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Full Length Research Paper

Revisiting food and nutrition security: A comprehensive overview

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The modest progress in reducing malnutrition over the past two decades and the severe impacts of recent food crises have re-ignited a debate on new ways for improving food and nutrition security. This paper contributes to the discussion by synthesizing the pertinent literature and presenting an innovative framework that may help identifying and designing promising pathways to food security and improved nutrition. The framework links the complex interactions of factors at the macro and micro levels and shows how external shocks such as global food price spikes and natural disasters as well as interventions in form of policies and programs affect the availability of food, people's access to it, and the resulting nutritional status of individuals.

Key words: Food security, nutrition, development, policy, intervention, external shock.

INTRODUCTION

Despite considerable efforts of national governments and the international community to reduce hunger and malnutrition in the context of the Millennium Development Goals (MDGs) and other initiatives, the proportion of undernourished people in developing countries has been largely constant since the mid-1990s (FAO, 2010).[1] While some progress in hunger reduction had been made until 2007, the 2008 global food price crisis and subsequent food price spikes in local markets have pushed or kept millions of people in food insecurity (Brinkman et al., 2010; FAO, 2009a). The main causes of this rise in global and national food insecurity include trade restrictions imposed by major food exporters, biofuels policies, and increased food commodity speculation combined with poor national and local governance to cope with such shocks. Besides, longer-term dynamics such as climate change and mounting food demand through changing dietary patterns and growing populations have strained international food markets and are expected to lead to further rising food prices and increasing price volatility (Nelson et al., 2010; FAO, 2011).

A broad range of policies has been proposed to reduce the vulnerability of the world's poor to global food price spikes, including amendments in global trade rules that restrict the possibility of food exporters to impose export bans, stricter rules on biofuel production and food commodity speculation, the institutionalization of grain reserves to stabilize prices in times of crises, and the creation and expansion of national social safety mechanisms, in addition to a boost in investments to raise agricultural productivity and adapt to changing climate sustainably (Fan et al., 2011; World Bank, 2012a). However, few of the proposed policies have been implemented so far, and the return to lower food prices after the 2008 global food price crisis was short-lived. In 2011, international food prices spiked for the second time within three years, sparking concerns about a repeat of the 2008 crisis and related consequences for the poor (World Bank, 2012a). The World Bank food price index reached its 2008 peak in early 2011 and has stabilized at about double its 2005 level throughout the first quarter of 2012 (World Bank, 2012b).

Both the causes of recent food crises and the proposed

[1] Malnutrition is generally defined as a chronic condition which is a consequence of over- or under consumption of any or several essential macro- or micronutrients relative to the individual physiological and pathological requirements. Four forms of malnutrition can be distinguished: Protein-energy (or protein-calorie) malnutrition, micronutrient malnutrition (that is, dietary mineral and vitamin deficiencies), secondary malnutrition (that is, malnutrition primarily caused by illness or disease), and overnutrition (Mayer, 1976). This paper focuses on the first three forms of malnutrition that lead to a state of undernutrition.

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responses show the complexity of the global food system and highlight the growing importance of factors that go beyond agriculture and the household level. Yet, interventions to address food insecurity have often focused on agriculture-based approaches and have been geared towards improving households' access to food. Nonetheless, MDG progress assessments confirm that the developing world is particularly off-track in achieving the goals closely linked to food and nutrition security (FNS) (World Bank, 2012a). While substantial progress in reducing extreme poverty has been made over the past two decades mainly as a result of robust economic growth in major developing countries, hunger and child malnutrition has been much more persistent. Accordingly, while the target of reducing extreme poverty (MDG 1a) may have already been reached at the global level, meeting the hunger-reduction target (MDG 1c) by 2015 will be difficult and meeting the target related to child nutrition (MDG 1c) is unlikely (UN, 2011; World Bank, 2012a). Likewise, the targets which developing regions are lagging the most behind are the ones related to child and maternal health (MDG 3, 4) (World Bank, 2012a).

The grave impacts of the recent food price spikes and the division between poverty reduction and nutrition improvement have ignited a broad debate about the usefulness of the conventional approaches to address hunger and malnutrition and the kind of changes that are needed. For example, the International Food Policy Research Institute's (IFPRI) 2020 Vision Initiative draws attention to the nexus between agriculture, nutrition, and health and aims at finding solutions to better leverage agriculture for improving nutrition and health (Fan et al., 2012).[2] Along the same line, the World Bank (2012a) acknowledges that "in the longer term, the focus should be broadened to strengthening the link between smallholder agriculture and nutrition, addressing seasonal [food] deprivation, and promoting girls' education and women's income" (p. 6); and the UN (2011) states that "nutrition must be given higher priority in national development if the MDGs are to be achieved" (p. 13).

The concept of food security is well-suited to facilitate the discussion and guide action on promising pathways out of hunger and malnutrition. However, as the consequences of the recent food crises unfold, the concept of food security may require a stronger focus on nutrition outcomes. Over time, the concept of food security and related approaches to address food insecurity have been developed and modified in accordance with the common understanding of the nature of the food problem and the evolution of the global food system (Maxwell, 1996a; Maxwell and Slater, 2003). Since the term 'food security' entered the broader development policy debate at the 1974 World Food Conference, the concept has been revised and extended.[3] The most common definition today was first launched at the World Food Summit in 1996 and agreed upon by most governments and leading governmental and nongovernmental development agencies (FAO, 1996). In the evolution of this definition, at least three overlapping paradigm shifts in thinking about food security can be identified: (1) from the global and the national level to the household and the individual level, (2) from a food first perspective to a livelihood perspective, and (3) from objective indicators to subjective perception (Maxwell, 1996a). As pointed out above, tendencies toward an additional paradigm shift can be observed recently that may be described as from a sector-specific approach to a multi-sector system approach with focus on nutrition outcomes.

Against this background, this paper provides a comprehensive overview of the complex interactions that characterize the FNS system and offers a framework to guide the discussion and action on promising pathways for achieving food security and improved nutrition outcomes. It synthesizes the respective food security and nutrition literature and extends previous frameworks based on the lessons learned from the recent food crises.

The most prominent frameworks such as those currently used by the Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS) of the FAO and United Nations partners (FIVIMS, 2012), the Food and Nutrition Technical Assistance Project (FANTA) supported by the United States Agency for International Development (USAID) and partners (Riely et al., 1999), and the International Food Policy Research Institute (IFPRI) (von Grebmer et al., 2010) all originate from UNICEF's framework on the causes of malnutrition and death in children and women (UNICEF, 1990) and broaden it to include additional factors of food security. The general usefulness of the UNICEF framework is derived from its identification of different channels through which an individual's nutritional status might be affected and the related causes of malnutrition at different levels. The causes are structured into immediate, underlying and basic causes which relate to the

[2] The 2020 Vision for Food Agriculture, and the Environment is an IFPRI initiative "to generate and promote a shared vision and consensus for action for meeting food needs while reducing poverty and protecting the environment" and "to generate information and encourage debate to influence action by national governments, nongovernmental organizations, the private sector, international development institutions, and other elements of civil society." The initiative supports the MDGs and seeks to contribute to their achievement by 2015 (IFPRI 2012).

[3] Although not referred to it as such, the concept of food security has been internationally acknowledged for almost 70 years. At the United Nations Conference on Food and Agriculture in Hot Springs in 1943, representatives of the member states declared "the goal of freedom from want of food, suitable and adequate for the health and strength of all people" (UN, 1943, p 163).

individual, household and societal levels, respectively. So far, the original UNICEF framework has been mainly enhanced at the household level.

The recent food crises call for extending existing frameworks particularly in terms of: (1) the macro dimension of FNS and (2) the impact of external shocks and stresses to the FNS system (including global economic crises, natural disasters, conflict, and climate change), and counteracting and preventive options for intervention in the form of policies and programs. At the macro level, the macroeconomic causes of food insecurity and malnutrition including macroeconomic instability, slow economic growth, insufficient/inefficient budget allocation to prevent and treat nutritional deficiencies, and international and national institutional failures as well as the key sectors for achieving food security and improved nutrition deserve greater attention. The framework proposed in this paper addresses these shortcomings and incorporates the concept of poverty and the adverse consequences of malnutrition on development.

THE FOOD AND NUTRITION SECURITY SYSTEM

Defining food and nutrition security

The World Food Summit in 1996 defined food security as a situation "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" (FAO, 1996, par 1). At the World Summit of Food Security in 2009, this definition was reconfirmed, and the concept was extended and specified by adding that the "four pillars of food security are availability, access, utilization, and stability" and stated that "the nutritional dimension is integral to the concept" (FAO, 2009b, p 1, fn 1).[4] The strength of this definition is its comprehensiveness and imperative for "concerted actions at all levels" (that are "individual, household, national, regional, and global levels") and "coordinated efforts and shared responsibilities" across institutions, societies, and economies to tackle food insecurity effectively (FAO, 1996, par 1). Furthermore, poverty is regarded as the major obstacle to achieve food security at the household level so that "poverty eradication is essential to improve access to food" (FAO, 1996, par 2).[5]

The framework presented in this paper builds on the World Summit definition and integrates the four pillars of food security into a system approach. It links food security and nutrition security acknowledging that food security at the household (and individual) level is a necessary but insufficient condition for adequate nutrition (as outlined in the UNICEF framework) and that food and nutrient intake interacts with the individual health status (which make defining food security without considering nutrition outcomes inconclusive). The framework adopts a country perspective and distinguishes between the macro and micro dimension of FNS.

The use of the term 'food security' at the national (and global) level has been often focused on issues on the supply side of the food equation and particularly a country's ability to provide enough food to meet the needs or demands of the population either through domestic production or food imports (Pinstrup-Andersen, 2009). Hence, for major food importers such as most Middle East and Northern African countries, external balance and currency reserves need to be recognized as crucial factors of national food security (Diaz-Bonilla et al., 2002; Breisinger et al., 2012). The macro dimension of FNS however goes far beyond issues of agricultural production and international trade, given strong linkages with the rest of the economy through which outputs in non-food sectors, and macro and (non-agricultural) economic policies greatly influence food supply (Timmer, 2000, 2005). As Sen (1981) pointed out, adequate food supply is only one of many preconditions of having enough food to eat, while the causes of hunger and starvation may be of other nature. In addition, concerning nutrition outcomes, the role of social sectors - primarily health and education - is critical for treatment and prevention of nutritional deficiencies. Nevertheless, from a household perspective, FNS at the macro ensures (only) the *availability* of sufficient, nutritious food and adequate nutrition-relevant services - the first pillar of the World Summit definition.

The micro dimension relates to issues of FNS at the household and individual levels. Household FNS refers to the ability of a household to produce and/or purchase the food needed by all household members to meet their dietary requirements and food preferences as well as the assets and services necessary to achieve and maintain an optimal nutritional status.[6] This complies with the

[4] This definition incorporates the four essential components of a measure of food security at the individual and household levels as outlined by Campbell (1991): (1) availability of having sufficient quantity of food; (2) quality of the available food concerning the food types and the diversity of the diet; (3) physiological acceptability relating to feelings of food deprivation, restricted food choice, and anxiety about the quantity and quality of food on-hand in the households stores; and (4) social acceptability of consumption patterns, determined by social norms in respect of meal frequency [and composition] and way of food acquisition such as being able to purchase foods instead of having to beg, scrounge, or steal food. However, issues of measuring food security and suitability of common indicators are beyond the scope of this paper and have been examined by several scholars (e.g., Barrett, 2010; de Haen et al., 2011; Haddad et al., 1994; Headey and Ecker, 2012; Maxwell, 1996a; Maxwell et al., 1999; Webb et al., 2006).

[5] "Poverty is pronounced deprivation in well-being […]. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity" (World Bank, 2012, adapted from Haughton and Khandker, 2009).

[6] As Pinstrup-Andersen (2009) pointed out, the term 'food preferences' should be interpreted in regard to foods that are socially and culturally acceptable and comply with ethical and religious values but not misinterpreted in terms of perceived values as in the case of luxury goods.

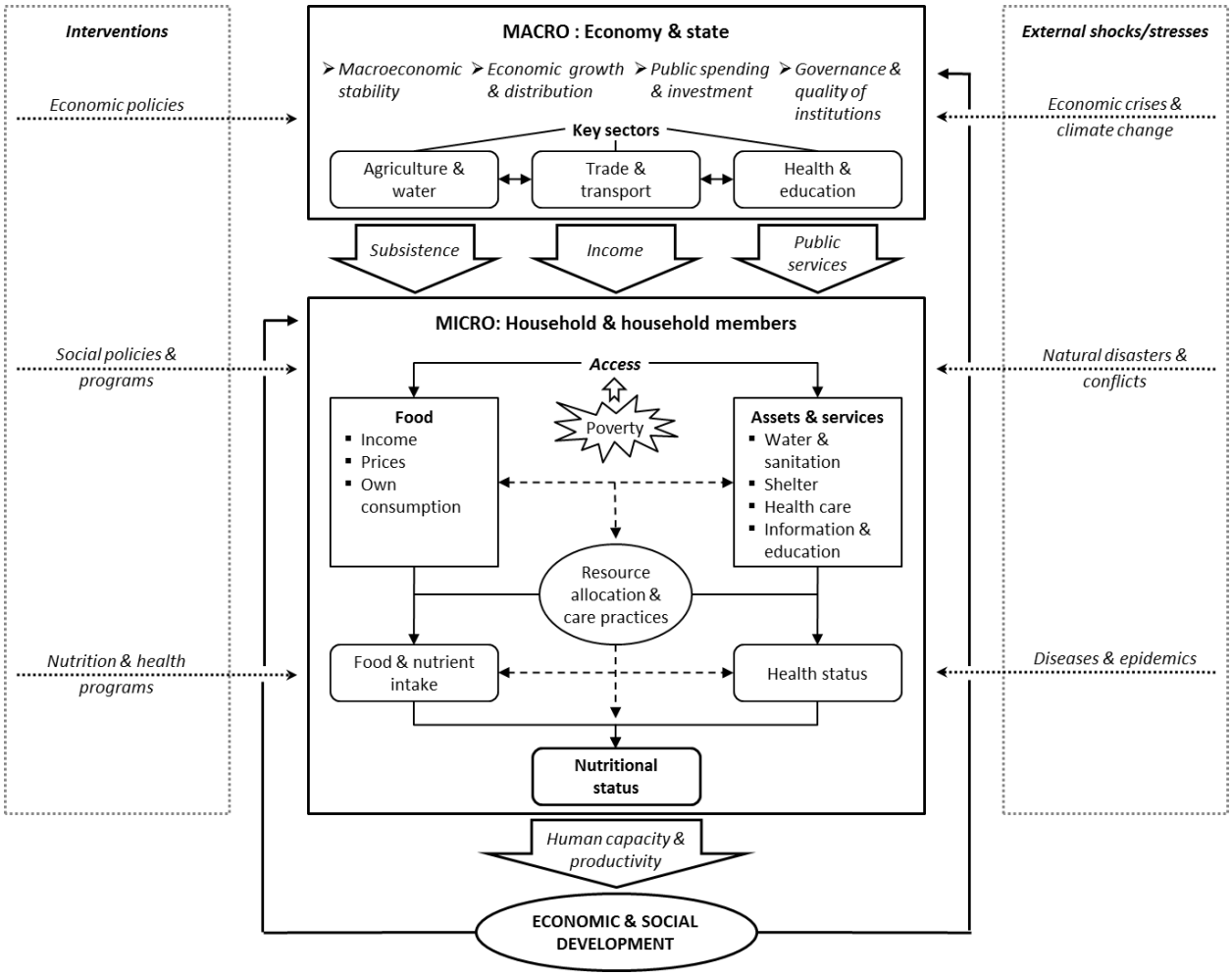

Figure 1. Overview of the FNS system. Source: Authors' own representation.

second pillar of the World Summit definition, that is, *access*. Yet, even household access to enough and nutritious food may not assure adequate food intake of all household members for two reasons (Pinstrup-Andersen, 2009): First, the ability to acquire sufficient food may not convert into actual food acquisition, because the preferences of the household or its decision maker may not prioritize food acquisition over the acquisition of other goods and services. Secondly, the intrahousehold allocation of the available food may not comply with the physiological requirements of each individual household member; the extent to which sufficient food intake translates into good nutrition depends on several health-related factors.

The condition of intake of sufficient and safe food which is adequate according to the individual physiological requirements forms the third pillar, that is, *utilization*. Accordingly, food safety enters the concept of FNS at the interface between nutrition and health on the individual level. Finally, FNS can be distinguished into transitory and permanent FNS, where the former describes a situation of food and nutrient shortages during certain periods such as times of food crises or seasons of agricultural production, whereas the latter identifies a situation of a long-term, persistent lack of adequate food. The condition to time refers to both macro- and micro-level FNS and is summarized under the fourth pillar, that is, stability.

Figure 1 presents a diagrammatic overview of the FNS system. The framework shows the main factors of FNS on the macro and micro levels and their linkages across sectors and levels that, in combination, determine nutrition outcomes. It also illustrates the major channels through which external shocks/stress and interventions at the macro and micro levels sequentially translate into individual nutritional status and how this, in turn, affects the economic and social developments in countries and households (and their individual members).

The macro dimension

At the macro level, crucial factors of the FNS system

include macroeconomic stability, economic growth and its distribution, public spending, and governance and quality of institutions. Important indicators for macroeconomic stability in regard to aggregate food availability are the external and internal balances of a country. Important items on the balance of payments (and sources of foreign exchange earnings) are exports of goods and services, remittances, foreign direct investments, and foreign aid. The fiscal balance and the related ability of a country to borrow money on the international market or from development banks also matter for food security, especially in times of economic crises. For example, additional financial resources may be needed to expand social safety nets to buffer the negative effects of global food price spikes. Public spending, more generally, is a key tool of governments for improving food security. The mix between investments (for example, in infrastructure) and recurrent spending (for example, for providing public services), the allocation of resources across different sectors and regions within a country, and the efficiency with which resources are spent are all key determinants of food security outcomes. The state and related institutions also play an important role in ensuring that public services are provided effectively and efficiently to the people in need and that a good business climate attracts domestic and foreign private investments (Easterly and Levine, 2003; Rodrik et al., 2004). Such investments, in addition to advances in productivity, matter for accelerating economic growth and income generation. Whether economic growth improves FNS depends on a number of factors as the recent literature suggests that nutrition is less responsive to economic growth than poverty (Ecker et al., 2012; Headey, 2012). The structure of growth across and within different sectors and the extent to which growth creates jobs for food insecure people are critical (Dollar and Kraay, 2002; Ravallion and Chen, 1997). Growth may also improve FNS through generating tax revenues and foreign exchange earnings through exports and resulting increases in beneficial investments and public spending.

The key economic and social sectors relevant for FNS are agriculture (including fishery) and water, trade and transport, and health and education. They can contribute to improving food access and nutrition by providing food (in the case of agriculture), generating household incomes, and/or supplying assets and services essential for malnutrition prevention and treatment.

Agriculture and water

Globally, agriculture is fundamental for achieving FNS in terms of supplying food and generating income to the poor. Yet, at the national level, the role of agriculture is subject to the country's natural resource endowments and its relevance for FNS changes during the process of structural transformation (Mellor, 1966; Webb and Block, 2010). In subsistence economies, farming and livestock husbandry for self-sufficiency is the dominant source of livelihoods, while the sector's role as an employment and income provider gains importance with increasing economic diversification. Agricultural growth is often pro-poor and has typically strong linkage effects driving the overall growth and contributing to lower food prices (Christiaensen et al., 2011; Delgado et al., 1998; Diao et al., 2010). In addition, agricultural exports provide substantial earnings in most developing countries, generating revenues for public spending, investment, and (food) imports (World Bank, 2007). Particularly in arid regions, the agricultural sector is inevitably connected to the water sector, while agricultural water use often competes with water demand for human and industry consumption. Declining renewable water resources and rising water needs for alternative use challenge agricultural production to meet growing food demands (Duncan, 2002; Veolia Water, 2011).

Trade and transport

In the course of advancing national and international market integration, an efficient trading system, functioning market institutions, and transport and storage infrastructure gain importance for establishing effective food supply chains. To mitigate the adverse effects of global food price spikes in the most vulnerable countries, proposed actions include investing in physical grain reserves in both large producing and, more importantly, poor importing countries for fast and easy emergency relief and establishing an international working group to regularly monitor food and biofuel crop production, consumption, trade, stocks, prices, and policies as well as price movements and speculations in related energy and financial markets (Fan et al., 2011). Investments in transport infrastructure, particularly roads, do not only reduce food prices for consumers and input prices for producers, but also contribute to people's access to health and education services.

Health and education

The importance of the health and education sectors for FNS has been often underemphasized in the past despite the sectors' critical role for nutrition. For example, national nutrition strategies and related interventions (typically carried out by the health sector) have been rarely aligned to national food security strategies that have often been dominated by the agricultural sector. Yet keeping these realms separate appears counterintuitive in consideration of the close, natural interlinkages between food access and utilization and nutrition outcomes (as discussed below). Moreover, given the relevance of nutritional and hygienic knowledge and formal education for nutrition outcomes as well as the high cost-effectiveness of related interventions, a stronger integration of public health and education

concerns into FNS strategies and policies is mandatory. Consequently, expanding quality education does not only enhance human capital formation but also contributes to improved FNS indirectly - through enabling people to access nutrition-relevant information - and directly, if food and nutrition issues are included in school curricula, for example.

The micro dimension

At the micro level, nutrition of all members of a household is equally subject to the household's economic (and physical) access to food and to basic household assets and (public) services that affect individuals' health conditions. In most cases, limited access is due to limited financial resources which perpetuate the vicious cycle of poverty, malnutrition, and illness. A major factor of food access is hence household (real) income and, in subsistence farm households, the assets necessary to produce enough food for own consumption. Poverty does not only limit the access to food of sufficient quantity and quality but also increases the vulnerability to food price spikes and other shocks and stresses entailing volatility in nutrient supply (Barrett, 2002). High food prices force the poor to adjust their dietary choice or budget allocation to other basic goods and services that might translate into a deterioration of nutrition among the most vulnerable household members. Young children's nutritional status tends to be most responsive to deteriorating living conditions and particularly vulnerable to food shortages and diseases, due to their high physiological nutrient requirements for growth, special dietary needs, often more direct exposure to adverse health conditions, and dependency on adults (ACC/SCN, 2000; Walker et al., 2007). Also, pregnant women are at an elevated risk of malnutrition due to their amplified nutrient requirements for reproduction.

Furthermore, individual food access and adequate food and nutrient intake is contingent upon intra-household food distribution and the care given to meet individual dietary needs, both of which in turn depend on a set of characteristics of the household decision maker and the person responsible for meal preparation and child feeding (Ruel and Menon, 2002; Smith et al., 2003; Thomas, 1990). Formal education and nutritional knowledge of parents, especially mothers (Behrman and Wolfe, 1984; Glewwe, 1999; Semba et al., 2008), and gender equality in decision making on household resource allocation (Behrman and Deolalikar, 1990; Kennedy and Peters, 1992; Thomas, 1994) are crucial factors of the nutritional status of young children in particular. Children's nutritional status is also directly determined by the mother's nutritional and health status through the physiological and social mother-child relationship. In addition, since mothers are typically entrusted both to feed their children and to prepare the meal for all other household members, the physical, mental, educational, and social status of women and girls are most critical for the nutrition situation in families and populations and therewith for the development potential of societies (Smith et al., 2003).

Finally, a person's nutritional status is determined by her individual health status (and vice versa), influencing physiological nutrient requirements and interacting with the utilization of nutrients from food. For example, parasitic and diarrheal diseases cause nutrient losses through blood and stool and reduce nutrient absorption necessitating higher nutrient intake and thus more food to cover the losses, if such compensation is possible at all (Katona and Katona-Apte, 2008; Stephenson et al., 2000). At the same time, poor nutrition weakens the human immune system and therewith increases the risk of disease and illness (Black et al., 2003). Thus, access to clean drinking water, hygienic sanitation, proper shelter, basic health care for disease and illness treatment and prevention including immunization, and related information and education campaigns all determine people's nutritional status indirectly through the link with health (Fay et al., 2005; Frongillo et al., 1997; Smith et al., 2005). In short, nutrition and health are mutually dependent and affect food needs.

Development effects of (mal)nutrition

The relationship between economic and social prosperity and nutrition is bidirectional. Good nutrition is fundamental for individuals to realize both their physical and intellectual potential. It is the basis for individual and family well-being and human capital formation and, as such, key to economic and social development (Horton et al., 2010; Victoria et al., 2008). Malnutrition has serious consequences at the micro and macro level in the current generation and, even more so, for future generations. At the micro level, undernutrition reduces the individuals' income generation potential, lowers children's schooling performance, increases the risk of disability, morbidity, and mortality, and thus contributes to the intergenerational transmission of poverty and illness (Black et al., 2008; Grantham-McGregor et al., 2007). Even temporary malnutrition such as during food crises or the (pre-harvest) rainy season (frequently referred to as 'hunger season') can cause irreversible health impairments especially in children (Hadley et al., 2007; Schofield, 1971). At the macro level, malnutrition slows economic growth and deepens poverty through three routes: (1) direct losses in productivity from poor physical and mental performance (or death) of the work force, (2) indirect losses from reduced working and cognitive capacity of the working population at present and in the future, and (3) losses in resources due to increased health care costs (World Bank, 2006). The economic costs of malnutrition are substantial; only productivity losses to individuals are conservatively estimated at more than 10% of lifetime earnings and losses to gross domestic product (GDP) at 2 to 3% on average (Horton, 1999; World Bank, 2006). Substantial losses in income

and GDP are due to impaired cognitive abilities, which are particularly relevant in more advanced economies (Hoddinott et al., 2008; Horton and Ross, 2003; Selowsky and Taylor, 1973).

External shocks/stresses and interventions

The FNS system can be comprised by various external shocks and stresses at the macro and micro level. Recent macroeconomic shocks include the global food price spikes in 2008 and 2010-2011. Besides, the expected consequences of the ongoing financial and sovereign debt crisis in the United States and Europe for global economic growth, development assistance, foreign direct investments, and remittances put developing countries' economies and households under increased stress. Examples of shocks with immediate effects on FNS that occur at the micro level include civil conflicts and natural disasters such as floods and droughts. These shocks are usually localized and therefore threaten the livelihoods of only parts of the population directly through loss of household assets, market access, and income earning opportunities, among others. Yet, depending on the geographical spread and intensity, they may also slow national economic growth, lead to higher inflation, and cause a burden for the national budget limiting the financial space for alternative spending and investment. Although all members of a household may be similarly exposed to such a shock, the nutritional effects may substantially differ between household members subject to the individual level of vulnerability (and exposure) and the household resources to mitigate the individual impact. Examples of external shocks which immediately impair individual health are diseases and epidemics that can also have serious consequences for the nutrition of other household members, particularly if the main income earner or care taker is affected.

Means of governments to respond to external shocks and stresses - and, more broadly, to improve FNS - comprise economic policies, social policies and programs, and targeted nutrition and health programs. The suitability of particular interventions depends on the type of shock or stress and is country and context-specific. For instance, short-term responses to mitigate the immediate impact of food crises on the vulnerability of measures to improve people's resilience (such as food assistance and income transfers) typically tackle food and nutrition insecurity at the micro level, while appropriate strategies to reduce a country's vulnerability to global food price volatility require economic policies and investments at the macro level. Though, since external shocks are often hard to predict, having sound risk management strategies and coping mechanisms in place such as emergency grain reserves, social safety nets, and food assistance schemes is critical to control the nutritional impacts during and after crises. Combining different types of interventions may form synergies and thus increase their effectiveness. For example, nutrition and health programs achieve higher rates of success if they are complemented with economic and social policies addressing poverty, underutilized agricultural productivity, and trade barriers (Berti et al., 2004; Bryce et al., 2008; Engle et al., 2007). Effective responses to external shocks require their detection in a timely manner. Hence, early warning systems - including the appropriate technology and efficient institutional linkages - are vital for cushioning adverse welfare effects of shocks.

CONCLUSIONS

The lasting consequences of the recent food crises for food security and nutrition in developing countries and the modest progress in reducing nutritional deficiencies experienced since the international community's commitment to the MDGs have re-ignited a debate about effective strategies to address hunger and malnutrition. This paper intended to contribute to the debate and action by synthesizing the pertinent food security and nutrition literature and providing a framework that may help to guide the discussion on promising pathways for achieving food security and improved nutrition. Since food insecurity and malnutrition are typically a result of many interrelated failures at different levels, an integrated, cross-sector approach combining different intervention options appears to be most promising.

Developing effective FNS strategies requires identifying the factors which constrain progress most in the particular context, the type and combination of interventions which are most appropriate to tackle these factors, and the indicators suitable to assess the impact (and not only the outcome such as nutrient intake instead of nutritional status, as in many cases) in a timely manner. In this regard, policy-oriented research can make an important contribution but may require revising its conventional working in separate, disciplinary realms toward a more cross-disciplinary integrated approach, too. Such an approach is essential in empirical studies to account for interactions between FNS factors at the different levels and thus to correctly determine the overall impact of interventions and external shocks, for example. So far, relatively little effort has been made into this direction. In addition, although historical data clearly show that economic development leads to better nutrition, the spillover effects of specific macroeconomic, sector-specific, and social policies on people's nutritional status have been barely studied. Consequently, the current body of research offers little guidance to policymakers on which economic policy options are particularly beneficial from a nutrition perspective. This paper may also serve as a basic reference for more empirical studies in that area of research.

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