

# FOOD AND NUTRITION SECURITY THE CONCEPT AND ITS REALIZATION

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## Abstract

This paper reviews the prevailing concept of food and nutrition security and points at needs for concept revisions in order to more comprehensively depict causes and indirect consequences for the food and nutrition insecure, and guide policy actions. The state of realization of food and nutrition security is briefly presented, and the menu of policy actions for enhancing food and nutrition security is discussed, and linkages between “bread and brain”, i.e. cognitive and educational issues of nutrition are pointed out. The paper highlights the need for accelerated and revised actions at international and national levels to achieve food and nutrition security for all.

## 1. The Concept of food and nutrition security

The 2009 Declaration of the World Summit on Food Security defines the concept of food security as “Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability. The nutritional dimension is integral to the concept of food security” (FAO 2009, p. 1). FAO further states that, based on this definition, “... four food security dimensions can be identified: food availability, economic and physical access to food, food utilization and stability (vulnerability and shocks) over time” (FAO 2013, p. 17). Each food security dimension is described by specific indicators by FAO (2013).

Undernourishment is one such important indicator among several. The absolute number of undernourished people in the world decreased from an estimated 1012 million in 1990/92 to about 842 million in 2010/12 according to FAO estimates, a decline by 17 percent (FAO 2013, see table 1). The percentage of undernourished in the developing countries declined from 23.6 to 14.3 percent. If these trends continue, the Millennium Development

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Goal indicator related to under-nutrition in the developing world would be just about one percentage point above the target of cutting the percentage of undernourished in half (FAO 2013). While there is a risk of declining progress in reducing hunger, which needs to be addressed, ending hunger in the coming two decades should be a realistic yet ambitious goal. At the opposite continuum, overweight and obesity are now recognized as drivers of disease in most countries in the world due to obesity-related disorders and increased risk on non-communicable diseases (Davies and Mullan 2014).

**Table 1.** The Multiple World Food and Nutrition Problems.

<b>Problems</b>	<b>Numbers of people</b>	<b>Consequences</b>
Hunger (Under-Nutrition, calories)	ca. 0,8 Bill. (crude estimate)	acute deficiency, political conflicts
Hidden Hunger (deficiencies of micro-nutrients, vitamins, iron etc).	ca. 2 Bill. (crude estimate)	diseases, reduced productivity
Children's under-nutrition (the first 1000 days)	ca. 165 Mill.	stunting, reduced physical, cognitive development.
Obesity and resulting chronic diseases	ca. 1 Bill.	high costs of public health

Source: derived from data presented in The Lancet, 6/ 2013 and FAO 2013.

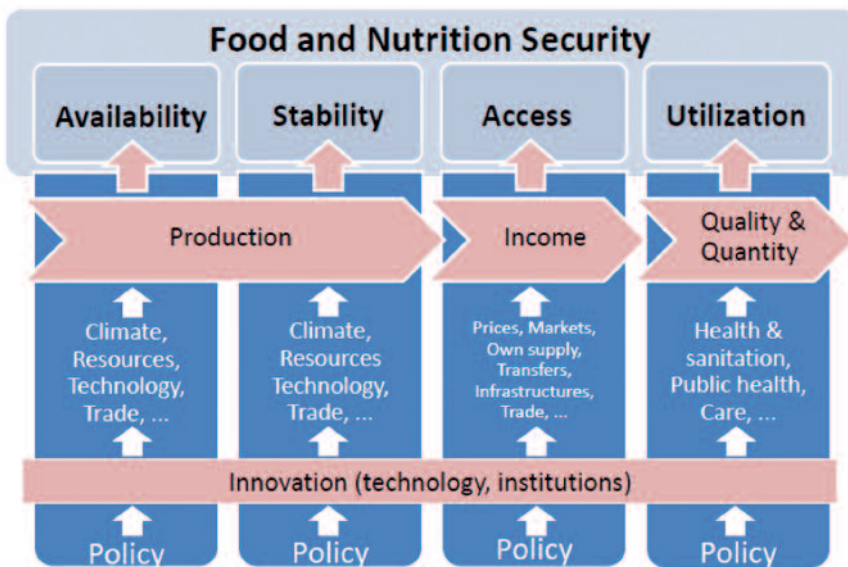
### **1.1 Deficient Metrics and Data**

The food crisis has shed light on the deficient data about the scale and change of food and nutrition problems. The numbers about undernourished people are rough estimates at best, and even less well known is the increase in diet deficiency and related long-term – indeed lifelong – health effects that impair physical and mental capacities. The above-mentioned estimates (table 1) only capture patterns and broad trends and not annual change. They are based on aggregate data, not actual people (household) level food deficiencies. Other relevant indicators of nutrition are child underweight and stunting. They show less progress than the reduction of calorie deficiency (hunger). It is roughly estimated that 2 billion people suffer from micronutrient deficiencies. Moreover, the prices of non-staple foods, such as vegetables and pulses, have risen even more than grains, further adding to deficiencies in healthy diets, especially in South Asia. Part of an appropriate response to the global food crisis needs to be an overhaul of the system of monitoring information on food and nutrition.

The nutrition indicators much in use that are based on bone-length (stunting) and body mass relative to carefully designed reference populations have proven important predictors of health, but may be poor proxies for people’s (constrained) cognitive potentials, and actually underestimate the problem of nutritional deficiencies for people’s wellbeing. More and better data are needed, but FNS action must not wait for that. Investment in improved food and nutrition related data are – not only on outcomes but also on causes – part of action.

**1.2 Critical Assessment of the Prevailing Food and Nutrition Security Concept**

In the prevailing concept, food and nutrition security depends upon the availability of food through production and trade, upon access to food due to purchasing power or self-production, upon the utilization of that food for nutrition, and upon the stability of the food system, especially of related markets and prices (Figure 1). These dimensions of the food security concept, however, need to be viewed in a dynamic context, where food and nutrition insecurity undermines the resilience of poor people and low-income countries and thus exacerbates economic insecurity, often eroding societal cohesion.



**Figure 1.** The Prevailing Concept of Food and Nutrition Security. Source: designed by author, based on FAO (2002).

Food and nutrition security goals need to be addressed with comprehensive strategies, beyond the narrowly defined food sector, and be adapted to regional circumstances. Strategies for food and nutrition security need to take note of two fundamental changes that re-position food and nutrition in the global and national economies. For instance, food and agriculture are now embraced by the larger (bio-) economy, and food markets are embraced by financial markets. Each of these inter-linkages poses challenges to the aspects of availability, access and utilization of food by the poor, and food system stability.

The basic framework of food and nutrition security (the 4 pillars of availability, access, nutrition/utilization, stability in figure 1) broadly outlined above has at least four limitations:

1) *Lack of depicting causality*: lacking a comprehensive theoretical basis, it is of rather limited value in terms of capturing causalities. Especially it lacks linkages between drivers and impacts on nutritional outcomes. Of critical importance is the distinction between drivers that are inside versus outside the food system. Here is where clarity of system boundaries and causalities will have to be defined, including through complex feedbacks such as commodity market volatility; urbanization with “supermarketization”; rural and agricultural growth linkages; consumption and behavioral change. At a more micro-level, more detailed food and nutrition security concepts have been conceptualized, depicting the food, health and care aspects as drivers. While certainly helpful at household level to understand causalities, it is necessary to connect these concepts with the more macro-framework. This raises the matter of conceptualizing food and nutrition security across scales.

2) *Lack of depicting synergies*: the synergies among enhancement in one pillar for the other pillars are not well captured. For instance, the impacts of technology enhancing production have consequences for stability and income (access). In fact, stability really cuts across the other three pillars. Moreover, productivity (availability) and access are clearly partly endogenous to human capabilities (including nutrition). Ignoring such synergistic linkages has further led to the compartmentalization of food and nutrition security initiatives in each of the four columns. The research communities have thus often chosen to connect to one or the other pillar, rather than exploring options across the whole framework. This led at times to unproductive singular emphasis on food availability, versus food access, versus nutrition actions. A useful way out of this deficiency may be a well-defined nutrition value chain concept. Synergies should be enhanced among complementary sectors such as agriculture, health, water and sanitation, and early child education (Rue *et al.* 2013).

3) *Ignoring Dynamics*: the prevailing food and nutrition concept does not capture dynamics well. Different time subscripts are relevant for different drivers and resulting nutrition problems. The prevailing food and nutrition concept does not capture dynamics well. Different time subscripts are relevant for different drivers and resulting nutritional impacts: impacts can appear in the short or long term, and can result from abrupt shocks or more permanent drivers. Stunting is typically used as a long-term (decades/years) indicator of under- and malnutrition. This is because stunting is not sensitive to short-term FNS shocks, unlike indicators of underweight prevalence. Stunting can however be the result of seasonal food and nutrition insecurity over a sustained period of time. Caloric and nutrient deficiency, as well as weight loss, are medium-term (months) indicators of food and nutrition insecurity. Short-term FNS impacts (weeks/days), especially in early childhood, are often the result of nutrition shocks.

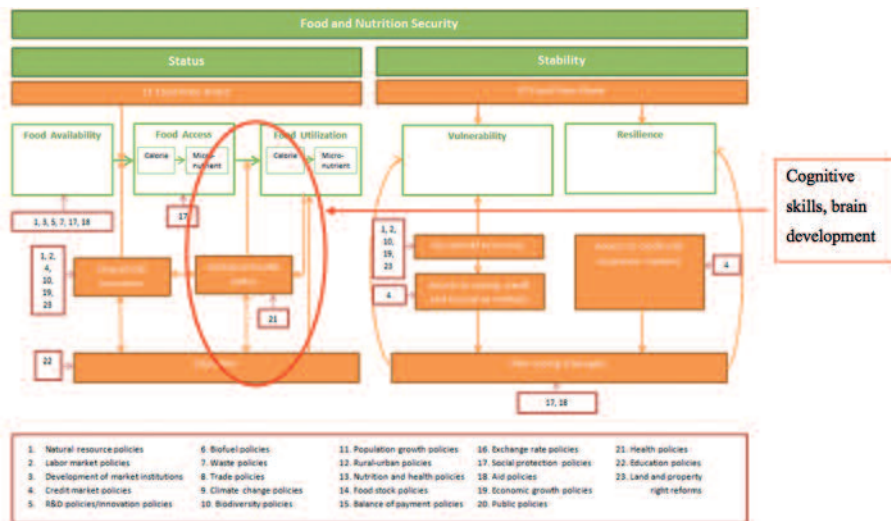
Further, the periodicity of the drivers and their impacts (seasonal and recurrent versus continuous and lasting) also cannot be ignored (Pangari-bowo *et al.* 2013), with potential feedback mechanisms across periodicities: for example, recurring short-term shocks leading to long-lasting impacts. Finally, impacts can be more or less irreversible. For instance, sustained undernourishment over a period of time can lead to stunting, which cannot be compensated for subsequently by improved nourishment. On the other hand, the impact of some forms of undernourishment on brain development seems possible to mitigate with improved nourishment later in life. Brain development in humans is remarkably resistant to permanent damage from protein-energy malnutrition. However, specific nutrients have different and crucial roles (de Long 1993). The implications of food deficiencies that last for a certain time for cognitive capacity, and their long run or even intergenerational effects, have been largely neglected until recently in the framework, as have potential opportunities for rehabilitation of cognitive capacities. On the other hand there are complex long run linkages: mothers' *in utero* malnutrition may impact on the second generation's level of schooling (Kim 2014).

4) *Ignoring the Broader Political and Ecology Context*: Capturing political determinants such as discrimination and marginalization impacts on food and nutrition security – which are becoming relatively more important – would require a broader framework to capture these causes, which the stereotype four pillars cannot provide. FNS problems are deeply rooted in institutional and governance deficiencies at international and national levels (von Braun 2013). Achieving FNS without addressing these deficiencies seems hardly feasible. A comprehensive FNS concept thus needs to take the

political dimensions of the FNS problem into account explicitly, rather than treating them as exogenous framework conditions.

One of the basic causes of FNS deficiencies is the marginalisation and exclusion of people from rights and political processes. The marginality concept calls for the integration of various concepts of poverty, with those of social exclusion, geography, and ecology. People at the margins are explained by a set of distances (i.e., physical distances such as being located in remote or harsh environments), social distances (being excluded, discriminated against, or not having access to rights), but may also be related to technological and institutional infrastructure deficiencies. Food and nutrition insecurity is often a sub-set of the outcomes of marginality (von Braun and Gatzweiler 2014).

While pointing out these deficiencies of the prevailing food and nutrition security concept, it is recognized that the concept may still be a useful point of departure for the food and nutrition policy action agenda, but its limitations need to be kept in mind. In the following, a broader perspective for food and nutrition security is taken, and new challenges for the world food system are pointed out.



**Figure 2.** Linkages between macro and micro-level policy interventions and food and nutrition security at the household/individual level. Source: Pieters et al. 2013. Note: the authors define policies 1-16 as macro policies, 17-18 are mixed macro and micro-level policies, 19-23 are micro-level policies.

### 1.3 Steps toward a more comprehensive concept

As mentioned above, it is important to develop a sound theoretical framework to the analysis of food and nutrition security at the truly meaningful scale: the households and the individuals. These determinants are generically captured in the UNICEF conceptual framework for under-nutrition, which showcases a hierarchy of basic, underlying and immediate drivers (Black *et al.* 2008). As a further step in that direction, Pieters *et al.* (2013) provide a conceptual framework linking macro and micro level policies with FNS at the household and individual levels. Figure 2 is useful in pointing out the complexity and number of linkages and provides for a global overview of the determinants of FNS at the household and individual level. Naturally, specific FNS pathways are at play within the complex web of inter-linkages of Figure 2. For instance, the focus on the inter-linkages between appropriate nutrition and the development of the brain, of the cognitive skills and ultimately the educational achievements and the formation of human capabilities are only implicitly portrayed in this overview. These inter-linkages have traditionally gotten sufficient attention from economists and nutritionists alike. They deserve a closer attention, particularly as they seem to provide more hope for corrective action against the negative impacts of under- and malnutrition for personal and societal development. For instance, more scientific inquiry is needed, if a narrow focus on a certain age segment, such as the currently much advocated first 1000 days in life in nutritional improvement strategies, might not neglect the opportunities to recover from post FNS shocks in older children's age segments, and related chances to mitigate the impact on cognitive capabilities' formation more broadly.

## 2. Toward realization of food and nutrition security

### 2.1 Food and agriculture in broader contexts

Producing more food to achieve food security is confronted with challenges arising from the fact that agriculture and the food economy are part of the larger economic and biological systems. Food security partly depends on the availability of food, which is part of biomass production and increasingly determined by new competitive uses of biomass for energy and industrial raw materials. This “bioeconomy” intends to use a bigger part of what we are able to sustainably grow on soils, with seeds, sun and water, and use it a lot more efficiently. It is the aggregate of all industrial and economic sectors and their associated services that produce, process or in other ways use biological resources (plants, animals, micro-organisms). Langeveld

*et al.* (2010) define a bio-based economy as the “(...) technological development that leads to a significant replacement of fossil fuels by biomass in the production of pharmaceuticals, chemicals, materials, transportation fuels, electricity and heat (...)”. Defined as such, the bioeconomy is interconnected with a large cluster of economic sectors in the wider economy; even in some industrial economies it constitutes the largest sector in terms of GDP and employment, while in many low-income economies it tends to be the largest employer. New technology intervenes in all of the above sectors, to different degrees. The largest sector of the bioeconomy, in terms of total output, employment and so on, is typically food and feed production.

Achieving sustainable development will have to rely on alternative sustainable sources of energy and raw materials, mostly away from fossils, and in that context, biomass is likely to play a key role. The challenge will be to frame reliance on biomass without undermining the long-term productivity of agriculture and other ecosystems. Addressing the challenge will require a systemic approach identifying:

- The consequences of substituting the consumption of finite resources by using biomass and other renewable resources;
- What is needed in order to move towards production systems that rely more on recycling, on more efficient use of limited resources and on an increased employment of renewable resources.

This identification needs to recognize fundamental paradigm shifts. First, in world food consumption, demanding more products that are rather biomass intensive, for example animal products. A comprehensive integration of animal production into efficient value chains is an essential part of the bioeconomy. Second, climate change provides powerful incentives for investment in the bioeconomy in three ways: first, there is the need to establish a different energy base, including Biomass; second, there exists the threat of declining crop productivity and increased production risks; and third, the emerging GHG mitigation markets or related taxation policies are increasing the incentives for biomass production (sequestration).

The new value chain system of the knowledge-based bioeconomy is much more a system than a chain; actually, it is a set of interlinked chains, i.e. a “value web”. For food security it is essential to increase efficiency in the whole value web. Until now the technological options have for the most part been pursued in a traditional manner, and hence in isolation: that is to say, by enhancing outputs per unit of individual inputs in production, say yield per hectare or per animal and without consideration for the opportunity costs within the value web. For addressing the necessary yield increases, however, plant breeding is essential to meet these challenges.



## 2.2 Development strategy for food and nutrition security addressing the set of risks

In 2000, the member states of the United Nations committed themselves to creating a “more peaceful, prosperous and just world”, to “free(ing) our fellow men, women and children from the abject and dehumanizing conditions of extreme poverty”, to making “the right to development a reality for everyone,” and to ridding “the entire human race from want”. Obviously, ending hunger would be an essential component of the Millennium Development Goals, and MDG 1 actually calls for halving hunger and poverty by 2015 in relation to 1990. In pursuing the MDGs, we should seek the elimination of hunger on a realistic but ambitious time schedule. Cutting maternal and child malnutrition is to be part of the hunger goal, as these nutrition issues reduce cognitive ability, and rob nations of healthy and productive adults. Micronutrient malnutrition is a part of these larger, devastating “hunger” problems.

It is now well recognized that pursuing each of the eight MDGs separately without acknowledging their interlinkages will reduce the complex process of human and economic development to a series of fragmented, conflicting, and unsustainable interventions (von Braun *et al.* 2005). A comprehensive development strategy that addresses the whole set of goals is required for the efforts to be successful. These strategies differ by country due to resources and institutional conditions, so strategies must be tailored to the specific needs and circumstances of a given situation. The political and economic climate must be taken into account, along with historical, cultural, and geographic characteristics. At the same time, each of the goals needs to be reached and that requires specific action in the overall context. Policy actions that improve agricultural productivity and food and nutrition security are essential components of a successful MDG strategy that focuses on the poor, as there are strong, direct relationships between agricultural productivity, hunger and poverty. Two thirds of the world’s poor live in rural areas and make their living from agriculture. Hunger and child malnutrition are more widespread in these areas than in urban areas, and that is likely to remain so for years to come.

The response to the food crisis should be multifaceted. It requires a strategic approach (development strategy), sector-relevant actions in production, consumption and trade policy. Moreover, under-nutrition should be addressed directly with new and strong actions. The world must also reduce waste in consumption and food processing. However, the often stated idea that the world food problem is mainly a problem of “distribution”, that is to say, that there is enough food in the world for all and that it just needs to be shared

more fairly and equally, is a gross simplification. The root cause of the food crisis was lack of agricultural productivity, and acute policy failures. But a broader set of risks needs to be comprehensively addressed. These include:

- The risk of *high and volatile food prices*, which limit poor people's food consumption, diet quality, and spending on health and general welfare, is likely to increase in the future. Moreover, volatility also impacts on production as it increases risk and thereby undermines productive investments.
- *Financial and economic shocks*, which lead to job loss, expensive and scarce credit, and decreased demand for agricultural commodities, are also likely to persist in some parts of the developing world.
- The impacts of *climate change*, including an increase in the incidence of extreme weather events such as droughts and floods and a decrease in yields in developing countries, will further exacerbate food insecurity. These impacts will be severe because the majority of the poor depend on agriculture as a source of food and income.
- The risks that *political disruptions and failed political systems* pose for people and economies. This includes the risk of structural failures of policy change, such as lack of property rights and of traditional land and water rights, eroding the assets of the poor, as can happen under increased land grabbing. In addition, societal and political risks – such as food riots, destabilization of governments and domestic and trans-border conflicts – can result from these food system risks.

### **2.3 Agricultural production systems delivering Food and Nutrition Security**

A sustainable and resilient agriculture in both small and large farm sectors, requires not only technological innovations, but sound institutional arrangements for well functioning markets that offer a conducive investment climate, access to infrastructure, and information and extension systems that serve farming men and women. An essential component of resilient agriculture is the end of land and soil degradation, as the natural resource base needs to serve future food security. The end hunger goal must be combined with related environmental sustainability goals in an inseparable package. Some part of the burden of food insecurity is an element of the costs of inaction to reduce land degradation.

The future of food security to a considerable extent relates to the transformation of small farms for two reasons: about half of the world's hungry poor live on small farms, and second, the small farms of the developing world have considerable potential for contributing to rural and economy-wide growth. In emerging economies, these two features of small farms

connect development strategy with agriculture and food and nutrition security strategy. Thus, attention to agriculture remains important for many regions of the developing world. The above-mentioned tasks require public and private investments at scale.

Besides the strategic structural change and investment priorities just mentioned above, technological breakthroughs, and their adoption on a large scale, are critical in preventing food insecurity. Numerous studies have shown that spending on agricultural research and development (R&D) is among the most effective types of investment for promoting growth and reducing poverty. Advances in plant breeding have increased staple crops' nutritional value, their suitability to subtropical and tropical weather conditions, and their resistance to diseases and pests. Plant breeding and genetic modifications (GM) have created beneficial traits such as disease resistance, environmental improvement, higher nutritional value, and increased yields – traits that are difficult to achieve rapidly through traditional breeding techniques.

Disseminating new technology in agriculture requires substantial upfront investments in the foundations of effective technology utilization – that is, rural education, infrastructure, and extension services. However, public R&D investments have been stagnating since the mid-1990s, and the gap between rich and poor countries in generating new technology remains large, except in a few countries such as Brazil and China.

At the global level, a science and technology initiative is needed to prevent further increases in agricultural prices, reduce competition for natural resources, and adapt to and mitigate the effects of climate change. That global initiative should focus on increasing agricultural productivity, making agricultural practices more sustainable, enhancing food quality and health, and improving natural resources management. The initiative must also address nutrition insecurity directly by breeding new varieties of staple crops that are rich in micronutrients. This approach would allow the poor to receive necessary amounts of vitamin A, zinc and iron through their regular staple diets. This “bio-fortification” provides a means of reaching malnourished populations in relatively remote rural areas and delivering naturally fortified foods to people with limited access to commercially marketed fortified foods or supplements.

#### ***2.4 Addressing the land issues***

The amount of land that is presently used for agricultural purposes cannot be substantially increased, as either cultivation makes no economic sense due to low potential yields, or expansion would negatively impact the environment and climate. The preferred way of increasing productivity is,

therefore, to intensify farming sustainably on the land that is already used for agriculture. Sustainable intensification crucially includes further advances in crop varieties by breeding techniques (Montpellier Panel 2013).

Viewed globally, soil may be one of the most important terrestrial resources for carbon storage. Yet land degradation is a rampant and inadequately quantified global issue. Research should focus on maintaining or improving the quantity and quality of productive soils. To achieve this, new national and international concepts of land use need to be devised and a global initiative for the assessment of costs of inaction on land and soil degradation is called for (Nkonya *et al.* 2011).

By means of innovative research into locally adapted crop cultivation, alternative farming scenarios must be developed which allow priorities to be set for land use. The rapid expansion of foreign direct investment in land acquisition reflects the strong demand for biomass that has become an international issue. The often unregulated land markets in which power rather than efficiency and price rules, and the investment ventures need more policy attention to protect rights of poor land users, especially small farmers and pastoralists.

Food security strategies must take a trans-sector perspective, beyond food and agriculture. The governance of the food system needs to pay renewed attention to property rights, especially for land, including communal lands. The emerging market for biomass and its agricultural underpinnings need sound institutional arrangements and codes of conduct beyond voluntary guidelines. A resilient and sustainably growing agricultural production sector remains essential for food security of the poor.

### ***2.5 Policies to prevent extreme price volatility***

Staple foods can be viewed from different perspectives given different actors' roles in production, trading, and consumption. For farmers, they are an income source; for food processors they are an input; for traders and financial investors they are part of an asset in portfolios; and for poor consumers they are implicitly "currency", as they spend a large share of their income on them. The latter is the most neglected role. For the poor, grain price spikes mean hyperinflation in their currency, and they have no central bank that guards their currency. Food price volatility – unpredictable large swings in prices – affects the poor the most and undermines their health and nutrition. Extreme price volatility also hinders investment and leads to misallocation of resources. It increases the incentive to construct commodity asset portfolios, which foster speculative trading, further boosting price spikes (Tadesse *et al.* 2013).

In view of the adverse role of biofuels subsidy policies for food security in times of tight grain supplies, these policies need to take food-security consequences explicitly into account, which they currently ignore. When food prices are high, subsidies for biofuel production should be frozen, reduced, or subjected to a temporary moratorium on biofuels from grains and oilseeds until extreme prices subside. Second-generation biofuel technologies are in the making but are still far from reality. If they are “smart”, these technologies may partly overcome the food-fuel competition and lessen the negative effects on the poor.

Extreme price volatility is an international issue that requires international action. Together, national actions such as increasing grain stocks or restricting trade are inefficient and make global matters worse. These policy decisions – such as export restrictions which many countries have applied during the food crisis – often appear to be panic responses that give little attention to potential global market consequences. Food markets must not be excluded from the appropriate regulation of the banking and financial system, as the staple food and feed markets (grain and oilseeds) are closely connected to speculative activities in financial markets. There is growing evidence that the price formation at the main international commodity markets was significantly influenced by speculation that drove spot prices upward beyond market fundamentals (Tadesse *et al.* 2013; Algieri 2012). To prevent extreme volatility, it is essential to ensure open trade, and transparent, appropriately regulated market institutions. Any cost-benefit assessment of institutional actions need to consider the cost of action versus costs of inaction in three domains – the costs of human resources and suffering from the food crisis, the costs of losses from trade and from the political disruptions as trade would remain more open under such a regime, and the costs from higher national grain stocks and excessive self-sufficiency investments.

## **2.6 More and better social protection and nutrition policies**

Actions related to agricultural production, trade, and reserves are necessary but not sufficient to overcome the food and nutrition security crisis; it is not just an acute problem, but a chronic global one. Another set of public policies is required to address health and nutrition risks through social transfers and health services. Most of these actions are carried out by national governments, but international support for these investments is also needed, especially in the least developed countries. Setting priorities in this area requires a sound metric for targeting actions and measuring progress. First, a focus should be put on lives saved and livelihoods improved (measured by reduced mortality and morbidity), criteria of success that might also be con-

sidered in any future MDG framework. Second, priority should be given to enhanced economic productivity, growth, and returns to investment (measured by human productivity and lifetime earnings). A framework that includes both of these very different concepts may be helpful for stimulating an informed policy discourse on priority setting. With that in mind, policy actions in three priority areas are called for: (1) expand social protection and child nutrition action to protect the basic nutrition of the most vulnerable; (2) take protective actions to mitigate short-term risks (such actions would include cash transfers, pension systems, and employment programs); and (3) adopt preventive health and nutrition interventions to avoid long-term negative consequences. Social safety nets not only ease poverty in the short term, but also enable growth by allowing poor households to create assets, protect their assets, and allocate resources to more risky but highly remunerative production activities. Since good nutrition is crucial for children's physical and cognitive development, as well as their productivity and earnings as adults, early childhood nutrition and school feeding programs should be strengthened and expanded to ensure universal coverage (Hod-dinott *et al.* 2008).

Programs transferring income to the poor in response to food crises have a long tradition, in particular as food price subsidies and rationing schemes. Often, however, they are ineffective and fail to reach the most food insecure. Of relevance are also employment-related transfer programs, such as the Indian rural employment scheme, scaled up to the national level in the past decade. Cash transfer programs are increasingly common. These programs – which transfer cash to households partly on the condition that they meet certain requirements such as sending children to school and using preventive health services – have proven successful in reducing poverty in the short run (through cash transfers) and in the long run (through the human capital formation that they encourage). They work particularly well in countries with low school attendance and adequate schooling infrastructure. They are not magic, however – they do not work in every country, can have adverse fiscal and labour market effects, and alone they are not sufficient for reducing poverty sustainably. Early childhood nutrition actions should be connected to them.

Lack of food energy is generally an issue only in highly food-insecure areas, but micronutrient malnutrition is much more widespread and pervasive. The core problems of low birth weight and early childhood under-nutrition need primary attention in nutrition and health actions. One promising way to start is to identify gaps where existing programs are insufficient to reach needed coverage and impact. Communities with the

highest concentration of poor and vulnerable can guide priority setting. While problems of insufficient and poor-quality food persist, changes in the global environment are creating new nutritional issues such as the “nutrition transition” – a process by which globalization, urbanization, and changes in lifestyle are linked to excess caloric intake, poor-quality diets, and low physical activity, which together lead to rapid rises in obesity and chronic diseases even among the poor in developing countries. The main challenge for agriculture, health, and nutrition is thus to adapt to the changing environment and address the double burden of under- and over-nutrition by maintaining adequate food supply while increasing the production of low-cost, high-quality foods to improve diet quality among the poor. Unfortunately, there is still too little private sector engagement in food fortification and in child nutrition in developing countries, in such areas as the delivery of low-cost and healthy baby foods. New alliances among the private and public sectors and nongovernmental organizations (NGOs) are needed in this field of action.

### 3. Conclusions

In sum, accelerated action for achieving global food and nutrition security in the years ahead is called for, and should be based on a comprehensive concept:

- The prevailing concept of food and nutrition security (FNS) needs to be revisited and augmented, in order to provide appropriate guidance for policy actions. Better understanding of the dynamics, synergies and causal linkages in FNS for human development is called for. This also includes explicit attention to sufficient access to micronutrients for cognitive capabilities’ protection and enhancement of health.
- The current and future MDGs should have a strong focus on the poverty and hunger goals. The hunger target that accompanies the poverty target brings attention to the food and nutrition security of the extreme poor – those far below the poverty line – and that should be maintained and further strengthened. A next set of MDGs should actually include an “End Hunger” goal over an ambitious but realistic time schedule, such as until 2025 or 2030, where the progress toward the goal is well monitored based on people-level data, not just broad trend estimates, as currently the case.
- Strategic elements of the required policy and program actions include approaches to overcoming supply constraints through enhanced food sector productivity. Essential components of a resilient agriculture are yield-increasing technologies, technologies for food quality, reduced

losses and waste in the food system and an end of land and soil degradation. The end hunger goal must be combined with related sustainable development goals (SDG) in an inseparable package.

- More attention to comprehensive and direct nutrition intervention is urgently needed, including addressing the micronutrient deficiencies in combination with public health investments. This is an essential element of food and nutrition security policies that have not only a focus on survival but an increased focus on protecting and enhancing the cognitive capacities and well being of people. This entails linking the end hunger goal with access to education goal through sound educational systems upgrading, i.e. linking “bread and brain” actions comprehensively.
- The actions for achieving food and nutrition security require strong prioritization, sequencing, transparency, and accountability for successful implementation. Related governance practices in many countries must be strengthened, as well as reformed global governance system of food, which does not currently deliver the necessary public goods to achieve food and nutrition security for the poor.

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