Staff Paper

Food Security in Developing Countries

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Abstract

This paper provides a systematic definition of food security, focusing on its different dimensions; examines the nature and magnitude of the different dimensions of food insecurity in developing countries; discusses the difficult tradeoffs that policy makers face in trying to address food security's multiple dimensions simultaneously; and explores promising new approaches to address food insecurity. The geographic focus is on Sub-Saharan Africa and South Asia, where the majority of the world's food insecure people live.

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The term "food security" is like a blank screen. Each author seems to project her own meaning on the term, despite the efforts of organizations such as the United Nations Food and Agriculture Organization (FAO) and the U.S. Department of Agriculture (USDA) to develop standard definitions. For some, food security means national or local food self-sufficiency—an argument to protect local farmers against outside competition and an argument against production of cash-crops for export—while for others, it is equated with emergency famine relief. With its multitude of meanings, "food security" is invoked to justify all sorts of actions, some of which are detrimental to the well-being of the hungry.

The purposes of this chapter are to provide a systematic definition of food security, focusing on its different dimensions; examine the nature and magnitude of the different dimensions of food insecurity in developing countries; discuss the difficult tradeoffs that policy makers face in trying to address food security's multiple dimensions simultaneously; and explore promising new approaches to address food insecurity. The geographic focus is on Sub-Saharan Africa and South Asia, where the majority of the world's food insecure people live.

Defining Food Security

The FAO defines food security as follows: "Food security exists when all people, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." Definitions used by the USDA, the World Bank, and the U.S. Agency for International Development are similar.[1] This definition, while seemingly straightforward, has several important implications.

Access and Availability

First, food security requires that all people have ***access*** to sufficient food. Having access to food requires that the food be available, but availability does not guarantee access. Thus, a

focus on trying to assure food security simply through increasing food production is incomplete at best, and in some circumstances can actually worsen access to food by pricing the poor out of the market if local production takes place at very high cost.

Access involves having both ***physical access*** to a place where food is available and ***economic access*--**having a socially legitimate claim to that food—what Amartya Sen calls an "entitlement to food."[2] This entitlement can come about through owning the food a person has produced himself, having the purchasing power to buy it in the market, or having some other recognized claim to the food, such as being a family member entitled to shared household resources or being included in a relief agency's list of those qualifying for food aid.

Sen notes that at a most fundamental level, people are hungry because they do not own enough food; thus, to understand hunger, one needs to study the structure of ownership in society.[3] Food security in a given locale is thus inextricably linked to the fundamental rules of that society—everything from land tenure to gender roles to where international borders are drawn. The food insecure are hungry ultimately not because their villages or countries produce too little food but because the hungry do not own enough rights in society to command that an adequate diet be produced (either through their own efforts or those of others) and ceded to them. In this fundamental sense, food insecurity is a question of poverty.

For the majority of the people in the world, including the majority in low-income countries, access to food comes at least partially through the market—through having the income necessary to purchase an adequate diet rather than produce it entirely oneself.[4] Having sufficient income to purchase an adequate diet depends not only on the amount of money one earns but also on the price of food. Here is where the *availability* and the *access* dimensions of food security become inextricably linked. Availability reflects the supply side of the food

security equation, while access reflects effective demand, with *food prices* linking the two sides of the equation.[5] In low-income countries, where the poor may spend up to 70% of their cash incomes on food, the price of food determines in large part the poor's real income (i.e., what goods they can obtain with their earnings) as well as wage rates for unskilled labor, and thus non-farm employment opportunities.

The price of food, in turn, depends on the *cost* at which the food can be made available, either through local production, commercial imports, or aid. It is the cost of food to the consumer relative to her income, not the physical availability per se, that is crucial in determining food security. Mountains of high-priced food do little to help the poor who have no claim on that food. For example, the Bangladesh famine of 1974, in which between 26,000 and 100,000 people perished, occurred in a year in which food grain availability per capita actually was higher than it had been in any of the preceding 3 "normal" years. The famine was triggered by floods that destroyed the earning opportunities of landless rural workers, so that even though food was available, it was too "expensive" relative to their very low incomes.[6]

The real cost of food to consumers depends not only on farm-level productivity (which determines farm-level cost of production), but productivity throughout the *food system*—the set of activities that runs from "seed to table", including agricultural input markets, assembly markets, processing, wholesaling, and retailing. Frequently, post-harvest operations account for over 50% of the cost to the consumer of even relatively unprocessed products, such as grains, in poor countries, particularly in sub-Saharan Africa, where transport costs are high. *Productivity* is the key concept here rather than *production*. Productivity refers to the efficiency with which resources (e.g., farm labor, fertilizer, and seeds) are converted to desired outputs (e.g., food). Production simply refers to the level of output, which can be raised in many ways, some of

which can be very costly, such as the heavy use of subsidies, which drain resources from other productive uses in society, such as the financing of health care, agricultural research, and expanded education, many of which themselves are critical inputs to long-term food security. Thus, initiatives that simply seek to increase food production with little regard to improving the productivity of the food system ultimately contribute little if anything to food security.

Since the food system is a major employer of the poor in South Asia and Sub-Saharan Africa (either as farmers, farm laborers, or in marketing and processing activities), increasing productivity of this system (an aspect of "food availability") is linked in another important way to food access. Increasing productivity in the food system increases incomes of these workers, improving their ability to access food through the market. Broad-based growth of agriculture and the rest of the food system is thus critical to improving food security, but its impact on raising the incomes of the food insecure is at least as important as its impact on increasing local food availability.

Utilization

The definition of food security speaks of "sufficient, safe and nutritious food for an active and healthy life." An active and healthy life requires, at the cellular level, that the person's body be able to extract and use the nutrients in the food consumed. Thus, how the food is prepared (which affects its nutritional value) and the state of health of an individual (which affects the body's ability to absorb and use the nutrients) affect food security. Diarrhea, intestinal parasites, and a host of diseases can compromise the body's ability to benefit from the food ingested.[7] Efforts to provide safe drinking water; control, treat, and prevent disease (e.g., through vaccinations and oral rehydration therapy); and offer improved nutrition education all contribute

to food security through improving food utilization, and in some cases may contribute more to food security than increasing local food production.

Transitory vs. Chronic Food Insecurity

People become food insecure when the availability of food, their access to it, and/or their ability to utilize it are disrupted, either on a transitory or a chronic basis. For example, hurricanes or wars can wipe out crops, livestock, and roads, temporarily disrupting both food availability and access, leading to transitory food insecurity. The most extreme example of transitory food insecurity is *famine*, in which thousands or millions of people are pushed to starvation by such disruptions. Given the great improvements in emergency relief procedures in the second half of the 20th Century, no major famines since the late 1970s have been caused just by natural disasters such as droughts. All the major famines since the 1980s have had human disruptions, typically war and civil strife, as major contributors.

Famine is the most visible manifestation of food insecurity. As real and as painful as images of famine are, however, it represents just the top of the iceberg of food insecurity. In a given year, famine may affect a few million people worldwide. Yet *chronic* food insecurity, reflecting long-term inadequate access to food and ability to utilize it (due to poor health) affects nearly 1 billion people per year.[8] This chronic food insecurity is a silent killer that increases morbidity and mortality (especially among children), saps the energy of large elements of the population, reduces the cognitive ability of malnourished children, and slows economic growth. Its root causes are poverty (which results in inadequate access to food), slow productivity growth throughout the food system (which affects both the real cost of food to consumers and the incomes of those working in the food system), and poor health and nutritional knowledge (which

affect the body's ability to utilize the food consumed). Addressing the problem of chronic food security represents one of the most important yet stubborn challenges of the 21st Century.

Just as food access and food availability are linked and cannot be analyzed independently of one another, so too are transitory and chronic food insecurity inextricably linked. *Coping strategies* provide the conceptual link between the two. As poor households attempt to cope with transitory food insecurity, they frequently they sell off assets (farm equipment, draft animals, and in the extreme, their seed for next year's planting), compromising their ability to produce food or income in subsequent periods, plunging them into chronic food insecurity. Such a transition is referred to as a *poverty trap*.[9] One of the challenges in responding to acute food insecurity crises, particularly when relief responses are very limited, is how to target relief to those households that, absent assistance, are most likely to fall into such poverty traps.

Magnitude and Location of Food Insecurity in the World

The FAO estimates that as of early 2009, 963 million people suffered from undernourishment, which it defines as chronic hunger.[10] While the number of undernourished in the world grew by 80 million between 1990-92 and 2008, the percentage of the population in developing countries suffering from undernourishment fell steadily from 1990-92 through 2006, from 20% to 16%, reflecting impressive progress in poverty reduction in Asia over the period, particularly in China and India. During the period 1997-2006, the rate of undernourishment fell by more than 3% per year in East Asia and by 1.7% in South Asia.[11] But the global incidence of undernourishment, or chronic food insecurity, reversed its long-term decline in 2007-08, as the worldwide food price increases reduced the poor's economic access to food. According to the FAO, the number of the world's hungry grew by 115 million between 2003-05 and 2008 – by 75 million in 2007 and 40 million in 2008.[12]

As shown in Table 1, South Asia is home to the largest number of the food insecure (314 million in 2003-05; 21% of the region's population), but Sub-Saharan Africa has the largest incidence of undernourishment (30% of the population, for a total of 212 million people). Sub-Saharan Africa remains the part of the world where food insecurity seems most intractable, as evidenced by high, and in some cases increasing rates of undernourishment. These high rates are frequently associated with disruption of the food system and collapse of incomes due to current or recent wars (e.g., the rate of undernourishment in 2003-05 was 76% in the Democratic Republic of the Congo and 68% in Eritrea). Yet even in Africa, as shown in Table 1, the rates are highly variable by region, with the countries of West Africa that were not involved in civil strife generally having the sub-continent's lowest rates of chronic food insecurity.

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Ironically, even though food in developing countries is overwhelmingly produced in rural areas, a disproportionate share of the food insecure live in these areas, where incomes, and hence economic access to food, are much lower than in urban areas.[13] Yet with rapid urbanization in most developing countries, urban food insecurity is a growing problem. A common feature of many of the food insecure in both urban and rural areas is their reliance on markets to obtain most of their food. While the urban poor's reliance on food markets is widely recognized, it is less well known that the majority of the rural food insecure, including not only the landless but frequently the majority of small farmers, are net buyers of basic staples.[14] Thus, improving the efficiency of both urban **and** rural food markets in order to drive down the real cost of food to poor consumers needs to be a central element of any strategy to reduce chronic food insecurity.

Approaches to Improving Food Security

Given the broad definition of food security, covering food availability, access, and utilization, it is not surprising that a wide range of projects and programs claim to improve either transitory or chronic food security. Efforts aimed at dealing with transitory food insecurity have focused on all three dimensions of food insecurity: availability (e.g., through the creation of food reserve stocks), access (e.g., through distribution of emergency rations); and utilization (e.g., through distribution of oral rehydration kits to control diarrhea). Efforts to reduce chronic food insecurity have focused mainly on improving food availability. These efforts have included: (a) development of improved agricultural technologies through conventional and transgenic plant and animal breeding and better farm equipment; (b) improved post-harvest handling, processing and marketing technologies (c) expansion of the quantity and quality of farmland available, including expansion of irrigation, and (d) access to agricultural inputs such as fertilizers and improved seeds.

On a global level, increases in agricultural productivity are essential in order to allow food availability to grow apace with demand, which is driven by population growth, higher incomes, and increasing demands for non-food uses of the products (e.g., biofuels). Yet on a country and local level, a single-minded focus on the availability side of food security may be counterproductive for three reasons: (a) local food self-sufficiency may be a very costly way of achieving food security, (b) the *pattern* of resource use to achieve agricultural growth is at least equally important for improving food security as the *rate* of agricultural growth, and (c) some efforts to expand food availability through increased production may hurt food utilization.

Self sufficiency as a costly path to food security – Self-sufficiency refers to producing most or all of the food one consumes oneself—at the household, national or regional level.

Advocates of a "food first" approach[15] argue that food-insecure countries should give first priority to producing staple foods for their own populations and eschew production of export crops, which is seen as using the resources of the poor to feed rich overseas consumers (or fill the fuel tanks of the rich with biofuels). The shortcoming of this approach is that it focuses only on the impact of agricultural production on food *availability* and ignores economic access to that food. *If* the poor can participate in a remunerative way in the production of export commodities (either through producing the products themselves, as is the case in smallholder cocoa and coffee production in West Africa; or through employment elsewhere in the value chain), and *if* staple food markets work well, the poor may be able to assure themselves much greater access to food by participating in the export production and using their earnings to buy food produced by others (e.g., rice farmers in Vietnam). A self-sufficiency approach foregoes the potential gains from comparative advantage and trade, which historically have been major factors in improving the welfare of the poor in much of the world.[16] However, lack of access by the poor to remunerative participation in export production (e.g., due to insecure land tenure, highly stringent grades and standards, and weak labor laws) and poorly functioning international and local food markets can undermine these potential gains from a trade-based approach to food security. For example, export restrictions imposed by many Asian and African food exporting countries during the food crisis of 2007-08 led many countries to move away from trade-based approaches to food security, seeking instead either to increase their food self-sufficiency or to acquire access to overseas land where they could produce food to export to their own countries.[17] These developments highlight the need for international agreements aimed at assuring reliable, open international markets for food if countries are to avoid very costly second-best approaches to assuring their food security.

The pattern of agricultural growth. Efforts to expand agricultural production through large-scale mechanized farming in low-income areas of Asia and Sub-Saharan Africa fall into the same trap as the Food First approaches—they focus solely on increasing food availability, with little attention to whether the projects generate the broad-based income growth essential to improving the poor's access to food. Frequently, such large-scale approaches use capital-intensive, labor-saving equipment such as large tractors and combines that are economically efficient in high-income countries where labor is expensive and capital is relatively cheap but which are not efficient in the low-wage economies of South Asia sub-Saharan Africa. Few such projects for the production of staple foods have been sustainable in these areas without substantial subsidies.[18] Moreover, such approaches, by concentrating the returns to farming in a few hands of large landowners, fail to generate the broad-based mass of purchasing power necessary for sustained growth of both agricultural and non-agricultural incomes that are at the core of assuring improved access to food.[19]

Potential conflicts between agricultural expansion and other contributors to food security. Poorly designed efforts to expand agricultural production can lead to unintended negative effects on food security by compromising food utilization. For example, expanded agricultural production may increase demands on women's time for agricultural tasks, which can lead mothers to devote less time to child care (resulting in poorer child health). Irrigation schemes may result in more standing water and consequently growing populations of disease vectors such as mosquitoes and schistosomiasis-bearing snails; and agricultural workers may face greater exposure to pesticides. In each case, the resulting poorer health can lead to poorer food utilization and hence greater malnutrition. The solution is not to eschew agricultural growth, but to recognize that food security is determined by factors broader than just agricultural

production; consequently, efforts to expand agricultural production need to take these other factors into account.

These considerations notwithstanding, increasing broad-based agricultural production ***is*** critical to improving long-term food security in most low-income countries, not only to increase food availability, but also to increase incomes of the poor (both in agriculture and related non-agricultural enterprises) in order to increase their economic access to food and to provide the economic growth necessary to finance the educational and health services critical to improving food utilization.[20] The central challenge is to do so in a way that not only fosters improved food access, availability and utilization in the long run but is consistent with responding to short-run crises of food insecurity.

The Central Challenge: Designing Approaches that Simultaneously Address Transitory and Chronic Food Insecurity

The central challenge in dealing with food insecurity is to design approaches that deal with short-term (transitory) food crises in ways that do not undermine the long-term productivity growth that is critical to overcoming chronic food insecurity. Many traditional ways of dealing with food crises, such as distribution of emergency food aid, imposition of price controls, and bans on food exports, depress food prices and thereby undermine incentives for farmers, traders, and processors to invest in the types of productivity-enhancing innovations critical to reducing chronic food insecurity. The challenge arises because of what Timmer, Falcon, and Pearson have termed the *food price dilemma*.[21] The dilemma arises because food prices play a dual role in the economy: they create incentives for farmers, traders, and processors to invest in productivity-enhancing innovations in the food system (the higher the prices, the greater the incentive); and they also are major determinants of the real income of the poor, and hence their

access to food (the lower the prices, the greater the access). This dual role of food prices makes "getting prices right" in order to promote food security a complex task, as one needs to ask "right for whom and over what time period?"

The long-term solution to the food price dilemma is increased productivity throughout the food system, which allows food to be produced and delivered to consumers at lower real prices (by lowering costs), while maintaining sufficient profitability in the system to induce ongoing private investment. The problem is that in the short-run, many people still face food insecurity, and their coping strategies may lead them to disinvest (sell off or eat their assets, such as livestock), which undermines productivity growth. Thus, efforts to spur productivity growth over the longer term must be accompanied by shorter-term measures to protect those most vulnerable to both transitory and chronic food insecurity. Timmer, Falcon and Pearson's recommended solution transitory food insecurity is *targeted* food subsidies to the poor. The notion of targeting is crucial because the cost of generalized subsidies (either explicit budgetary subsidies to reduce the price of food, or implicit subsidies, such as those that result from price controls) are very high to a country, either in terms of budgetary outlays or in terms of opportunity cost of resources that could be used either to increase productivity in the food system or invest in other activities, such as improved health systems or nutrition-education programs. Ideally, what one seeks are targeted subsidies that actually enhance rather than discourage the long-term investments necessary to improve productivity throughout the food system. Examples include food-for-work programs that build infrastructure that reduces marketing costs for food, and child feeding programs that keep children in school, thereby expanding investment in the human capital needed to spur broad-based income growth. Targeting such assistance is difficult,

however, in economies characterized by pervasive poverty and where the administrative capacity to identify "the deserving poor" from the "undeserving" is weak.

We now turn to operational approaches to address the food-price dilemma, focusing on ways of increasing productivity in the food system and reducing transitory food insecurity in ways that reinforce each other.

Ways Forward – Operational approaches

Improving Food System Productivity

Increases in productivity of the food system require increases in productivity on the farm, but also off the farm so that agricultural inputs can reach the farm, and farm produce be delivered to consumers, more cheaply. Increases in the productivity of food systems require capital investments. And given two decades of underinvestment in agriculture in food-insecure countries, there is a lot of catching up to do.[22] But investment in what? Bonnen identifies four types of capital necessary for rural development: physical, biological, human and institutional. The mix of these types of capital will vary over time and space according to the natural and economic endowments of a particular food system, but all four types of capital must be engaged.[23]

Physical capital investments lower the cost of food by increasing the productivity of labor and management in both the on- and off-farm parts of the food system. Massive investments in irrigation were the foundation of Asia's Green Revolution. With water control assured, modern varieties could express their full yield potential with little risk of crop failure. The higher financial profitability of irrigated production led to a second round of investments in equipment such as mechanical threshers, or power tillers. Physical capital investments also took place off the farm, in primary and secondary road networks, and crop storage and marketing facilities.

While capital investments like irrigation may contribute to reducing food insecurity, they are not a panacea. They are very costly investments, require high levels of management and expensive maintenance, and water is itself becoming an increasingly scarce resource. For example, only 3.5% of Sub-Saharan Africa's arable land is irrigated, less than a fourth that of India in 1961, at the dawn of its green revolution. Increasing the percentage irrigated land up to that which India had in 1960 would cost approximately US$114 billion, more than 55 times the annual official development assistance allocated to African agricultural development in the early 2000s.[24]

Biological capital refers to ecosystem resources, such as soil, plant life, forests, aquifers, and wildlife, as well as investments in genetic modification to increase the biological and economic productivity of plants and animals. The importance of biological capital is receiving greater attention due to concerns about loss of biodiversity, as well as the potential to earn income through trading carbon credits. In many food insecure countries, particularly in Africa, soil biological capital has become severely degraded.[25] The increased real cost of chemical fertilizers makes investment in improved, biologically sustainable production systems, together with conservation farming techniques that make better use of limited rainfall, a high priority. Genetically Modified Organisms (GMOs), often painted as a threat to biodiversity in western countries where they were developed to tolerate specific herbicides or resist pests, may have a key role to play in achieving food security in the future. Examples of GMOs include varieties of drought-resistant corn, parasitic weed-resistant sorghum, vitamin A-enriched rice and cassava, aflatoxin-resistant peanuts, and insect-resistant pulses.

Human capital investment is essential for increased productivity on the farm, for diversification into non-farm income sources, and for making the transition to full-time employment in non-agricultural sectors.[26] Human capital investment involves, primarily,

education and improved health. Indeed, the effectiveness of investment in education requires complementary investments in health and nutrition. On the farm, education in literacy and numeracy provides the foundation for learning about improved production and storage technologies. It also facilitates membership in farming organizations, and the ability to use market information. Education is also correlated with the ability to diversify into non-farm activities that use off-season labor.[27] Non-farm activities both increase total households income and provide an important shock absorber when farm income is reduced by climatic or disease problems. Education is also essential to the transition from employment in the agricultural to non-agricultural sectors, often accompanied by migration from rural to urban areas. When migration takes place without adequate investment in education the result can simply be a transfer of rural food insecurity to urban food insecurity, and even greater levels of political instability.

Institutional capital is the "invisible hand" that enables markets to work. Institutions define ownership of resources, and the rules by which they can be exchanged. In addition to laws concerning property rights, and the mechanisms to enforce them, there is a broad range of institutional "software" that is needed to enable food systems to function effectively, such as food policies (including trade policy), grades and standards, rules governing commodity exchanges, biosafety frameworks for the development and testing of GMOs, and agricultural statistics and market information systems. The creation and maintenance of this economic software is costly, involving investments such as the development and retention of trained researchers and analysts, and investment in land titling programs to enable assets to be used as collateral. An important subset of institutions relate to the management of production and

exchange risks at different levels of the food system – household, community, national and global.

While the specific mix and form of each type of capital will vary, all are needed to achieve improvements in food security. Two key issues for development policy are 1) who should be responsible for identifying and making the investments (public versus private versus community investments), and 2) what policy framework will best facilitate private investment? There is high degree of interdependence between public, private and community investments in the four types of capital necessary for the promotion of food security over time. A particular challenge to policymakers is the high degree of heterogeneity in capital resource endowments within rural communities, as well as across communities (i.e., spatially). For example, the majority of smallholders in Africa are net buyers of food staples, and even among those with a surplus the majority of sales come from just a small minority of households.[28] Thus, trade policy and marketing investments that lead to higher prices for sellers in a given location may hurt net buyers in the same location (even if net buyers somewhere else are better off as a result). Recognizing and understanding heterogeneity in resource endowments is essential to developing strategies and programs with the appropriate mix and form of capital investments to avoid "robbing Peter to pay Paul". Decentralized approaches to local food security planning, such as those adopted recently in Mali, where local communities develop their own priorities which then guide public (including local) and NGO investments to improve food security, are one way of addressing such heterogeneity.[29]

Addressing Transitory Food Insecurity in a Way that Reduces Chronic Food Insecurity

When evaluating ways of addressing transitory food insecurity, a critical step is to seek solutions that address short-term food needs of the vulnerable and simultaneously support (or at

least do not damage) long-term improvements in food security. Selecting food aid commodities and distribution systems that do not undermine local production incentives is one of the key decisions highlighted in the literature, but there are many other areas in which interventions to meet short term needs can actually support longer term improvements.

Saving lives by improving transitory food security, especially during emergencies with the risk of famine, has been the focus of international organizations such as the World Food Programme, as well as nongovernmental organizations and national governments. While past emergency response efforts have not always been closely coordinated with longer term development programs, new approaches seek to meet immediate food needs while building assets and improving future prospects for achieving long-term food security, at individual, household, community and market levels. These interventions may address food availability issues, such as improving agricultural production or lowering transport costs, or they may improve access by increasing incomes of food-insecure households.

Food-for-work and cash-for-work programs have been in use for decades, including during the Depression of the 1930s in the United States and in India and Bangladesh during crises, helping to build infrastructure while providing income to impoverished workers. In these programs, participants receive much-needed income in the form of cash or food, while the roads built or forests planted contribute to longer term growth or sustainability for society as a whole. For success in meeting the short-term needs, there must be labor availability in the households with greatest need. For example, if the most food-insecure households are made up of the aged and infirm, such programs will not be effective in raising their incomes. Also, the program must be designed to attract those households with greatest need and not draw labor from other productive activities. In food-for-work programs, the selection of foods used to pay the workers

can mean the difference between households eating the food or selling the food to obtain other types of food, pay debts, or use the receipts in other ways.

Cash transfers, whether conditional (e.g., in exchange for participating in a literacy class) or unconditional (given simply as payments to those deemed most food-insecure) are one type of intervention that is being used more frequently in recent years as an alternative to delivery of food aid directly to households. As with the food- and cash-for-work schemes, the design of the programs and the targeting aspects are key in ensuring that the needs of the food insecure can be met.

Unconditional cash transfers to food-insecure households or individuals are designed to help provide the means to purchase the food in local markets. As an alternative to free food distribution, this approach aims to: (a) give the household greater choice in the type of food obtained and (b) rely on the private marketing system, rather than relief agencies, to deliver the food, thereby increasing incentives to local farmers and traders to invest in food production and distribution. Since cash is fungible, however, cash transfers enable households to make their own decisions on the use of the funds, whether for health needs, food, school fees, or other needs. Although some may see use of the money on non-food items as a “leakage” out of a food-security program, it should be remembered that funds spent on health care, for example, may increase food security through improving food utilization. While donors have expressed concern about how the funds will be used, program monitoring in several pilot schemes indicate that the fears of misuse by recipients (to buy alcohol or “luxury” items) may be exaggerated.[30]

Many safety net programs use cash transfers, especially in urban environments where the markets for consumer staples are functioning and can respond to increased demand caused by the income transfer. Key to this intervention is the idea that the cash inflow will assist the household

in retaining productive assets (including human health) that enable the household to survive and avoid falling into a poverty trap. Such programs are not, however, suitable for emergency situations where markets have been severely disrupted and where the injection of increased purchasing power by the poor will likely just lead to increased food price inflation. In such situations (which are usually very temporary), direct distribution of food is frequently more effective in addressing transitory food insecurity.

Conditional cash transfers are funds that are available to an individual or a household if specific actions are taken. For example, households may be given cash if their daughters attend school. The current income supplement encourages building the human capital of girls, which is known to bring about improvements in health and welfare over time in rural communities where girls are not attending school.[31] Another example is vouchers that have value when used for the purchase of seeds or other agricultural inputs. In this case, the transfer encourages agricultural investments that are designed to increase incomes within a cropping cycle, while also enabling farmers to select new technologies with less financial risk. In contrast with unconditional cash transfers, investment decisions resulting from conditional cash transfers are made by a third party that sets the conditions for the grant (e.g., a local government or an NGO), with a specific view on what will make a longer-term difference while meeting the immediate food need.

There are also innovations on the food-availability (supply) side that are currently being tested. With the encouragement of several donors, the World Food Programme (WFP) is increasingly purchasing food for food-aid distributions within the country or region of the distributions. For example, in 2001-2005, WFP purchased maize and beans in Mozambique to distribute within Mozambique to victims of flood and drought, as well as chronically food insecure populations. There are three key goals with this approach: 1) to meet the food needs of

vulnerable populations with locally appropriate foods; 2) to lower the costs of procurement and distribution of food aid by buying locally, and 3) to increase the producer incentives for production within the country to meet those needs now and into the future. Tschirley and del Castillo evaluated WFP local and regional purchase operations and found that the first and second objectives are usually met.[32] Additional research is needed to fully assess the third objective. Local and regional purchases work best when there are only localized food shortages or when food insecurity is primarily due to low incomes (poor access). Purchasing relief supplies locally in the context of a widespread production shortfall can lead to further food price inflation.

Related to the local and regional purchase are the efforts to increase food staple stocks in rural areas, through improving on-farm storage, community grain banks or market storage incentives. In Mozambique, community development funds have been used as seasonal stocking loans for private traders, such that maize grain, a major staple, can be sold by local farmers, and then those stocks are available for the local markets later in the year when farm stocks run low. Community cereal banks have been promoted based on the same idea, although management of such cereal banks frequently remains problematic.

Food-aid decision makers may also look to commodity selection as a key supply-side consideration. Research in southern Africa has demonstrated that by distributing maize grain rather than flour, there is increased use of local small-scale maize milling facilities in rural and urban areas, providing a low cost staple, which is an inferior good in economic terms, but more nutritious than industrially refined flours.[33] Thus, the self-targeting commodity (maize grain for whole-grain maize flour) is useful in developing local processing while avoiding leakage of the product to non-target populations. Local knowledge is needed to identify commodities that are

self-targeting and least likely to cause problems for local producers and in local markets (e.g. rice with high percentage of broken grains, whole-grain maize meal, or cassava).

Roles of Different Actors: Who Should Do What?

We now turn to the issue of organizational roles (i.e., who does what) with regard to the implementation of food-security measures. Major factors affecting the success or failure of food security initiatives are 1) the degree of organizational capacity to undertake identified roles, and 2) the ability to coordinate among organizations over time, space and levels of aggregation. We focus primarily on Sub-Saharan Africa (SSA) because of its very high incidence of food insecurity.

The World Food Summit of 1996 recognized that national governments have primary responsibility for ensuring the food security of their populations.[34] Indeed, the most severe food insecurity crises occur when national government fails or is overwhelmed. Governments are primarily responsible for providing the public goods to enable households to pursue food security through their economic activities. The most essential public goods are security of life and property and the rule of law. Governments are also responsible, in most cases, for ensuring the provision of investments such as road and communication infrastructure, education, health services, crop and livestock pest and disease prevention, information services, and policy frameworks to govern resource use, markets and trade (despite moves in recent years to support some of these services through user fees). The provision of public goods affecting food security is a very complex proposition, involving multiple line ministries and multiple levels of government (local, regional and national). The coordination challenge, even within government, let alone between government and other actors, is real and daunting.

Sub-Saharan African nations, in particular, have found it difficult to put in place effectively-coordinated national food security strategies. A 2008 U.S. Government Accountability Office report on international food security noted that less than half of national poverty reduction strategies in SSA adequately articulate food security as a priority despite high rates of malnutrition, and that in 2006 only 17 SSA countries out of 48 provided a report to the FAO office responsible for monitoring the World Food Summit plan of action.[35] A recent review of Government responses to food crises in Southern and Eastern Africa found that interventions in national and regional food markets often aggravated the situation further.[36] As a consequence of the failure to make adequate, coordinated investments in food security, development assistance expenditure on food aid for African countries has risen dramatically over the last 15 years, crowding out resources for investment in longer-term food production growth.

To encourage African governments to take greater responsibility for agriculture and food security, the Africa Union (AU) endorsed in 2003 the Comprehensive African Agricultural Development Program (CAADP). CAADP encourages countries to adopt annual targets for agriculture's share of total public investment and agricultural growth of 10% and 6% respectively, focusing on investment programs for land and water use, markets and agribusiness, food security and agricultural technology. In 2008, the AU Ministers of Agriculture approved the Framework for African Food Security (FAFS), which provides guidance to countries on the development of national food security strategies and investment plans to improve food security risk management, increase food supply, improve dietary quality, and expand economic opportunities for vulnerable populations.

While African governments, as well as governments in some smaller, very poor Asian countries such as Laos and Cambodia, are gradually taking more leadership for national food

security policy, they clearly face major capacity constraints in terms of trained analytical capacity. As a result, functions that would normally be carried out by governments are often shared with (and in cases duplicated by) international donors, and international NGOs and their local counterparts. As international prices for wheat and rice began to rise dramatically in early 2008, the United Nations' World Food Program (WFP) and Food and Agriculture Organization (FAO) rapidly deployed country assessment teams in conjunction with country food security thematic groups to assess the degree of vulnerability and response options. In some cases, the governments established their own response working groups, but without any regular consultation mechanism in place with the donor group. The role of international NGOs has also expanded considerably over the past two decades from a primary focus on emergency food, medical and disaster relief to include the delivery of a broad range of agricultural development services including agricultural research, agricultural extension, seed multiplication and input delivery, farmer association development. NGOs are also facilitating the participation of smallholder farmers in commercial crop and livestock value chain development in partnership with private sector companies. Inevitably the lines of responsibility between government, donors and NGOs are blurred by government capacity constraints, and governments often find themselves in a "Catch 22" situation of being unable to compete with international organizations in recruitment and retention of qualified national personnel.

For the vast majority of countries that adopt a market-based approach to food security, the private sector is the locomotive, and well-functioning food markets need to serve as the first line of defense against food insecurity. The private sector involves a broad range of actors including farmers, farm organizations, input suppliers, traders at many levels, food processors and preparers, transporters, and banks. The private sector needs the support of government to

provide public goods such as infrastructure, as well as transparent regulatory frameworks that safeguard consumers and enable fair competition. It also needs the state to create "space" for civil society, including professional organizations for farmers and traders, which can undertake collective action to help reduce transaction costs and lobby for policies to promote broad-based economic growth. Critical to effective coordination among government, the private sector and civil society is trust, built on a foundation of understanding of each others' roles and constraints. All too often that understanding is missing, with government (and sometimes NGOs) perceiving the private sector as exploitative of farmers or consumers, or trust breaks down because regulations become a means to rent seeking or bribery. When governments try to take over some of the functions of the private sector in response to food crises, the private sector can become "paralyzed" and the crisis becomes worse.[37] Market information systems can provide a valuable communication bridge between the government and private sectors, as well as providing both with information needed to undertake their respective roles. Unfortunately, the rapid rise of prices on international markets in 2008, accompanied by temporary export bans, has undermined many governments' confidence in the role of markets in achieving food security. Restoring that confidence will require careful analysis of international food market risks and risk management tools, as well as upgrading national market information systems to be able to analyze the likely impacts of international markets on domestic prices.

Conclusions

Despite enormous progress in reducing poverty over the past 20 years, particularly in Asia, one out of every six people in the developing world suffers chronic hunger, a number that increases to one in three in Sub-Saharan Africa. Superimposed upon this landscape of chronic food insecurity are episodes of transitory food insecurity—crises due to temporary disruptions of

local food availability, vulnerable populations' access to food, and their ability to utilize it. At its root, food insecurity in its different dimensions is rooted in poverty—of individuals, families, communities and governments, but also in a poverty of ideas and institutions needed to simultaneously foster the broad-based productivity growth in the food system needed to reduce chronic food insecurity in the long run while at the same time building reliable and affordable social safety nets for both the chronically and temporarily destitute.

If the various dimensions of food security—availability, access, and utilization, as well as transitory and chronic—could each be addressed independently, solutions would be much easier. But the various dimensions are inextricably linked through food prices and household coping strategies. For example, ensuring food security involves much more than just producing more food, and in some cases, concentrating single-mindedly on local food production may actually undermine food security. The key challenge remains how to design financially and socially sustainable strategies, policies, and programs that address the poverty and low productivity in the food system that lie at the heart of chronic food insecurity while simultaneously addressing the very real needs of victims of transitory food crises. Improved technologies, policies and institutions are all needed to address the challenge. All three can contribute, among other things, to making food markets work better in both rural and urban areas. Such improvement needs to be a central part of any such strategy, given the huge reliance of the food insecure on such markets. But markets, by their very nature, do not serve the destitute, so complementary public policies are needed to help reach those whom markets cannot serve while not undermining the capacity of the markets to serve those who do have purchasing power. Such approaches require close collaboration of the public sector, the private sector, and civil society. Building such approaches will remain one of humanity's key challenges during the first half of the 21st Century.

Region	Total Population (millions)	Malnourished Population (millions)	Percent of Total Malnourished
World	6,406.0	848.0	13
Developing Countries	5,141.0	832.2	16
Asia and the Pacific	3,478.6	541.9	16
- East Asia	1,930.6	218.7	11
- China	1,312.4	122.7	9
- S.E. Asia	544.5	86.9	16
- South Asia	1,468.4	313.6	21
- India	1,117.0	230.5	21
Latin America & Caribbean	544.2	45.2	8
Near East and N. Africa	420.0	33.0	8
Sub-Saharan Africa	698.6	212.1	30
- Central Africa	93.1	53.3	57
- East Africa	242.4	86.0	35
- Southern Africa	99.2	36.8	37
- West Africa	263.7	36.0	14

Table 1. Prevalence of Undernourishment in the World, 2003-05

Source. Food and Agriculture Organization of the United Nations. *The State of Food Insecurity in the World 2008* (Rome: FAO, 2008), 48-49.

Notes

1. Food and Agriculture Organization of the United Nations, "Special Programme for Food Security," FAO, http://www.fao.org/spfs/en/ (accessed Dec. 22, 2008); U.S. Department of Agriculture and Economic Research Service, "Food Security in the United States: Measuring Household Food Security " USDA, http://www.ers.usda.gov/Briefing/FoodSecurity/measurement.htm (accessed Dec. 22, 2008); U.S. Agency for International Development and Bureau for Program and Policy Coordination, "Food Aid and Food Security Policy Paper" (Washington, DC: USAID, 1995). 7; Shlomo Reutlinger, "Policy Options for Food Security," Agricultural Research Unit Working Paper (Washington, DC: World Bank, 1985).

2. Amartya Kumar Sen, *Poverty and Famines: An Essay on Entitlement and Deprivation* (New York: Clarendon Press, 1982).

3 . Ibid., 154-56.

4. Although the majority of the poor and malnourished in Sub-Saharan Africa live in still live in rural areas and are engaged in producing a significant portion of their own food, numerous surveys have shown that a very large number of these farmers, in some cases the majority, are net buyers of basic staples. Thus, the price of these staples in rural markets has a very large impact on their food security. For details, see Michael T. Weber et al., "Informing Food Security Decisions in Africa: Empirical Analysis and Policy Dialogue," *American Journal of Agricultural Economics* 70, no. 5 (1988).

5. Effective demand is need backed up by purchasing power. For a discussion of the role of food prices in linking access and availability, see C. Peter Timmer, Walter P. Falcon, and Scott

R. Pearson, *Food Policy Analysis* (Baltimore: Published for the World Bank by The Johns Hopkins University Press, 1983).

6. Sen, *Poverty and Famines*, 137-38.

7. The utilization of the food also depends on the *safety* of the food—it being free of chemicals and pathogens that could cause illness. Issues of food safety, while very important, are beyond the scope of this chapter.

8. The Food and Agriculture Organization of the United Nations (FAO) estimates that soaring food prices in 2007 and the first half of 2008 increased the number of food insecure in the world from 848 million in 2003-05 to 963 million in 2009, illustrating the critical role that food prices play in affecting the poor's access to food and hence their food security. See Food and Agriculture Organization of the United Nations, "FAO Newsroom: Number of Hungry People Rises to 963 Million," http://www.fao.org/news/story/en/item/8836/icode/. (accessed Jan. 10, 2009); Food and Agriculture Organization of the United Nations, *The State of Food Insecurity in the World 2008* (Rome: FAO, 2008).

9 . Michael R. Carter and Christopher B. Barrett, "The Economics of Poverty Traps and Persistent Poverty: An Asset-Based Approach," *Journal of Development Studies* 42, no. 2 (2006): 178-99.

10. Food and Agriculture Organization of the United Nations, "FAO Newsroom: Number of Hungry People Rises to 963 Million." Unless otherwise indicated, the figures cited in this and the following paragraph are drawn from this document and from the FAO's *State of Food Insecurity in the World 2008*.

11. World Bank, *World Development Report 2008: Agriculture for Development* (Washington: World Bank, 2007). 47, 94.

12. Number of hungry people rises to 963 million. http://www.fao.org/news/story/en/item/8836/

13. World Bank, *World Development Report 2008*, 96.

14. FAO, *State of Food Insecurity in the World 2008*, 24-25; Weber, et al. "Informing Food Security Policy"; T.S. Jayne, D. Mather, and E. Mghenyi, "Smallholder Farming under Increasingly Difficult Circumstances: Policy and Public Investment Priorities for Africa,"*MSU International Development Working Paper* no.86, ed. Carl Liedholm and Michael T. Weber (East Lansing, MI: Michigan State University, Departments of Agricultural Economics and Economics, 2006). http://aec.msu.edu/fs2/papers/idwp86.pdf

15. See, for example, Frances Moore Lappe, Joseph Collins, and Cary Fowler, *Food First : Beyond the Myth of Scarcity* (Boston: Houghton-Mifflin, 1977).

16. John M. Staatz, "Conceptual Issues in Analyzing the Economics of Agricultural and Food Self-Sufficiency," in *National and Regional Self-Sufficiency Goals: Implications for International Agriculture*, ed. Fred J. Ruppel and Earl D. Kellogg (Boulder, Colorado: Lynne Rienner Publishers, 1991).

17. John M. Staatz et al., "Agricultural Globalization in Reverse: The Impact of the Food Crisis in West Africa," Paper presented at the *Geneva Trade and Development Forum* (Crans-Montana, Switzerland: 2008), http://www.gtdforum.org/download/Agricultural%20Globalization%20in%20Reverse_MSU_Crans-Montana%20paper.final.pdf; GRAIN, "Seized! The 2008 Land Grab for Food and Financial Security," (Barcelona: GRAIN, 2008), http://www.grain.org/briefings_files/landgrab-2008-

en.pdf. The efforts of countries like South Korea and some of the Gulf States to acquire huge tracts of land in Sub-Saharan Africa to produce food for export back to these countries raises serious concerns about the impact of such projects on the food security of the African countries involved—particularly for the indigenous populations currently living in the areas to be ceded to the outside investors.

18. For a recent analysis of this issue for Sub-Saharan Africa, see World Bank, Africa Regional Office, Agriculture and Rural Development Unit, *Awakening Africa's Sleeping Giant: Prospects for Commercial Agriculture in the Guinea Savannah Zone and Beyond* (Washington: World Bank, forthcoming).

19. Bruce F. Johnston and Peter Kilby, *Agriculture and Structural Transformation: Economic Strategies in Late-Developing Countries* (New York: Oxford University Press, 1975).

20. For a full discussion of the role of broad-based agricultural growth in stimulating income growth of the poor and generating the tax base for social services, see World Bank, *World Development Report 2008: Agriculture for Development.*

21. Timmer, Falcon and Pearson, *Food Policy Analysis*. The following paragraphs draw heavily on and expand some of the ideas developed in this classic book.

22. Joachim von Braun, "The World Food Situation: New Driving Forces and Required Actions," *Food Policy Report* (Washington DC: International Food Policy Research Institute, 2007).

23. James T. Bonnen, "Agricultural Development: Transforming Human Capital, Technology, and Institutions," in *International Agricultural Development,* ed. Carl K. Eicher and John M. Staatz (Baltimore: Johns Hopkins University Press, 1998).

24. John M. Staatz and Niama Nango Dembélé, "Agriculture for Development in Sub-Saharan Africa," *Background Paper for the World Development Report 2008* (Washington: World Bank, 2007). 32.

25. Pedro A. Sanchez, "Soil Fertility and Hunger in Africa," *Science* 295 (2002), David Weight and Valerie Kelly, "Fertilizer Impacts on Soils and Crops of Sub-Saharan Africa," *Michigan State University International Development Paper* no. 21 (East Lansing, MI: Department of Agricultural Economics, Michigan State University, 1999). http://aec.msu.edu/fs2/papers/idp21textonly.pdf

26. A significant portion, perhaps between a third and a half, of small farmers in developing countries, lack enough land and other assets to "farm their way out of poverty" and will likely need, over a generation, to move out of agriculture into other professions if they are to escape poverty. For an analysis of this issue, see World Bank, *World Development Report 2008*, 72-93.

27. Steven Haggblade, Peter Hazell, and Thomas Reardon, *Transforming the Rural Nonfarm Economy: Opportunities and Threats in the Developing World* (Baltimore: Johns Hopkins University Press, 2007).

28. Jayne, Mather, and Mghenyi, "Smallholder Farming under Increasingly Difficult Circumstances: Policy and Public Investment Priorities for Africa."; Weber et al. "Informing Food Security Policy."

29 . John Staatz et al., "PROMISAM (Project to Mobilize Food Security Initiatives in Mali): Final Technical Report," *Report to USAID/Mali* (Bamako, Mali: Michigan State University, 2008). http://aec.msu.edu/fs2/mali_fd_strtgy/PROMISAM_final_technical_report_2008.pdf

30 Hanna Mattinen and Kate Ogden, "Cash-Based Interventions: Lessons from Southern Somalia," *Disasters* 30, no. 3 (2006).

31 For an example from Mozambique, see Claudio Massingarela and Virgilio Nhate, "The Politics of What Works: A Case Study of Food Subsidies and the Bolsa-Escola in Mozambique," *Background Paper for the Chronic Poverty Report 2008-09* (Manchester, UK: Chronic Poverty Research Center, 2006).

32. David Tschirley and Anne Marie Del Castillo, "Local and Regional Food Aid Procurement: An Assessment of Experience in Africa and Elements of Good Donor Practice," *MSU International Development Working Paper* no. 91 (East Lansing: Michigan State University Departments of Agricultural Economics and Economics, 2007). http://aec.msu.edu/fs2/papers/idwp91.pdf

33. In economics, a good is defined as an "inferior good" if it has a negative income-elasticity of demand—that is, if, as an individual's income rises, she chooses to buy less of the good (substituting a preferred good—perceived as "higher quality" for the "inferior good."). For example, in many low-income countries, whole-grain flour is perceived as an inferior good; as incomes rise, consumers tend to shift towards more highly refined flour. It is important to note that "inferior good" in this sense does not refer to nutritional quality, for the whole-grain product may be superior nutritionally. But inferior goods are important in addressing food insecurity because if they exist in a particular setting, they can serve as a "self-targeting food" that can be subsidized to reach the poor, while the rich chose not to consume it.

34. Food and Agriculture Organization of the United Nations, FAO Corporate Document Depository, “Rome Declaration on World Food Security and World Food Summit Plan of Action”, http://www.fao.org/wfs/index_en.htm (accessed January 15, 2009).

35. U.S. Government Accountability Office, "International Food Security: Insufficient Efforts by Host Governments and Donors Threaten Progress to Halve Hunger in Sub-Saharan Africa by 2015," *Report to Congressional Requesters* (Washington, DC: GAO, 2008).

36. David and T.S. Jayne Tschirley, "Food Crises and Food Markets: Implications for Emergency Response in Southern Africa," *Michigan State University International Development Working Paper* no.94 (East Lansing, MI: Department of Agricultural, Food and Resource Economics, Michigan State University 2008). http://aec.msu.edu/fs2/papers/idwp94.pdf

37 Ibid.

Recommended Readings:

1. Donovan, Cynthia, Megan McGlinchy, John Staatz and David Tschirley. . *Emergency Needs Assessments and the Impact of Food Aid on Local Markets*. (Rome: World Food Programme, Emergency Needs Assessment Branch, 2005). http://documents.wfp.org/stellent/groups/public/documents/ena/wfp086537.pdf
2. Food and Agriculture Organization of the United Nations, *The State of Food Insecurity in the World 2008* (Rome: FAO, 2008). This is an annual publication; check for the latest issue.
3. Sen, Amartya Kumar. *Poverty and Famines: An Essay on Entitlement and Deprivation* (New York: Clarendon Press, 1982).
4. Timmer, C. Peter, Walter P. Falcon, and Scott R. Pearson, *Food Policy Analysis* (Baltimore: Published for the World Bank by The Johns Hopkins University Press, 1983).
5. World Bank, *World Development Report 2008* (Washington: The World Bank, 2008). Available online at http;// www.worldbank.org/wdr2008

Recommended Websites:

1. ELDIS Food Security Resource Guide: http://www.eldis.org/go/topics/resource-guides/food-security
2. Development Gateway Foundation, dgCommunities, Food Security Portal: http://foodsecurity.developmentgateway.org/
3. Food and Agriculture Organization of the United Nations, Special Programme on Food Security: www.fao.org/spfs/en/

4. Food and Agriculture Organization of the United Nations, Committee on World Food Security, Food Security Statistics: http://www.fao.org/unfao/govbodies/cfs/indicators_en.htm
5. International Food Policy Research Institute: http://www.ifpri.org/
6. Michigan State University, Department of Agricultural, Food and Resource Economics, Food Security Group: http://www.aec.msu.edu/fs2/
7. U.S. Department of Agriculture, Economic Research Service, Food Security in the United States: Measuring Household Food Security http://www.ers.usda.gov/Briefing/FoodSecurity/measurement.htm
8. World Bank Food Crisis website: http://www.worldbank.org/html/extdr/foodprices/
9. World Bank, World Development 2008: Agriculture for Development: www.worldbank.org/wdr2008
10. World Food Programme of the United Nations: www.wfp.org