

Why food and nutrition security matters for inclusive structural and rural transformation

by
Steven Were Omamo
World Food Programme

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Investing in rural people

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Abstract

The prevalence of undernourished people in the world has declined steadily over the last few decades, but almost 800 million people remain undernourished. Deeper and more rapid progress against food and nutrition insecurity is urgently required. Structural and rural transformation must play its role. In theory, inclusive structural and rural transformation – i.e. a transformation that delivers widely held benefits – implies expanded food and nutrition security, which, in turn, supports the transformation. In fact, where structural and rural transformation has been significant, it has been accompanied by wide and deep improvements in food and nutrition security, with food availability, food access and food utilization all registering significant improvements. Higher labour and land productivity linked to commercialization, specialization and mechanization of production processes has boosted food supplies. Livelihood options have expanded – especially off-farm – and incomes have risen, allowing households to increase the quantity and quality of food they consume. This has led to improved health and education outcomes, affirming and advancing core drivers of structural and rural transformation. But there are important exceptions and caveats. Even where structural and rural transformation has been rapid and sustained, incomes have increased and food supply has been relatively easy with comparatively low and stable prices, and food and nutrition insecurity has persisted, with undernutrition, overnutrition and micronutrient deficiencies coexisting in several contexts. Implications for policy centre on nutrition-specific and nutrition-sensitive measures and investments that render rapidly transforming food systems better able to deliver and support healthy and nutritious diets for all consumers, but especially for pregnant women and young children for whom malnutrition has long-lasting consequences. Also key are policy measures to counter the effects of forces and conditions that militate against expanded participation by small-scale farmers and traders in commercial food production and trade – effects that, by extension, hinder this central dimension of inclusive structural and rural transformation.

Why food and nutrition security matters for inclusive structural and rural transformation

Food and nutrition security – defined here as reliable access to food in sufficient quantity and quality to enjoy a healthy and active life, coupled with a sanitary environment, adequate health services and knowledgeable care – is a key reflection and central determinant of broad social and economic welfare and dynamism (FAO, 2013; Timmer, Falcon and Pearson, 1983).¹ Typically, where food and nutrition *insecurity* is deep and widespread, so too are poverty and stagnation (FAO/IFAD/WFP, 2015; IFPRI, 2015). The link to structural and rural transformation is obvious. Inclusive structural and rural transformation, i.e. a transformation that delivers widely held benefits, must feature expanded food and nutrition security.

The stakes could not be higher. While the prevalence of undernourished people in the world has declined steadily over the last few decades, 795 million people in the world, just over one in nine, remain undernourished (FAO/IFAD/WFP, 2015). An estimated 26 per cent of the world's children are stunted, 2 billion people suffer from one or more micronutrient deficiencies and 1.4 billion people are overweight, of whom 500 million are obese (FAO, 2013). Multiple types of malnutrition – undernutrition, deficiencies in micronutrients (vitamins and minerals), and overweight and obesity – coexist within the same country, household or individual, imposing high economic and social costs on countries at all income levels. Globally, economic costs alone are estimated at US\$3.5 trillion per year, US\$500 per person (FAO/IFAD/WFP, 2015). Deeper and more rapid progress against food and nutrition insecurity is required. Structural transformation and rural transformation must play their roles.

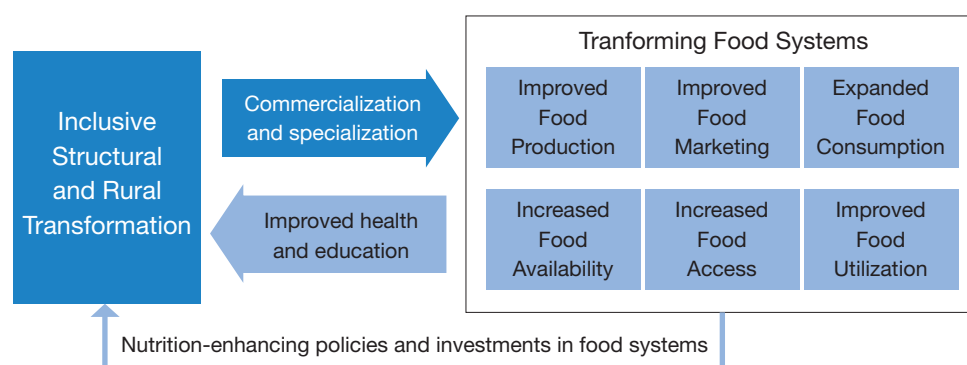
Structural transformation and rural transformation occur together and are thus framed in that way in this paper – i.e. as “structural and rural transformation.” Structural transformation is both a cause and an effect of economic growth. It involves rising productivities in agriculture and the urban economy, a change in the composition of the economy from a preponderance of agriculture to industry and services, rising involvement in international trade, growing rural-urban migration and urbanization, and the realization of a demographic transition from high to low birth rates. It leads to profound political, cultural, social and environmental stresses, which have to be managed for long-term sustainability. Rural transformation is a process that involves rising agricultural productivity, increasing commercialization and marketable surpluses, diversification of production patterns and livelihoods, expanded off-farm decent employment and entrepreneurial opportunities, better rural coverage and access to services and infrastructure, and greater access to, and capacity to influence, relevant policy processes, all leading to broad-based rural (and wider) growth and to better managed, more sustainable rural landscapes.

1. The phrasing “food and nutrition security” differs from the related term “food security and nutrition,” which appears in most official IFAD documents. This paper uses the former term because it better highlights the integral linkages between food security, on the one hand, and nutrition security, on the other. It is also more widely used, including by other United Nations agencies (e.g. Food and Agriculture Organization of the United Nations and United Nations Children's Fund), the International Food Policy Research Institute and others.

To address linkages between structural and rural transformation and food and nutrition security, this paper considers three questions: How has structural and rural transformation affected food and nutrition security? How can food and nutrition security promote inclusive structural and rural transformation? What are the major policies and investments that facilitate inclusive structural and rural transformation in terms of food and nutrition security?

A two-way relationship is examined (Figure 1). In one direction, each of the three core pillars of food and nutrition security (availability, access, utilization²) are impacted by the commercialization and specialization that drive and reflect structural and rural transformation, signalling growing demand-orientation, urbanization and burgeoning non-farm rural economies. In the other direction, food and nutrition security leads to better health and education outcomes that affirm and strengthen the core drivers of structural and rural transformation. Through nutrition-enhancing food systems, the economic dynamism brought about by structural and rural transformation can be translated into general welfare improvements, further affirming and sustaining that dynamism. In both directions, factors that affect the nutritional status of children and pregnant women have long-term consequences, as do opportunities and constraints facing smallholder farmers and traders whose decisions are fundamental to the pace and quality of rural transformation in many contexts.

Figure 1: Analytical framework



Source: Steven Were Omamo.

Implications for policy centre on measures and investments that render rapidly transforming food systems better able to deliver and support healthy and nutritious diets for all consumers. Also identified are measures to counter the effects of forces and conditions that militate against expanded participation by small-scale farmers and traders in commercial food production and trade – effects that, by extension, hinder this central dimension of inclusive structural and rural transformation.

2. To promote understanding of the core argument, the cross-cutting dimension of food stability is not addressed directly.

Food and nutrition security under structural and rural transformation

In general, where structural and rural transformation has been significant, it has been accompanied by wide and deep reductions in food and nutrition insecurity (Timmer, 2007). Livelihood options have expanded and incomes have risen, allowing households to increase the quantity and quality of food they consume. Simultaneously, increased food and nutrition security has improved health and education outcomes, boosting and affirming the core drivers of structural and rural transformation. All three dimensions of food and nutrition security – availability, access and utilization – have registered significant gains. But there are important exceptions and caveats. Even where structural and rural transformation has been rapid and sustained, and where food supply has been relatively easy and prices comparatively low and stable, food and nutrition insecurity has persisted.

Food availability

Commercialization is an essential part of the process of specialization that increases labour and land productivity in agriculture and thus drives structural and rural transformation (Johnston and Kilby, 1975; Johnston and Mellor, 1961).³ Commercialization entails expanded use of improved inputs and practices in food production, leading to higher yields and greater availability of food. Returns (and imperatives) to mechanize are higher, improving the timeliness, intensity and efficiency of food production operations, thereby increasing unit food output and overall food availability (Yang et al., 2013). Mechanization also reduces post-harvest losses, adding further to food availability. But commercialization, specialization and mechanization are not the preserve of large agribusinesses. When given a level playing field in terms of inputs and market connections, smallholders are productive and competitive against larger players (IAC, 2004). If smallholders and rural small and medium-sized enterprises (SMEs) are to participate in and benefit from the transformation, they, too, must embrace these essential dynamics. And they have done so in increasing numbers, such that these core drivers of structural and rural transformation are increasingly fundamental to small-scale food production and trade (Reardon, et al., 2009). The result of these effects has been a steady increase in both the quantum and range of food available globally and in most regions of the world (FAO, 2013; FAO/IFAD/WFP, 2015; Timmer, 2007).

3. The term “commercialization” is used here to denote a process whereby key decisions in production, marketing and consumption are driven largely by the motivation to minimize costs and maximize returns or benefits.

Food access

In most cases, as a result of increased labour and land productivity on farms as well as increased off-farm employment opportunities for hired labour in agricultural and non-agricultural activities, commercialization of food production induced by structural and rural transformation leads to higher household incomes, which increase overall welfare and allow for increased food consumption (Von Braun and Kennedy, 1994).⁴ Non-farm livelihood options are increasingly important to the level and diversity of income sources and overall purchasing power (Barrett, Reardon and Webb, 2001; Reardon et al., 2007). With notable exceptions, such as during the food and fuel price crisis of 2007-08, real prices of food (especially staples) fall, further increasing access (Timmer, 2007). Structural and rural transformation also entails increased commercialization of food consumption, as centralized food-processing facilities develop, supermarkets emerge and fast-food outlets become widespread (Reardon, Timmer and Berdegue, 2004). While rural households continue to rely on self-produced grains, vegetables, meats and eggs for a large portion of their diet, under structural and rural transformation they purchase more of their food as they enter the mainstream economy (Senauer, Sahn and Alderman, 1986). Consumption shifts from self-produced to purchased food, often at a rate faster than can be explained by income growth or changes in other household characteristics (Gale et al., 2005). The move away from self-produced food is associated with lower consumption shares of staple grains, typically the most important self-produced food (Tschirley et al., 2015a). The expenditure share of food consumed away from home also grows, further expanding access to a greater range of foods. While commercialization of production raises returns (and imperatives) for mechanized production, commercialization of consumption – in a similar way – increases both the scope and the need for mechanized food processing and preparation (Reardon and Timmer, 2012; Reardon, Timmer and Berdegue, 2004). Commercialization of food consumption thus leads to a broadening of food markets, creating new opportunities for retailers and product distributors, and generating new employment opportunities and higher purchasing power, all of which expand access to food (Tschirley et al., 2015a).

Food utilization

Utilization refers both to actual consumption and to biological conversion of food by the human body. Dietary intake of food and nutrients as well as the biological status of individuals come into play. Food choices matter. High-quality diverse diets are critical, especially with respect to intake of micronutrients. Evidence at the global level strongly suggests that rising household incomes such as those induced by structural transformation lead to greater quality and variety in diets (FAO, 2013; Haddad et al., 2003). At higher incomes, an increasing share of food comes from non-staples, such as livestock products, vegetable oils, and fruits and vegetables. Also critical to food utilization are child-care and feeding behaviours, health status, access to health services, and access to water and sanitation (Gelli et al., 2015; Ruel et al., 2013). While 2.5 billion people around the world still lack access to improved sanitation, 748 million people still use unsafe drinking water sources and access to modern health care remains constrained, the provision and access to improved sanitation and health care is increasing in most regions, with concomitant positive implications for food utilization (FAO/IFAD/WFP, 2015; UNICEF, 2014; WHO/UNICEF, 2015). Demand-driven deepening of

4. Though Timmer (2007) notes that gains based on increases in farm productivity tend to be lost, as changes in labour markets favour non-agricultural pursuits of agricultural ones. Non-farm income sources become driving forces of welfare improvements (Haggblade, Hazell and Reardon, 2010).

food systems generates an increasing array of nutrition-led innovations and investments in food processing and distribution systems (Gelli et al., 2015). While recognizing the risks linked to overconsumption of processed goods (see later in this section), the result is that nutrition-rich foods become increasingly available and affordable (Hawkes et al., 2012). Almost by definition, commercialized food consumption rests on greater standardization of marketed food as captured in metrology systems and quality ratings (Reardon, 2015; Swinnen, 2007). The nutritional content of food available for consumption is therefore also subject to standardization and categorization, potentially allowing for more transparency and precision in food choice for particular nutritional outcomes (Gelli et al., 2015). The overall picture is therefore one of increasing scope for appropriate food utilization as structural and rural transformation progresses.

Gaps and challenges

There are important exceptions and caveats to the above positive dynamics (FAO, 2013). This is especially so in Southern Asia and sub-Saharan Africa, where progress in cutting food and nutrition security has been slow overall. Although some countries report successes in reducing hunger, undernourishment and other forms of malnutrition remain at overall high levels. In Southern Asia, 281 million people are undernourished, almost 16 per cent of the population. In sub-Saharan Africa, 220 million people are undernourished (23 per cent of the population), and there are more stunted children than there were 20 years ago (FAO/IFAD/WFP, 2015). Undernutrition in the aggregate – including fetal growth restriction, stunting, wasting, and deficiencies of vitamin A and zinc along with suboptimum breastfeeding – is a cause of 3.1 million child deaths annually, or 45 per cent of all child deaths in 2011 (Black et al., 2013). In parallel, globally, an estimated 43 million children under five years of age were overweight, a 54 per cent increase from an estimated 28 million in 1990 (Gelli et al., 2015).

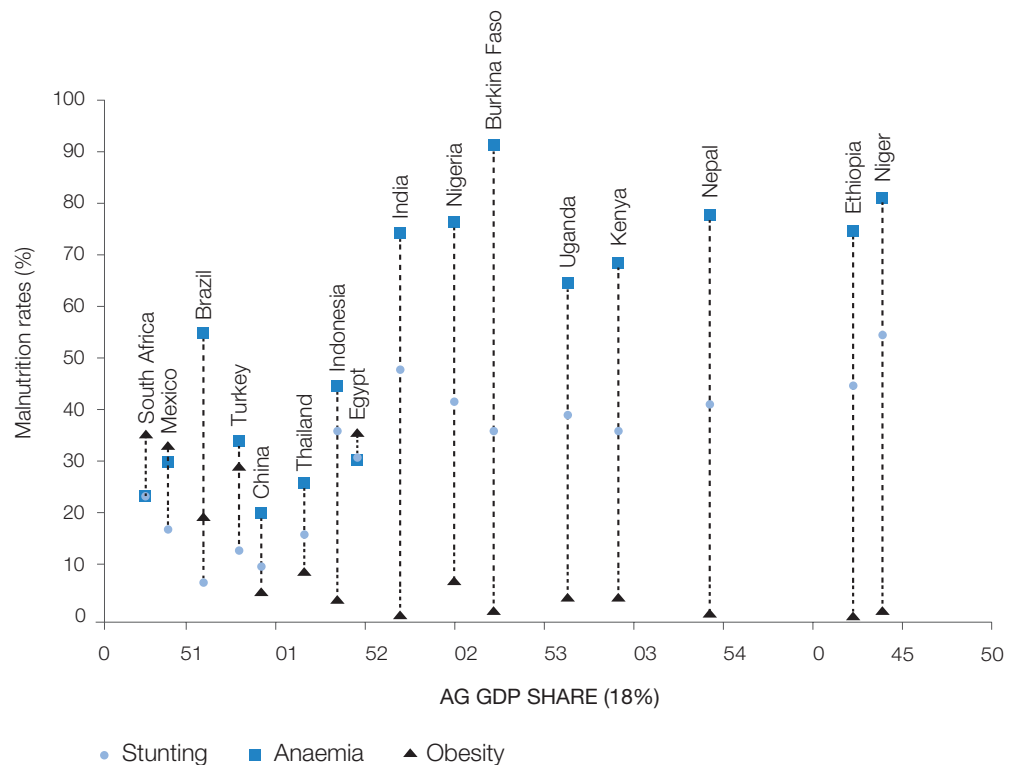
The implications are deep. The Food and Agriculture Organization of the United Nations (FAO) estimates that the cost to the global economy caused by malnutrition, as a result of lost productivity and direct health care costs, could account for as much as 5 per cent of global gross domestic product (GDP), equivalent to US\$3.5 trillion per year, or US\$500 per person. The costs of undernutrition and micronutrient deficiencies are estimated at 2-3 per cent of global GDP, equivalent to US\$1.4-US\$2.1 trillion per year (FAO, 2013). The *Cost of Hunger in Africa Study* undertaken by the African Union, United Nations Economic Commission for Africa and World Food Programme found that in four countries (Egypt, Ethiopia, Swaziland and Uganda), the annual costs associated with child undernutrition can reach 16 per cent of GDP (AUC-NEPAD/ECA/WFP, 2014). It cannot be mere coincidence that structural transformation in many African countries is lagging and unbalanced.

But even as incomes rise in rapidly transforming middle-income countries such as Brazil, China, India, Indonesia and Mexico that have made significant progress in reducing the number of those chronically hungry, undernutrition remains a problem. Together, these middle-income countries account for 363 million (almost 50 per cent) of the world's undernourished. Simultaneously – reflecting the phenomenon termed the “nutrition transition” – overnutrition (in the form of overweight and obesity) is high and rising in each of these countries, and also in other countries with lower average incomes. Micronutrient deficiencies are also significant (IFPRI, 2015).

Important gaps and challenges also exist at subnational levels. Cross-country evidence indicates that both children and adults in urban areas are better nourished than are those in rural areas (FAO, 2013). Within rural areas, households have widely differing capacities to generate income from increasingly important non-farm sources, implying sharp differences in their abilities to participate in burgeoning rural economies and benefit from growth in earnings and consumption (Barrett, Reardon and Webb, 2001; Gillespie, Harris and Kadiyala, 2012; Hawkes et al., 2012; IFPRI, 2015; Kimani-Murage et al., 2010).

Figure 2 plots measures of the three forms of malnutrition – undernutrition (stunting), micronutrient deficiencies (anaemia) and overweight (obesity) – against levels of structural transformation as captured by the share of agriculture in GDP. The 16 selected countries fall into three income groups (low, low middle, and high middle) and their agricultural GDP shares range from a low of 2.5 per cent (South Africa) to a high of 44 per cent (Niger).

Figure 2: Malnutrition rates and agriculture share of GDP in selected countries



Source: Steven Were Omamo, based on data on agricultural GDP shares from the World Bank, (2015); stunting, anaemia and obesity rates from FAO (2013).

No causal relationships are assumed or implied, but the data indicate that, in general, as the transformation progresses, undernutrition and micronutrient deficiencies fall, but with the latter remaining significant in most countries. Obesity rates surge at high levels of transformation, but are also important at lower levels.

While key elements of the required evidence base are still to be fully developed (Reardon and Timmer, 2012), the coexistence of undernutrition, overnutrition and micronutrient deficiencies in the different contexts, illustrated in Figure 2, has been linked to several factors. These factors include economic and gender inequality, urbanization, rapidly changing consumer preferences, sedentary lifestyles featuring reductions in physical activity, convergence towards cheap, poor-quality obesogenic foods due to low purchasing power among nutritionally vulnerable groups, inadequate sanitation and hygiene, climatic and socio-economic shocks, and poor targeting and lack of focus on nutrition in food-based safety nets (IFPRI, 2015). The set countries examined in Figure 2 exhibit several of these influences.

Despite significant recent progress in cutting undernutrition in many low-income countries, all three measures of malnutrition remain high in the five low-income countries (Burkina Faso, Ethiopia, Nepal, Niger and Uganda). Factors driving these outcomes include economic and gender inequality, lack of diversification in livelihoods, low purchasing power among nutritionally vulnerable groups, lack of diversification in diets, illiteracy and lack of knowledge, inadequate sanitation and hygiene, and humanitarian crises (Headey, 2015; FANTA, 2010).

Stunting and anaemia rates in the five lower middle-income countries (Egypt, India, Indonesia, Kenya and Nigeria) are not significantly below those in the low-income countries, with India and Nigeria registering especially poor indicators. For Nigeria, where most indicators of malnutrition have worsened in recent years (WHO, 2015), agricultural stagnation, poor health and sanitation, and lack of nutrition knowledge are critical drivers; for India, culturally rooted inequality and poor access to health and sanitation services are important. Indonesia's high rates of undernutrition and micronutrient deficiencies are related to high consumption of processed food, lack of exercise and limited access to healthy foods, especially in urban areas (Shrimpton and Rokx, 2013). Egypt's triple burden of undernutrition, overnutrition and micronutrient deficiencies has been linked to poor diet choices, sedentary lifestyles in urban areas, culture-related body preferences for women, and institution and removal of price subsidies for wheat and bread (Galal, 2002).

In the six high middle-income countries (Brazil, China, Mexico, South Africa, Thailand and Turkey), stunting rates and micronutrient deficiencies are half of those in lower middle- and low-income countries. The exception is the high rate of anaemia in Brazil, reflecting significant "hidden hunger" linked to income and gender inequality, low diet diversity, and unequal access to health care, clean water and sanitation. Mexico, South Africa and Turkey have serious obesity problems, with stunting rates in South Africa exceptionally high for a country at this income level and overall degree of structural transformation. China and Thailand show strong performance on all three measures, albeit with evidence of rapidly rising obesity (Ramachandran and Snehalatha, 2010).

The data shown in Figure 2 would appear to confirm the view that different forms of food and nutrition *insecurity* serve as powerful signals of incomplete, uneven, unbalanced, and non-inclusive structural and rural transformation (Tschirley et al., 2015a). Significant food and nutrition insecurity may also point to a transformation that is at risk of stalling, as the huge costs of malnutrition persist and mount. For this paper, however, the more important recognition is that food and nutrition *security* can be a platform for inclusive and sustained structural and rural transformation.

Nutrition-enhancing food systems for inclusive structural and rural transformation

Improved nutrition, especially reductions in maternal and child undernutrition, leads to lower mortality and, with a lag, to lower birth rates (Haddad, Kato and Meisel, 2015). This yields a “demographic dividend” of large numbers of healthy and productive workers available for employment within two decades, which affirms core dynamics underpinning structural and rural transformation. Better nutrition leads to better education attainment, which drives technology adoption, adaptation and innovation. Better education also drives up wage rates and incomes (Hoddinott et al., 2008). And higher incomes improve nutrition. A 10 per cent increase in GDP is associated with a 6 per cent decrease in stunting and a 4 per cent decrease in women underweight (Gelli et al., 2015). All of these outcomes affirm structural and rural transformation.

But the demographic dividend and related benefits are not automatic. Persistent malnutrition can generate outcomes that may be inimical to inclusive structural and rural transformation, turning potential dividends into actual penalties (Haddad, Kato and Meisel, 2015). Large pockets of poverty (and thus also of malnutrition) persist in most low- and middle-income countries. And as illustrated above, income growth can have unintended negative consequences. A 10 per cent increase in GDP is associated with a 7 per cent increase in overweight and obesity in women (Gelli et al., 2015). At issue, therefore, is the strength of the nutritional underbellies (or backbones) of the *food systems* that determine the quantity, affordability, diversity and quality (nutritional content) of food supply, and thus also of diets.

Food systems encompass the entire range of activities involved in the production, processing, marketing, consumption and disposal of goods that originate from agriculture, forestry or fisheries, including the inputs needed and the outputs generated at each of these steps. Well-functioning food systems perform these functions efficiently (least cost) and predictably, providing adequate incentives and returns to producers, processors and distributors, and delivering safe and nutritious food to well-informed consumers, with minimum delay and spoilage. Food systems also involve the people and institutions that initiate or inhibit change in the system, as well as the socio-political, economic and technological environment in which these activities take place (FAO, 2013).

As noted by several authors, food system transformation is a central feature of broader structural and rural transformation. Weighty changes are under way in food system structure and functioning. Interlocking networks of relationships for production, processing, distribution and consumption of food commodities are shifting dramatically. Volume and quality standards and requirements are growing in importance and coverage. These rapidly transforming food systems must be influenced in ways that increase their abilities to provide safe, affordable, diverse foods of sufficient quantity (energy and other macronutrients)

and quality (micronutrients) for all consumers. In particular, that includes the smallholder agricultural households who lie at the heart of rural transformation and whose more intensified production practices, higher and more diversified incomes (both farming and non-farming), and better connections with other sectors are opening up new opportunities for sustained access to healthy diets (Gómez et al., 2013; Haggblade, Hazell and Reardon, 2010; Reardon and Timmer, 2012; Reardon et al., 2009; Tschirley et al., 2015a and 2015b).

But several important challenges and constraints must be overcome. Most smallholder farmers lack fundamental capacities for productive engagement in food markets, especially those in which product volume and quality matter. Communication and transportation facilities are often poor. Some markets are highly segmented, with access restricted, sometimes to particular groups of people. Financial bargaining power brought to the exchange relationship between seller and buyer is often highly unequal. Capital and infrastructural constraints can be immense. Transaction costs are very high, especially in smallholder-dominated regions. Non-competitive elements are myriad and entrenched. And the size and distribution of market-based economic gains are contested and subject to strong political influence (Barrett and Mutambatsere, 2008; Bates, 1981 and 1989; Fafchamps, 2000; Fafchamps, 2001; Fafchamps and Minten, 1999; Islam, 2014; Omamo, 1998a and 1998b; Reardon and Timmer, 2012; Reardon et al., 2009).

As a consequence of these kinds of challenges, relatively small numbers of wealthy rural households and communities, well endowed with financial, human and political capital, are better equipped than are other households and communities to take advantage of opportunities opening up in rural areas due to structural and rural transformation (Barrett, Reardon and Webb, 2001; Haggblade, Hazell and Reardon, 2010).

Nevertheless, there is convincing evidence that key elements of food systems can be shaped so as to enhance household livelihoods more broadly and simultaneously lead to improvements in nutrition (IFPRI, 2015). Diversification of food systems as a whole is a corollary of commercialization and specialization, as low-productivity subsistence-oriented diversification at the farm level is replaced by greater specialization along intensified crop lines, which itself reflects greater market dependence for disposal of output and acquisition of inputs, factors and consumption goods, especially food. Food system attributes that promote and support healthy diets thus span production, marketing and consumption. Opportunities and actions are both “nutrition-specific” – aiming to make food systems more attuned to producing good nutrition outcomes – and “nutrition-sensitive” – aimed at improving the general economic, social and political environment. A comprehensive elaboration of critical features is provided in the 2013 *State of Food and Agriculture* (FAO, 2013). Offered here are the central elements of supportive frameworks in these three dimensions of healthy and nutrition-improving food systems, with the consumption component especially critical.

Food production

Productivity growth in basic staples confers strong benefits across food systems through higher incomes to farmers and lower food prices to consumers, and thus remains a fundamental priority. But diet quality is key, pointing to the need to extend the search for productivity growth beyond staples to include nutrient-dense foods such as vegetables, legumes and animal-source foods, ideally within diversified, integrated production systems

backed by improvements in post-harvest management of these highly perishable food items. Such diversified production systems tend to generate higher incomes for farmers, allowing them to diversify their diets from market sources. Diversified systems can also be more resilient to agroclimatic and socio-economic shocks. Key challenges lie in empowering women (e.g. through technologies and practices that not only enhance productivity but also save time), and also in scaling up beyond localized successes. Biofortification, the process of enhancing micronutrient content of foods through breeding, is a promising new intervention to improve nutrition through agriculture, with both proven nutritional efficacy and growing farmer and consumer demand for several biofortified crops such as oranges, sweet potatoes and high-iron beans.

Food marketing

The nutritional performance of food markets is linked to increasing availability and accessibility of a wide variety of foods. Required are integrating actions and contractual arrangements linking on-farm production to processing and retailing, buttressed by extension, product promotion and appropriate regulatory policies to enhance competition in manufacturing and retailing. The industrial organization of food markets is undergoing radical modifications. New technologies and management practices are revolutionizing storage, transport, processing and financing methods, leading to a surge in retailing of packaged and processed foods sold not only in supermarkets and other modern outlets, but also in traditional channels on which the bulk of both urban and rural populations continue to rely. An increasing range of food options is available to consumers. Opportunities exist at each link in food supply chains to deliver more diverse and nutritious foods to consumers. Again, reducing post-harvest losses is critical for highly perishable micronutrient-rich foods, such as fruits, vegetables and livestock products. Improving the nutritional quality of food through fortification and reformulation is also promising, ideally through well-established traditional and modern distribution networks, along with targeted consumer education and awareness campaigns.

Food consumption

Nutritionally inappropriate diets underpin all types of malnutrition. Not only must access to nutritious foods be expanded for all populations, so too must knowledge about proper diets and appropriate food preparation. These diets influence individual nutritional outcomes while also sending signals back through supply chains to retailers, processors and producers.

The core issue under structural and rural transformation is the nutrition transition. Undernutrition and micronutrient deficiency must be addressed alongside overweight and obesity. Analytical and operational challenges are significant. Measures to cope with undernutrition and micronutrient deficiency must not exacerbate problems of overnutrition, especially for vulnerable groups such as pregnant women and young children for whom nutrition has long-term consequences.

The evidence is powerful and convincing that transfer-based interventions to improve nutrition for these vulnerable groups have long-lasting positive impacts. These interventions – which include direct distribution of food and cash, take-home family rations, food vouchers for fixed

quantities of specific foods, maternal-child supplementary feeding programmes, school meals, and food- and cash-for-work – seek to transfer real purchasing power, assure minimum acceptable levels of household food consumption, maintain adequate nutritional status of individuals, rehabilitate malnourished individuals (especially children), and provide incentives for participation in other social services such as health care and schooling. In tandem with these direct measures to improve access to nutritious foods, nutrition education about appropriate eating habits and behaviour can generate strong benefits. Also critical is enhanced access to good health care and sanitation, along with maternal education that improves mothers' self-care practices and care and feeding behaviours for their families. Accurate targeting of both transfers and complementary interventions is critical, ideally is based on nutritional risk categories (e.g. age, sex, pregnancy/lactation, growth, weight gain) or nutritional status (e.g. as captured by anthropometric status). Sustainability and impact are enhanced by linkages to broader safety-net and social-protection systems (Gentilini and Omamo, 2011).

The literature is less clear about returns to indirect (market-based) measures, such as food price subsidies and taxes. Unintended impacts of these measures may limit their effectiveness, for example via leakages or counterproductive substitutions. These measures are also difficult to implement and politically sensitive, rendering them notoriously difficult to remove once in place. These complexities raise challenges for addressing obesity, since most measures targeting this problem are indirect. Special care must be taken to avoid the likelihood of undernutrition and micronutrient deficiency as a result of measures that target obesity. For instance, a policy to increase the price of an "unhealthy" food (e.g. red meat) could reduce access to its healthy components (e.g. protein, calcium and iron). But evidence is emerging of positive changes in preferences towards "healthy" foods (e.g. fruits and vegetables) when costs of such foods are subsidized (Cheng, 2007).

Measures to meet the nutritional needs of vulnerable populations in the context of a protracted crisis are critical but challenging. This is not a trivial phenomenon. Food and nutrition insecurity looms large in such contexts, with women and children especially at risk. Between 2010 and 2012, of the 366 million people living in protracted crisis situations, 129 million were undernourished. This accounted for approximately 19 per cent of the global total of food-insecure people. The mean prevalence of undernourishment in protracted crisis situations was 39 per cent, compared with 15 per cent, on average, in the rest of the developing world (FAO/IFAD/WFP, 2015). While protracted crises are context-specific, suggesting the need for context-relevant approaches to addressing the food and nutrition insecurity that each crisis generates, core principles for action have been developed (CFS, 2015). Key among these are protection of at-risk groups, empowerment of women and girls, effective management of natural resources, disaster risk reduction, and strengthening of key national and local capacities, since protracted crises often feature poor governance, weak capacities and a lack of basic systems.

Implications for policy and investment

Policies and investments to improve both the income and nutritional performance of food systems are myriad, complex, but well-articulated in several recent publications, most notably in the 2013 *State of Food and Agriculture* (FAO, 2013), the 2015 *State of Food Insecurity in the World* and the 2015 *Global Food Policy Report* (IFPRI, 2015), and also in several other important publications (e.g. Anim-Somuah et al., 2013; Benson, 2004; Bundy et al., 2009; Dorosh and Thurlow, 2013; Gillespie, Harris and Kadiyala, 2012; Haddad et al., 2003; Haddad, Kato and Meisel, 2015; Hoddinott et al., 2008; NEPAD, 2004; Robinson et al., 2014a; Ruel et al., 2013; Ryckembusch et al., 2013). There is no value to be gained from a detailed elaboration of prioritized measures. But it is important to note that, as signalled in the previous section, opportunities and requirements span food production, marketing and consumption.

In production, policy tools should focus on promoting availability, affordability, diversity and quality of food, nutrition-oriented research and development (e.g. on biofortification), and also promoting nutrition-rich foods in schools and in home gardens. In marketing, given the increasingly vital role of food companies in shaping food system structure and functioning, the focus should be on regulation and taxation to promote efficiency, safety, quality and diversity of supply chains, and also on innovation in product formulation and transport, especially with respect to reduction of waste and spoilage. In consumption, well-targeted nutrition-focused food assistance programmes and broader safety nets, appropriate food price incentives, and nutrition regulation, education and information campaigns are required, backed by improved access to clean water, adequate sanitation and proper hygiene in both urban and rural areas. Publicly held food reserves continue to be important components of many national food and nutrition-security strategies and must be more effectively managed.

Looking beyond food systems to broader rural economies, measures to strengthen the rural non-farm economy are especially important, with a focus on strategies to address the effects of inequities in assets and capacities across households and communities (Haggblade, Hazell and Reardon, 2010; Tschirley et al., 2015a). As the rural poor depend so much on markets as buyers, cushioning them from price and income shocks is critical. Given the importance of gender equity in improving food security and nutrition, policy in all three components of food systems should focus on empowering women, aiming to close the gender gap by increasing access to physical, financial and human capital for women and girls (IFPRI, 2015; Quisumbing and Pandolfelli, 2010). And at the political economy level, the cross-sectoral (“horizontal”) imperative of coherent food and nutrition policy design and implementation must be recognized and appropriately accommodate through bespoke integrating platforms that span agriculture, health, commerce, education, social services, transport and public works, as well as local government (Bonnen, Hedley and Schweikhardt, 1997; Garrett and Natalicchio, 2012).

These priorities and measures are fully affirmed here as strongly supportive of inclusive structural and rural transformation through improved food and nutrition security.

A fundamental issue is how basic drivers of structural and rural transformation can be leveraged for broader gain. In the case of food and nutrition security, the core recognition is that under structural and rural transformation, food demand is burgeoning in volume, value and diversity, everywhere. For every country in the world, a major strategic question must therefore be, “Who will provision this demand going forward?” – domestic farmers linked to local traders and processors, distant ones linked to distant traders and processors, or some beneficial combination of both? For the many countries in which millions of smallholder farmers and traders still dominate rural landscapes, the logic of inclusive structural and rural transformation – i.e. transformation that, among other things, promotes broad-based food and nutrition security – requires that a large share of that food demand be met domestically.

Given the above-identified challenges facing smallholder farmers and SMEs in accessing dynamic segments of rapidly transforming food systems and rural economies, three clusters of policy measures and investments are suggested:

- *To overcome constraints on entry and participation in high-volume, high-quality markets for foods and complementary goods and services*, measures to strengthen technical and organizational capacities of farmer organizations, direct institutional demand for quality food (e.g. from school feeding programmes) towards smallholders, and provide coordination and linkage support to key supply chain service providers would be beneficial, ideally reinforced by improved incentives for financial institutions to expand rural footprints and lending to farmer organizations and rural agrifood SMEs (Haggblade, Hazell and Reardon, 2010; SBA, 2011; WFP, 2015). The recent cases of Burkina Faso and Rwanda (WFP, 2015) provide strong examples of governments committing significant shares (up to 30 per cent) of public food demand towards smallholders.
- *To boost limited commerce-enhancing infrastructure (hard and soft) in rural areas*, targeted improvement of rural commercial infrastructure would be rewarding, including roads, storage and warehousing capacity, and rural marketplaces and complementary services (AfDB, 2012; Barrett, Reardon and Webb, 2001; IFAD, 2014; Reardon and Timmer, 2012).
- *To address gaps in access to key commercial technology and capital for farmers and rural agrifood SMEs*, institutional innovations (including public-private partnerships) to share risk and de-risk lending to rural agrifood SMEs should be prioritized (Maestre et al., 2014; NIRSAL, 2015; Robinson et al., 2014b; SBA, 2014).

Investments such as these can draw smallholders and SMEs more fully and quickly into the most dynamic streams of the transformation, giving them a better chance to align their own futures with the rapidly changing world around them, and thereby assure the long-term food and nutrition security of their families, communities and countries.

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