and mortgage land rights (Klump 2007).

Public expenditure targeted at improving nutrition and health outcomes was also large. A comprehensive nutrition policy to improve dietary diversity and programs to increase micronutrient supplementation were implemented. Further, Vietnam established child-health and family-planning programs, maintained national health coverage, and provided health subsidies to poor people (von Braun et al. 2008). It is notable that the implementation of these reforms occurred with a focus on promoting equity while improving living standards (Vandemoortele and Bird 2011).
Ghana

Ghana remarkably succeeded in reducing the prevalence of undernourishment to less than 5 percent between 2009 and 2011, thus eliminating hunger. But, progress in reducing the prevalence of child stunting has been much slower. Between 1988 and 2008, child stunting fell slightly from about 37 percent to 29 percent. Further reduction of child stunting to a relatively low level by 2025 is, however, possible.

Ghana’s success has been mainly through a combination of economic and agricultural reforms, especially in the cocoa sector, which began in the mid-1980s. To promote macroeconomic stabilization and restore production incentives, particularly to export-producing farmers, the government devalued the Ghana cedi; put in place measures to control inflation; reduced and eventually removed input subsidies, reformed cocoa marketing, and liberalized trade (Leturque and Wiggins 2011). Other key factors that facilitated this success include political stability, investments in infrastructure and human capital; the infusion of international aid to effectively support government efforts in agricultural research, for example; and an increasing inflow of remittances from the diaspora (Aryeetey and Mckay 2007; Leturque and Wiggins 2011).

Social protection-led strategies and targeted nutrition interventions

Brazil

Brazil is on track to eliminate hunger by 2025. The prevalence of hunger and child stunting are very much close to falling below 5 percent, but the initial rates have been relatively lower compared to the other countries. The prevalence of undernourishment was halved between
1990 and 2010 from 15 to 7.5 percent. Besides, the prevalence of child stunting was reduced by almost two-thirds between 1989 and 2007 from around 19 percent to 7 percent.

New macroeconomic and trade policy reforms together with pro-poor social spending introduced in the mid-1990s in Brazil have spurred this success. Social protection reforms involved the expansion and better targeting of social assistance and social security programs. As part of the reforms, existing transfer programs were consolidated under Brazil’s flagship social program, popularly known as *Bolsa Família* (Holmes et al. 2011). The program which promotes improved education and healthcare for beneficiaries is now the largest conditional cash transfer program in the world to date. Integral to the success of *Bolsa Família* is the integrated approach with other social programs and policies for food and nutrition security (de Souza 2009).

To support the social protection programs, key social legislation and policies, particularly the 1988 statutory right of every citizen to social security, the 2003 Zero Hunger strategy, and the 2004 basic income law that guarantees the right of all citizens or foreigners that have resided in Brazil for five years or more to a basic income were put in place by the government of Brazil (Holmes et al. 2011). Large public investments in education, healthcare, clean water, and good sanitation were also made as von Braun et al. (2008) indicate.

*Thailand*

Similar to Brazil, Thailand is also on track to eliminate hunger by 2025. The country astoundingly reduced the prevalence of undernourishment from approximately 43 to 6 percent
between 1990 and 2013, almost eliminating hunger. Progress towards reducing the prevalence of child stunting has been slower but also significant, falling from about 25 percent to 16 percent between 1987 and 2006.

In the mid-1980s to mid-2000s, pro-poor growth in Thailand was led mainly by the development of the non-rural sector and a structural shift of household income from farm to non-farm activity (Cherdchuchai and Otsuka 2006). In the 1990s, however, government policies refocused on agriculture (FAO 2006). Thailand’s agricultural sector became characterized by a market-oriented approach, with well-developed marketing chains, and interaction between smallholders and private companies; and high diversification and specialization of products, encouraged by public expenditures on agricultural research and extension. This contributed to increased incentives for agricultural production, which enabled Thailand to become one of the largest global exporters of rice (Leturque and Wiggins 2010).

In addition to agricultural reforms, Thailand adopted an integrated and community-based approach to improving nutrition and health outcomes, beginning in the early 1980s (Kachondham 1992). Nutrition programs, which were included in the National Economic and Social Development Plan, focused on underdeveloped areas, targeting mainly children and pregnant and lactating women. This was not a silo approach as clear linkages between agriculture and nutrition were made in order to ensure sustainability of impact (von Braun et al. 2008).
Barrientos (2010) notes that such inter-sectoral approaches and local participation continued to improve in the 1990s and led to the introduction of the Universal Health Coverage Scheme (UNHCS) in 2002. Fully financed by the Government of Thailand, the UNHCS entitles every citizen to free basic healthcare. The government has also more recently extended social protection programs that go beyond healthcare to cover, among others, death and old age benefits to workers both in the formal and informal sectors (UNESCAP 2011).

Ending hunger sustainably: The role of agricultural growth, social protection, and nutrition strategies

Agricultural growth, as part of overall economic growth, contributes directly to the reduction of poverty, hunger, and undernutrition. This impact occurs mainly through increases in the ability of farm households to purchase and produce more nutritious foods, higher demand for rural labor, and lower food prices for poor consumers (Diao et al. 2007; Fan and Brzeska 2012).

As Ligon and Sadoulet (2011) demonstrate, agricultural income growth has a higher and positive effect on the expenditures of the poorest households compared to non-agricultural income growth. Similarly, Headey (2011) suggests through a cross-country study that agricultural growth has a significant effect on calorie intake, although the effect on dietary diversity is marginal. With the exception of India, the author also finds that growth in the agricultural sector is particularly associated with improved nutrition through reduced underweight and stunting in more food insecure countries. On the other hand, findings from Ecker, Breisinger, and Pauw (2011) in Yemen show that while agricultural growth can lead to
substantial improvements in nutrition, the impact on stunting is just about 10 percent of the impact on calorie deficiency.⁵

The experiences of China and Vietnam in the 1980s, for example, clearly show that smallholder-focused growth strategies in agriculturally-predominant countries offered the largest impacts on poverty and hunger reduction. Strong growth linkages between agriculture and the rest of the economy will be important to achieve such impacts (Johnston and Mellor 1961; Mellor 1976).

Just as sectoral growth patterns matter for reduction in poverty, hunger, and undernutrition, sub-sectoral growth patterns also matter. As Fan and Brzeska (2012) articulate, whether growth in a subsector will be pro-poor and pro-nutrition depends on the subsector’s: i) linkages with the rest of the economy, ii) initial size and geographic concentration, iii) growth potential, and iv) market opportunities. Even though staple-crop growth, for example, has been shown to reduce poverty and calorie deficiency, Pauw and Thurlow (2010) find that it did not have much impact on nutrition in Tanzania. This is because growth came mainly from crops that were not grown by the poor.

In countries such as India where rapid economic growth has occurred and undernutrition is pervasive, concerted effort is needed to leverage agricultural growth, in particular, for improved nutrition outcomes. Research shows that pro-poor growth has been stifled in the country and is more evident outside of the agricultural sector (Fan et al. 2007; Ravallion 2009).
Yet agriculture continues to be the main source of livelihoods for the majority of poor households in India.

Growth alone, however, is not sufficient to effectively address hunger and undernutrition. Well-designed social protection strategies and nutrition strategies are also critical as success stories show. The experiences of Brazil and Thailand suggest that social protection programs together with nutrition interventions, if properly targeted, offer much promise to effectively tackle poverty, hunger, and undernutrition as well inequality.

Social safety nets such as conditional cash transfers, can contribute to growth (and food and nutrition security) by building assets and protecting them from shocks; reducing inequality; facilitating structural reform; and increasing the effective allocation of resources (Alderman and Hoddinott 2009). The effectiveness and impacts of social protection programs depend on proper design and implementation. As Alderman and Hoddinott (2009) outline, effective safety nets should have a clear objective; feasible means of targeting beneficiaries; reliable mode of resource transfer; sound monitoring and evaluation system; and transparency in operation.

Well-targeted nutrition interventions that are implemented in a unified and synergistic manner are crucial to accelerate progress in nutrition. As Ruel and Alderman (2013) argue, the acceleration of progress requires greater effort in linking nutrition-specific interventions that address the immediate causes of undernutrition, including inadequate food and nutrient intake, feeding, and care practices, with nutrition sensitive-programs that address the underlying
causes of undernutrition, including insufficient access to adequate care resources, health, water, and sanitation services.

The effectiveness, coverage, and scale of nutrition-specific interventions (such as micronutrient supplementation, optimum breastfeeding, and complementary feeding practices), can be improved immensely when nutrition-sensitive programs (such as agriculture and food security, maternal mental health, and early child development programs) are leveraged as delivery platforms (Bhutta et al. 2013; Ruel and Alderman 2013). Furthermore, the nutrition-sensitivity of programs can be increased through, for example, improved targeting, use of conditions, integrated nutrition goals and actions, and focus on improvements in women empowerment. A good balance between nutrition-specific interventions and nutrition-sensitive programs will be critical to harness synergies.

In India, for instance, concrete action is needed to address persistent undernutrition, both among children and adults (Gillespie et al. 2012). While India has implemented several social safety net and nutrition intervention programs, the enabling environment to advance progress has been largely inadequate (Haddad 2011). More recently, however, there is a strong rights-based movement and a growing stakeholder consensus on the need for comprehensive action that cuts across sectors (Gillespie et al. 2013).

India’s National Food Security Bill which was introduced mid-2013 is a promising attempt to improve the food and nutrition security of poor people, but challenges related to, for example,
fiscal sustainability, targeting, and administration loom ahead (Sugden 2013). The bill will require a better targeted and transparent public food distribution system. In addition, the mode of consolidating the bill with existing state-level food subsidies and policies has to be made clear (Fan 2013). As von Braun et al. (2008) recommend, India’s nutrition strategy can be enhanced further through strategic options such as pro-poor growth through agriculture; redesign of nutrition and health policies and programs for effectiveness; and better targeting of nutrition investments to vulnerable groups, including girls and women.

**Ending hunger sustainably: The role of better and timely measurement**

Given the multidimensional nature of hunger, a plurality of indicators that taken together can accurately and fully capture its realities is needed. As indicated earlier, hunger must be redefined to include both insufficient food intake and undernutrition. The current metric for assessing global hunger is too narrow as it measures only calorie-deficiency. The measurement of hunger should be expanded to include dietary quality which captures the adequacy of essential macro- and micro-nutrient intake. It must also include an assessment of the nutritional status of individuals which derives from a combination of sufficient food intake and good biological utilization of food consumed (FAO 2008). It is crucial at this time that discussions on the post-2015 agenda culminate into a consensus on methodologically sound indicators that are cost-effective and practical.

At the global level, this paper recommends tracking indicators that measure the input- (calorie deficiency and lack of dietary diversity), and output-side (stunting, underweight, and wasting)
of hunger. In addition, it is important that Individual, household, and institutional factors that influence these indicators are continuously examined and monitored. As follows, these input-and output-side indicators and ways to improve their usefulness are discussed.

*Input-side: Calorie deficiency and diet diversity indicators*

Calorie deficiency is measured by the widely used FAO prevalence of undernourishment indicator (see Table 1). This indicator does not capture imbalances in the consumption of macro- and micro-nutrients, access by individual household members, within-country trends, and short-lived or within-year variations in food security (FAO 2012; Heady and Ecker 2013). Additionally, evidence gathered in different contexts shows that calorie consumption is a weak indirect predictor of nutrition outcomes (see, for example, Pelletier et al. 1995; Deaton and Drèze 2009; Jensen and Miller 2010).

The construct of the FOA undernourishment indicator should make better use of representative household surveys and the distribution framework of calories must be more regularly updated (Haen 2011; Carletto et al. 2013). The indicator should be complemented with information on the other dimensions of hunger such as dietary quality.

Research suggests that dietary diversity indicators are better measures of hunger, in a broad sense, compared to calorie deficiency (Hoddinott and Yohannes 2002; Arimond and Ruel 2004; Arimond et al. 2010). Further, dietary diversity indicators are more sensitive to macro- and micronutrient intake, shocks, and seasonal variations. Potential dietary diversity indicators are
presented in Table 1. Frequent measurements of dietary diversity are essential to evaluate the nutritional implications of interventions and to help guide future policies and programs. Dietary diversity indicators that sufficiently capture local contexts while facilitating comparability within and between countries must be further developed and promoted.

While dietary diversity indicators are good predictors of the likelihood of adequacy in micronutrient intakes, these indicators may not consistently predict specific micronutrient deficiencies across different contexts (Arimond et al. 2010; Heady and Ecker 2013). Direct measures of deficiency in essential micronutrients such as iron, vitamin A, and zinc or outcomes of a lack of dietary diversity should also be tracked on a regular basis, particularly in countries where these deficiencies are severe.

*Output-side: Stunting, underweight, and wasting*

Anthropometric measures that gauge the nutritional status of individuals, particularly stunting (low height-for-age) should be measured frequently. Studies by Victora et al. (2008) and Haddad (2013), for example, argue that stunting is increasingly recognized as a better indicator of chronic undernutrition because of its greater specificity in measurement compared to other indicators such as underweight (low weight-for-age). However, underweight and wasting indicators should also be measured frequently to assess the relatively short-term impacts of hunger.
The challenge with using anthropometric indicators is parceling out the causality of these outcomes. Stunting, for example, may be an outcome of hunger or it may be associated with non-food factors such as poor sanitation, lack of access to safe drinking water, and inadequate care practices. In using anthropometric indicators to assess hunger, greater effort is required to control for such confounding factors (Olsen 1999).

[INSERT TABLE 1 approximately here]

Improving the measurement of hunger through capacity building and innovations

The reliance of indicators, such as diet diversity scores and anthropometric measures, on relatively expensive household or individual surveys makes their regular update a challenge (Ruel et al. 2010; Arimond et al. 2010). The lack of capacity in developing countries to collect reliable and timely data due to shortages in statistical infrastructure and human capital exacerbate the problem. Increased investments aimed at building the capacity of developing countries to collect sound data are essential inputs to designing and implementing evidence-based policies and programs that make the goal of eliminating hunger possible.

Investments in innovative tools such as information communication technologies that reduce the cost and time to collect data and publish the findings are equally essential (Heady and Ecker 2013). Mobile phone-based and computer-assisted personal interviewing, for example, hold great potential to conduct household surveys in a cost-effective manner, among their other benefits (Caeyers et al. 2012; Ballivian and Azevdeo 2013). Additionally, innovations that
increase accurate account of citizens in developing countries, such as biometric identification, should be further promoted (Crook 2013; Gelb and Clark 2013).

**Conclusions: Lessons and approaches for future directions**

Concrete and integrated actions by all stakeholders, including governments, the international community, civil society, and the private sector is required to sustainably achieve the hunger goal by 2025. Countries such as Brazil, China, Ghana, Thailand, and Vietnam offer success stories, but South Asia and Africa South of the Sahara remain home to around 62 percent of the world’s undernourished people (FAO et al. 2013). Clearly, a smarter, more innovative, better focused, and cost-effective approach is needed. Such an approach should include actions to promote country-led strategies; scale-up support for evidenced-based policymaking and policy experimentation; and engage new players and enhance global partnerships.

*Promote country-led strategies*

Policies aimed at ending hunger must be country-led in order to be more effective, efficient, and sustainable, as well as better adapted to the local context. Similarly, to be more inclusive and to increase “ownership,” policies have to build on bottom-up support, with local people acting as the driving force in the development process. The international community should refrain from promoting one-size-fits-all policies and programs and should support the design and implementation of country-led strategies.
The greatest successes in fighting hunger and undernutrition have been primarily country-driven. As the experiences of country cases discussed in this paper show, there was a great degree of national ownership over the strategies employed. This led to the implementation of sometimes unorthodox, but necessary polices that were well adapted to the local context, such as partial and sequenced liberalization of markets pursued in China; the similar two-track approach pursued in Vietnam, involving the protection of some sectors and liberalization of others; Brazil and Thailand also led carefully designed and targeted social service provision programs that were integrated into their national strategies.

The ability of countries to implement innovative policy responses must be increased by strengthening institutions and capacity. IFPRI, for example, supports the Africa-owned and Africa-led Comprehensive Africa Agriculture Development Programme (CAADP) through its Regional Strategic Analysis and Knowledge Support System by providing high-quality analyses and knowledge products to improve policymaking and implementation under the CAADP framework.

Scale-up support for evidenced-based policymaking and policy experimentation

National policies aimed at ending hunger in developing countries must be driven by evidence and much less by theory or ideology. Evidence-based policymaking, in turn, should be supported by building developing countries’ data collection capacity. Many developing countries currently have weak statistical systems due to shortages in statistical infrastructure
and human capital that pose serious challenges. Indeed, a data revolution is needed for the post-2015 agenda and has been called for by various parties.

Countries must be able to collect appropriate data in a timely and frequent manner to monitor and evaluate programs. Data must be collected on outcome indicators such as stunting, wasting and underweight, as well as intermediary indicators such as calorie intake and diet diversity. Frequent collection of data at the sub-national level allows governments to collect data on pilot projects, monitor the impact of programs implemented, and track progress or lack thereof to make necessary adjustments to policy. A sound monitoring and evaluation system would also serve to increase accountability, making it easier to identify and respond to underperformance. Investments in innovative tools such as ICTs that reduce the cost and time to collect and share data are also crucial.

Policies aimed at ending hunger in developing countries must be repeatedly tried, tested, adjusted, and tried again before being scaled up (Fan 2010). Pilot projects and policy experiments provide decision-makers with information on what works and what does not work before scaling-up successful policies and programs. Experimentation offers vital information on the proper design, sequencing, and implementation of reforms. Policy makers must foster a culture that values adaptation and change by creating the legal and political space for local experimentation.
In China, for example, under the collectivized system, rewards were not easily matched to individual efforts and farmers had little incentive to increase productivity (Lin 1992). When local authorities in the poor Anhui Province experimented with contracting land to individual households, the individual teams brought in yields that were far larger than the collectivized teams. Faced with such strong evidence, central authorities eventually conceded the benefits of the new system of contracting land. The system, which spread rapidly, became known as the Household Responsibility System (Fan 2010).

_Engage new players and enhance global partnerships_

The successful engagement of key actors, including emerging economy donors, the private sector, and philanthropic organizations is also a crucial element for advancing progress towards the hunger goal. The opportunities presented by these actors must be fully harnessed given their growing role in the global sphere. For example, emerging economies are now redefining development assistance and extending it beyond traditional aid to include mutually beneficial economic and political partnerships that promote trade and facilitate knowledge and technology exchange. Although South-South development cooperation has fluctuated over the years, estimates show that such cooperation has increased, rising by 50 percent between 2006 and 2010 (UN 2012).

Between 2009 and 2012, China, for example, trained approximately 3,000 agricultural experts and built 5 new agricultural technology demonstration centers in Africa (FOCAC 2012). Overall, the predominant share of China’s development cooperation is, however, geared towards
infrastructure development (UN 2012). Brazil has also increased its support for agricultural growth in Africa and has assisted in establishing social-protection programs on the continent.

In general, partnerships between emerging donors and other developing countries must be made more transparent, better-coordinated, and strategic. These partnerships must focus on countries with large vulnerable populations and sectors that have strong links to poor and hungry communities. The Africa-South America Summit, the forum on China-Africa Cooperation, the Arab-Africa economic cooperation forum and the India-Africa Forum Summit are just a few examples of important platforms that can be further leveraged to increase knowledge and technology exchange in agriculture and social protection programs.

The private sector, with the right incentives, can provide effective and sustainable investment and innovation that is critical to ending hunger by 2025. Governments in developing countries must provide enabling environments for the private sector initiatives to flourish. To achieve this, improvement of the regulatory landscape, including reducing the hurdles to doing business and sound intellectual property rights laws are crucial. Incentives such as temporary tax concessions should be explored.

Public-private partnerships should be leveraged in activities, such as agricultural research and technology dissemination, as they present the opportunity for the public and private sector to capitalize on each other’s competencies and increase efficiency and results by sharing resources, risk, costs, and benefits (Spielman and Zambrano 2013). For example, PepsiCo
partnered with the Ethiopian government, The World Food Program, and United States Agency for International Development in a pilot project to scale up chickpea production and fight malnutrition in Ethiopia (WFP 2012). But these public-private partnerships and private sector initiatives must be monitored and evaluated to ensure that investments are socially and environmentally responsible. For this, research organizations, including the CGIAR, have an important role to play.

Philanthropic organizations also play an important role in the fight against hunger and the opportunities they present should be further harnessed. For example, with a total grant payment of $3.4 billion in 2012 alone, the Bill and Melinda Gates Foundation funds programs aimed at increasing small farmers’ productivity and nutrition outcomes of hungry people, among others (Bill and Melinda Gates foundation 2013). The largest development organization in the world, the Bangladesh Rural Advancement Committee (BRAC) also works to achieve similar results by employing holistic approach to poverty and hunger alleviation including through empowerment of vulnerable people such as rural women (BRAC 2013). Philanthropic activity, however, must be better coordinated to avoid inefficiency including duplication of efforts (UNECOSOC 2012).

Finally, the opportunities of global partnerships must be fully harnessed in order to sustainably end global hunger by 2025. More integrated approaches are needed, particularly across disciplines or sectors and actors. Initiatives to end hunger can no longer afford to be insular as issues of importance are cross-cutting and synergies must be realized. In addition, a clear
definition of the roles and responsibilities of different stakeholders must be established to promote efficiency. Furthermore, tools and metrics to monitor and evaluate the performance of stakeholders will be especially vital to increase transparency and promote global accountability.
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Table 1. Select indicators for measuring hunger

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<thead>
<tr>
<th>Measure</th>
<th>Approach</th>
<th>Origin</th>
<th>Availability</th>
<th>Proposed changes</th>
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<tr>
<td><strong>Input-side Indicators</strong></td>
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<td>Calorie Deficiency Indicator</td>
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| Prevalence of undernourishment               | Calculated using estimates of country food availability, distribution, and calorie requirements to ascertain the proportion of the population that falls below the minimum dietary energy requirement level. Those individuals are considered undernourished. It uses data on national food balance sheets and occasional household surveys. | Food and Agriculture Organization          | Reported as a 3-year average   | • Indicator should be reported yearly at national and sub-national levels using representative household surveys  
• Distribution framework of calories should be regularly updated |
| Dietary Diversity Indicators                 |                                                                                           |                                             |                               |                                                                                 |
| Food Consumption Score                       | Calculated using the frequency-weighted consumption of 8 food groups by a household in the past 7-days before the survey. Greater weight is assigned to food groups with higher nutritional value such as meat and fish. | World Food Programme                        | Collected mostly for independent research and programs | • Indicator should be reported yearly at national and sub-national levels  
• Scores should be computed at individual level and be comparable over time and space |
| Household Dietary Diversity Score            | Calculated by summing up the number of food groups consumed by members of the household over a 24 hour recall period. 12 food groups are used, making the indicator a number between 0 and 12. | United States Agency for International Development | Collected mostly for independent research and programs | • Indicator should be reported yearly at national and sub-national levels  
• Indicator should consider the type and frequency of food consumed beyond 24 hours differentiate weights by the nutrient content of food groups, and be comparable over time and space |
| Anthropometric Indicators | Output-side Indicators | World Health Organization | Varies by country | • Indicator should be reported yearly at national and sub-national levels
• Frequency of data collection should be determined by specific context e.g. frequency and intensity of weather shocks such as droughts
• Indicator should be reported at national and subnational levels in hunger hotspot areas
• Frequency of data collection should be determined by specific context e.g. frequency and intensity of weather shocks such as droughts

Prevalence of stunting | Calculates the proportion of children whose height-for-age is less than two standard deviations below the median height-for-age of the international reference population. The international reference population represents the well-nourished population. | World Health Organization | Varies by country | • Indicator should be reported yearly at national and sub-national levels

Prevalence of underweight | Calculates the proportion of children whose weight-for-age is less than two standard deviations below the median height-for-age of the international reference population. | World Health Organization | Varies by country | • Indicator should be reported at national and subnational levels in hunger hotspot areas
• Frequency of data collection should be determined by specific context e.g. frequency and intensity of weather shocks such as droughts

Prevalence of wasting | Calculates the proportion of children whose weight-for-height is less than two standard deviations below the median height-for-age of the international reference population. | World Health Organization | Varies by country | • Indicator should be reported at national and subnational levels in hunger hotspot areas
• Frequency of data collection should be determined by specific context e.g. frequency and intensity of weather shocks such as droughts

Source: Authors’ own construct and compilation based on Swindale and Bilinsky (2006); WFP (2008); Haen et al. (2011); FAO et al. (2012); WHO (2013b); Carletto et al. (2013); and Heady and Ecker (2013).

Note: Data for all the indicators should be collected collaboratively by international organizations and national and regional governments.
Elimination of hunger means 5-8 percent of “residual” hunger may be unavoidable. In Europe, for example, there are now more than 18 million people receiving EU-funded food aid, 43 million who do not get enough to eat each day, and 120 million who are at risk of poverty in countries covered by Eurostat.” This suggests the hunger level in Europe is about 8 percent. For more details, see International Federation of Red Cross and Red Crescent Societies (2013).

Data for prevalence of undernourishment trends is from the underlying database for FAO’s report “The State of Food Insecurity in the World 2013 (FAO et al. 2013) and data for child stunting is from the World Bank’s World Development Indicators database (World Bank 2013) and WHO’s Global Database on Child Growth and Malnutrition (WHO 2013b).

Progress in reducing undernourishment seems to be overestimated while that of child stunting may be underestimated. Limited reliability of data in Ghana might have contributed to the dislink between the undernourishment and child stunting data.

For impacts of Bolsa Família, see De Brauw et al. (2012).

Overall, evidence on growth and nutrition are not homogenous and should not be treated as such. See Fan and Brzeska (2012) for suggestions on why discrepancies exist in the results of growth-nutrition linkage studies.

In addition to these confounding factors, while there is better consensus on the indicators used for children under 5 years of age, there is less agreement on the indicators for adolescents and adults. For adolescents, for example, their physical development can vary significantly depending on the effects and onset of puberty, making it hard to define “normal development” (FAO 2005). In such cases, diet diversity scores and direct measures of macro- and micro-nutrient deficiency are better indicators of nutritional status.