1. Overview: Handbook on Food: Demand, Supply, Sustainability and Security

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1.1 INTRODUCTION: GLOBAL FOOD PRICE SURGE: THEN AND NOW

In a 2012 report, IFAD (International Fund for Agricultural Development), WFP (World Food Programme) and FAO (Food and Agriculture Organization of the United Nations) argue that in 2010–12 as many as 870 million people (or 12.5 per cent of the global population) were nutritionally deficient in energy. This figure was certainly adversely affected by the food price spiral of 2007–08. A recent and continuing surge in food prices portends another crisis. Nevertheless, there are some striking differences between the food crisis of 2007–08 and the present. One is that the latter is more pervasive (not only have prices of wheat and maize risen sharply but also those of sugar, among other food commodities). A second important difference is that the present surge is largely a result of supply shocks – weather is a more important factor this time than in 2008, reducing production and stocks. A third difference is that, although trade policy responses are associated with price spikes, the former had a more important role in the earlier crisis.

Some critical inputs into agriculture such as oil also affect food prices. Oil affects food prices through supply and demand channels. On the supply side oil and oil-related costs are a substantial component of production costs of food and non-food crops. Agriculture is second only to transportation in its oil-use intensity, implying high sensitivity of marginal costs to oil prices. The effect of rising oil prices is reinforced by surges in fertiliser prices, most of which are based on energy products, such as natural gas. In fact, energy costs could account for up to 90 per cent of the fertiliser cost (e.g. nitrogen fertiliser). Moreover, the bulky nature of food grains implies that their prices are heavily influenced by transport costs. As rise in energy prices pre-dates that in food prices, the causality is likely to run from energy prices to food prices and not the other way around.

Demand factors further contributed to food price spiral. Of particular importance is biofuel demand (Headey and Fan, 2010; Timmer, 2010). In recent times when oil prices have exceeded US$60 a barrel, biofuels become more competitive, especially if such high oil prices are expected to persist. Recent studies (cited in Headey and Fan, 2010) show that the diversion of the US maize crop from food to biofuel uses is the largest source for international biofuel demand and the largest source of demand-induced price pressure.

Biofuels are a major new source of demand in maize and vegetable oil markets, and so they are a potentially important factor in explaining price rises in these markets. But the knock-on effects on other food commodities are significant as well. In the United States, for example, expansion of maize area by 23 per cent in 2007 resulted in a 16 per cent decline in soya-bean area and a price rise of 75 per cent between April 2007 and
April 2008. In Europe, other oilseeds displaced wheat for the same reason (Headey and Fan, 2010).

There is a high degree of correlation between food and oil prices. The increases in oil price in the first quarter of 2012 are a result of both shortages and rising demand, particularly from the industrial sector in China.

Heightened volatility in food prices is also the result of localised weather problems, for instance, onion prices soared in India in November–December 2010, following unseasonal heavy rains. Evidence also points towards the role of speculators in exaggerating the rally in food prices. Commodity derivatives are seen as an important portfolio-hedging instrument since the returns in commodity sector are uncorrelated with the returns on other assets. This financialisation of commodities may not be a source of food inflation; however, it does play an important role in the short-term volatility in food prices (World Bank, 2011a). High oil prices, strong demand for crops from the biofuel sector, depleting stockpiles of food-grains and lower production are also responsible for the food price surge. No less important are protectionist policies adopted by many exporting nations, and expansionary monetary policies. Moreover, as markets are increasingly integrated, economic shocks in international markets get transmitted to domestic markets quickly but pass-through effects vary greatly (Timmer, 2010).

Recent evidence suggests that most major cereal producers, including both consumer nations and exporter nations, responded positively to spiralling food prices in 2007–08 (Fuglie and Nin-Pratt, 2012).

The exporters are distinguished on the basis that they export more than 10 per cent of their production. The major consuming nations increased their production of maize by 16.8 per cent during 2007–08 and 2008–09, of rice by 12.4 per cent, and of wheat by 8.5 per cent. The response in China and India was particularly strong as they increased public agricultural spending by 25–30 per cent in 2008. The response from major exporting nations was even stronger, especially for maize and wheat production, which increased by 25–30 per cent. Rice production grew less as it is dominated by smallholders.

There were other constraining factors for rice. First, rice prices rose with a lag. Second, in most rice producing countries, protectionist government policies limited incentives to produce more. Third, Asian rice producers are much more dependent on fertilisers than smallholders from other regions. In countries where fertilisers were highly subsidised and/or their export was restricted, fertiliser price did not rise much (as in China and India) and the supply response was quite high.

1.2 IMPACT OF GLOBAL PRICE RISE ON DOMESTIC PRICES

What is crucial for understanding the impacts of global food price surge is transmission to domestic prices. As a recent Asian Development Bank (ADB, 2011) study emphasises, several factors determine this transmission. For food importing countries, the key factors are the exchange rate, trade policies and the speed of adjustment. For countries that are not so dependent on food imports, market conditions – local crop conditions, supply costs and policy measures – matter more. Available evidence suggests that international grain prices and domestic prices move in tandem. In fact, in some cases, domestic prices rise faster.
Between June 2010 and February 2011, global rice prices increased by 16.8 per cent. But domestic rice prices, since June 2010, rose by 21.4 per cent in Bangladesh, 21.6 per cent in Indonesia and 36.7 per cent in Vietnam. By contrast, the increases were lower (between 13.5 per cent and 10.3 per cent) in Sri Lanka, Pakistan, China and Thailand; and decreased in the Philippines (the price of well-milled rice fell by 0.9 per cent) and Cambodia (by 10.5 per cent).

Wheat prices are a different story. International prices rose by 99.6 per cent in the 8 months to February 2011, but domestic prices in Asia generally did not exceed 70 per cent. In the Kyrgyz Republic, for example, local wheat prices rose by about 67 per cent, in Bangladesh by 50 per cent, and in India, China and Pakistan by 10–20 per cent.

Since food is assigned a high weight in consumer price indices (about 59 per cent in Bangladesh, over 46 per cent in India and 40 per cent in Vietnam), food price inflation is associated with general inflation. In Vietnam, for example, inflation was in double digits (about 12 per cent in January 2011), in part due to higher food prices (about 15 per cent).

But higher food prices also induce a positive supply response. Recent evidence suggests that most major cereal producers – including both consumer nations and exporter nations – responded positively to spiralling food prices in 2007–08.

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Supply response is impeded by transport and other input costs. Transport costs have risen because of rising fuel prices, cutting into producers’ profits. Also, given lack of data on farm gate prices, it is not straightforward to assess what fractions of retail prices are transmitted to the former – especially smallholders.

### 1.3 IMPACT OF PRICE RISE ON GROWTH, POVERTY AND INEQUALITY

There are short-run growth and poverty effects.

Two scenarios are considered in the ADB study (2011) for ten selected Asian countries: in the first scenario, worldwide food prices rise by 30 per cent in 2011 and decline by 5 per cent in 2012; and in the second, in addition to the rise in food prices, the oil price rises by 30 per cent in 2011, and declines by 3.1 per cent in 2012.

In the first scenario, GDP growth in some food-importing countries will decrease by up to 0.6 percentage points in 2011. By contrast, in food exporting countries, higher
global food prices are associated with growth acceleration. In Thailand, for example, the GDP growth accelerates slightly. In several countries (India, Indonesia and Malaysia), the growth impacts are likely to be stronger in 2012, as the economies take time to adjust to exogenous shocks in food prices.

Under the second scenario, the GDP impacts are more pronounced, with growth deceleration of up to 1.5 percentage points in 2011 and 0.8 percentage points in 2012. In the Philippines, for example, the GDP growth slows down by 1.2 percentage points in 2011, and 0.9 percentage points in 2012, since it is a net importer of both food and oil.

Should these simulation results be taken at face value? We are inclined to the view that these exaggerate the slowing down of growth if yield increases occur in response to total factor productivity (TFP) growth. So, even if agricultural investment suffers under a tight monetary stance, TFP growth may be sustained through more efficient use of water, fertiliser and other resources (Fuglie, 2010; IFAD, 2011).10

An increase in food prices adversely affects the poor since they spend a large proportion of their income on food items. In response, the poor tend to take remedial actions: switching over to less nutritious and cheaper diets, cutting down on their children’s (especially girls’) food intake, and reducing expenditure on non-food items such as health and education of children. In extreme situations, the poor are also forced to sell their assets such as livestock. Although food prices have been increasing since 2000, they increased at a more rapid pace between 2006 and 2007–08 when prices of major cereals surged very rapidly. Asia and the Pacific countries experienced varying spikes in these prices. These spikes have been due to a combination of both short-term (such as droughts, trade restrictions, and speculation and hoarding) and long-term factors (such as declining yield growth, inadequate investments in infrastructure and linkages with other commodity markets such as energy markets).

Although there are alarming estimates of the impact of food price inflation on poverty – a World Bank estimate of the increase in the number of poor globally, for example, ranges from 75 million to 105 million (World Bank, 2008) – more plausible and insightful estimates are reported in a recent study by the ADB (2008), taking supply responses to higher food prices into account. An important finding obtained from simulations for China and Indonesia is that the negative effects of food price inflation (e.g. higher incidence of poverty and increase in income inequality) are dampened by the positive supply response in rural areas. The comparison is interesting as China is a net food exporter while Indonesia is a net food importer. China gains from rising global food prices. Specifically, the largest gains accrue to households dependent on agriculture. Not only does the head-count index of poverty decline but so does the Gini index of income inequality, more than compensating for the unfavourable effects in urban areas. The results for Indonesia, however, differ. Although higher global food prices result in higher consumer prices, appreciation of the exchange rate and a loss of competitiveness of Indonesian exports, and a lowering of real GDP, the food crops sub-sector expands. Not surprisingly, therefore, the overall head-count of poverty rises but slightly.

Two recent studies (ADB, 2011; World Bank, 2011b) offer assessments of the impact of the recent and continuing food price surge. Both are alarmingly high. The main findings of the ADB (2011) study are given below. Changes in poverty are a pure price effect in the sense nominal incomes are held constant. There are two implicit assumptions: one is that wages adjust with a lag; and the second is delayed supply response. While
both seem consistent with empirical evidence, it must be emphasized that the short-term results may be larger than longer-term effects.\textsuperscript{11}

Using the poverty cut-off of $1.25 per day (purchasing power parity, PPP, 2005) and assuming that domestic food prices rise by 10 per cent, the simulations show that the number of poor in selected Asian countries rises by 64.4 million or the percentage of poor rises by 1.9 points.\textsuperscript{12} With higher food price increases of 20 and 30 per cent, the percentage of poor rises by 3.9 points and 5.8 points, respectively.\textsuperscript{13} As the poverty gap ratio captures both increases in the number of poor, and deterioration in their standards of living, this is the more comprehensive measure. With domestic food prices rising by 10 per cent, 20 per cent and 30 per cent, the poverty gap ratio rises by 1.4, 2.7 and 4.1 percentage points, respectively.

\section*{1.4 IMPACT ON REAL FACTOR INCOMES}

Additional simulations focus on the impact of a 10 per cent increase in the price of a staple food in a small sample of countries (FAO, 2008). Households are classified across different characteristics (net market position, income quintile, sources of income). The main findings are: (1) urban consumers lose in Bangladesh, Pakistan and Vietnam; (2) in both rural and urban areas, the poorest quintiles are the worst affected; (3) even in some countries where rural households gain on average, such as Vietnam and Pakistan, the poorest of the poor suffer a welfare loss; (4) disaggregating quintiles of households by landownership, the poor landless are likely to be worse-off. In Bangladesh, for example, the welfare loss of the landless is as high as 3.5 per cent in the bottom quintile; in Vietnam, the average loss of the landless is 1.8 per cent, as against 2.7 per cent of the bottom 40 per cent. Classifying households into agricultural ‘specialisers’ – households that derived more than 75 per cent of their income from farming – an interesting finding is that their welfare improves. In Bangladesh, for example, the average welfare of agricultural specialisers – comprising 10 per cent of the rural sample – increases by 1.7 per cent (1.3 per cent in the bottom quintile, 1.8 in the top). In Vietnam too, the richer agricultural specialisers gain around 2.2–2.3 per cent.\textsuperscript{14} Finally, welfare effects vary between male- and female-headed households. Specifically, in most urban, rural and national samples, female-headed households record greater proportional losses (or smaller proportional gains) than male-headed households. A key explanation is that female-headed households fail to benefit from agricultural income generating activities due to their limited access to land, credit and markets (e.g. Bangladesh, Vietnam and Pakistan).

A more recent study of countries in the Greater Mekong sub-region offers a rich and insightful analysis of how food producers, consumers and wage labourers were affected by the food price crisis (Sombilla et al., 2010). While higher rice prices were welfare reducing, the favourable supply responses were weakened by higher input prices. Wage labourers lost. In Cambodia, for example, in terms of the rice wage equivalent, the average wages during the crisis were lower. In rural coastal region, the daily rice wage equivalent fell from 4.67 kg in June 2007 to 3.84 kg in June 2008; in the rural plains, it fell from 5.75 kg to 4.77 kg; and in rural Cambodia as a whole, from 5.09 kg to 4.43 kg. For those surviving at bare subsistence, such reductions imply substantial welfare loss.
A policy concern is quick transmission of rising food prices to farm gate prices – especially for smallholders – and easy access to markets. If impediments to market access are removed, the sales of smallholders increase more than proportionately to those of wealthy farmers (Shilpi and Umali-Deininger, 2007). So, given a timely and an adequate supply response, the rise in poverty may be considerably lower than predicted without such a response.15

1.5 EFFECT ON NUTRITION AND LABOUR MARKET PARTICIPATION

If there are nutritional shocks as a result of the food price surge, poverty–nutrition traps (henceforth PNTs) cannot be ruled out (Jha et al., 2009).

The effect of nutritional intake on labour productivity and wage rates, an important area for research for economists and nutritionists, found initial expression in the form of the efficiency wage hypothesis. It postulated that in developing countries, particularly at low levels of nutrition, workers are physically incapable of doing hard manual labour. Hence their productivity is low which then implies that they get low wages, have low purchasing power and, therefore, low levels of nutrition, completing a vicious cycle of deprivation. These workers are unable to save very much so their assets – both physical and human – are minimal. This reduces their chances of escaping the PNT.16

So instead of nutritional deprivation as an effect of income loss, the focus shifts to nutritional adequacy as a precondition for participation in labour market activities. Even if some succeed in participating, their wage earnings will not allow them to escape the PNT. Indeed, a mild labour shock (e.g. associated with a crop shortfall) would worsen their plight, as the risk of loss of employment would be considerably higher. In particular, female workers are more prone to PNT than male workers, and there is a persistent gender inequality in rural India. They find that improving nutrient intakes can have significant effects on rural wages and, therefore, on the possibility of breaking PNT as well as reducing poverty. Thus public policy should concentrate urgently on providing direct nutritional supplements to the nutritionally deprived in addition to pursuing direct poverty alleviation policies.

Estimates of obesity are alarming. Recent projections indicate that globally in 2005 about 1.6 billion (age 15+ years) were overweight and at least 400 million were obese. Besides, at least 20 million children under the age of 5 years are overweight globally. By 2015, 2.3 billion adults are likely to be overweight and more than 700 million will be obese. Once considered a problem only in high-income countries, excess weight and obesity are emerging as a major health concern in low- and middle-income countries (WHO, 2006).17

Excess weight and obesity are a manifestation of energy imbalance between calories consumed and calories expended. Broadly, the underlying causal factors include (1) dietary shifts towards higher intake of energy-dense foods that are high in fat and sugars but low in vitamins, minerals and other micronutrients; (2) decreased physical activity due to the increasingly sedentary nature of many forms of work; (3) faster and less strenuous modes of transportation, and growing urbanisation.

Excess weight and obesity are associated with higher risks of cardiovascular disease
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(mainly heart disease and stroke), diabetes, musculoskeletal disorders – especially osteoarthritis – and some cancers (endometrial, breast and colon). Childhood obesity, on the other hand, is associated with a higher risk of premature death and disability in adulthood.

Many developing countries are confronted by a ‘double burden’ of malnutrition in which undernutrition and obesity exist side-by-side within the same country, same community and, not infrequently, in the same household (Gaiha et al., 2010). This double burden is attributable to inadequate pre-natal, infant and child nutrition followed by exposure to high fat, energy-dense, micronutrient-deficient foods and lack of physical activity (Caballero, 2005; WHO, 2006).

While the relentless battle against poverty and hunger continues, the double burden of undernutrition and obesity, a new phenomenon particularly in middle-income developing countries, that afflicts millions has barely received careful attention. Underweight children and obese adults are two manifestations of this scourge.

The emergence of the double burden is symptomatic of the dietary transition underway in developing countries as a result of growing prosperity and urbanisation. Diets are shifting from traditional foods towards low-cost energy-dense foods, and physical activity patterns are becoming less strenuous and more sedentary. The excess energy from these foods may affect children and adults within the same household differently. Children may use up the excess energy and still remain underweight while adults are more likely to gain weight. Intrahousehold food allocation biases between adults and children, and between males and females, compound these effects.

The upsurge in the numbers of the overweight and obese portends higher risks of chronic non-communicable diseases (NCDs). The burden of chronic diseases has risen sharply in India, accounting for 53 per cent of all deaths and 44 per cent of disability-adjusted life years in 2005. Worse, many of these deaths occur at early ages and the number of potentially productive years lost due to deaths from cardiovascular disease in the age group of 35–64 years (9.2 million years lost in 2000) is the highest in the world. By 2030, it is expected to touch 17.9 million years.

1.6 DIETARY TRANSITION AND POLICY IMPLICATIONS THEREOF

While growing prosperity and associated life-style and dietary changes are irreversible, a pessimistic reading of the rising burden of diet-related NCDs must be avoided. Although the health policy challenge remains – arising from the conflict between policies that reduce undernutrition and those designed to curb obesity – there is now better awareness of interventions that reduce both. These include promoting breast-feeding, improving the nutritional status of women of reproductive age and reducing foetal growth retardation. Moreover, their costs are a fraction of treating the much larger numbers likely to suffer from chronic ailments in the near future.

A defining characteristic of transformation of emerging economies in the Asia-Pacific region – especially India, China and Indonesia, among others – has been a dietary transition. As their food markets integrate globally and communication improves, diet transitions become unavoidable resulting in a move away from inferior to superior foods.
and a substitution of traditional staples by primary food products that are more prevalent in Western diets. These shifts are reflected in higher consumption of proteins, sugars, fats and vegetables.\textsuperscript{21}

Some of the underlying factors behind this dietary transition are expansion of the middle class, higher female participation in labour markets, emergence of nuclear two-income families, a sharp age divide in food preferences (with younger age groups more susceptible to new foods advertised in the media), and rapid growth of supermarkets and fast-food outlets (Gaiha and Thapa, 2008; Deolalikar, 2010; Timmer, 2010).

The health implications of the dietary transition are unclear. A more varied and nutritionally balanced diet and higher levels of food hygiene are associated with better health. But there is a trade-off as more energy-dense foods are linked to higher incidence of diet-related NCDs such as diabetes, coronary heart disease and certain types of cancer. Although India lags behind other developing countries in the epidemiological transition – decline in infectious disease mortality is compensated increasingly by higher mortality from chronic degenerative NCDs – there is some evidence of this transition taking place.

In view of the above-mentioned tradeoff, some policy recommendations can be made. In particular, enhancing awareness of healthy diets is a must. As consumer preferences for flavour, packaging and variety evolve in complex ways in a context of rapidly integrating food markets, a careful scrutiny of measures (e.g. labelling of food quality, consumer awareness campaigns through the media and other channels) designed to influence consumer food choice is imperative.

\subsection*{1.7 INCREASING FOOD OUTPUT}

The world population is expected to be about 9.1 billion in 2050. With increasing urbanisation and high-income levels, food production must increase by 70 per cent to meet the food demand in 2050.\textsuperscript{22} Since the scope for net increase in arable land is highly limited (especially in Asia and the Pacific Region), 90 per cent of this additional food requirement has to be met through increases in yields in areas with intensive agriculture. Availability of fresh water resources for food production is declining fast and may worsen due to climate change. Since South Asia, and East Asia and the Pacific are slated to experience food deficits in domestic production and increased dependence on food imports by 2030, the pressure to maintain food security would be reflected in intensive exploitation of natural resources (land, water, forestry and fish production). Most poor in these sub-regions are located in ecologically fragile environments that are already experiencing further deterioration. Utmost attention, therefore, should be paid to the sustainability of natural resources used in the intensification of agriculture.

Much recent literature draws attention to slowing cereal yields (WDR, 2008). Combined yield of rice, wheat and maize in developing countries grew at 2 per cent per annum during 1970–90 and about 1 per cent per annum during 1990–2007. But this is not sufficient to argue that agricultural productivity growth decelerated sharply. One major limitation of this measure is that it lumps together a wide range of intensification processes.

The TFP growth analysis, however, points to a different story.\textsuperscript{23} In developing regions, productivity growth accelerated in the 1980s and in the subsequent decades. Input
growth slowed but remained positive. China sustained exceptionally high TFP growth rates since the 1980s. Few other countries and sub-regions in Asia-Pacific also performed well (Fuglie, 2010).

TFP performance in developing countries is strongly correlated with national investments in ‘technology capital’ a measure of a country’s ability to develop and extend improved technology to farmers. Countries that failed in this respect lagged behind others. So there is a case for higher spending on agricultural research. However, there are long time lags between research investments and productivity growth.

Another important insight relates to supply response to higher food prices. The slowdown in growth rate of agricultural capital formation was in part a consequence of a long spell of unfavourable prices facing producers, resulting in capital moving out of agriculture. The incentives offered by spiralling food prices are likely to accelerate agricultural growth and dampen food price inflation.

Within the agricultural sector, sub-sectors comprising livestock and fisheries have made considerable progress. Attention may be drawn to the factors leading to high production of some of the high-value products. It may be added that in China, fishery exports doubled during the 1990s but these were not more than 8 per cent of the total production for that decade. Domestic demand, rather than exports, fuelled an increase in production (Gulati et al., 2007). For instance, milk production in India increased because of a shift in the composition of food away from cereals. Changes in technology and the sale of commercial production in poultry have adversely affected household production in Cambodia, Laos, Vietnam and Indonesia. This may have reduced production for self-consumption.

Biotechnology – especially GMOs – offers new opportunities for enhancing yields and livelihoods. Some of the big challenges, however, are: (1) developing varieties that can perform well under conditions of drought, flood, heat and salinity; (2) strengthening biosafety assessment; and (3) making smallholders aware of the risks and benefits of GMOs. These enormous tasks need substantial finances and scientific talent, and public–private collaboration (Pender, 2008).

1.8 SUSTAINABILITY OF FOOD OUTPUT

There are serious sustainability concerns too.

Degradation of land adds to the crisis of declining yields. In South East Asia and the Pacific (SEAP) sub-region, loss of top soil due to water and wind erosion is 15.7 per cent and 5.4 per cent, respectively. The loss of grain production due to land degradation in China between 1985 and 1989 is estimated to be 60 per cent, mostly caused by flooding, drought and soil erosion. The estimated annual cost of soil degradation is 7 per cent of GDP originating from agriculture in South Asia. For the SEAP sub-region as a whole, the estimated loss varies from 1 to 7 per cent of agriculture GDP. Water-loging is also an important cause of salinity in the SEAP sub-region, and has affected about 7 per cent of arable land. Heavy use of chemical fertilisers has led to contamination of ground water. Another major concern for sustainability is the growing scarcity of water for agriculture, caused primarily by overexploitation of ground water resources in the SEAP sub-region. In the North China plains, the water table has fallen by one metre a
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year due to heavy dependence on tube well irrigation. In southern India, the situation is extremely alarming since the ground water levels have declined by 25–30 m in a decade (Pender, 2008).

Most of the overexploitation of ground water is occurring due to faulty policies such as absence of or weak regulatory measures for use of ground water and public provision of cheap electricity and diesel in the form of heavy subsidies for drawing ground water (Gulati and Narayanan, 2003).

Increased production of livestock has contributed to pollution of water resources and is also responsible for the overconsumption of water and rising demand for feed/coarse cereals. The increase in meat production in China between 1994 and 2004 (i.e. from 45 million to 74 million tonnes) led to rising demand for feedgrains. As a result, 70 per cent of the increased exports (the trade in soybeans doubled in this period) of soybeans went to China (World Bank, 2008).

Climate change scenarios paint a grim picture and reinforce the concerns for sustainable natural resource use. Asia and the Pacific Region encompasses a wide spectrum of farming agro-ecosystems – dry wheat producing areas (Central Asia) and wet rice producing ones (South East Asia). The region is likely to face extreme weather conditions, including a higher probability of floods and droughts.

While the search for effective mitigation mechanisms continues, it must be combined with adaptation. The latter, of course, deserves greater attention than it has received. Since the ‘world’s appetite for emissions reductions has been revealed to be chronically weak’, it is imperative ‘to find ways of adapting to many possible future climates’ (The Economist, 25 November, 2010).

Poor countries need assistance as they lack the financial resources, technical expertise and political institutions for such endeavours. Moreover, they are more vulnerable to the risks of climate change as they depend more on agriculture that is so closely tied to weather. Crops are sensitive to changes in patterns of rainfall and peak temperature, and also the pests and diseases that attack them.

Adaptation calls for not just expanded research into improved crop yields and tolerance of temperature and water scarcity, but also research into management of pests, soil conservation and cropping patterns that enhance their resilience. There is also a case for weather insurance which will pay not when crops fail but when specific climatic events occur (e.g. rainfall below a set level).

There is a shift from the traditional supply chains characterised by many traders and intermediaries and face-to-face interactions between agents, towards chains with fewer links and more impersonal dealings. Supermarket chains offer better deals to farmers, higher prices and greater certainty of selling the produce, along with credit and technical assistance in certain cases. However, farmers are also obliged to meet stringent quality requirements and adhere to food safety standards. Supermarkets prefer dealing with a few large farmers rather than many small farmers. Organising small farmers is a challenge. Further, in response to changes in dietary habits and lifestyle, and liberalisation of retail trade, supermarkets with global links are emerging fast. Smallholders’ participation in supply chain/supermarkets can be made profitable if the government plays the role of not only providing public goods (infrastructure, food safety standards and favourable environment for enforcing contracts) but also a proactive role in collaboration with forward-looking private players in providing inputs and transferring...
technology to smallholders. These initiatives, combined with suitable trade negotiations, can be helpful in overcoming the threats that global trade poses to smallholders.

1.9 FOOD ENTITLEMENTS, SUBSIDIES AND RIGHT TO FOOD

In India’s context, as also elsewhere, there are strong advocates of the Right to Food Act (RTF), passed by the Parliament of India in 2013, given pervasive hunger and child malnutrition. So, while identification of key analytical issues draws upon the debate in India, the implications are more general.

Besides, there are legal compulsions. Article 21 (the fundamental ‘right to life’) of the Indian Constitution encompasses the right to food while Article 47 of the Directive Principles directs the state to ‘regard the raising of the level of nutrition and the standard of living of its people . . . as among its primary duties’, and India being a signatory to various international treaties on these issues. Finally, the Supreme Court has issued several orders on fulfilment of food entitlements (Khera, 2010).

We delineate a perspective on the RTF that differs from the vast literature that has emerged around it in recent years.26 The RTF as an enforceable claim to a minimum quantity of food of a certain quality carries with it correlated duties, particularly of the state.27 These include the duty to avoid loss of the means of subsistence, and to provide for the subsistence of those unable to provide for their own (Shue, 1980). Much, of course, will depend on the specific form of the right to food, the corresponding duties/obligations and the implementation mechanisms.

In practical terms, RTF translates into food entitlements, that is, enforceable claims on the delivery of food. These entitlements could be based on trade, production and employment.

Since RTF does not involve state provision of food except under special circumstances of failures of duties to avoid and protect, and natural disasters, in an important sense it could be viewed as a right to policies (or, as ‘a right to a right’) that enables individuals to produce or acquire minimum food requirements (Osmani, 2000). This may yield useful insights into whether non-fulfilment of the right to food is due to insufficiency of public resources or due to policies followed or both.

From this perspective, recent debates on the National Food Security Bill have concentrated on a rigid interpretation of the RTF as being confined mostly to state provision of food.

Although estimates of the subsidy involved differ, it is likely that the fiscal burden will be unsustainable. More importantly, given the waste involved (it takes Rs 6 of Public Distribution System (PDS) expenditure to transfer a rupee of real income), it is not even clear if this is the best way of fulfilling RTF. If, instead, more sensible policies are pursued that aim to augment low productivity in agriculture, avoid market imperfections that come in the way of remunerative farm gate food prices and expand livelihood options, fulfilment of food entitlements may be far less costly. In fact, an analysis based on the 61st round of the National Sample Survey (NSS) yields two robust insights: the higher the agricultural wage rate, the lower is the demand for rural public works; and the
lower the food price, the lower is the demand for subsidised food (Gaiha et al., 2009). A crucial requirement is a clear enunciation of time-bound objectives and a coherent policy framework. Although not specific to the right to food, what really matters is the effective use of resources in enforcement. As experience accumulates – both juridical and policy related – these costs may decline substantially (Gaiha, 2003).

Hence, contrary to assertions that RTF is both ‘undefinable’ and ‘undeliverable’, it was argued that it is evolving slowly into an enforceable right. Some of the arguments against it are exaggerated, if not mistaken. More significantly, its potential for enabling governments to do what they should by providing a strong foundation for their poverty alleviation programmes and policies, and for sharpening the focus of civil society organisations as active agents in such programmes is substantial. While realisation of this right is likely to be slow, difficult and uncertain, it would be a mistake to discard it on the ground that ‘too many rights may well make a wrong’ (The Economist, 2001, p. 20).

1.10 OUTLINE OF THE VOLUME

In his chapter ‘The political economy of food security: a behavioral perspective’, C. Peter Timmer makes three basic points. First, from a political economy perspective, food security is intimately connected to volatility of staple food prices. Second, policy makers respond to this connection by focusing policy attention and fiscal resources on preventing and coping with volatile food prices, but these resources have opportunity costs in terms of slower long-run economic growth. And third, policy makers are right to do this, because their political constituents have deep, visceral responses to volatile food prices, especially to food price spikes, that are based in behavioural psychology. The empirical regularities of behavioural economics, especially loss aversion, time inconsistency, other-regarding preferences, herd behaviour, and framing of decisions, present significant challenges to traditional approaches to food security. The formation of price expectations, hoarding behaviour and the welfare losses from highly unstable food prices all depend on these behavioural regularities. A new theoretical underpinning to political economy analysis is needed that incorporates this behavioural perspective, with psychology, sociology and anthropology all likely to make significant contributions.

In their chapter ‘Shocks to the system: monitoring food security in a volatile world’, Derek Hindey, Olivier Ecker and Jean-Francois Trinh Tan argue that monitoring food security is an increasingly important goal in development given predictions of persistently high food prices, continued uncertainty in the global economy, and the potential for increased frequency of natural disasters. Yet the 2007–08 food crisis revealed the development community’s inability to gauge the impacts of economic shocks on food security. For assessing the crisis’ global impact, it relied on simulation analyses combined with unreliable indicators that led to grave miscalculations of the number of affected people. This chapter reviews the literature on the welfare effects of major economic shocks – particularly of food price spikes – and discusses common approaches and indicators for assessing the impact on food security and nutrition. Based on empirical evidence from past crises it evaluates the validity and reliability of different types of food security indicators in gauging the impact. The chapter concludes by outlining some
means of improving food security measurement for a better monitoring of future food crises.

In their chapter ‘Food price inflation, growth and poverty’, Shikha Jha and P.V. Srinivasan explore the implications of high and volatile global food prices for economic growth and poverty, and discuss policy choices available to developing countries in Asia in dealing with uncertain supplies and rising and fluctuating food prices. As the poor cope with rising prices by depleting assets and switching to less nutritious foods they fall further into a PNT. Food price increases contribute to general inflation by putting pressure on wages. By reducing household expenditures on education and health, they adversely affect productivity and growth. Tight monetary policy could hurt growth further in the context of supply constraints. While in the short run a judicious mix of trade and buffer stock policies can help stabilise prices, in the long run improving agricultural productivity requires investment in research and modern technology. International policy coordination can help avoid panic driven protectionist policies, integrate markets and reduce global food imbalances.

In his chapter ‘Transmission of global food prices, supply response and impacts on the poor’, David Dawe shows that price transmission from world markets to domestic markets during the world food crisis of 2007–08 was less than complete. But domestic price increases were nevertheless typically large, with domestic prices in early 2008 being about 40 per cent higher in real terms than in early 2007. Transmission across countries was heterogeneous. Some countries (e.g. China, India, Indonesia) that were not too dependent on imports (or exports) used trade policies to insulate themselves from the world price shock and contain domestic price increases, and these policies exacerbated the shocks experienced by other countries. But countries that were dependent on imports for a substantial share of domestic consumption generally experienced larger domestic price increases. The evidence from household surveys indicates that high food prices generally hurt the poor, although the poverty impact in any particular country will depend on the net trade status of that country and the distribution of land (and thus marketable surplus). The poverty impact of high food prices is likely to be worse in food-importing countries and in countries with an unequal distribution of land.

In their chapter ‘The financialization of food commodity markets’, Christopher L. Gilbert and Simone Pfudrer quantify the extent of financialisation of food commodity markets over the period since 2000 and analyse the impacts of this process. They look specifically at food price bubbles, price volatility and price comovement. They reject the view that financialisation has been responsible for high and volatile food commodity prices but also reject the view that financialisation has not had any effects on these markets. Trades originated by financial actors, and specifically index investors, can move prices but tend typically to be volatility reducing. The widely commented increased comovement, which relates to oil prices but not to equity prices, appears more likely to have resulted from the use of food commodities as biofuels feedstocks than from financialisation.

In their chapter ‘Financialisation of food commodity markets, price surge and volatility: new evidence,’ Kritika Mathur, Nidhi Kaicker, Raghav Gaiha, Katsushi S. Imai and Ganesh Thapa argue that recent literature points towards the role of speculators in exaggerating the rally in food prices, over and above that explained by the fundamentals of demand and supply. Some studies argue that futures market speculation can
only be blamed for the increasing food prices if it is accompanied by hoarding. With this background, the issues that the present chapter deals with are: (1) assessing the impact of indices such as the S&P500 and MSCI on commodity prices; and (2) tracing the volatility patterns in commodity prices, and linking volatility in commodity markets to these variables. Their results show a negative relationship between the commodity market returns and the Dollex, and a positive relationship between commodity market returns and crude oil price returns. The impact of equity markets, inflation and emerging market performance on commodity markets is weak. They also find some evidence of reverse causality or mutual endogeneity, for instance, causality from Goldman Sachs Commodity Index (GSCI), Standard and Poor’s Stock Market Index (S&P500) and West Texas Intermediate (WTI) to Morgan Stanley Capital International Index (MSCI), Consumer Price Index (CPI) to WTI, and MSCI, S&P500 to the US-dollar denominated Bombay Stock Exchange Index (Dollex). They also study the causal relationships between the volatility of returns on macroeconomic variables and commodity markets, using the cross-correlation function and Granger causality tests. The results confirm unidirectional relationship from (volatilities of) GSCI to S&P500, from GSCI to MSCI, and from Dollex to GSCI. But there is also evidence of a two-way causality between Inflation and GSCI (volatilities). Thus, the case for financialisation of commodity/food markets driving commodity/food returns and their volatility rests on weak foundations, leaving the door open for the pivotal role of supply–demand fundamentals.

In their chapter ‘Dietary shift and diet quality in India: an analysis based on the 50th, 61st and 66th rounds of NSS’, Raghav Gaiha, Nidhi Kaicker, Katsushi S. Imai, Vani S. Kulkarni and Ganesh Thapa examine changes in diets in India over the period 1993–2009. Diets have shifted away from cereals towards higher consumption of fruits, vegetables, oils and livestock products. Using household level data, a food diversity index (FDI) is constructed, based on five food commodities. Significant price effects that vary over time are confirmed, as are income/expenditure effects. Over and above these effects, more sedentary life styles and less strenuous activity patterns played a significant role in shaping dietary patterns. An important finding is the slowing down of dietary transition in the more recent sub-period 2004–09. Clues relate to weakening or strengthening of food price, expenditure and life-style effects over time. Using an instrumented measure of FDI in the second stage, and all other exogenous variables, its effects on nutrients’ intakes are analysed. A common finding that food diversity is associated with better quality diet and higher intakes of nutrients is not corroborated. While there is a reduction in calorie intake, there are increases in protein and fat intakes. A case is made for the provision of public goods, nutrition labelling, regulation of food standards, consumer awareness of healthy diets, food fortification and supplementation, and active involvement of the private sector in adhering to the regulatory standards and nutritional norms.

In her chapter ‘Dietary change, nutrient transition and food security in fast-growing China’ Jing You analyses food security issues in China against the background of fast and consistent economic growth over more than three decades. Along with a better economic situation, the country has also undergone changes in food consumption – not only changing structures of diets but also the increasing quantity of food to feed the larger and richer population. This chapter reviews food issues in China at the micro and macro levels, respectively. At the micro level, it draws upon large-scale household surveys and
summarises findings on both rural and urban individuals’ structural changes of food consumption, including responsiveness of tastes and food consumption behaviour to income and food prices, the contradiction between improved economic status and unimproved nutrient intake, and changes in eating decisions. At the macro level, it takes stock of the recent literature and the up-to-date data. It discusses the challenges of food security facing China, including both domestic production and import pressures. The chapter concludes with current policy and possible improvement.

In their chapter ‘Poverty nutrition traps’ Raghbendra Jha, Katsushi S. Imai and Raghav Gaiha argue that while economic growth has been associated with poverty reduction, it has often been observed that such poverty reduction has largely benefited people living just below the poverty line and not those who are well below it and severely deprived, particularly in terms of nutrition. Particularly at low levels of nutrition, workers are physically incapable of doing hard manual labour. Their productivity tends to be low, which then implies that they get low wages, have low purchasing power and, therefore, low levels of nutrition, completing a vicious cycle of deprivation, i.e., they are caught in a PNT. These workers are unable to save very much and so their assets – both physical and human – are minimal, i.e. they are obliged to work to maintain the minimum living standard for their survival. A principal reason for the existence of poverty traps and the particular problem of PNT is the fact that workers have very few assets apart from their labour. Consequently, they are obliged to work under circumstances that perpetuate their poverty/hunger. Any long-term solution to the problem of poverty traps must, therefore, involve augmentation of worker assets so that they are not obliged to work under unfavourable conditions. These conditions require both positive and negative public policy initiatives.

In her chapter ‘The political economy of dietary allowances’, C. Sathyamala argues that there is an assumption that dietary recommendations, including norms for nutritional requirements, have been arrived at through an impartial inquiry. While revising of dietary norms is to be expected as advances are made in nutritional science, recommendations of dietary allowances become a contested territory. Depending on particular contexts, recommendations have been scaled up or scaled down to suit the needs of the state and capital. Use of calorie counts has taken the focus away from the need to provide for a diet with all the necessary, equally important nutrients in appropriate quantities for optimal health, irrespective of costs. This chapter, based on a review of literature, presents key shifts in the development of nutrition from the late-nineteenth century, to support the assertion that nutritional recommendations are very much shaped by the socio-political contexts in which they are formulated.

In their chapter ‘Economic prosperity and non-communicable disease: understanding the linkages’, Ajay Mahal and Lainie Sutton maintain that the period since World War II has seen global GDP per capita increase by nearly three times and improved life expectancy in most countries around the world. However, this period has also been characterised by the growth of NCDs. Nearly 25.5 million die of NCDs annually, 80 per cent of the deaths occurring in low- and middle-income countries. One perspective has been to view NCDs as a collateral damage of affluence, presumably necessitating no more than a better measure of economic performance and possibly policy action directed to address market failures associated with their spread. Another approach, however, views low economic and social status as a key driver of NCDs necessitating urgent attention to
inequalities. A large empirical literature on these issues has been repetitive and unclear in its basis for policy suggestions, especially on the causal linkages running from income to health. The chapter attempts to disentangle existing literature on this subject, listing key stylised facts about the global NCD epidemic, its relationship to economic performance; the theoretical basis of the two-way causality between incomes and NCDs, the emerging literature for developing countries and new empirical work assessing causal links from income to NCDs and their risk factors.

In his chapter ‘Trade, food and welfare’, Alexandros Sarris discusses how agricultural trade and trade policy affect food security. Trade and trade policy affect food security, but whether open economies are more likely to achieve food security depends on how trade and trade policy interact with the domestic markets that affect those that are food insecure. A closed economy while insulated from external shocks, is more vulnerable to domestic shocks. On whether a country can trust global food markets to deliver food commodities when needed and at reasonable cost, the answer is, in general, yes. However, there are occasions, when international markets become excessively unstable and unreliable. History suggests that such occurrences are very infrequent. On what countries that face food security problems do, the review suggests that a drive towards complete self-sufficiency is almost never the answer, and some degree of adequate domestic productive food capacity is wise.

In his chapter ‘Enhancing food security: agricultural productivity, international trade and poverty reduction’, Peter Warr argues that food security is a meaningful concept because of the special characteristics of food as a commodity. It is argued here that food security is enhanced by three factors: reductions in the real price of food; reductions in poverty incidence; and establishment of effective food social safety nets. Food price reductions depend heavily on agricultural productivity improvement, which occurs through research and extension and through investments in rural infrastructure. Reductions in poverty incidence are a central determinant of food security because under most circumstances only the poor suffer from food insecurity. By increasing the real purchasing power of the poor they can be self-insulated against food insecurity. Establishing effective food social safety nets is necessary because some groups lie outside the reach of the forces of economic growth and poverty reduction, requiring special help with regard to food. Emergency food safety nets are also required in case of natural or anthropogenic disasters.

In her chapter ‘Best-fit options of crop staples for food security: productivity, nutrition and sustainability’, Jill E. Gready argues that food is a primal need and all people have a right to sufficient nutritious food to sustain life and health. Food security represents public concerns and responsibilities of governments for food provision. Food insecurity, on the other hand, embodies the anxieties of people most at risk of being unable to obtain sufficient affordable, safe and nutritious food reliably. She identifies and attempts to integrate, the disparate factors limiting food production, but more importantly vulnerabilities and risks for reliable production in an increasingly uncertain world, climatically and resource constrained. She provides an objective framework to define best-bet choices of staple food crops and options to improve their productivity, sustainably and reliably with minimal resource and labour inputs and farming-system complexity. Its aim is to simultaneously assure food security and minimise food insecurity. Her analysis suggests that although a step change in plant productivity, analogous
to the Green Revolution is necessary, its starting point should not be the current status quo and vested interests of national, international and commercial agriculture. She suggests alternative staple crops better fit-for-purpose: more nutritious, better adapted and more resilient to harsh unreliable growing conditions, more efficient users of resources (land, water, fertiliser, labour), and ecologically sustainable. She outlines why photosynthetic improvement is the best-bet option to increase intrinsic crop yield and resilience to adverse growing conditions and minimise resource use, and how such improved crops should be deployed to maximise their advantages, especially under increasing atmospheric CO₂ and higher temperatures, and drought. The goal must be to minimise food insecurity, provide stable pathways out of poverty and reduce the crippling effects of ‘hidden hunger’ (malnutrition).

In their chapter ‘Emissions of greenhouse gases from agriculture and their mitigation’, Francesco N. Tubiello and Josef Schmidhuber argue that greenhouse gas (GHG) emissions from agriculture – including crop and livestock production – forestry and associated land-use changes (AFOLU) are responsible for a significant fraction of global anthropogenic emissions, up to 25 per cent according to the latest estimates of the FAO. The estimates stem from a complete time-series of emission statistics for the period 1961–2010, made at country-level by using FAOSTAT activity data and the GHG methodology endorsed by the United Nations Framework Convention on Climate Change (UNFCCC) and developed by the International Panel on Climate Change (IPCC). In particular, from 2000 to 2010, agricultural emissions increased by 1.1 per cent annually, reaching 5.3 Gt CO₂-eq. yr⁻¹ in 2010. Current global agricultural emissions are larger than those from net deforestation, and higher than those from the entire transport sector. They are dominated by emissions from livestock production, application of synthetic fertilisers and rice cultivation. In terms of mitigation measures and their linkages with key rural development dimensions, recent literature indicates that supply-side measures – such as changes in crop and grassland management – might either enhance or have negative societal impacts on food security. By contrast, demand-side measures – such as reduced waste or reduced demand for livestock products – could more decisively contribute to both food security and GHG abatement. In fact, demand-side measures offer greater potential abatement, with a range of 1.5–15.6 Gt CO₂-eq. yr⁻¹, compared to supply-side measures, ranging 1.5–4.3 Gt CO₂-eq. yr⁻¹. Given the complexity of land-based mitigation challenges, as well as the multiple repercussions they may have on many key societal outcomes, these mitigation options for agriculture need to be considered and implemented in a complementary fashion. Supply-side measures could be implemented immediately, focusing on those that spur increased efficiency of production, i.e. more agricultural product per unit input and less natural resources used per commodity output. For demand-side measures, their potential will likely depend on successful introduction of appropriate policy aiming at maximising co-benefits with improved environmental quality and human development issues.

In their chapter ‘Land degradation, water scarcity and sustainability’, Manab Das, Debashish Goswami, Anshuman and Alok Adholeya argue that land degradation and water scarcity are factors that have direct negative consequences on the general status of the ecosystems and their inhabitants. Excessive anthropogenic activities in agriculture, forestry and industrial sectors have resulted in a significant negative effect on soil health and water sustainability. Producing food to feed everyone well, including the 2
billion additional people expected to inhabit the earth by mid-century, will place greater pressure on available water and land resources. In response to the degrading land and water resources, an efficient and sustainable development strategy is warranted. Efficient water management supported by suitable policies are required to meet the increased demands for food, water and material goods of a growing global population, while at the same time protecting the ecological services/functions provided by natural water ecosystems. Similarly, sustainable land management (SLM) practices which are based on three main principles, viz. increased land productivity, improved livelihood and improved ecosystem, could be an effective strategy to cope with land degradation.

In his chapter ‘Viability of small-scale farms in Asia’, Keijiro Otsuka begins with the observed inverse relationship between farm size and productivity that is oftentimes found in developing countries, particularly in South Asia, which indicates that small farms are more efficient than large farms. In other words, the optimum farm size is small in low-wage economies, because labour-intensive, small-scale production systems are more cost-effective than capital-intensive, large-scale farms. This is clearly the case for subsistence farming where major staples, such as rice, wheat and maize, are grown using manual methods. However, as wage rate increases, capital-using larger farms become more efficient. Indeed, the positive correlation between farm size and productivity tends to emerge in high-wage areas in Asia. Yet, the average farm size in Asia is small and generally declining over time. This study argues that unless significant farm size expansion takes place in high-performing Asian countries, the production cost of farming will increase, leading to declining comparative advantage in agriculture in Asia.

In her chapter ‘Food entitlements, subsidies, and right to food: a South Asian Perspective’, Simrit Kaur, in addition to analysing several dimensions of food (in)security in South Asia, tests a specific hypothesis, i.e. whether India’s food subsidy programme (PDS) has a significant price dampening effect. As theoretical predictions of the price effects are ambiguous, an empirical investigation of the same has considerable policy significance – especially in the context of ongoing food crisis and the National Food Security Ordinance (NFSO). The econometric analysis suggests that the share of PDS in food availability, like the revamping of PDS in 1997, has no significant price dampening effect. Results also indicate that inflation in India is driven more by external than domestic factors. Within domestic factors, supply bottlenecks drive prices more than excess demand. As an illustrative case study, she also reviews the NFSO, and whether it is amenable to extension to other developing countries where the state provides food to the vulnerable.

In her chapter ‘Global middle class and dietary patterns: a sociological perspective’, Vani S. Kulkarni argues that shifts in food preference, consumption and dietary patterns among middle classes have been quite dramatic so much so that the meaning of ‘middle-classness’ is traced through the ontology of diet consumption. Although consumption patterns, including dietary consumption patterns, are reflection of life styles and perceptions, and a certain habitus (Bourdieu, 1984, 1990; Wacquant, 2004), the phenomenon is dominantly analysed in terms of the scientific model and the economic perspective. Economic affluence and implications for nutrition are certainly important drivers of dietary consumption pattern, and hence necessary to analyse. Nevertheless, these analyses are not sufficient to gain a comprehensive understanding of diet behaviour of the middle class. This is because the consumption patterns of middle classes are embedded within a much
broader social context and social relations that influence dietary consumptions and are influenced by it. The social context includes the phenomenon of symbolised identities, psychological and emotional conditions, memories, historical traditions and ‘the local configuration of social relations which comprise social structures such as class, race, and gender; institutional practices, collective and individual behaviour, and intersecting personal biographies’ (Poland et al., 2006, p. 60). As dietary patterns become increasingly diversified and the size and nature of the middle class becomes ever more heterogeneous, it behoves a more detailed inquiry into the relationship between dietary patterns of the middle class and the economic, social and cultural processes. This chapter is just such an enquiry. It also emphasises why and how the various aspects of dietary patterns of the middle class are relationally connected. It, therefore, proposes a sociological approach to the study of dietary consumption patterns of the middle class.

NOTES

1. This draws upon Headey and Fan (2010), several recent influential writings of Timmer, especially Timmer (2010), and IFAD (2011).
2. Mathur et. al. in this volume contest this contention.
3. In an influential work, Wright (2011) argues that no special tools are necessary for analysing grain price volatility and that the balance between consumption, available supply and stocks remains relevant for any analysis of such volatility.
4. In an emphatic comment, Timmer (2010) adds another dimension. He observes, ‘The emergence of biofuels as a commercially viable use of food-grains and vegetable oils not only raises the level of demand that agricultural resources and productivity must meet, but it also links the prices of energy to foodstuffs. There has long been a partial link between energy prices and food prices through production costs, but this demand side link has more troubling implications. In particular, energy prices have been more volatile for decades. A price link between energy and food implies that this volatility will extend to food prices in the future’ (p. 6).
5. As a recent World Bank report (2011a) observes, links between crude oil and agricultural markets have become stronger since 2005, with the pass-through elasticity rising from 0.22 for the pre-2005 period to 0.28 through 2009. Dawe, in this volume, has some interesting results for Asian countries.
6. For confirmation of role of speculators in the food crisis of 2007–08, see Timmer (2010) and Imai et al. (2008). Gilbert in this volume has a more nuanced view.
7. Wright (2011) and Mathur et. al. (this volume) produce evidence against this argument. Wright, in particular, rules out speculation and argues that food price spikes are a result of supply–demand fundamentals. In fact, every episode of price spikes that he analysed since the 1970s displayed a low stock-to-use ratio and, given that, even a mild supply shock caused a huge price impact.
8. As the World Bank report (2011a) points out, much of the recent increase in commodity financial transactions has occurred in the futures markets, including for maize and wheat. This is largely driven by demand is from index funds holding and continuously rolling over future positions in commodity markets, without taking physical delivery. The extent to which these inflows affect spot prices, however, remains debatable. This mechanism has been questioned in recent studies, including Mathur et al. (this volume).
9. The simulations are done with the Oxford Economics global model. It assumes that the economies in Asia will take a tight monetary stance to prevent domestic inflation getting worse, but higher interest rates will curb investment, and higher consumer prices will restrict consumption. These two together will curb growth.
10. See Imai et. al. (2013).
11. For details, see Imai et. al (2013).
12. Global food prices rose by more than 30 per cent in the first 2 months of 2011, relative to the previous year, and domestic food inflation in Asia averaged 10 per cent (ADB, 2011).
13. The World Bank (2011b) study computes the expected domestic price changes and the associated increases in the cost of living for net consumers and profits of net producers. Using the poverty cut-off of $1.25, while in half the sample, the increase was 0.5 percentage points, in a few countries the increases were much larger (in Tajikistan the increase was 3.6 percentage points and in Pakistan it was 1.9 percentage points).
By contrast, poverty fell in Vietnam, as a large fraction of poor households is net producers of rice and benefits from higher prices.

14. A negative correlation between rice prices and nutritional status was observed in Bangladesh and Indonesia (Torlesse et al., 2003; Block et al., 2004).

15. There is an important caveat, however. If food price volatility rises, as it has in the recent surge, it could dampen investment in augmenting supply (Gaiha and Thapa, 2006; World Bank, 2011a).


17. See Popkin et. al. (2012).

18. See also Gaiha et. al. (2013).

19. See Popkin et. al. (2012).

20. See Gaiha et.al. (2013).


22. This is net biofuel demand.

23. TFP growth refers to growth in yields controlling for the effects of growth of inputs. The primary driver of TFP is technological improvement.

24. For details, see Gaiha and Mathur (2010).

25. For a review of weather-based insurance, see Gaiha and Thapa (2006).

26. This draws upon Gaiha (2003) and our more recent research on related issues. See also Jha et. al. (2013).

27. For an elaboration, see Gaiha (2003).

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