Food Security: The Need for Multilateral Action

Presenter: Christopher Delgado
Draft Working Paper
May 13, 2010

Food Security: The Need for Multilateral Action

SDN¹: Christopher Delgado², Robert Townsend, Iride Ceccacci, Yurie Tanimichi Hoberg, Saswati Bora
DEC³: Will Martin, Don Mitchell, Don Larson, Kym Anderson
PREM⁴: Hassan Zaman

Busan, Korea
June 3-4, 2010


Inquiries to cdelgado@worldbank.org
⁴ PREM: Poverty Reduction and Equity Department, Poverty Reduction and Economic Management Network, World Bank.
The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the view of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the Governments they represent.
TABLE OF CONTENTS

Executive Summary .................................................................................................................. v

1. Introduction .......................................................................................................................... 1

2. The dimensions of food security ......................................................................................... 3

3. Why food security is important for growth as well as equity ........................................ 4
   3.1 TO SUSTAIN ECONOMIC CONVERGENCE AND MAINTAIN SOCIAL STABILITY ........ 4
   3.2 IMPACTS CAN LAST A GENERATION, LIMITING HUMAN POTENTIAL .................... 5
   3.3 INTERACTIONS BETWEEN FOOD INSECURITY AND CONFLICT DRAG SOCIETIES DOWN .......... 6

4. What needs to be done again, and what is different from the 1970s? ............................. 7
   4.1 EARLY GLOBALIZATION AFTER 1945 AND THE FOOD PRICE SPIKE OF THE EARLY 1970s ........ 7
   4.2 THE GREEN REVOLUTION AND RENEWING CONFIDENCE IN MARKETS 1976-2000 .............. 8
   4.3 SEA CHANGES IN GLOBAL CEREALS MARKETS 2001-2009 ........................................ 11

5. An uncertain outlook ......................................................................................................... 15
   5.1 MORE UNCERTAIN PRICES ...................................................................................... 15
   5.2 UNCERTAINTY OVER POVERTY AND HUNGER TRENDS ........................................ 18

6. The way forward: linking food security with growth strategies ...................................... 19
   6.1 INVEST MORE ......................................................................................................... 20
   6.2 INVEST BETTER IN FOOD AVAILABILITY AND STABILITY ..................................... 21
   6.3 INVEST BETTER IN FOOD ACCESS AND NUTRITION ............................................. 25
   6.4 A MULTILATERAL ACTION IS NEEDED .................................................................. 27

References ............................................................................................................................. 29
FIGURES AND TABLES

FIGURE 1: GLOBAL UNDERNOURISHMENT INCIDENCE TREND.................................................................5
FIGURE 2: REAL DOMESTIC AND INTERNATIONAL RICE PRICES, INDIA, 1965-2004, (RS/TON IN 1981 PRICES)..........8
FIGURE 3: DECLINING FOOD PRICES AMID RISING STOCKS ..................................................................11
FIGURE 4: GRAIN STOCK DESTOCKING AFTER 1983 AND 1997 ..................................................................11
FIGURE 5: FOOD AND GRAIN PRICES 2000-2010 ..................................................................................12
FIGURE 6: GROWTH RATES OF YIELDS FOR MAJOR CEREALS ARE SLOWING IN DEVELOPING COUNTRIES ..............21
FIGURE 7: LOCAL GRAIN PRICE VOLATILITY IN ETHIOPIA ......................................................................23
FIGURE 8: THE DISTRIBUTION OF SAFETY NET PROGRAMS ....................................................................26

TABLE 1: COUNTRIES WITH THE LARGEST INCREASE IN DOMESTIC PRICE OF MAIN STAPLES (OUT OF 58 COUNTRIES) ..19
Executive Summary

For the first time in history, more than one billion people are undernourished worldwide according to the Food and Agricultural Organization (FAO). This is about 100 million more hungry people than in 2008 and around one-sixth of the world’s population. Hunger in turn has irreversible consequences. At least 3.5 million preventable under-5 deaths per year are due to poor quality of dietary intake of children and mothers. And many more infants who survive every year are permanently disadvantaged through stunting and reduced cognitive development. Besides the obvious tragedy for those involved and the moral implications for a globalizing world, it is a prodigious tax on future growth for all.

The outlook for food security in developing countries with rapidly growing populations remains uncertain. Food prices are expected to remain volatile due to structural changes that have occurred in commodity futures markets since the late 1990s, and to policy distortions such as mandates for the use of food crops as biofuel feedstock. On the supply side, land and water constraints, coupled with the impact of climate change, are likely to result in more unpredictable food production.

It is essential to invest more and better in agricultural productivity growth. The share of agriculture in official development assistance (ODA) declined sharply from a high of 18 percent in 1979 to 5 percent in 2006-8, which equated to approximately a 50 percent decline in the real dollar value of support. Not surprisingly, the annual rate of growth of yields for major cereals in developing countries has declined from 3 percent to 1 percent over the past 30 years, a rate well below projected demand growth. Priority interventions in agriculture include smallholder-farmer-relevant research and extension, better management of land and water resources, reducing transaction costs by investing in rural infrastructure (feeder roads, irrigation, wholesale and retail markets, storage, information and communication technology), securing property rights of the poor, facilitating their access to markets, and development of institutions that allow cost-sharing between the public and private sectors for resource mobilization. Promoting rural non-farm employment in secondary towns and strengthening urban-rural linkages are essential pathways out of poverty. They require improving the rural investment climate, expanding rural infrastructure, and upgrading skills of the rural population to facilitate transition out of agriculture.

It will be equally necessary also to invest more and better in reducing the vulnerability of poor people who are increasingly exposed to food market volatility. It is difficult to promote growth and poverty alleviation without promoting increased market exposure, but increased market exposure will also increase vulnerability to increased food price and incomes volatility. Investing in food access, safety nets and nutrition is crucial to protecting the most vulnerable
parts of the population. It is both costly and often too late to re-create safety net structures every time they are needed, and countries with effective programs with a wide coverage of the poor have been able to curtail the human cost of recent crises.

Competitive markets lower the cost of basic staples to consumers and also provide a variety of food types that permit, if not, ensure dietary diversity. Measures required to make domestic food markets work better for the poor include investment in appropriate infrastructure, competition and regulatory policy and enforcement and strengthening information flows. At the global level, a comprehensive and ambitious conclusion of the Doha Development Agenda would strengthen the international trading system, considered essential for lowering cereal price volatility and long-term food security. From the food security perspective, grain-based biofuel mandates, export bans for cereals, and similar policy interventions that reduce the ability of international markets to stabilize domestic markets in import-dependent countries should be on the agenda for discussion.

Vulnerable individuals, especially pregnant women and infants under two years of age, require special attention to ensure that they are able to consume a sufficiently nutritious diet. Interventions to increase female income, including through access to safety net programs, have been shown to be effective at achieving a better quality of diet for children in the household. The provision of fortified foods is the missing link in most food based safety net programs, yet most food-based safety net programs provide, or subsidize, non-fortified food because they are cheaper to source or because the local private sector does not have the capacity to fortify.

Greater multilateral action is needed to improve aid effectiveness. Bilateral and multilateral aid is allocated on a per country basis, often for all purposes, and sectoral projects are typically programmed three years in advance. In effect, there is no standing bilateral or multilateral pool of sectorally targeted but otherwise unallocated, flexible, capital available to adequately support and complement what countries are asking donors as a group to do for agriculture and food security. The Global Agriculture and Food Security Program (GAFSP) was recently created for this purpose, and housed in the World Bank, which serves as the Trustee. Its role is to assist in the implementation of pledges made by the G8++ at L’Aquila in July 2009 for the use of a variety of external supervising entities (such as Multilateral Development Banks and some UN Agencies). It was created in response to a request from the G20 Summit in Pittsburgh in September 2009. The new mechanism was set up under external joint donor and recipient governance and launched in late April 2010. Its objective is specifically to address the underfunding of country and regional agriculture and food security strategic investment plans already being developed by countries in consultation with donors and other stakeholders at the country-level. To date, GAFSP has been generously supported by pledges and disbursements from (in alphabetical order) the Bill and Melinda Gates Foundation, Canada, Republic of Korea,
Spain, and the United States. In order to succeed, it requires both moral and financial support from a larger group of G20 countries committed to growth and food security in poor countries.

In short, increased and better coordinated action in agriculture, social safety nets, and nutrition by low income countries and development partners is required if food security trends are to improve. The architecture for better coordination of scaled-up engagement is emerging and needs to be further strengthened. Country level coordination among development partners has improved, building on the Paris Declaration and the Accra Agenda for Action. At the global level, the United Nations’ High-Level Task Force (HLTF) on the Global Food Crisis has been established to coordinate actions on food security amongst relevant UN agencies. The World Summit of 2009 on Food Security adopted the 5 Rome Principles of Global Food Security to guide action by donors, countries, and partner agencies: (1) invest in country-led plans amenable to achieving real results; (2) foster better stakeholder coordination; (3) combine both short-run humanitarian programs with longer-run structural approaches capable of dealing with root causes; (4) improve the efficiency and effectiveness of multilateral response; (5) increase aid predictability to mobilize commitment to food security. The G20 needs to ensure that future interventions are carried out in support of these principles.
1. Introduction

Economic growth is hampered and cannot be sustained in poor—and especially populous poor—
countries if there are major uncertainties concerning the availability of food staples that typically
account for half of household net expenditures. This was widely recognized in the 1960s and
1970s, following protracted periods of famine and global food price volatility. Major
international efforts in research, extension, and irrigation infrastructure then led to the expansion
of rice, wheat rice and maize production that has been credited with most of the tripling of global
cereal production between 1949-51 and 1995-97. The part of this process that occurred in
developing countries, termed the “Green Revolution”, was largely propelled by judicious public
goods investment in agriculture, primarily in Asia, that allowed smallholder farmers to be part of
the solution and not just part of the problem. The Green Revolution has clearly been central to
preventing hundreds of millions of deaths from starvation and has been a key factor permitting
the tripling of global population over the same period (Borlaug 2000).

Greater public investment in agricultural productivity growth contributed to the trend decline in
food prices, which also became much more stable following the first half of the 1970s until 2002.
Besides increases in global food security, this fact was central to the success of labor-intensive
industrialization strategies in large countries such as China (Hayami 1997). However, in large
part due to the decline and greater stability in world prices, complacency set in globally with
regard to the provision of public goods investment to stimulate continuing private sector
response in poor countries. Donor financing for investment in agriculture was halved in real
terms, declining from 18 percent of overall donor support to developing countries, to about 3
percent in 2002, rising again to 5 percent by 2006. The share of public spending on agriculture
by developing countries also declined. As a result, the average annual rate of growth of cereals
yields in developing countries fell steadily from 3 percent during the late 1970’s to less than 1
percent presently, a rate less than that of population growth and much less than the rise of the
use of cereals for other things besides direct use as food (WDR 2008).

Increasing aggregate food availability is not enough to reduce hunger. The study of famine has
shown that the key to reducing hunger is to increase the “food entitlement” or command over
food of individuals, which may or may not be linked to aggregate food availability in markets.
Changes in food entitlements could occur through changes in a variety of factors, such as
policies (domestic and foreign), environment, technologies, and individual characteristics that
affect how individuals secure access to food (Sen 1981). The main point is that aggregate food
availability alone is not enough, even though subsequent work has shown that in many cases
improvement in the overall national food supply is a necessary if not a sufficient condition for
reducing hunger (Eicher and Staatz 1998).
Something major needs to be done to reverse declining trends in the growth of cereal yields in developing countries, especially in the most populous poor ones that cannot expect to be able to rely increasingly on imports for large shares of their basic foods. Failing this, the prospects for sustained overall global growth are unclear. Addressing this issue will require major resources, a global approach, and involves investment in public goods such as infrastructure, research and extension. Widely accepted and detailed analysis of the historical experience of agriculturally-dependent countries suggests that it will be very difficult to have any economic growth or diversification into industry in these countries without widely spread fundamental improvements in agricultural productivity growth occurring first (WDR 2008). Moreover, experience in the early 1970s suggests the likelihood of increasingly inward-looking agricultural trade regimes, rising domestic food prices that accelerate confrontations over wage demands, and protracted social unrest. Furthermore, the present economic outlook resembles, but with greater uncertainty, the early 1970s more than any time since then with respect to the outlook for high commodity price volatility (FAO 2009a). While direct efforts to curb this volatility seem questionable, there is urgent need for concerted global action to mitigate the negative effects of this volatility on the poor in poor countries.

For the first time in history, more than one billion people are undernourished worldwide. This is about 100 million more than before 2008 and around one-sixth of the world’s population. Rising hunger is a global phenomenon and all regions in the world have been affected by the increase in food insecurity. Asia and Pacific, the world’s most populous region, is home to the largest number of hungry people (642 million). Sub Saharan Africa has the largest prevalence of undernourishment relative to its population size (32 percent). The largest percentage increase in the number of hungry people in the developing world in 2009 from 2008 levels occurred in the Near East and North Africa (+13.5 percent). Latin America and Caribbean, which was the only region in recent years with signs of improvement, also saw a marked increase (+12.8 percent). Even in developed countries, undernourishment has become a growing concern (FAO 2009b). Globally, 178 million infants have suffered long-term physical and mental impairment from malnutrition since 2008 (De Pee et al 2009). Renewed action is essential to the creation of a climate of mutual benefit necessary to the success of sustainable global economic growth. Now is the time to act in a significant and more effective way.

Declining donor support for agriculture from around 1980 until recently, together with growth in the proportion of support in bilateral forms, have imposed significant transaction costs of aid and diverted local capacity. Availability of significant additional donor resources for agriculture has been largely limited to replenishment cycles of multilateral development banks, or to funds available through private foundations. Some progress has been made to address these issues through the Paris Declaration on Aid Effectiveness, and the Accra Agenda for Action, and bilateral donors have made progress on alignment of plans at the country level. However, a broader multilateral effort is needed, as recognized and called for in 2009 by the G8 and the G20.
2. The dimensions of food security

“Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (World Food Summit 1996). Food insecurity results from failures in food availability, access, utilization or stability.

The concept of availability holds that sufficient quantities of food of appropriate quality are supplied through domestic production or imports (including food aid). Problems with food availability at the national level arising from national production fluctuations are typically addressed with imports. However, in some situations grain imports may be slow in coming, or not coming at all due to logistical problems, trade distortions (such as export bans by suppliers), foreign exchange problems or credit issues.

Individuals should have adequate incomes or other resources to access appropriate food needed for a nutritious diet. For most of the malnourished, the lack of access to food is a greater problem than availability. Most of the food insecure live in rural areas where food is produced and available for purchase, but they cannot afford to buy it. This is a particular problem for those whose usual food entitlement is to grow their own food and the crop fails. Poverty and lack of alternative income sources or liquid assets constrain their access to food in the marketplace. According to the UN Hunger Task Force, about half of the hungry are smallholders; a fifth are landless; and a tenth are agropastoralists, fisherfolk, and forest users; the remaining fifth live in urban areas (Sanchez et al 2005).

The concept of food utilization addresses the fact that nutritional well-being where all physiological needs are met depends on the adequacy of diet, clean water, sanitation and health care. Food must not only be available and accessible, but also be of the right quality and diversity (in terms of energy and micronutrients), be safely prepared, and be consumed by a healthy body, as disease hinders the body’s ability to turn food consumed into adequate nutrition.

To be food secure, a population, household or individual must have access to adequate food at all times. The ensuing need for stability clashes with the fact that “food security” is fundamentally a stochastic concept, subject to uncertainties and risks. Harvest shortfalls and high food prices are primary threats to food security in most places, but risks related to job loss, health problems, and civil strife all play important roles. Food vulnerability for households is a consequence of how these various risks play out across their income-generating activities and on their capacity to mitigate risk and absorb loses.
3. Why food security is important for growth as well as equity

3.1 To sustain economic convergence and maintain social stability

Although the first goal of halving extreme poverty by 2015 is still reachable based on current projections, risks abound. There has been remarkable progress in poverty reduction globally and the MDG target of halving global poverty incidence by 2015 is likely to be met, although with tremendous variation in progress across countries. Improved macroeconomic policies, deregulation and liberalization in many countries, rapidly expanding world trade and the growth of remittances have all contributed to accelerated economic growth and poverty reduction in developing countries. As a result, the incidence of extreme poverty is falling rapidly throughout the world. Despite growing populations, the number of poor people living on less than $1.25 a day in developing countries fell from about 1.8 billion in 1990 to 1.4 billion in 2005—from 42 percent of the population to 25 percent.

Aggregate trends mask significant heterogeneity across regions as East Asia accounts for much of the progress in reducing poverty. East Asia reduced its incidence of poverty, measured as the proportion of people living under the $1.25 threshold, from 55 percent in 1990 to 17 percent in 2005. The progress in China was even more remarkable as poverty rates came down from 60 percent to 16 percent during the same period with the absolute number of people in extreme poverty declining from 683 million to 208 million. While the number of poor people in India increased from 436 million to 456 million during this period, the incidence fell from 51 percent to 42 percent. In comparison, the economic growth rate and the pace at which it is bringing down the incidence of poverty in Sub-Saharan Africa appears too slow to meet the MDG target. The pace of growth before the 2009 financial crisis helped lower the proportion of Africans living on less than $1.25 a day from 58 percent in 1990 to 51 percent in 2005, but the absolute number of poor people actually increased from 296 million to 388 million.

The progress on poverty reduction notwithstanding, incidence of hunger remains high and rising. Global incidence of undernourishment (hunger) in 2009 was estimated by the Food and Agriculture Organization (FAO) to have increased to 1.02 billion. While this partly includes the setback suffered as a result of the recent crises, a vexing fact of recent times has been the fact that despite the fall in the number of poor, hunger/undernourishment incidence has steadily risen from 830 million people in 1995 to the current estimated 1.02 billion. As a share of the global population, the undernourishment rates have fluctuated within a relatively narrow band. In 1990, the share of hungry people was 20 percent, in 2005 this had dropped to 16 percent and in 2009 it is estimated to have risen to 19 percent (Figure 1).

---

5 This section uses material from the Global Monitoring Report 2010 of The World Bank and other cited sources.
Malnutrition indicators reflect slow progress in reducing hunger and poor dietary quality. An example is the slow progress in various child development outcomes including mortality. At least 3.5 million preventable deaths of under five children occur annually due to poor dietary intake (De Pee et al 2009). The proportion of children under five who are underweight – another measure of hunger - declined from 33 percent in developing countries in 1990 to 26 percent in 2006, a much slower pace than needed to halve it by 2015. Among children under five years of age, as of 2008, nearly one in four children in the developing world was underweight, and one in ten, was severely underweight.

**Figure 1: Global Undernourishment Incidence Trend**

<table>
<thead>
<tr>
<th>Year</th>
<th>Undernourished Incidence (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>850</td>
</tr>
<tr>
<td>1995</td>
<td>800</td>
</tr>
<tr>
<td>1997</td>
<td>850</td>
</tr>
<tr>
<td>2002</td>
<td>900</td>
</tr>
<tr>
<td>2005</td>
<td>950</td>
</tr>
<tr>
<td>2007</td>
<td>1000</td>
</tr>
<tr>
<td>2009</td>
<td>1050</td>
</tr>
</tbody>
</table>

*Source: FAO, State of Food Insecurity in the World, various issues*

Fragile and conflict-prone countries are most likely not to meet the MDGs in the reduction of acute poverty and incidence of malnutrition. The spate of recent economic crises has overwhelmed the already weak capacities of many low-income countries to muster the monetary as well as institutional resources to combat poverty and hunger. Fragile and conflict prone states (half of which are in sub-Saharan African and jointly account for a fifth of the population of low income countries) have been particularly hard hit as they are not only more susceptible to these shocks but also least equipped to deal with them.

3.2 *Impacts can last a generation, limiting human potential*
The long-term physical and mental development of 70 percent of children born in developing countries since the beginning of 2008 has been irretrievably compromised (De Pee et al 2009). Some estimates show that the food price crisis of 2008 caused global poverty incidence to increase by anywhere between 100 million (Ivanic and Martin 2008) to 200 million (Dessus, Herrera, Hoyos 2008). The impact on undernourishment was similarly large. By one estimate, undernourishment increased by 63 million people in 2008 due to the food price crisis and the economic downturn in 2009 could have contributed to 41 million more undernourished people than if the crisis had not taken place (Tiwari and Zaman 2010).

Measures of nutritional status that are based on calorie sufficiency alone can understate the true long term impact of these crises, including on food security. As households compromise on dietary diversity, abandoning nutrient-rich food in favor of cheap sources of calories, and cut back spending on health and education during periods of crises, they incur substantial long term costs. Children born during droughts in Zimbabwe had significantly lower height during adolescence and enrolled into schools later than average. Similarly individuals in China born between 1959 and 1962 and exposed to the Great Famine in the early stages of their lives were not only 3 cm shorter compared to cohorts born before and after the famine, they also had significantly lower income and wealth (Chen and Zhou 2007). Experimental evidences have confirmed that early childhood nutritional status can have persistent effects through adulthood including wages in the labor market (Hoddinot et al 2008). Furthermore, to the extent that these resultant shocks to human capital impinge on economic growth they weaken these countries’ ability to mitigate the ill effects of future crises, including those related to food security.

3.3 Interactions between food insecurity and conflict drag societies down

Conflict and food insecurity overlap considerably in developing countries. Lack of available and accessible food has been the source of many conflicts. Conflict is often manifested in competition over the factors of food production, primarily land and water. Having more people to feed, with less land and water, more variable climates, and greater price volatility increases stress and raises the risk of civil unrest and conflict. Studies on the motives of war have found conflict to be closely associated with underlying factors affecting food insecurity.

Economic motivations related to the desire to control resources (“greed”) or the perception of unfairness in the distribution of income generated by the resources (“grievance”) can precipitate the occurrence of conflict (Collier 2000, Collier and Hoeffler 2004). A collapse of cash crop prices led to a sudden drop in income for small farmers in Rwanda and contributed to the complex forces behind the 1994 genocide (Uvin 1996, Messer and Cohen 2006).

Statistically, countries with a quarter of their national income coming from primary commodity exports have a risk of conflict four times greater than ones without primary commodity exports (Collier 2000). When shocks impact food security in the context of very unequal distributions of
income, land and other material goods, it is fertile ground for individuals and groups with grievances to cause conflict (Pinstrup-Andersen and Shimokawa 2008). Miguel et al. (2004), for example, found that a five percentage-point negative rainfall shock in a sample of African countries increased the likelihood of a civil war the following year by nearly one-half. Investment in irrigation, is likely to help reduce conflict.

While food insecurity induces conflict, conflict further induces food scarcity, adding to food insecurity, creating a spiral that traps many in poverty. Conflict destroys land, water, biological, and social resources for food production and also destroys other food entitlements; 30 million people in more than 60 countries were displaced or had their livelihoods destroyed by conflict every year in the 1990s (WFP 2004). Meeting the food needs of refugees places a considerable burden on recipient countries. In 2001, there were more than 12 million refugees, 25 million internally displaced people and an unknown number of people trapped in combat zones (FAO 2002). More broadly, FAO (2002) estimates losses of almost $52 billion in agricultural output through conflict in Sub-Saharan Africa between 1970 to 1997, a figure equivalent to 75 percent of all official development assistance received by conflict-affected countries. Estimated losses for all developing countries averaged $4.3 billion per year – enough to have raised the food intake of 330 million undernourished people to minimum required levels.

4. What needs to be done again, and what is different from the 1970s?

4.1 Early globalization after 1945 and the food price spike of the early 1970s

After the Second World War, recognition that peace required food security helped fund a serious attempt to establish a multilateral food security system (Shaw 2007). Global attitudes about food security were also shaped over the period by greater global consciousness of the extent of famine around the world (Sen 1981, von Braun, Teklu and Webb 1998). The 1950s and 1960s saw the steady rise in the association of food security with political security under the cold war, on both sides of the Iron Curtain (Shaw 2007). It was also a period of laying the infrastructure and institutional groundwork of roads, irrigation, agricultural universities and research centers in developing countries that would allow the rapid development of food production in most of Asia and Latin America from the 1970s onwards. The latter occurred under a “Green Revolution” driven by public investment in technology generation and diffusion of improved cereal seed-fertilizer packages, and irrigation (Eicher and Staatz 1998). Between the earlier period and the Green revolution was a 5 year period of food price spikes, price volatility and food insecurity that was to shape agricultural policy for a generation, and that offers key insights for current policies.

A sharp spike in commodity prices in the 1970s was triggered by droughts during a period of low world stocks and redistribution of power over energy supplies, leading to food price volatility. In
East Asia, rice prices in 1974 at one point reached as high as $2,000/ton in 2008 dollars. The surge in food prices in 1973-74 coincided with a spike in crude oil prices, but was due to a variety of factors. Food prices remained high for several years as the normal supply response was hampered by sharp increases in fuel and fertilizer prices. The surge in crude oil prices sustained the high grain prices for most of the following decade as oil exporting countries increased grain imports in response to new found wealth. China and other Asian countries also increased grain imports during the latter half of the 1970s and 1980s in order to maintain stable domestic prices relative to world prices. In some cases, such as India, governments have certainly succeeded in maintaining domestic prices much more stable than international prices (Figure 2).

**Figure 2: Real Domestic and International Rice Prices, India, 1965-2004, (Rs/ton in 1981 Prices)**

The macroeconomic imbalances and commodity shocks of the early 1970s pushed many poor countries towards inward looking and anti-market policies in the food and agricultural areas. It led into a period of stagnation in most of Africa, where the 1980s was commonly referred to as the “lost decade” for growth and poverty alleviation (Grindle 1996).

Much of agricultural development policy advocacy in the 1980s and 1990s in Africa consisted of debates for and against the undoing of the anti-market policies put in place in the mid 1970s in response to dire food security concerns at the time, and which policies took on a life of their own thereafter (Delgado 1998).

**4.2 The Green Revolution and renewing confidence in markets 1976-2000**
Higher investment, better technologies and adequate policies contributed to increase yield. Following the food price spike in 1973-74 there was a significant increase in agricultural investment, agricultural policies improved, and agricultural growth increased in many developing countries, especially outside Africa. New investment built on progress already made in developing improved crop varieties adapted to subtropical and tropical production conditions. The most prominent of these were the rice and wheat varieties developed by the International Rice Research Institute and the International Maize and Wheat Improvement Center respectively. When grown with adequate moisture and under higher soil fertility, these improved varieties yielded four times as much as those in use at the time.

Higher levels of investment in agriculture by both governments and development partners facilitated adoption of improved crop varieties, particularly in Asia. By 1980 Asian countries were spending about 14 percent of their total public budgets on agriculture. In addition, the share of Official Development Assistance (ODA) to agriculture across all developing countries increased from 10 percent in 1975 to 18 percent by 1979, which translated into a more than doubling in real US$ terms (OECD 2006).

The use of improved crop varieties, fertilizer, and irrigation increased significantly from the earlier 1970s. The share of area planted to improved crop varieties increased in Asia from 10 percent in 1970 to 80 percent by 2000. Fertilizer use more than doubled. Irrigated areas continued to expand and by 2000 accounted for about 40 percent of cropped area in South Asia and 30 percent of cropped area in East Asia. Complementary investments were made in agricultural research, extension, seed multiplication, to facilitate the adoption new technology (WDR 2008).

Since the early 1980s, the excessive taxation of agriculture has also declined, raising farmer incentive to produce and invest. A recent analysis of a large sample of countries across the world shows that net agricultural taxation has on average declined sharply. Between 1980–1984 and 2000–2004, it declined from about 30 percent to 10 percent in Sub-Saharan African countries, from about 15 percent to 5 percent in East and South Asia countries (Anderson 2009).

The result of higher investment, better technologies, and lower agricultural taxation was a significant increase in global agricultural productivity growth, driven by developing countries primarily in Asia. Global agricultural GDP growth averaged 2 percent annually from 1980 to the early 2000s, while population growth averaged 1.6 percent annually over the same period. Global poverty rates declined, and global food security improved. Agricultural reforms initiated in China in 1978 to improve property rights, output prices, and adoption of higher yielding crop varieties (primarily rice) was the primary driver of the 15 percent per year increase in rural incomes from 1978 to 1984 (von Braun et al 2005). By 2001 the rural poverty rates in China had
declined to 12 percent, down from 76 percent of the population in 1980 (Chen and Ravallion 2007). In rural India, poverty fell from 64 percent in 1967 to 34 percent by 1986.

The Green Revolution was not universal: regions outside of Asia such as Africa and Latin America did not experience the dramatic increases in yields as experienced by other regions. Public investments in agriculture were lower and agricultural taxes higher in Africa than in other regions of the world (WDR 2008).

Declining global food prices led to the rise of surplus stocks in the late 1970s. The global growth in agricultural productivity lowered world grain prices. By 1977 real world grain prices were half the 1974 levels, and by 2000, they were about one quarter the 1974 levels. Over the same period, the grain stock-to-use ratio doubled from 16.5 percent to 33 percent. Higher stocks reduced the sensitivity of global prices to production shocks. By the early 1980s, grain stocks rose to burdensome levels (Figure 3). This led to a series of government policy changes that reduced global grain stocks, beginning with a major policy change in the United States in 1983 that sharply reduced grain stocks and decoupled U.S. producer prices from global grain prices (Mitchell and Le Vallee 2005). This was followed almost a decade later by major reform of the Common Agricultural Policy (CAP) of the European Community which reduced grain support prices and lowered grain stocks in government programs. The immediate effect of lower grain stocks on prices was not apparent because it coincided with the collapse of the former Soviet Union in the late 1980s, which sharply lowered grain imports. This allowed the shift in dietary patterns towards increased grain-fed meat consumption in developing countries to continue without major disruptions to the generally declining trend in real grain prices.

The significant decline in global food prices led to complacency about the continued need to invest in agriculture. The share of public spending on agriculture in Asian countries halved from 14 to 7 percent between 1980 and 2004, and in African it declined from about 7 to 4 percent. The share of Official Development Assistance (ODA) to agriculture halved from its peak of 18 percent to 9 percent by the late 1980s and then again to about 4 percent by the early 2000s. The subsequent pace of real world food price decline eased, with real prices in 2000 similar to where they were in 1987. With lower investment, less attention was now being given to the generation and adaptation of new crop varieties, to extension services, and to input use. While further improvements in price policies continued to provide incentives to investment, the scope for future dramatic reductions in agricultural taxation had narrowed considerably.
4.3 **Sea changes in global cereals markets 2001-2009**

Due to the declining stocks levels that started in 2000, global food markets in the twenty-first century are more vulnerable to shocks from weather, biofuels and speculation. The twenty-first century began with low food prices and stagnant demand, as many developing countries struggled to recover from the lingering effects of the Asian financial crisis that began in 1997. Moreover, it can be seen in Figure 4 that the major de-stocking that took global stocks back to stock-to-use ratios last seen in the early 1970s only occurred after 1997, suggesting new forces at work in global cereals markets.
Real food prices reached all-time lows in 2000 and then began a gradual recovery that eventually accelerated, and then peaked in 2008, before declining amid the global recession. Annual average real global food prices increased 98 percent from 2000 to 2008, and nominal monthly food prices almost tripled from January 2000 to their highs in June 2008. Basic staple food grains such as wheat and rice more than tripled (Figure 5) while other staples such as palm oil showed similar increases. The increase in real food prices in the 1970s and since 2000 were similar in magnitude, with real prices increasing 82 percent from 1972 to 1974 compared to 98 percent from 2000 to 2008. However, the price spikes in the 1970s occurred more quickly and were driven by easily identifiable shocks (large imports by the former Soviet Union), while the increase from 2000 to 2008 was more gradual and caused by a confluence of factors (Mitchell 2008).

**Figure 5: Food and Grain Prices 2000-2010**

![Nominal Price Index Jan 2000=100](chart)

Source: Mitchell (2008)

As with the world food crisis of the 1970s, global grain stocks were allowed to fall to dangerously low levels in the 2000s. Crude oil prices also contributed to the surge in food prices in both periods by raising fuel and fertilizer prices, which are import factors of cereals production. However, in addition to these cost-of-production factors, policy also contributed to the food price increases since 2000 by encouraging production of biofuels from food crops. Food demand in developing countries also increased, but was not a major factor contributing to food price increases; increases in effective demand were mostly confined to soybean imports by China to propel its growing poultry and livestock industry. With this exception, the global demand for food and feed increased along historical trends and population growth rates, with global grain consumption for non-biofuels uses increasing by 1.3 percent per year and global trade increasing 1.7 percent per year from 2000 to 2009. Global grain feed demand grew by only 1.1 percent per annum from 2000 to 2008 (USDA 2010).
Biofuels have benefitted greatly from a wide array of supportive policy measures in the agriculture, energy, transport and environment sectors, as governments sought to promote its production. These have taken the form of production subsidies on the underlying agricultural crop to infrastructure for biofuel storage, blending and production mandates, import tariffs, and tax incentives. Such subsidies are quite significant – for ethanol the Total Support Estimate ranges from $0.28 per liter in the US to $0.60 in Switzerland, and for biodiesel, $0.20 per liter in Canada to $1.0 per liter in Switzerland (Steenblik 2007).

Since biofuels are direct substitutes of oil, their production has linked the agricultural and energy markets to an extent never seen before. Traditionally price movements in these two markets have exhibited relatively low, or even negative correlation. However, this has been altered in a fundamental way since the increase in biofuel use and the advent of oil prices exceeding $50 a barrel, introduced a spillover of price volatility from the oil and energy market into agricultural markets (Mitchell 2008).

World market prices rose dramatically: the demand for food crops to produce biofuels increased sharply from 2000 and contributed to the surge in food-crop prices (Mitchell 2008). This additional demand was not quickly met by increased production and stocks fell. The three largest biofuel’s producers are the United States, Brazil and the European Union, all of whom have provided strong government support to biofuel production. Brazil currently uses approximately one half of its sugar cane crop (18 percent of global production) for biofuels, and the United States uses almost one-third of its maize production (13.2 percent of global production) for ethanol. The European Union produces both ethanol from grains (wheat and maize) and biodiesel from vegetable oils (rapeseed, soybean and sunflower oils). In 2009, the EU-27 used an estimated 7.4 million tons of vegetable oils (5.4 percent of global production) for biodiesel, and other countries used an additional 3.2 million tons of vegetable oils for biodiesel, which together accounted for about 8 percent of global vegetable oils production. The increase in ethanol production from sugar cane in Brazil has been increasing since the 1970s and had little discernable impact on sugar prices because it was met by increased Brazilian production.

Many of the policy responses to the recent food crisis were similar to those of the 1970s, and serve to remind us that food security, when threatened, is a major concern for all governments. During the 1970s, the United States banned exports of certain food crops in an effort to contain domestic food price increases (Mitchell and Mielke 2005). The European Union did the same in the mid-1990s when food prices rose, and that policy response was repeated during the recent food crisis as a large number of countries (India, Vietnam, Ukraine, Argentina and others) banned or restricted exports of one or more major cereals. Countries also increased grain imports during and after the food crisis of the 1970s and again in recent years as large imports of rice by the Philippines in 2008 contributed to a surge in global rice prices. Direct foreign investment in food production occurred following the food crisis of the 1970s as Japan invested in soybean
production in Brazil and several oil exporting countries have recently invested in food production in Africa.

Structural changes are happening in the commodity futures markets. The progressive deregulation of US commodity market operations from the late 1980s to early 90s--first manifested in the oil market--was later extended to agricultural commodity markets. It facilitated the entry of non-traditional players into agricultural derivatives markets, which previously had been used primarily up to then by agricultural commercial entities seeking to hedge the risks of being dependent for their business on future procurement of agricultural commodities. While deregulation was initially associated with a rush of money into energy markets, which are sufficiently broad and liquid to accommodate a trading boom, institutional investors began to diversify their holdings into a broader basket of commodities that included food grains. In 2000, long-only investors--investors such as index funds and pension funds who stand to gain when prices climb higher--have increased their market positions from one quarter of the commodity market in 1998 to about two thirds in 2008. Such interests have committed about $4.7 billion to commodities, and this has been doubling every year since, hitting $80 billion in 2005, and $175 billion in 2007. Total fund investments were estimated by commercial analysts in mid-2008 at approximately a quarter of a trillion dollars\(^6\).

The share of long term investments in commodities futures markets are on the rise. For example, only 0.5 percent of Hard Red Winter Wheat futures contracts on the Chicago Board of Trade resulted in physical deliveries in 2008. Previously, commodity exchanges were owned by commercial market participants with a need to have a vehicle for hedging price risks. However, now most major exchanges are run as financial sector businesses in their own right, deriving income from the volume of transactions that they facilitate. The vast majority of the investment or transactions in these markets are now being undertaken by parties whose objective is to make financial returns from their investments, mainly over the medium to long term, as opposed to hedging short-term commercial risk (Gilbert 2008). These new investors are also significantly different from the traditional view of speculators. They do not seek to profit from market volatility as do the traditional speculators, seeking returns from short-term ups and downs in the market, but as long-only investors, make money only from ups. They do not alter their market positions in relation to either short term market volatility or supply/demand shifts, they only alter their markets positions based on long term investment prospects and occasional rebalancing of the share of food within the overall commodity basket (food, energy, oil, metals). They do not, unlike short term investors and speculators, add to liquidity in the market, since they do not change holding except at contract roll over. This is an important feature since adding liquidity to commodity markets is considered to be the primary rationale for encouraging a certain level of financial speculation in commodity markets.

\(^6\)“Feeding Frenzy”, May 31, 2008 article in the Toronto Globe and Mail
Price spikes tend to occur when stocks get to a tipping point. The markets for storable commodities such as grains are characterized by long periods when prices are in the doldrums, punctuated by short periods of intense but short-lived price spikes (Deaton and Laroque 1992). On the surface, the reasons for this are clear: when stock levels are adequate, changes in stocks play an important role in stabilizing prices. If production is unexpectedly low in a particular year, stocks can be drawn down so that consumption does not need to decline as much as production. Similarly, a year with a good harvest can be accommodated by accumulating stocks—consumption can remain nearer its average level. When stock levels become low—perhaps following several years of poor harvests, or surprisingly rapid growth in demand for use in biofuels—it becomes difficult or impossible for stocks to play their balancing role. If production falls by ten percent, but available stocks are only five percent of consumption, it is not possible for stocks to meet the decline in production. Under these circumstances, prices may need to increase dramatically for consumption and production to be brought into balance.

Defensive policy distortions such as export bans and panic public procurement of imports is based in part on the perception of the depth of markets going forward. Low stock levels induce less confidence in price stability and even physical availability, as happened in 2008, and thus market behaviors occur that aggravate price volatility. The short-lived price booms of 1973-74 and 2007-8 were both associated with low stock levels and greatly decreased confidence in the ability of global food markets to supply needs, especially for relatively thin international markets such as for rice.

5. An uncertain outlook

5.1 More uncertain prices

Demand uncertainty has risen due to evolving energy markets and structural change in the nature of the food commodity markets. As concerns about climate change have risen along with the desire to decrease reliance on fossil fuel sources, commercial bioenergy production continues to grow. Globally, in 2007 there were approximately 52 billion liters of ethanol production - led by the US (51 percent), Brazil (37 percent), and the EU (4 percent), and about 10 billion liters of biodiesel - led by the EU (60 percent) and the US (17 percent) (FAO 2008). US ethanol production began to rise rapidly in 2002 and jumped from 1 billion gallons in 2005 to 5 billion gallon in 2006. The EU, led by Germany and France, began to increase biodiesel production in 2005. In a study examining the relation between various US government mandates and US coarse grains prices, under a scenario where a production mandate (the US Renewable Fuels Standard that mandates 15 billion gallons per year) becomes binding, the inherent volatility in the US coarse grains market is estimated to rise by about one quarter (Hertel and Beckman 2010). This added volatility is estimated to derive from that of the energy market, and is incremental to the traditional volatility arising from agricultural market fundamentals.
The verdict is still out on how structural change in the nature of food commodity markets will affect future food prices or food price volatility. The strong overlap between the increase in long-only investment in commodity markets and the escalation in food prices resulted in U.S. Congressional hearings urging regulatory action on non-traditional participants in commodity markets. Yet reputable academic research has shown inconclusive evidence of causality of the two phenomena (Gilbert 2008, Tyner, Abbot, Hurt 2008). Establishing direct causality between the increase in the volume of long-only investment and lasting increases in food prices or food price volatility hinges on establishing structural changes in the linkages between the futures and spot prices. This remains an open issue at the present time.

Land and water constraints, coupled with technology uncertainties, are likely to result in a more unpredictable supply. Supply uncertainties due to land and water constraints, climate change and declining yield growth pose questions as to whether demand projections will be met. In addition, high price volatility may dampen supply response to higher average prices, negatively impacting both producers and consumers. The progress in agricultural growth in developing countries has been dominated by significant gains in Asia. However, in South Asia in particular, the annual yield growth of the Green Revolution has diminished in recent years. Average agricultural productivity growth declined from more than 3 percent in the 1980s to less than 1.6 percent from 2000 to 2008 and it is projected to decline further. In Sub-Saharan Africa, cereal yield growth rates have declined from 1.8 percent in the 1970s to 0.7 percent in the 1990s, increasing slightly to 1.1 percent from 2000 to 2008.

The land available for agriculture has been greatly reduced in Asia and Africa due to population pressure and rapid urbanization. Productivity of available land is also undermined due to desertification, salinization, soil erosion and deforestation. Globally 5 to 10 million hectares of agricultural land are being lost annually to severe degradation (WDR 2008). At the same time, competitive pressures from biofuels are adding pressure on agricultural land. Governments and private actors from wealthy and emerging nations that are buying up land in developing countries in an effort to secure their own long-term food or raw material supplies trigger concern for the livelihoods and food security of people presently living on those lands.

Agriculture uses 85 percent of fresh water withdrawals in developing countries, and irrigated agriculture accounts for about 40 percent of the value of agricultural production in the developing world. Demand for water for both agricultural and non-agricultural uses is rising and water scarcity is limiting the future expansion of irrigation. According to the Comprehensive

---

7 In June 2008, the US Homeland Security and Governmental Affairs Committee held pension funds responsible for price spikes in commodities markets. The Committee proposed barring schemes with more than $500 million in assets from investing in the US agricultural and energy commodities in a dramatic bid to lower food and energy prices. The proposed bill, the Commodity Speculation Reform Act of 2008 passed in the US House of Representatives in September 2008.
Assessment of Water Management in Agriculture, approximately 1.2 billion people live in river basins with absolute water scarcity; 478 million live in basins where scarcity is fast approaching; and a further 1.5 billion suffer from inadequate access to water because of lack of infrastructure or the human and financial capital to tap the available resources (WDR 2008).

Agriculture is extremely vulnerable to climate change. Higher temperatures and more erratic rainfall patterns reduce yield, encourage weed and pest proliferation, and increase the likelihood of short run crop failures and long run production declines. Although there will be gains in some parts of the world, overall impacts are expected to be negative, threatening global food security, particularly in the poorer parts of the developing world (Nelson et al 2009). Comparing historical crop production and weather data, Schlenker and Lobell estimated the likely yield response to climate change for 5 key African food crops (maize, sorghum, millet, groundnut, and cassava) in 2046-2065 relative to a baseline of 1961-2002. In all cases except cassava, there is a 95 percent probability that yield declines exceed 7 percent, and a 5 percent probability that they exceed 27 percent. Countries with the highest average yields have the largest projected yield losses, suggesting that modern seed-fertilizer packages are more susceptible to heat related losses (Schlenker and Lobell 2010).

International trade has enormous potential as a means to reducing price volatility. Food security is frequently mis-identified with food self-sufficiency. But the critical issue in developing countries is most frequently whether poor individuals and households have access to sufficient food. Food security can frequently be reduced by attempts to increase food-sufficiency. Policies that, for example, seek to reduce imports by imposing tariffs may raise the domestic price of food and make it harder for poor people to afford the food they need. This can be a particularly serious problem given that poor people frequently spend three-quarters of their income on food (Ivanic and Martin 2008).

Weather shocks are the most important source of price volatility for staple foods such as grains. Opening to international trade provides enormous potential for diversifying away food price risk. Other things equal, the variance of food prices will be roughly 1/10th as large in a market with ten widely-separated countries as it would be in each country taken alone. Policies that restrict imports or exports using quotas can also substantially increase the volatility of domestic prices—increasing the risk of food price spikes.

Countries seek to use trade policy selectively in order to reduce the volatility of their own prices; however this behavior is likely to increase global price volatility. When prices are high, many countries seek to insulate their markets by imposing export taxes or restrictions if they are exporters, or by lowering import tariffs if they are importers. Conversely, in periods of low prices, importers frequently raise duties, and exporters sometimes use export subsidies. While these policies can be effective for individual countries, the combined impact of key countries
adopting these insulating policies is to increase the volatility of world prices. If many countries
do this—and particularly if quantitative restrictions rather than price-based measures are used—
world prices can become very unstable and importers can become concerned about the reliability
of their access to food supplies from world markets.

5.2 Uncertainty over poverty and hunger trends

Although the global poverty and hunger MDG is still attainable, World Bank projections in the
Global Monitoring Report 2010 suggest that Sub-Saharan Africa will not be able to halve
poverty by 2015, especially following the slowdown in growth due to the economic crisis (World
Bank 2010a). Projections indicate that the economic crisis will lead to deterioration across all
MDGs, extending beyond 2015. In all the growth scenarios estimated by the 2010 Global
Monitoring Report, the world will meet the MDG of halving its headcount poverty rate using a
poverty line of $1.25 per day. However, the poverty rate in 2015 is considerably higher in the
low growth scenario (18.5 percent) than the one which assumes a rapid recovery from the crisis
(15 percent). Sub-Saharan Africa is projected to miss its poverty target by more than 9
percentage points, if growth continues on post-crisis trends, reaching 38 percent by 2015. Before
the crisis the region had been on a path to reach a poverty rate of 36 percent, which would have
lifted another 20 million people out of poverty by 2015.

There is considerable variation in the likelihood of achievement of poverty target rates across the
other regions. According to the Global Monitoring Report 2010, East Asia and Pacific will
achieve the MDG of halving poverty even in a low growth scenario. South Asia will likely meet
the poverty target in the post-crisis base case scenario but not in a low-growth scenario. Middle-
income countries in Europe and Central Asia are projected to miss the poverty reduction MDG at
poverty lines of both $1.25 and $2 per day, the latter line being more meaningful for this group
of countries.

Even before the crisis there were significant regional differences in the likelihood of meeting the
hunger MDG. In 2008, 63 developing countries (out of 117 with available data) were on track to
halve the prevalence of underweight among children under five by 2015. However in 34
countries progress is insufficient and 20 have made no progress towards achieving this MDG
target, most of them in Africa.

The prospects of meeting the MDGs related to hunger look bleaker due to the crises. This is
primarily due to two reasons. First, many of the countries exposed to high global food prices
were those with high pre-existing levels of malnutrition. Ranking countries most affected by
malnutrition, Burundi, Madagascar, Niger, Timor Leste and Yemen are among the ten most
affected countries for both stunting and wasting indicators. All of these countries experienced
double-digit food inflation in 2007-08. Second, any relief that the subsequent decline in prices in
2009 was likely to bring about was more than offset by the global economic crisis that reduced employment opportunities and income. Moreover, although international prices were somewhat close to their pre-crisis level by the end of 2009, the price of staples in domestic markets continued to increase throughout 2009 (Table 1).

Table 1: Countries with the largest increase in domestic price of main staples (out of 58 countries)

<table>
<thead>
<tr>
<th>Country</th>
<th>Food Item</th>
<th>Caloric Contribution</th>
<th>Price Increase, January 2009-October 2009</th>
<th>Average Price Increase, 2008-2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>Sorghum</td>
<td>13% 50%</td>
<td></td>
<td>Mozambique Cassava 33% 61%</td>
</tr>
<tr>
<td>Uganda</td>
<td>Maize</td>
<td>10% 35%</td>
<td></td>
<td>Dem. Rep. Congo Cassava 55% 60%</td>
</tr>
<tr>
<td>Bhutan</td>
<td>Rice</td>
<td>.. 26%</td>
<td></td>
<td>Sudan Sorghum 26% 38%</td>
</tr>
<tr>
<td>Sudan</td>
<td>Sorghum</td>
<td>26% 24%</td>
<td></td>
<td>Kenya Maize 36% 21%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Maize</td>
<td>34% 23%</td>
<td></td>
<td>Chad Sorghum 18% 18%</td>
</tr>
<tr>
<td>Kenya</td>
<td>Maize</td>
<td>36% 16%</td>
<td></td>
<td>Burkina Faso Sorghum 27% 15%</td>
</tr>
<tr>
<td>China</td>
<td>Rice</td>
<td>27% 15%</td>
<td></td>
<td>Tanzania Maize 27% 14%</td>
</tr>
</tbody>
</table>

Source: World Bank ‘Food Price Watch’ Issue 1, February 2010

6. The way forward: linking food security with growth strategies

Food security is a prerequisite for broad-based economic growth. Once a household can attain basic nutritional needs, it starts to have the ability to consume other items, stimulating demand, as well as having the health to engage in entrepreneurial activities. The growth process that this unleashes is likely to be more broad-based and equitable. It is essential for people to believe in mutual benefit of market-led development. The lack of investment in the dimensions of food security discussed earlier (availability, access, utilization and stability) will lead to further food price volatility, adversely impacting the majority of the poor who are net consumers of food, dampening consumer spending and lowering growth.

Seventy five percent of the world’s poor live in rural areas where agriculture is the main source of livelihoods. Recent studies suggest that agriculture is up to 3.2 times better at reducing $1-day headcount poverty in low-income and resource-rich countries--including those in Sub Saharan Africa (Christiaensen et al 2010). Reducing poverty among the poorest and improving their food security will require additional investments to raise agricultural productivity, link farmers to markets, reduce risk and vulnerability, and facilitate rural non-farm income. Rural non-farm
activities are also an important source of income growth and safety net support for rural households. In Sub-Saharan Africa, for example, multiple studies show that they can account for half of farm-household income and are especially important as coping strategies of the rural poor for dealing with volatility in agricultural incomes (Reardon, Delgado, Matlon 1992).

6.1 Invest more

The financing gap remains large; therefore more investment in agricultural productivity growth is needed. The International Food Policy Research Institute (IFPRI) estimated the global incremental agricultural public investment required—the additional amount necessary to meet the Millennium Development Goal of halving poverty by 2015—to be US$14 billion annually for all developing countries (Fan and Rosegrant 2008). The estimated incremental annual investment needed in Sub-Saharan Africa ranged from US$3.8 to US$4.8 billion (the former using a unit cost approach, the latter being the additional investment needed to meet the Maputo Declaration of spending 10 percent of Government budgets on agriculture).

Estimated returns to additional agricultural investment are high. The most frequently estimated returns are for investment in agricultural research and extension. A recent synthesis of nearly 700 of these rates of return estimates in the developing world indicated an average return to investment in agricultural research and extension of 43 percent a year (Alston et al 2000). Returns are high in all regions, including Sub-Saharan Africa (which averaged 35 percent). Even discounting for selection bias in evaluation studies and other methodological issues, there is little doubt that investing in R&D can be a resounding success. The high payoffs relative to the cost of capital also indicate that agricultural science is grossly underfunded.

Returns on irrigation investments have also been high, although more varied. Returns have historically been higher in Asia than in Africa, but returns on irrigation project investments now often reach the 15–20 percent range commonly obtained in the rest of the world (IWMI 2005). Lower costs, and improved technologies and institutions have raised returns. In addition, small-scale irrigation has shown recent success, especially in Niger and in the Fadama program in Nigeria. Potential investments in expanding irrigation infrastructure which pass a threshold 12 percent rate of return are estimated to be feasible in Africa on 1.53 million hectares for dam-based large scale irrigation, and on 5.44 million hectares for small scale irrigation (World Bank 2010b). The potential is significant.

However, while expanding irrigation infrastructure to all land in developing countries with irrigation potential could contribute about half of the total value of needed food supply by 2050; this would also require 40 percent more withdrawals of water for agriculture (IMWI 2007). Therefore, improving productivity of existing irrigated areas is crucial, this includes about 5 million hectares in Africa (World Bank 2007) and more than half the crop area cultivated in South Asia, where productivity is very low (IMWI 2007).
6.2 Invest better in food availability and stability

It is essential to raise productivity growth to improve climate resilience and supply. With growing resource scarcity, climate change, and increasing demand, increasing food supply depends more than ever on raising agricultural productivity. Yet for major cereals—rice, wheat, and maize—the growth rates of yields in developing countries have slowed considerably since the 1980s (Figure 6). Except in Africa, the easy gains from high use of green-revolution inputs have already been made. Future productivity gains will need to rely on both improving technical efficiency (using existing technologies more efficiently), and technological change (the development and adoption of new technology).

Better use of existing resources and technologies is needed to improve technical efficiency. Average crop yields in many countries are often only a third of experimental farm yields, such as for rice in many parts of Asia, and maize in Africa (WDR 2008). Closing the yield gap will require investments to improve farmer advice and information (through improved extension services), to increase use of improved seeds and fertilizers (through improved seed multiplication, dealer networks, and financing), to use more labor-saving technologies, and to strengthen land tenure security (particularly for women in Africa) to raise incentives to invest.

Figure 6: Growth rates of yields for major cereals are slowing in developing countries

Better use of existing resources and technologies is needed to improve technical efficiency. Average crop yields in many countries are often only a third of experimental farm yields, such as for rice in many parts of Asia, and maize in Africa (WDR 2008). Closing the yield gap will require investments to improve farmer advice and information (through improved extension services), to increase use of improved seeds and fertilizers (through improved seed multiplication, dealer networks, and financing), to use more labor-saving technologies, and to strengthen land tenure security (particularly for women in Africa) to raise incentives to invest.
multiplication, dealer networks, and financing), to use more labor-saving technologies, and to strengthen land tenure security (particularly for women in Africa) to raise incentives to invest.

To offset the estimated negative impacts of climate change on crop yields in developing countries, estimated to reduce yields by about 20 percent, urgent attention is needed to improve water resource management through expansion of irrigation, river basin and rain-fed systems management (WDR 2008). Investments are needed to expand and rehabilitate irrigated area through irrigation infrastructure (canals, pumps, etc); support for water users associations; training and capacity-building for technical oversight to community based schemes, reform and modernization of existing large scale irrigation and investments in irrigation equipment providers. Attention is needed to improve river basin management through institutional development, including the support for river basin management authorities and technical support for establishment of water right systems. In addition, attention is needed to improve water use in rainfed systems through water control and conservation, including contouring and water capture infrastructure; advice on improved farm management practices for improved soil water retention and watershed management through forestation and similar approaches.

Technological change is urgently needed. While there are significant gains to be made from adoption of existing technologies, additional efforts are needed to generate new technologies to better match the heterogeneous agro-ecologies, and improve climate resilience. There are also persistent and emerging problems with significant negative impacts on the livelihoods and food security of the poor (e.g. banana bacteria wilt, coffee wilt disease, and rift valley fever among others). Yet despite these challenges the intensity of public investment in agricultural research (in relation to agricultural GDP) is five times higher in developed countries than in developing countries (Pardey et al 2007). Investment in both adaptive and strategic research is needed. This includes strengthening national agricultural research systems scientific and administrative capacity, strengthening linkages with farmers, advisory services, and international centers.

In addition to productivity gains, reducing costs in food marketing and trade can help smooth out food prices. In the poorest countries, the cost to farmers of transacting in markets can be high. Transport costs are often 50-60 percent of total marketing costs, leading to situations where bulky food staples are not competitive to produce for exports from local production regions, even in good years, and expensive to import to local markets in bad years. This leaves many local food markets, particularly in Africa, especially vulnerable to weather shocks that translate into high local staple volatility. A vivid example of this is Ethiopia (figure 7). Reducing costs in food marketing and trade can act to dampen local food price volatility.
Transaction costs that benefit neither farmers nor consumers can be reduced by investing in infrastructure. Reducing transaction costs requires investments to upgrade and improve management of rural infrastructure (feeder roads, wholesale and retail markets, and storage), to collect and disseminate market information (market food price data availability and access), to strengthen producer organizations (for scale economies in trade), and to improve regional integration of food markets (to lower costs and barriers to trade). Road infrastructure is crucial to link elements in the agricultural value chain, to meet the distribution requirements of urban retail markets, to improved reliability of agricultural inputs, to increase access to farmer fields leading to better farm management. Recent projects in agricultural-oriented road development show that private-public partnership can be effective to facilitate access to private investment, innovative finance and specialized expertise.

Information technology is becoming increasingly important to improve rural livelihoods and incomes. For example, wireless communications technologies are easy to use and have declining rollout costs thus within easy access of rural populations with low levels of income and literacy. The next billion mobile subscribers are expected to consist mainly of the rural poor (World Bank 2009). A successful use of mobile phones in rural areas is to access market information. TradeNet, a Ghana-based trading platform, allows users to sign up for short message service (SMS) alerts for commodities and markets of their choice and receive instant alerts for offers to buy or sell when anyone else on the network has submitted an offer by mobile phone. Users can also request and receive real-time prices for more than 80 commodities from 400 markets across West Africa. In India, access to market information through mobile phones has allowed fishermen to respond faster to market demand and has increased their profits (Jensen 2007); in Niger, it has reduced price disparities in grain markets (Aker 2008).
If complementary investments in training and capacity building are made, there has also been reported success in rural areas with broadband internet access. In India, the E-Choupal program was started by ITC, one of India’s largest agricultural exporters, in 2000. The program operates in traditional community gathering venues (choupals) in farming villages, using a common portal that links multimedia personal computers by satellite. Training is provided to the hosts, who are typically literate farmers with a respected role in their communities. The computers give farmers better access to information such as local weather forecasts, crop price lists in nearby markets, and the latest sowing techniques. Collectively, these improvements have resulted in productivity gains for the farmers. By 2008, E-Choupal had reached millions of small farmers in more than 40,000 villages, bringing economic and other benefits.

Interventions aimed at improving the overall market efficiency will also contribute to mitigate risks and minimize losses. These should include: upgrading and improving management of rural infrastructure; improve collection and dissemination of market infrastructures; develop systems for grades and standards and their application. At the same time, public policies should aim at strengthening the bargaining power of smallholders’ farmers –especially women- through their producer organizations; to improve skills and access through out-grower schemes and contract.

Smallholder agricultural development and greater involvement with higher value markets is necessary to have large scale impact. High value markets offer profitable opportunities for increasing smallholder income as domestic markets for livestock and horticultural products exhibit particular dynamism (WDR 2008), and given that non-traditional higher-value food have come to account for the majority of developing country agri-food exports (Jaffe and Sewadeh 2006).

Positive impacts of smallholder participation are associated with income generation, employment and improved access to credit and technical assistance, development of business service markets and social status (Henson et al 2008). Participation in modern supply chains can increase farmer income by 10 to 100 percent (Guatemala, Indonesia, and Kenya) (WDR 2008). However, the rapid evolution of markets and the associated supply chains for high-value agriculture and food products present significant challenges to small farmers and high transaction costs inhibit their participation. Thresholds investments are required to reduce small farmers’ competitive disadvantage relative to large farmers and economies of scale. These investments include enhancing the supply chain capacity to meet food safety and quality standards; to upgrade logistics capacity to supply on a reliable basis a strict quantity; to refine current processes and products.

It has been shown that large scale impacts are more likely to be achieved when there is a close collaboration with the private sector (especially to maintain and enhance value as market evolves) and when governments play a multidimensional supporting role. Results also show that
where domestic capacity is weak, international technical and marketing partnerships are critical in providing a vehicle for technology and knowledge transfer, identify market opportunities and obtaining local export market contacts and linkages (Henson 2008).

6.3 **Invest better in food access and nutrition**

Invest better in food access, safety nets and nutrition is crucial to protect the most vulnerable population. Improving access to food is linked with functioning markets. Competitive markets can lower the cost of basic staples to consumers and also provide a variety of food types which ensure dietary diversity\(^8\). However poorly functioning markets can increase hunger risks. This can occur for instance when market information is limited and a few traders control local markets. Moreover, there is evidence that local prices adjust upwards rapidly during global food price shifts but are sticky downwards. Hence the existence of food markets does not necessarily ensure the reduction of hunger. Measures required to make food markets work better for the poor include investment in appropriate infrastructure, competition and regulatory policy and enforcement and strengthening information flows.

Ensuring equitable intra-household allocation of food is an essential part of ensuring food security. Intra-household distribution norms are critical in ensuring that vulnerable individuals – specifically pregnant women and infants under two years of age – consume a sufficiently nutritious diet. There is evidence that increasing female income leads to a better quality diet for children in the household (Haddad et al 1996). Previous experience has shown that crisis events lead to females sacrificing their consumption more than males within a household. Hence investing in safety net and nutrition programs which target women and girls is essential to reduce hunger and malnutrition.

Safety net programs in low-income countries typically have low coverage, are under-resourced, and are fragmented. The majority of the extreme poor, in most low income countries, do not have access to public safety net programs relying on informal networks and other coping strategies. Public spending on such programs, averaging 1-2 percent of GDP (Grosh et al 2009), are typically significantly lower than on publicly provided education and health services, and the programs are often implemented by multiple government agencies. As a result, during crises which affect the food security of a large part of the population, policymakers are often compelled to rely on sub-optimal policies such as universal subsidies in order to cushion the poor. Hence it is essential that during non-crisis years, countries invest in strengthening existing programs, and piloting new ones, to address chronic poverty, achieve food security and human development goals and be ready to respond to shocks.

\(^8\) The discussion on food markets draws heavily on World Food Programme (2009) “Hunger and Markets”
A number of safety net options exist based on country circumstances and priorities (see figure 8). Food voucher or cash transfers, or food assistance programs are meant to ensure that minimum dietary energy needs of targeted beneficiaries are fully met. They can be used both to address chronic year-round poverty as well as scale up during crises. Cash or food for work programs are suitable for working age adults and can integrate infrastructure development objectives with income transfers. Supplementary feeding programs provide nutrient-rich foods, typically targeting mothers, young children and other vulnerable groups. School meal programs are one form of supplemental feeding that can play an important role in addressing education, hunger and nutrition objectives. Conditional Cash Transfer (CCT) programs are also a good way to integrate safety net type programs with broader development goals such as increased use of health and education services. Establishing new CCT programs may take too long during crises and exclude the neediest where services are scarce but where CCTs already exist they can be part of the response.

Staple food subsidies act as a safety net in many countries, especially in the Middle East region. Here, it is important to distinguish between universal subsidies that take up a large share of the budget and depress incentives and smaller subsidies and targeted at vulnerable groups through rationing or provision of staples typically consumed by the poor.

Fortified foods are the missing link in most food based safety net programs. Most food based safety net programs provide, or subsidize, non-fortified food. This is because they are cheaper to source or because the local private sector does not have the capacity to fortify. Yet the food...
security benefits of expanding fortification are clear. A study comparing four safety net programs in Bangladesh that included food assistance clearly shows that fortified wheat flour had a positive nutritional impact relative to households receiving unfortified rice. Fortified food assistance also had a larger positive effect on the caloric intake of women relative to men, as wheat is generally less preferred to rice in Bangladesh (Ahmed et al 2007). Hence implementing food vouchers with the view to increase consumption of fortified food may meet the twin objectives of ensuring adequate calorie intake and dietary diversity.

6.4 A multilateral action is needed

For a number of years, western donors have urged poor countries to make their agricultural and food security investments more strategic, better prioritized for results, and at a technically improved level. The Paris Declaration (2005) on Aid Effectiveness stressed 5 principles: (1) country ownership of the development agenda, (2) donor alignment with country priorities and systems, (3) harmonization of donor policies, procedures, and practices, (4) managing for development results, and (5) mutual accountability. The follow-up to Paris, the Accra Agenda for Action (2008), stressed: (1) enhanced country ownership, (2) building more effective and inclusive partnerships, and (3) achieving development results and being accountable for them.

Most recently, donor discussion at the Rome Food Summit stressed the Rome Principles (2009). They include the need to: (1) invest in country-owned plans, (2) foster strategic coordination between national, regional and global level to improve governance, promote better allocation of resources, avoid duplication of efforts and identify response-gaps, (3) strive for a comprehensive twin-track of direct action for the most vulnerable and a medium to long term programs to eliminate root causes, (4) ensure a strong role for the multilateral system by sustained improvements in efficiency, responsiveness, coordination and effectiveness of multilateral institutions, (5) ensure sustained and substantial commitment by all partners to investment in agriculture and food security and nutrition, with provision of necessary resources in a timely and reliable fashion, aimed at multi-year plans and programs.

Improve coordination of actual bilateral and multilateral funding to match the growing coordination of external partner advice and planning for food security in country-led investment plans under the Accra Agenda for Action. Bilateral and multilateral aid is allocated on a per country basis for all purposes and sectoral projects are typically programmed three years in advance. In effect, there is no standing bilateral or multilateral pool of sectorally targeted but otherwise unallocated capital available to adequately support what donors as a group at the country level had been asking countries to do in agriculture and food security.

The Global Agriculture and Food Security Program (GAFSP) was recently created for this purpose. The GAFSP is a multilateral mechanism to assist in the implementation of pledges
made by the G8++ at L’Aquila in July 2009 and set up as a Trustee Account within the World Bank for the use of a variety of external supervising entities (such as MDBs and some UN Agencies) in response to a request from the G20 in Pittsburgh in September, 2009. The new mechanism was set up by the World Bank under external joint donor and recipient governance and launched in late April 2010. Its objective is specifically to address the underfunding of country and regional agriculture and food security strategic investment plans already being developed by countries in consultation with donors and other stakeholders at the country-level. This is designed to make aid more predictable and more country-led in contributing to the achievement of the Millennium Development Goal 1 to cut hunger and poverty by half by 2015.

The GAFSP includes both a public and private sector financing window. The public sector window, which currently accounts for more than 90 percent of pledges, is intended to mobilize and consolidate concessional funding that is additional to current programs, immediately available, untied, and will help support strategic country-led or regional programs that result from sector-wide country or regional consultations and planning exercises such as CAADP in Africa. The public sector window is under the external governance of a Steering Committee composed of an equal number of voting donor and recipient representatives, and non-voting representatives from: the Trustee, the UN agencies, the potential Supervising Entities (such as MDBs and some UN Agencies) and Civil Society Organizations. The private sector window will provide long and short term loans, credit guarantees and equity to support private sector activities to improve agricultural development and food security.

To date, GAFSP has been generously supported by pledges and disbursements from (in alphabetical order) Canada, Korea, Spain, and the United States, and by the Bill and Melinda Gates Foundation. In order to succeed, it requires both moral and financial support from a larger group of G20 countries committed to growth and food security in poor countries.
References


