Food Price Increases in South Asia

National Responses and Regional Dimensions

The World Bank
South Asia Region
Sustainable Development Department
Agriculture and Rural Development Unit

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This report analyzes the causes and effects of food price inflation in South Asia during the period 2007-08 and beyond; simulates the impact of food price increases on household welfare and the potential of "second-round" adjustments in consumer and producer behavior for mitigating the negative welfare impact; assesses the potential impact of regional trade liberalization on food prices; and analyzes the impacts of the policies that South Asian governments adopted in response to the crisis. Suggestions are offered on how governments can prevent another such a crisis from occurring, and on how to react appropriately if it does occur. Combining trade liberalization with the elimination of trade-distorting subsidies would be highly beneficial for the region: under this scenario all countries of the region would achieve real income gains over time, and the largest benefits would accrue to the poorest countries. As a crisis prevention tool, supply-side measures have been relatively ignored in most South Asian countries but urgently need renewed attention if further food crises are to be avoided. There is growing agreement that a two-track approach is needed, combining increased investments in safety nets, to protect poor consumers, with measures to stimulate broad-based agricultural productivity growth, with emphasis on the major food staples.

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Acronyms and Abbreviations

EV	Equivalent Variation
CV	Compensating Variation
CPI	Consumer price index
DFID	Department for International Development (United Kingdom)
EAP	East Asia and Pacific region
FAO	Food and Agriculture Organization of the United Nations
GDP	gross domestic product
Ha.	hectare
Kg.	kilogram
FCI	Food Corporation of India
HIES	Household Income and Expenditure Survey
IRRI	International Rice Research Institute
LDC	least developed country
MSP	minimum support price
MT	metric ton
NLSS	National Living Standards Survey
NWFP	North West Frontier Province
OECD	Organization for Economic Cooperation and Development
PSLM	Pakistan Social and Living Standards Measurement Survey
Rs.	Rupee
SAFTA	South Asian Free Trade Area
SGR	strategic grain reserve
Tk.	Bangladesh taka
TPDS	Targeted Public Distribution System
WFP	World Food Program
WTO	World Trade Organization
USAID	United States Agency for International Development

Exchange Rates

Bangladesh Tk. 66 = US$1
Indian Rs. 46 = US$1;
Nepali Rs. 71 = US$ 1;
Pakistani Rs. 66 = US$1;
Sri Lankan Rs. 102 = US$1

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Executive Summary

Global food prices nearly doubled during 2004-08 and have remained relatively high since then. Most recently, the FAO index of real global food prices rose from 151 points in June 2009 to 172 points in January 2010. The rise in global food prices was highest for cereals, which remain relatively expensive: between 2005 and 2008 the international price of wheat more than doubled, and global rice and maize prices tripled, and as of June 2009, wheat and maize prices remained substantially higher than four years previously (by respectively 55 percent and 87 percent) while rice prices were about double.

A number of simultaneous events explain the unusually high food-price inflation that took place during 2007-08. While supply constraints (in particular low levels of world cereal stocks) played a role, the main drivers were increases in demand (especially the rapid increase in the use of food crops to produce biofuels), speculation (large flows of speculative capital into agricultural commodity futures markets) and policy failures (especially export restrictions).

In South Asia, food price inflation varied significantly among countries. In 2007-08, it ranged from relatively moderate in India (about 7 percent), to high in Nepal and Bangladesh (about 15 percent), to very high in Pakistan (around 20 percent) and in Sri Lanka and Afghanistan (more than 30 percent). Besides the inter-country variations, there were significant variations among commodities and, in many countries, among regions.

Food price inflation exceeded non-food price inflation throughout South Asia except in India. During the 2007-08 food crisis, food price inflation became the main driver of general inflation throughout of most South Asia. Though in the second half of 2008, the role of food price increases diminished in most countries of the region after prices came down, in 2010 food prices again became the main factor driving general inflation in a number of countries including India.

South Asian countries responded to food price inflation with a wide range of policies and measures. At the heart of food price policies in the region is the political economy of the trade-off between consumers' and producers' interests. Most of the measures that were taken sought to dampen the negative effects of the food price rises on consumer welfare, and were short-term in nature; measures to address traditional constraints on agricultural production, or to otherwise facilitate a supply response, have been much less common. Most popular have been trade policy measures to dampen price increases (e.g. abolishing import tariffs) or to ensure adequate supplies on domestic markets (e.g. restricting exports); building up or expanding public grain reserves; controlling prices; and extending existing social protection

measures or (to a much lesser extent) introducing new social protection programs.

Impact Of Food Price Inflation On The Poor

Besides negatively affecting macroeconomic stability, food price inflation decreases the welfare of households who are net buyers, rather than sellers, of food. In particular, it threatens the welfare of poorer households, for whom food takes a large share of total spending.

In South Asia most households, including those living in rural areas, are net buyers of food and likely to suffer welfare losses from increases in food prices. As is well known, the vast majority of urban households are net food buyers. But contrary to popular perception, 70 - 80 percent of rural households in the region are also net buyers of the main grain staples (rice and/or wheat).

For the average household in South Asia, food takes close to half of total spending, compared to only 17 percent in the United States. This high percentage makes South Asian populations very vulnerable to food price increases.

Poor people are likely to have been especially hard-hit by high food prices. First, poor people spend a larger proportion of their income on food. Second, the food price inflation of 2007-08 was especially stark for cereals, and the proportion of cereals in total food spending is much higher for the poor than the non-poor. Moreover, households who previously were living not far above the poverty line are likely to have fallen into poverty as the result of higher food prices.

Overview of policy instruments adopted in South Asian countries in dealing with food price inflation

Policy Instruments	Country					
	Afghanistan	Bangladesh	India	Nepal	Pakistan	Sri Lanka
Economic Policies						
Reduce taxes on food grains	√	√	√			√
Stock management		√	√		√	
Export restrict-ions		√	√	√	√	
Pricing policies		√	√		√	√
Social Protection Programs						
Cash transfers		√		√	√	√
Food for work	√	√	√	√		
Food ration/stamps		√	√			√
School feeding		√	√	√	√	
Rural employment schemes		√	√			

The effect of food price inflation on household welfare is analyzed at two levels in Chapter 2. The first, simpler, level keeps quantities fixed and is limited to the pure first-order impact of the price change. Households are classified into net buyers and net sellers of a commodity where the latter gain and the former suffer welfare losses as a result of a price increase. A second level of analysis takes account of the consumption and production decisions that take place as a result of the price change. We use nationally representative household survey data for Bangladesh, Pakistan, and Nepal from before the food crisis to simulate the impact of food price inflation on poverty headcount levels, taking account of both first-round and second-round effects. The analysis does not allow for general equilibrium effects.

In Bangladesh, Pakistan, and Nepal, the net marketing position of households leads to significant first-round welfare losses for the large majority of households. In Bangladesh and Nepal respectively, about 80 percent and 70 percent of households are net buyers of rice, while in Pakistan 77 percent of households are net buyers of wheat. Based on first-round effects only (net buyer-net seller analysis) a 50 percent increase in the price of rice would raise the national poverty headcount ratio in Bangladesh by about 6 percentage points. Similarly, a 40 percent increase in the wheat price in Pakistan would cause a 2 percentage point increase in national poverty. The estimated poverty effect in Pakistan is smaller than in Bangladesh because of the lower price increase and the smaller average gap between household consumption and production. In Nepal, a 20 percent increase in the rice price would raise the national poverty headcount ratio by only 0.5 percentage points, but rising rice prices make households who are already poor even poorer. In all three countries the impact of food price inflation on poverty differs significantly among regions, and regional poverty impacts often greatly exceed the average national impact.

In all three countries, second-round responses in production and consumption are found to offset part of the welfare loss from first-round effects. In Bangladesh, based on differences in national poverty headcount ratios with and without second-round effects, adjustments in behavior by consumers and producers decrease the first-order poverty impact by about 2 percentage points or up to 30 percent in proportional terms. In Pakistan, the second-round responses have an even larger effect; they reverse up to 90 percent of the first-round impact on the poverty headcount.

In Sri Lanka, food price inflation is likely to have increased the poverty headcount ratio and to have been particularly harmful to the poorest of the poor. Analysis by the World Bank shows that a large share of the population was clustered around the poverty line even before the food crisis, and implies that a 10 percent decline in per capita consumption may lead to a 6 percentage point increase in the poverty headcount ratio. In Afghanistan,

there is no information regarding the poverty impact of food price inflation, but because even before the food crisis 42 percent of the Afghan population was classified as poor, and an estimated 20 percent of the population lived just above the poverty line, there is no doubt that the impact of the food price crisis in Afghanistan has been extremely serious. In India, existing programs and policies made that country relatively shock-proof to the food crisis.

The first-round welfare loss caused by higher food prices is larger in urban areas than in rural. Unlike most urban consumers who can only respond on the consumption side, most rural households can adjust both consumption and production. In Bangladesh the headcount ratio based on the upper poverty line increases by about 6 percentage points in urban areas compared to 5 percentage points in rural areas. In Pakistan the urban-rural disparity is even larger: the urban headcount ratio increases by 3 percentage points while the rural ratio increases by less than one percentage point. In Nepal the disparity between rural and urban areas is less pronounced, because of the smaller overall impact of higher food prices.

The impact of food price increases on the poverty headcount also varies considerably among households in different income groups. Bangladesh and Pakistan both have high concentrations of households around the poverty line. As a result most of the welfare loss from high food prices is concentrated among households in the middle of the distribution of per capita expenditures. In Bangladesh the first-round impact of higher food prices on the poverty headcount ratio in the third expenditure quintile is 24 percentage points using the country's upper poverty line and 34 percentage points using the lower poverty line. Similarly, in Pakistan the poverty headcount ratio in the second (next to poorest) quintile increases by 11 percentage points. In both countries, higher food prices lead to a slight decrease in the poverty headcount in the poorest expenditure quintile. This is because even in the poorest groups there are some households that are net sellers and therefore gain from the food price increase. Since before the food price rise all households in the poorest quintile in Pakistan were poor, the headcount ratio decreases as soon as one or more of these households crosses the poverty line.

Households that remain below the poverty line are worse off with higher food prices. In Bangladesh the simulated rice price rise leads to an increase in the intensity of poverty as measured by the poverty gap which increases from 0.35 to 0.41 (upper poverty line) and 0.25 to 0.32 (lower poverty line). Similarly, in Pakistan the simulated wheat price increase results in a rise in the poverty gap from 0.17 to 0.18. Thus, high food prices clearly hurt the poorest households.

Despite the possibility of second-round effects, a considerable portion of the welfare loss caused by food price inflation is likely to persist—unless the general equilibrium effects are significantly larger than second-

round adjustments. That outcome is unlikely, given that the wage elasticities of output prices in South Asia tend to be relatively low. Whether poverty caused by increasing food prices is permanent or transitory will largely depend on whether high food prices persist and for how long, and on how governments respond, in terms of social protection programs and other policy measures.

Trade Liberalization and Food Prices

In principle, intra-regional trade liberalization could mitigate food price inflation. Discussions regarding the food crisis in South Asia have largely ignored the regional dimension of food price inflation and the possibility of improving food security by liberalizing trade. In countries that traditionally rely on food imports, regional trade liberalization might increase confidence in international markets.

During the food crisis most countries in South Asia increased their trade barriers instead of facilitating trade. While in an effort to control domestic food prices, most South Asian countries reduced import taxes, several of them also introduced export control measures or even banned exports of certain staples. These "beggar-thy-neighbor" type policies aggravated price increases elsewhere, as seen in Afghanistan where wheat prices shot up after Pakistan introduced an export ban, and in Bangladesh where India's restrictions on rice exports contributed to rice price inflation. Export bans also encouraged smuggling while lowering economic returns for domestic farmers.

The South Asian Free Trade Area (SAFTA) agreement aims at increasing intra-regional trade via partial trade liberalization. Based on formal trade flows, South Asia is one of the world's least integrated regions. The SAFTA agreement is an attempt to increase intra-regional trade through the gradual dismantling of some tariff barriers, but it leaves out a large number of products denominated as sensitive, and it does not address non-tariff trade barriers. Chapter 3 of this report uses a world-wide recursive dynamic computable general equilibrium trade model to analyze SAFTA's potential for increasing intra-regional trade and mitigating food price increases in South Asia.

The findings show that SAFTA's potential for influencing domestic food prices in South Asia is limited. The model simulations indicate that global restrictions on cereal exports had a much smaller impact on domestic prices in South Asia than the global average, mainly because of South Asia's relatively limited dependence on international markets. They also suggest that SAFTA hardly dampens domestic price increases, mainly because of the large number

of "sensitive products" (negative list) and the absence of agreements regarding non-tariff trade barriers and subsidies in SAFTA.[1]

Tariff reductions under SAFTA will not be enough to reduce informal trade in South Asia. Official trade data are widely believed to grossly understate the "true" size of intra-South Asian trade, given the substantial informal trade flows. Indeed informal imports of wheat and wheat flour from Pakistan ensured a more or less continuing supply in Afghanistan during 2007-08 despite the official export ban imposed by Pakistan. An initial attempt to model informal trade suggests that SAFTA has only a limited impact on informal trade flows across all countries. Tariff reductions, in the absence of other institutional reforms and enforcement, would most likely have little impact on illegal cross-border trade, especially between Pakistan and Afghanistan.

Lessons Learned and the Way Forward

The food crisis is by no means over. Domestic prices of both wheat and rice remain high throughout South Asia. There is growing agreement that a two-track approach is required, combining increased investments in safety nets with measures to stimulate broad-based agricultural productivity growth, with major emphasis on the major food staples.

The degree of price transmission is an important determinant of consumer welfare. For obvious political and social reasons, most South Asian governments are likely to continue to seek to protect consumers against price variability. This requires careful management of price transmission through trade, pricing, and stocking policies, supplemented by social protection programs.

Policies and programs for managing price transmission need to be appropriately designed. Trade policies should encourage the operation of the private sector and not restrict exports. Pricing policies may include limited subsidies targeted to the poor, but general control measures should be avoided. Public grain reserves should be limited in size, and an international coordinated global food reserve—in which countries' own reserves would become part of a larger global reserve—deserves consideration.

Protecting consumers' welfare and maximizing food security in a sustainable and fiscally affordable way is only possible if simultaneous attention is given to appropriate supply response measures that protect producers' welfare as well.

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[1] These simulation results do not mean that export restrictions imposed by individual countries do not matter. By restricting supplies, export restrictions can seriously augment food price inflation in importing countries that import a large portion of their food supplies from the countries that imposed the ban.

Higher food prices are not unequivocally bad and may provide new opportunities. Besides the potential benefits to net selling households and their effects on supply, higher food prices could generate a number of other benefits. In South Asia, they provide an opportunity to policymakers to re-examine the complex system of input-output pricing interventions; reduce spending on input subsidies and instead refocus public spending on investments to raise farm productivity (irrigation, rural roads, electricity) as well as on improved social protection measures. Higher food prices may also stimulate innovative developments in food aid, in particular a shift from traditional food aid to food assistance through local food purchases combined with cash transfers and vouchers. Sustained higher food prices could also help the implementation of responsible international trade policies that benefit low-income countries, and help to reform developed countries' agricultural support programs in a way that may remove the remaining barriers to progress on the WTO Doha trade negotiations.

The long-term challenge to produce enough food has not disappeared. The underlying problems remain of low stockpiles, rising demand mainly fuelled by continuing population growth in developing countries, and flattening yield growth. These problems are particularly relevant for South Asia, given the region's high population growth.

Raising productivity is necessary to ensure South Asia's food security. Given that most productive land is already under cultivation, future increases in agricultural production in the region will need to be based on yield increases. Because world prices of energy and fertilizer are expected to remain substantially higher than before, yield increases are the only sustainable way to reconcile higher input costs and farmers' incentives with low and stable consumer prices of wheat and rice.

Yield increases seem entirely feasible given the substantial yield gaps in South Asian agriculture. Despite a few important exceptions, the impact of higher prices on crop yields has been limited so far. To raise yields requires a combination of technical interventions and socioeconomic policies and measures. But besides technology transfer, policymakers should ensure that the global economic crisis does not jeopardize public investment in agricultural research and rural infrastructure. Governments must also allow price incentives to reach farmers, The should ensure that adequate mechanisms are in place for supplying quality inputs at accessible prices and that farmers have appropriate marketing opportunities. In this context public spending on irrigation, rural roads, and electricity is crucial.

1. Introduction

Food price inflation not only threatens macroeconomic stability but also decreases the welfare levels of most households, especially the poorer ones, for whom food consumption constitutes a relatively large share of total expenditures. This report analyzes the causes and effects of food price inflation in South Asia during the period 2007-08 and beyond; simulates the impact of food price increases on household welfare and the potential of adjustments in consumer and producer behavior for mitigating the negative impact on welfare; and assesses the potential impact of regional trade liberalization on food prices. The appendixes describe the policy reactions of individual governments to the increases in food prices against the background of their respective domestic food policies. The focus is on wheat and rice, which are the main food staples in South Asia and together account for an important part of food expenditures of the poor.[2]

By analyzing the household-level impacts of the food crisis and taking stock of the policy responses of national governments, including their regional dimensions, the report allows lessons to be drawn regarding the policies that South Asian governments may want to follow to enable them to react appropriately in case another food crisis unfolds, while at the same time helping to prevent such a crisis from occurring.

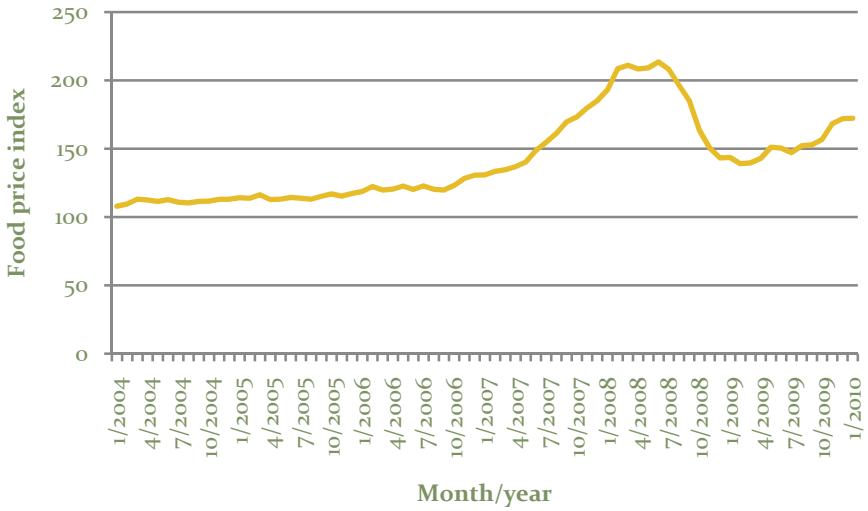
What Happened?

Global food prices increased dramatically during 2004-08 and have remained relatively high since then. Over just four years, 2004-08, the FAO index of real global food prices[3] nearly doubled (Figure 1.1 and Table 1.1). After a long-term decline (by 75 percent over 1974-2005), this index took only three years (2005-08) to rise again by the same percentage. Most recently, the index rose from 151 points in June 2009 to 172 points in January 2010—an increase of 14 percent driven largely by higher prices of fats/oils, dairy products, and particularly sugar.

[2] Data availability is also much better for wheat and rice than for other crops (see Annex 7 for a more detailed discussion of data issues).

[3] The FAO index is calculated from nominal international food prices denominated in US dollars.

FIGURE 1.1. FAO'S FOOD PRICE INDEX, 2004-09



Source: Based on FAO data.

The price rise varied across food categories (Table 1.1 and Figure 1.2). Whereas prices of cereals, edible oils, and dairy products all peaked at about 2.5 times their respective 2006 prices (a 150 percent increase), the increase in meat prices between 2006 and mid-2008 was limited to 25 percent and the sugar price had already peaked early in 2006. International cereal prices fell by 36 percent in the second half of 2008 but then rose again by 7 percent in the first half of 2009.

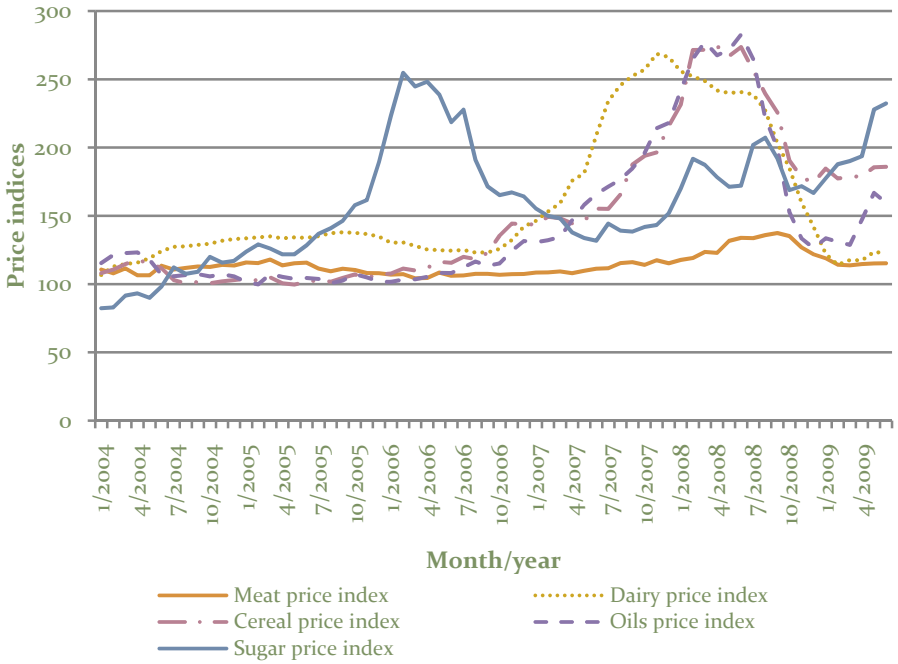
At least for cereals, the rise in prices during 2007-08 was less significant than the 1974 price shock (Table 1.2). Real prices of rice in 2008 were less than half of those in 1974. For wheat and maize, prices in 2008 were below their 1974 levels by 35 percent and 41 percent, respectively.

TABLE 1.1. INCREASES IN INTERNATIONAL PRICES OF MAJOR FOOD COMMODITIES (PERCENT)

Category	Increase January 2004-June 2008
Food price index	97.9
Grains	
Maize	146.5
Wheat	60.6
Rice	293.7
Oilseeds	
Palm oil	144.6
Soybean oil	133.6
Other	
Sugar	108.5
Dairy	88.1
Meat (beef)	23.9

Source: Based on FAO data.

FIGURE 1.2. PRICE INDICES OF INDIVIDUAL FOOD CATEGORIES, 2004-09



Source: Based on FAO data.

TABLE 1.2. NOMINAL AND REAL CEREAL PRICES, WORLD MARKETS, 1960-2008

Time	Wheat (US$/MT)	Rice (US$/MT)	Maize (US$/MT)	Wheat real (1990 US$/MT)	Rice real (1990 US$/MT)	Maize real (1990 US$/MT)
Average 1963-74	70.3	158.5	59.4	251.0	570.9	213.9
1974	179.7	517.2	132.0	395.1	1137.2	290.2
% change 1964-73	156%	226%	122%	57%	99%	36%
Average 1998-07	153.7	253.4	108.1	148.8	245.7	105.0
2008	332.4	661.4	224.0	255.7	508.8	172.3
% change 1998-2007	124%	100%	106%	72%	107%	64%
% change 2008 vs. 1974	92%	-2%	69%	-35%	-55%	-41%

Note: MT = metric ton.

Source: Dorosh (2009).

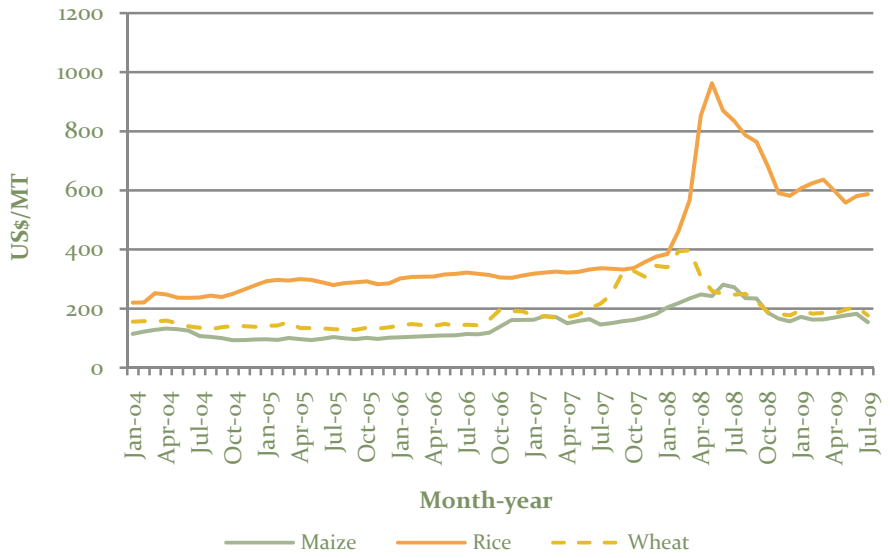
Cereal prices rose by even more than general food price inflation. Between 2005 and summer 2008 the international price of wheat more than doubled, and those of rice and maize tripled (Figure 1.3). In a single twelve-month period (March 2007-March 2008) the prices of wheat, rice, and maize rose by respectively 121 percent, 76 percent, and 37 percent.[4] Meanwhile, prices of both fertilizer and energy[5] doubled and became increasingly correlated with

[4] The percentage increase in the price of maize may seem relatively small, but the maize price had already begun rising in 2006 so when calculated for the period between January 2006 and January 2008 maize actually more than doubled in price.

[5] High energy prices make agricultural production more expensive by raising the cost of mechanical cultivation, inputs like fertilizers and pesticides, and transport of inputs and outputs.

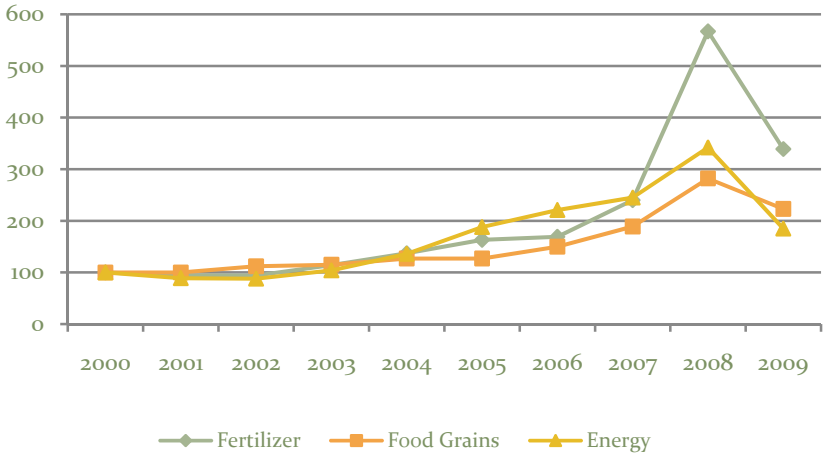
food prices (Figure 1.4). The price of rice rose by another 50 percent between March and June 2008, mainly because of export bans imposed by rice-surplus countries and panic buying by traditional rice importers. As of June 2009, wheat and maize prices remained substantially higher than four years previously (by respectively 55 percent and 87 percent), while rice prices were about double.

FIGURE 1.3. WORLD MARKET PRICES OF RICE, WHEAT, AND MAIZE, 2004-09



Source: Based on FAO data.

FIGURE 1.4. WORLD BANK WEIGHTED INDEX OF PRICES OF FOOD, FERTILIZER, AND ENERGY 2000-08



Source: Based on data from the Global Economic Monitor Database (DECPG Databases, World Bank 2009).

Why Did It Happen?

The unusually high food-price inflation of 2007-08 had several simultaneous causes. Supply constraints (in particular low levels of world cereal stocks) played a role, but unlike previous food price shocks, which were mainly driven by short-term food shortages, the 2007-08 price spikes came in a year when the world reaped a record grain crop. Compared to the previous year, the world in 2007-08 harvested more than 100 million metric tons (MT) of extra grain (Table 1.3). The main drivers of food price inflation were demand increases, speculation, and policy failures, discussed in turn below.

Demand-side factors

On the demand side, a major driver of price rises has been the rapid increase in the use of food crops to produce biofuels. High energy prices[6] have two main effects. First, they fuel perceptions of energy insecurity and encourage developed countries to search for alternative sources of energy, including land-intensive biofuels which compete for land devoted to crops and whose demand is further stimulated by suboptimal policies such as subsidies (Box 1.1). In this way energy insecurity contributes to food insecurity. Second, high energy prices raise input costs, particularly of chemical fertilizers and marketing/transport services.

Table 1.3. World grain markets, 2002-03 to 2007-08

	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Production							
Wheat	568	554	626	620	596	611	683
Maize	603	627	715	699	712	792	791
Other coarse cereals	272	289	337	287	280	294	310
Total wheat and coarse cereals	1443	1470	1678	1605	1588	1697	1784
Rice (milled)	379	393	402	419	421	434	435
Total	1822	1863	2080	2024	2009	2131	2219
Trade (exports)	237	239	241	253	261	276	282
Consumption	1916	1948	1995	2031	2049	2102	2147
Stocks (ending)	441	355	402	388	341	361	445

Note: Data are in million metric tons.

Source: Data on production, consumption, trade, and stocks are from USDA-FAS (www.fas.usda.gov/psdonline) and USDA-ERS (www.ers.usda.gov) except for other coarse cereals, data are derived from data from the International Grains Council (www.igc.org.uk). Production data on rice are from IRRI (www.beta.irri.org); rough rice data were converted to milled rice using a factor of 0.67 kg milled rice per kg of rough rice.

The data do not fully support the view that changing diets had a big impact on the cereal price spikes of 2007-08. A demand factor often cited as contributing to food price inflation is rapid income growth in emerging

[6] The price of oil rose from US$22-28 per barrel in 2005 to a peak of US$140 per barrel by July 2008. Biofuels are widely believed to become an economically viable option once oil prices top US$60 per barrel. Oil prices have receded since then but have mostly stayed well above US$60.

countries, especially India and China, which stimulates shifts in dietary patterns towards "cereal-intensive" commodities such as meat and dairy products. This explanation receives only mixed support from the data. For example, FAO data show that while per capita pork consumption in China went up 45 percent between 1993 and 2005 (from 53 to 77 pounds per year), cereal imports in India and China have been trending down over the past 25 years by an average of about 4 percent per year.

For most of the past decade the world has been consuming more cereals than it has been producing.[7] Between the 1970s and the 1990s, global cereal demand was growing at 2-3 percent per year while annual growth in cereal output was declining from around 3 percent to 1-2 percent. The mismatch contributed to a significant reduction of cereal stocks.[8]

In South Asia, the supply of foodgrains has increasingly lagged behind demand. In general terms past production growth rates for the main grain staples in South Asia have not kept up with consumption growth (Table 1.4). Except in Pakistan and Sri Lanka for rice, consumption growth of wheat and rice in South Asia has exceeded production growth by substantial margins. The gap between consumption and production growth is especially large for wheat in India and Pakistan, and rice in India.

TABLE 1.4. ANNUAL GROWTH RATES IN PRODUCTION AND CONSUMPTION OF RICE AND WHEAT IN SOUTH ASIAN COUNTRIES, 2000-08 (AVERAGE PERCENTAGE GROWTH RATES)

	Countries						
Crop	Bangla-desh	India	Nepal	Pakistan	Sri Lanka	South Asia	World
Production Growth							
Wheat	-8.8	0.3	2.1	0.3	0	1.6	1.8
Rice	2	1.5	0.2	1.8	2.2	0.2	1
Total	1.5	1	0.8	0.8	n.a.	1	1.5
Consumption Growth							
Wheat	0	1.9	2.2	1.2	2	2.2	1.3
Rice	2.6	2.6	0.4	-1	0	2.4	1
Total	2.3	2.3	0.9	1	1.6	2.3	1.2
Population Growth	1.6	1.7	2.3	2.6	0.9	1.9	1.1

[7] In this context Von Braun and Torero (2009) argue that underinvestment in agricultural research has also contributed to higher food prices, since higher investments in research would presumably have prevented the decrease in supply growth.

[8] World grain stocks have been gradually declining since the mid-1990s by an average of 3.4 percent per year as demand growth has outstripped supply growth (FAO 2008). By the end of 2007, stocks were equivalent to a mere 60 days of consumption.

Box 1.1. The role of biofuels

The increased demand for biofuels seen after 2003 resulted from legal mandates and was supported by huge subsidies (e.g. the United States offers blenders of ethanol a tax credit of US$0.51 per gallon and an import tariff of US$0.54 per gallon). Most studies that have looked at the causes of food price inflation seem to agree that demand for biofuels has been an important factor in keeping food prices at relatively high levels compared to before 2006. The available data strongly suggest that increased demand for biofuels diverted the use of maize away from food and feed towards biofuels, thus contributing to increased demand (Abbott and others 2008). For example, in the US the proportion of maize used for biofuel rose from 5 percent to nearly 35 percent between 1998 and 2008 and is expected to rise to 43 percent by 2016 (Searchinger and others 2008). This matters because the US accounts for about one-third of global maize production and two-thirds of global maize exports.

Global maize consumption jumped from 626 million MT in 2002-03 to 771 million MT in 2007-08; more than 40 percent of this increase was due to biofuel use in the United States. While US maize yields have increased over time, an important part of the extra production in the US stemmed from expansion of area, which increased by nearly 25 percent in a single year (2006-07 to 2007-08), from 28.5 to 35 million ha, mostly at the expense of soybeans. During the same period (2002-03 to 2007-08) the area under wheat also increased in a reaction to increased prices but not by nearly as much (about 10 percent, from 18.5 to 20.6 million ha). But between 2003-04 and 2006-07 the wheat area in the US actually decreased by about 12 percent, whereas the maize area remained about constant.

In a reaction to biodiesel mandates in European countries (but also the US to some extent), the area sown to wheat decreased in several other countries (e.g. Argentina, Canada, Kazakhstan, Russia, and Ukraine) and the EU with rapeseed acting as the main substitute.

The increased demand for biofuels also severely affected world grain stocks. For example, according to USDA (www.fas.usda.gov/psdonline), between 2001-02 and 2006-07 world stocks of maize decreased by 28 percent. Similarly, between 2001-02 and 2007-08 wheat stock levels declined 45 percent. Between 2004-05 and 2006-07, global maize production stayed roughly constant (see also Table 1.3 above). However, biofuel use in the US increased by 50 million MT during that same period. As a result, global maize stocks declined significantly (by about 22 million MT) and prices more than doubled. Global exports of maize increased by 17 million MT during 2004-05 and 2006-07, but still that was only about one-third of the increase in biofuels use in the US.

Rice prices have been less influenced by biofuels than other food crops, simply because rice is not used for biofuel production and rice land does not directly compete with food crops used for biofuels. However, it should also be noted that rice and wheat are to a certain degree substitutes in many countries (including those in South Asia) and increases in wheat prices will therefore influence the price of rice.

There is no universal opinion regarding the relative contribution of biofuel demand to food price increases. IFPRI, based on simulations with its IMPACT (International Model for Policy Analysis of Agricultural Commodities and Trade) model, believes that increased biofuel demand alone was responsible for at least 30 percent of global foodgrain price increases in 2008. The contribution was 75 percent according to Mitchell (2008) and 40-70 percent according to Lipsky (2008). Rosegrant and others (2008) estimate that biofuel demand was responsible for up to 47 percent of the maize price increase. IFPRI has projected that maize prices in 2020 will be 26 percent higher than under a scenario that keeps biofuel production at 2007 levels.

Two main factors contributed to the price hikes: weather-related production shortfalls in major producing/exporting countries, and the increasingly low levels of world cereal stocks. Weather-related shocks[9] not only include familiar patterns of short-term weather variability but also the potential longer-term effects of climate change on agricultural production. Climate change effects have been projected to lead to reductions of up to 22 percent in cereal output in South Asia by the year 2080 (Tubiello and Fisher 2007). The long-term downward trend in world cereal stocks perhaps would have had relatively little impact on prices by itself, but combined with the other factors it played an important role.

Speculation

Increased speculation in futures markets. There is now clear evidence that increased speculation in agricultural commodity futures markets by many hedge funds and mutual funds pushed up not only futures prices but also lifted the spot prices of wheat, rice, maize, and soybeans (Cooke and Robles 2009; Robles and others 2009).[10] Large flows of speculative capital tend to work in a vicious circle: they lead to price increases which in turn fuel more speculation. Speculation also tends to increase price volatility, and the fact that several agricultural commodities were already in short supply did not help (Sanders and others 2008). Depending on the specific crop, the volume of globally traded grain futures and options doubled between 2005 and 2008 (FAO 2009) and grew by up to 50 percent in a single year (May 2007 – May 2008).

Policy failures

Policy failures leading to market failure and overreactions also played an important role. Prime culprits were export restrictions which denied producers the benefits derived from improved terms of trade. For example, India put a complete stop to rice exports, and Pakistan banned wheat exports, with immediate effects on domestic prices in Bangladesh and Afghanistan respectively. Export bans not only worsen market conditions for import-dependent countries but also increase price volatility (because they make the international market smaller), stimulate smuggling and the formation of cartels, undermine trust in trade, and encourage protectionism. And, last but not least, export restrictions dampen incentives for local producers.

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[9] For example, wheat production in Australia – which previously could be up to 25 million MT in a good year, with most of it available for export – dropped to less than 10 million MT in 2006. Another example relates to Cyclone Margis in 2008, which cut Myanmar's rice exports from an expected 600,000 MT to 150,000 MT.

[10] Increased speculation in agricultural futures markets has widely been attributed to falling stock markets worldwide and the sub-prime mortgage crisis in the US that started in 2008.

From a global perspective such ad-hoc and sudden trade interventions constituted examples of policy failure, and are believed to have played an especially important role in the huge spikes in the rice price (Childs and Kiawu 2009; Wright 2009).[11] At the global level for all foods, the International Food Policy Research Institute (IFPRI) has estimated that export restrictions may have been responsible for as much as 30 percent of the increase in the food price index during the first six months of 2008 (Rosegrant 2008). Other perhaps well-intended but ill-conceived measures, such as banning futures trading in agricultural commodities, and raiding private "hoarders," also were policy failures because they created a general sense of increasing shortages. This in turn induced panic-buying by a number of traditional food importers (e.g. the Philippines in the case of rice) further adding to speculative behavior and price rises. These kinds of overreactions played an important role, even if they were began as consequences rather than causes of higher food prices.

Differences Among Countries and Commodities

The rise in food prices varied significantly among countries. India was quite successful in shielding consumers from global food price inflation, even if this success came partially at the expense of households who were net food sellers. Afghanistan, Bangladesh, Nepal, Pakistan, and Sri Lanka turned out to be much more vulnerable. A rough classification of the severity of food price inflation during 2007-08 ranges from relatively moderate in India (6-7 percent); moderately high in Nepal (about 13 percent though with huge spatial variation) and Bangladesh (14 percent); to very high in Pakistan (around 20 percent) and in Sri Lanka and Afghanistan (more than 30 percent). Price rises in individual commodities were often much higher than these averages (see below and Appendixes 1-6 for individual countries' experiences) and more often than not had serious impacts on the welfare of the poor (see Chapter 2).

Food price inflation exceeded non-food price inflation in all South Asian countries except India. During the 2007-08 food crisis, food price inflation became the main driver of general inflation in all South Asian countries except India (Table 1.5 and Figure 1.5). While in most of the region the role of food price increases diminished after prices came down in the second half of 2008, food prices in 2010 again became the main factor pushing up general inflation in a number of countries including Nepal, Pakistan, and even India.

---

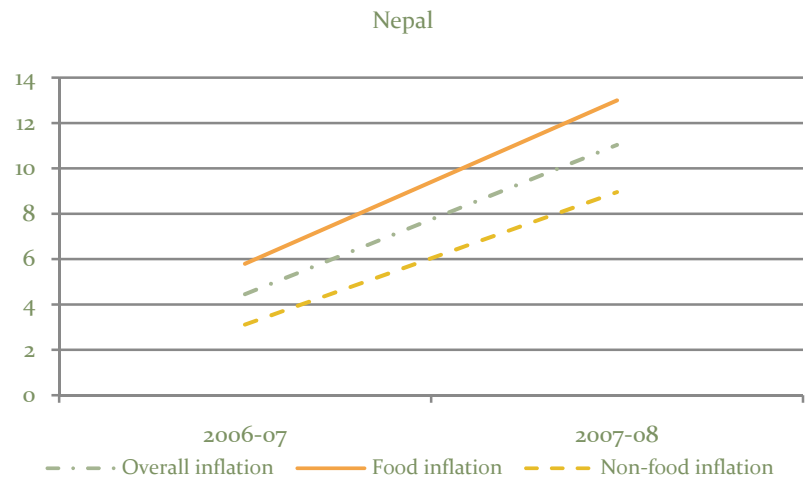
[11] The rice market tripled in size, from about 10 million MT in the early 1990s to about 30 million MT in 2007 so the message that many rice-importing countries received was "not to worry." However, several traditionally rice-surplus countries such as India, Thailand, and Vietnam unexpectedly imposed export restrictions in an effort to secure sufficient supplies for their domestic markets.

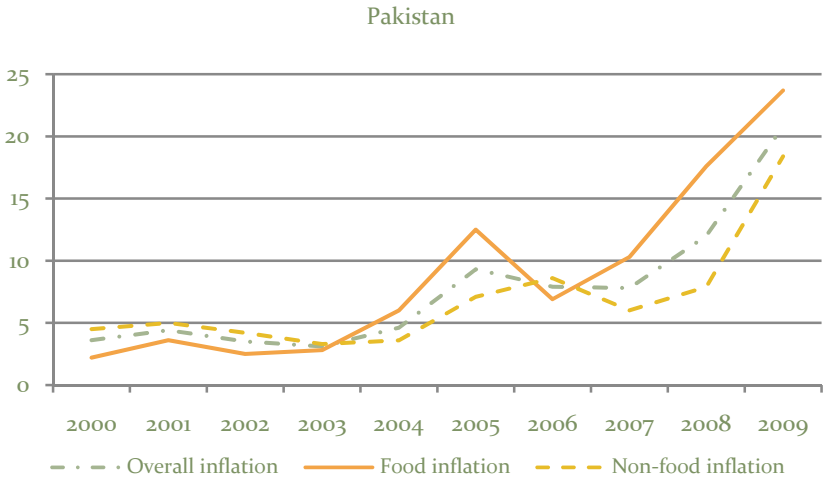
TABLE 1.5. FOOD PRICE, NON-FOOD PRICE, AND GENERAL INFLATION RATES IN SOUTH ASIA (YEAR-ON-YEAR, PERCENTAGES)

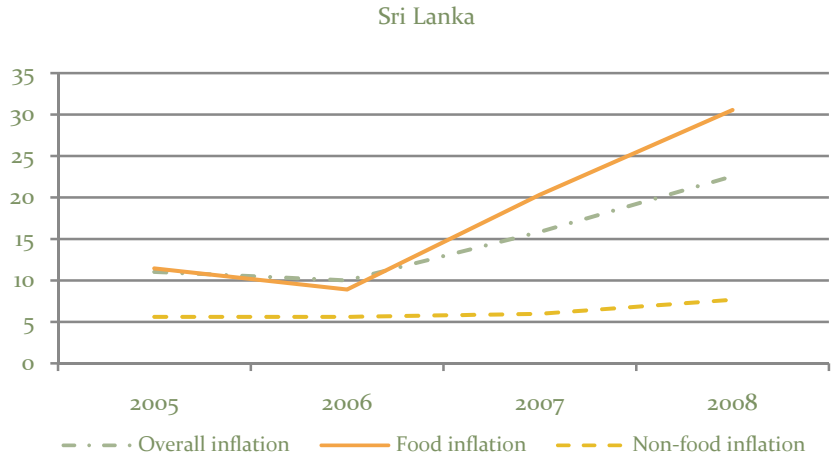
	Food price inflation	Non-food price inflation	General inflation
Afghanistan			
2005-06	9.1	10.9	9.8
2006-07	4.9	2.2	3.8
2007-08	31.9	12.2	24.3
2008-09	4.3	5.9	4.8
Bangladesh			
2004-05	8.7	5.3	7.4
2005-06	8.8	5.7	7.5
2006-07	9.8	8.3	9.2
2007-08	14.1	3.5	10.0
2008-09	0.3	5.9	2.3
India			
2004	2.3	4.6	4.2
2005	3.9	-5.5	2.0
2006	6.9	1.3	6.3
2007	7.0	12.9	8.6
2008	6.6	13.7	10.1
Nepal			
2006-07	5.8	3.1	4.5
2007-08	13.0	9.0	11.0
Pakistan			
2000	2.2	4.5	3.6
2001	3.6	5.0	4.4
2002	2.5	4.2	3.5
2003	2.8	3.3	3.1
2004	6.0	3.6	4.6
2005	12.5	7.1	9.3
2006	6.9	8.6	7.9
2007	10.3	6.0	7.8
2008	17.6	7.9	12.0
2009	23.7	18.4	20.8
Sri Lanka			
2005	11.4	5.6	11.0
2006	8.9	5.6	10.0
2007	20.3	6.0	15.8
2008	30.5	7.7	22.6

Sources: (i) Afghanistan: Central Statistics Office and Central Bank; (ii) Bangladesh: Bangladesh Bureau of Statistics; (iii) India: Reserve Bank of India and Office of Economic Advisor; (iv) Nepal: Nepal Rastra Bank; (v) Pakistan: State Bank of Pakistan; (vi) Sri Lanka: Central Bank of Sri Lanka.

Figure 1.5. Inflation trends in South Asia



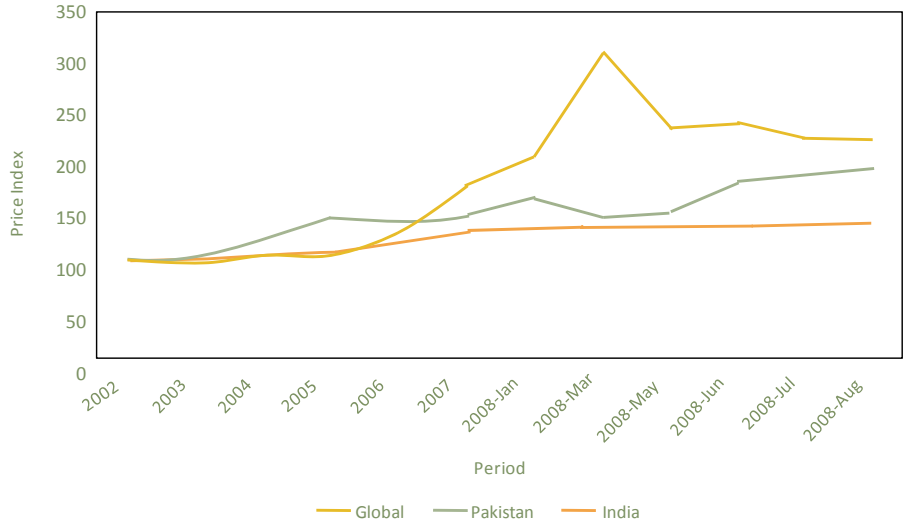




There were also large differences in the extent to which individual commodity prices went up in the different countries. These differences reflected not only domestic production and stock situations, but also policy decisions: exchange rate effects, management of domestic prices, and trade restrictions on grains.

In wheat, India and Pakistan allow only partial transmission of international price variability to their domestic markets. Domestic price increases in both India and Pakistan were much more gradual than in the international market. These countries are the region's two largest wheat producers and consumers and traditionally have allowed only partial transmission of global price increases to their domestic markets. Between mid-2006 and mid-2008, wheat prices in India increased less than 15 percent but those in Pakistan went up by about 35 percent (Figure 1.6). The smaller price increase in India can be attributed to the combined effects of a relatively comfortable supply situation, an appreciating exchange rate, high domestic subsidies on inputs, and restrictions on grain trade.

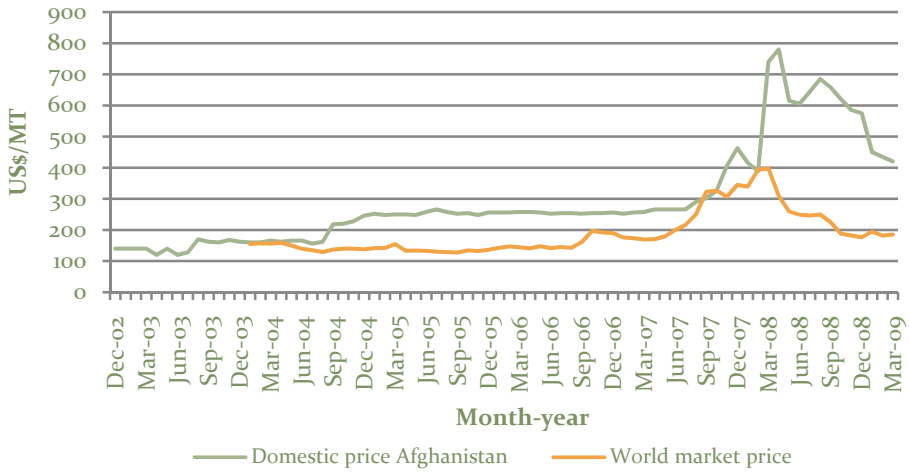
FIGURE 1.6. PRICE INDEX OF WHEAT IN INDIA, PAKISTAN, AND WORLD MARKET (2002=100)



Source: Ahmed (2010).

In Afghanistan, the international wheat price variation is fully transmitted to the domestic market. Afghanistan saw the steepest wheat price increase in all of South Asia, in the order of 100 percent or more between mid-2007 and mid-2008. Afghanistan was also the only South Asian country whose domestic prices rose much more steeply than world market prices (Figure 1.7). Since the end of 2007, the domestic wheat price in Afghanistan has consistently been about double the international wheat price—a matter of great concern among net wheat buyers in a primarily wheat-consuming country. The very steep price increase reflects poor domestic supply and high import costs.

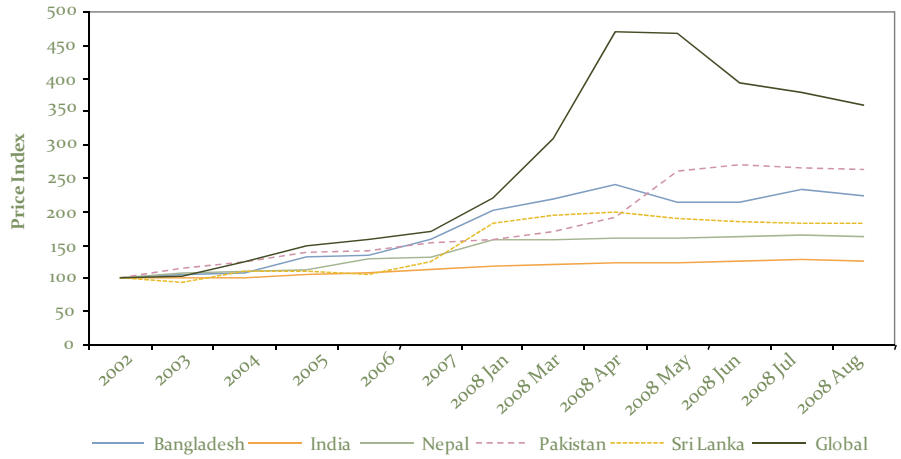
FIGURE 1.7. WHEAT PRICES IN AFGHANISTAN AND WORLD MARKET, 2003-09



Source: Based on FAO data.

Rice prices in South Asia increased much more gradually than the world market price. Unlike for wheat, since about 2005 all countries in South Asia have consistently kept their domestic rice prices below the world market price. Pakistan saw the fastest increase, followed by Bangladesh, Sri Lanka, Nepal, and India (Figure 1.8). Because domestic rice prices were kept low and allowed to increase only relatively gradually, their difference from the world market price widened very rapidly after mid-2007, before shrinking somewhat in the second half of 2008. The gap remains very large especially in India, followed by Nepal and Sri Lanka, and is smallest in Pakistan. As in the case of wheat, the increase in the domestic rice price was smallest in India, where it was strikingly less than the global price rise.

FIGURE 1.8. PRICE INDEX OF RICE IN SOUTH ASIA AND WORLD MARKET (2002=100)



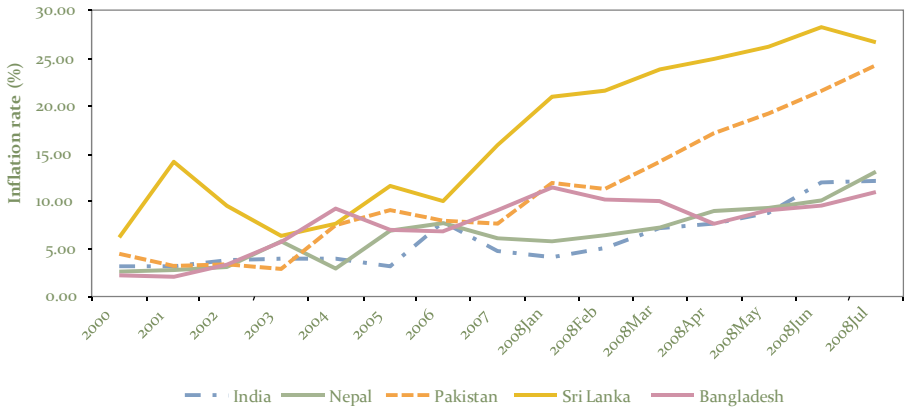
Source: Ahmed (2010.)

Impacts of Food Price Inflation

Throughout South Asia, the sudden and dramatic increases in food prices had significant impacts at both the macroeconomic and household levels. Loss of income, through terms of trade losses combined with higher inflation, adversely affected macroeconomic stability, mainly via the budgetary effects of growing subsidy burdens and safety net requirements and via balance of payments effects in net food importing countries.

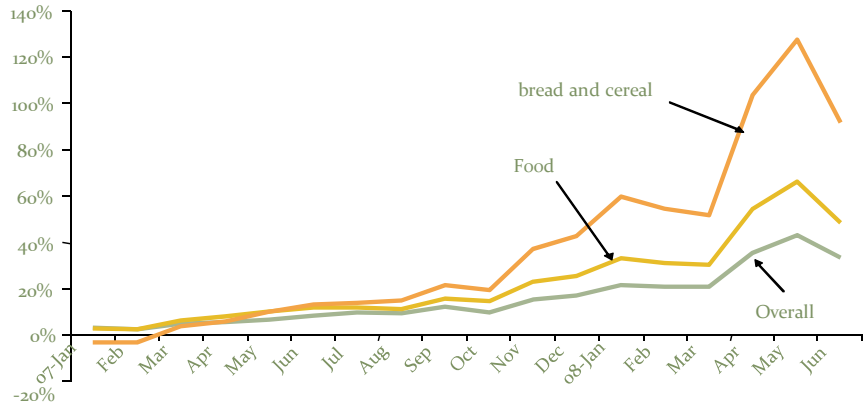
Mainly as a result of higher food prices, most South Asian countries experienced a surge in general inflation in 2008. Pakistan experienced the most rapid change in the inflation rate, from 8 percent in 2006 to 25 percent in July 2008 (Figure 1.9). Sri Lanka had already been experiencing inflationary pressure from expansionary fiscal and monetary policies before the food crisis, and the surge in food and fuel prices simply accelerated the pace. Afghanistan's inflation hike came mainly from food price increases. Since the increases in grain prices in Afghanistan much exceeded those in other South Asian countries, the effect on general inflation was quite intense (Figure 1.10).

Figure 1.9. Inflationary trends in South Asia



Source: Ahmed (2010).

Figure 1.10. Food and non-food inflation in Afghanistan, 2007-08



Source: Ahmed (2010).

The average share of food consumption in total consumption is very high in South Asia, at close to 50 percent as compared to 17 percent in the United States. This high percentage makes South Asia very vulnerable to food price increases.

High food prices undermine the food security of the poor. Food price inflation reduces purchasing power[12]; increases the number of people who go hungry (FAO 2009); and may aggravate nutritional deficiencies (Klotz and others 2008). Even before the onset of the food crisis South Asia already suffered from extremely high rates of malnutrition. Between 38 and 51 percent of all children under the age of five were malnourished according to World Bank (2006) and the region accounts for about 36 percent of all undernourished people in the developing world. High food prices also limit expenditures on essential non-food items such as health care, sanitation, and schooling. The nutritional impact of the food crisis depends on household behavior across the entire consumption basket.[13]

Higher food prices have a substantial effect on poverty, even after accounting for second-round adjustments in consumption and production. The poor are especially hard-hit by high food prices given the large share of food consumption in their total expenditure (Figure 1.11), the generally negative correlation between income levels and budget shares of food[14], and—given that food price inflation was especially stark for cereals—the high proportion of cereals in poor households' total food expenditure.

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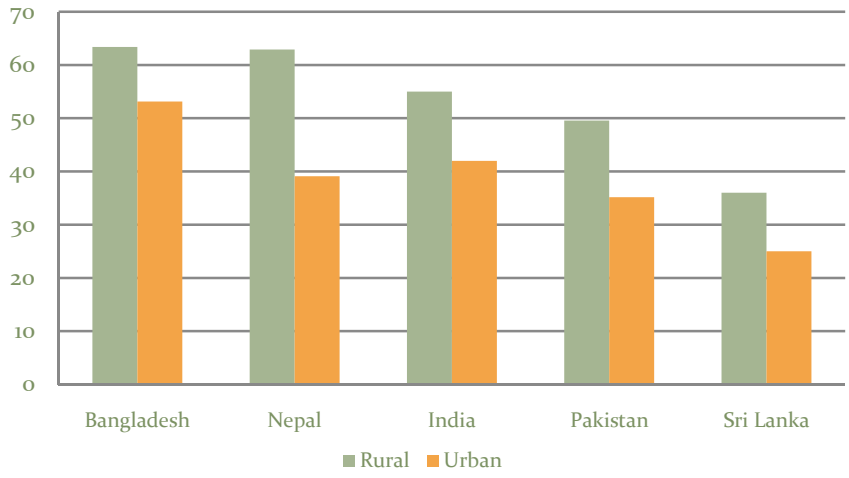
[12] In developing countries as a group, food consumption expenditure decreases by an average of about 0.75 percent for every 1 percent increase in the price of food (Regmi and others 2001).

[13] To analyze the nutritional impact of the food crisis would require data on household consumption changes from immediately prior to the price shock and in the midst of the price shock. This would be an important topic for future analysis.

[14] For example, in Bangladesh the budget share is 69 percent for the poorest expenditure quintile and 45 percent for the richest quintile, based on data from before the food crisis.

FIGURE 1.11. SHARE OF FOOD IN TOTAL EXPENDITURE IN SOUTH ASIA



HOW DID SOUTH ASIAN GOVERNMENTS REACT?

South Asian countries adopted a wide range of measures in an effort to deal with the unusually high rates of food price inflation experienced in 2007-08. Perhaps somewhat arbitrarily these measures can be grouped into economic policies (including pricing policy measures, trade policy measures, and measures related to stock management and public distribution) and social protection programs (Table 1.6). Policies and programs mainly targeted consumption and trade, and gave relatively little attention to facilitating a supply response.[15] Understandably, the steep increases in prices turned the political economy of food into a key driver of the short-term economic policy agenda in South Asia, transforming food security into a strategic issue of key importance to government leaders. Most economic measures that were taken to deal with the food crisis were made under strong political pressure, with a clear preference for short-term, relatively easy-to-implement measures aimed at stabilizing prices. For example, several South Asian countries introduced trade policy measures to curtail price increases (e.g. reduction of import taxes on essential food items in Afghanistan, Bangladesh, India, and Sri Lanka) and to ensure adequate supplies in domestic markets (e.g. export controls including export taxes or even outright export bans, mainly in India, Pakistan, and Bangladesh). Other measures included building up or expanding public grain reserves (building up in Afghanistan and expanding in India, Pakistan, and Bangladesh) and/or controlling prices (e.g. in India, Pakistan, Bangladesh, and Sri Lanka).

[15] But see the discussions on Bangladesh and Afghanistan in the next chapter for positive exceptions. The relative neglect of supply response policies in Africa has been noted by Wodon and Zaman (2009).

Social protection measures focused mainly on safeguarding consumption. Not all South Asian countries have safety net programs in place (e.g. Afghanistan and Nepal have virtually none) and those programs that exist differ significantly in type, coverage, and performance (Rashid and Ferré 2010). The food price increases of 2007-08 renewed attention to the coverage, targeting, performance, and efficiency of such programs. Some countries (e.g. Afghanistan) introduced emergency programs, others (Bangladesh and India) expanded and improved existing programs, and some (Bangladesh and Pakistan) established new ones based either on food or cash transfers.[16]

Organization of This Report

This report is organized as follows. Chapter 2 uses household survey data for Bangladesh, Nepal, and Pakistan to explore the household-level impact of food price inflation. Since regional trade cooperation is a potential means to mitigate the effects of high world food prices, Chapter 3 uses a general equilibrium model of world trade to analyze the effects of regional trade liberalization for lowering food price inflation in South Asia. Chapter 4 concludes, deriving lessons for future policies and programs to improve future food security in South Asia. Appendixes 1-6 contain a detailed analysis of food price inflation at the individual country level in the wider context of domestic food policies. They review trends in domestic food supply, demand, prices, trade, and stocks and analyze government policy responses.

[16] For more details see the country-specific discussions in Chapter 2 and Rashid and Ferré (2010).

TABLE 1.6. POLICY INSTRUMENTS ADOPTED IN SOUTH ASIAN COUNTRIES TO DEAL WITH FOOD PRICE INFLATION

	Economic Policies					Social Protection Programs			
Country	Reduce taxes on foodgrains[2]	Stock management	Export restrictions	Pricing policies	Cash transfers	Food for work	Food ration/stamps	School feeding	Rural employment schemes
Afghanistan	√ Lowering of import tariff on wheat and wheat flour					√ Expanded as a result of the food crisis (through WFP)			
Bangladesh	√	√ Partial rebuilding of rice stocks and government imports of rice	√ Imposed ban on rice exports	√ Price of fertilizer increased but by much less than cost increase (increased subsidy element)	√	√ Expanded as a result of the food crisis	√ Food rations eliminated but millions of poor households get Vulnerable Group Feeding (VGF) cards Increased public grain distribution through Open Market Sales	√ Was replaced by cash grants but is being restarted	√ Introduced in September 2008 based on Indian model
India	√ Lowering of import duties/tariffs on edible oils, wheat flour, milled rice, maize, butter and asked states to impose legal limits on stocks of food commodities under the 'Essential Commodities Act'	√ Largest food stock holdings in the world. Imports of wheat and rice just before food crisis set in	√ Imposed ban on wheat and non-Basmati rice exports, and high taxes on Basmati rice exports	√ Increases in government procurement prices for rice and wheat Farm-gate price of fertilizer and power charges to farmers kept constant (increased subsidy element)		√ Expanded as a result of the food crisis	√ Maintains an active public food distribution system (PDS) which managed to quickly stabilize prices	√	√ Since early 1990s in some states; since 2007 at national level (NREGS)
Nepal		Very low government rice stocks	√ Imposed ban on rice exports		√	√ Expanded as a result		√ Limited coverage	

Country	Economic Policies					Social Protection Programs			
	Reduce taxes on foodgrains[2]	Stock management	Export restrictions	Pricing policies	Cash transfers	Food for work	Food ration/stamps	School feeding	Rural employment schemes
		limit increases in public distribution				of the food crisis (through WFP)			
Pakistan		√ Government imports of wheat Increased public grain distribution	√ Imposed ban on wheat exports and restrictions on domestic inter-provincial wheat transport	√ Nearly 50 percent increase in government procurement price of wheat	√ Piloting of new program (Benazir Card) but only after height of food crisis			√	
Sri Lanka	√	Government is considering establishment of strategic rice reserve	No explicit ban on rice exports although trade protection and other measures have kept domestic prices relatively high	√ Cap on rice price Farm-gate price of fertilizer kept constant (increased subsidy element)	√		√	School feeding program has very limited reach	

2. The Impact of Rising Food Prices on Poverty and the Potential Role of Second-Round Responses[17]

This chapter uses nationally representative household survey data for three countries—Bangladesh, Nepal, and Pakistan—to assess the impact of the 2007-08 food price inflation on poverty.[18] It expands on the traditional analytical approach in which the poverty impact is determined exclusively by the household's net marketing position (i.e. net producer or net consumer), by simulating the "second-round" effects of behavioral adjustments made by consumers and producers in reaction to price changes. The results illustrate the extent to which second-round adjustments in consumption and supply can potentially mitigate the short-term welfare loss caused by higher prices of selected food commodities.

First and Second-Round Effects of a Rise in Food Prices

Price inflation lowers the purchasing power of a given nominal income and therefore affects expenditure decisions. Since nominal wage rates tend to adjust to price increases only after a time lag, and even then often only partially,[19] price inflation leads to declining real wages, which lower consumption and reduce economic growth.[20] In addition, price inflation hollows out the real value of savings—which may lead to lower investment, thus further compromising economic growth.

Persistent inflation of food prices is particularly harmful for the poor and may wipe out part of the progress that has been achieved in

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[17] This chapter is largely based on Mghenyi (2009).

[18] The results do not measure the number of additional people who fell into poverty after the food crisis in 2007-08, because that depends on many other factors besides food price inflation.

[19] See for example Wodon and Zaman (2009) for evidence from Africa.

[20] Another way of looking at the potential of wage increases as a mitigating factor is to calculate the nominal wage adjustments that would be needed to neutralize household losses from price increases. According to Vishwanath and Serajuddin (2010), nominal wages would have had to rise by 14 percent for Bangladeshi households, and 15 percent for Sri Lankan households, to neutralize losses in purchasing power due to the rice price increases.

reducing poverty. As discussed in Chapter 1, rising food prices exacerbate inequality because the poor spend a disproportionally large share of their income on food, and food staples account for a large share of their total food expenditure. Moreover, households that currently live just above the poverty line may fall into poverty as a result of food price increases.

Most of the currently available research that uses household survey data to simulate the impact of food price inflation on poverty measures the first-round effects on household income. These studies distinguish households according to whether they are net buyers (their consumption value exceeds production value) or net sellers (their production value exceeds consumption value) of the commodities of interest (see e.g. Ivanic and Martin 2008; Dessus and others 2008; Vishwanath and Serajuddin 2010; World Bank 2009).

Yet second-round effects occur when households adjust their consumption and production patterns to the price change, and may potentially mitigate some of the welfare loss (Aksoy and Hoekman 2010). Thus, on the demand side, households may respond to higher food prices by reducing consumption, as a result of diminished real income, and/or adjusting their consumption bundle, as a response to changed relative prices. For example, a rapid survey by the World Bank at the height of the food crisis in Bangladesh in July 2008 found that households made a variety of consumption adjustments, including reducing their daily intake of rice and switching to lower quality foods (Vishwanath and Serajuddin 2010). Producers, for their part, may adjust to higher prices by expanding the area cultivated and/or intensifying production, for example by using higher yielding seeds, more labor, and fertilizers.

Compared with adjustments on the consumer side, the production response to a food price change is slower and often more muted. In South Asia during the food price crisis several features held back the supply response to higher world prices. First, agricultural inputs including fertilizer and transport had become substantially more expensive, mainly as a result of increases in energy prices. Second, as seen in Chapter 1, most South Asian governments insulated domestic producers of major food staples from the full impact of higher world prices. Third, the region's generally low levels of investment in agricultural research have limited the supply of yield-increasing technologies, and poorly functioning agricultural extension services in most South Asian countries further constrain technology adoption. Finally, the general neglect of agriculture by public investments and policies has kept transaction costs (marketing costs in particular) relatively high, especially for small farmers.

Analysis

The analysis relies on household survey data that were collected before the onset of the food crisis[21], and it focuses on main food staples rather than the aggregate food basket. Rice and wheat not only account for substantial shares of the food budget (Table 2.1) and farm incomes, but also experienced relatively larger price increases.

Table 2.1. Expenditure shares of rice and wheat

Countries	Food expenditure shares	
	Rice	Wheat
Bangladesh	.397	.002
Pakistan	.035	.177
Nepal	.290	.048

Source: Based on data from 2005 HIES (Bangladesh), 2005-06 PSLM (Pakistan), and 2004-05 NLSS (Nepal).

To simulate supply and demand responses and estimate their potential for mitigating first-round welfare losses, we use the domestic price increases that occurred in each of the selected countries. In Bangladesh the average increase in rice prices in the first nine months of 2008 (compared to the corresponding months of 2007) was about 50 percent (see also Appendix 2). In Nepal the price of rice increased by 20 percent between January and December 2008 (see also Appendix 4). In Pakistan during 2008 the average increase in the monthly price of wheat (compared to the same month in 2007) was 40 percent (see also Appendix 5).

First-round effects

The first-round welfare effects of food price inflation can be analyzed by categorizing a household's net marketing position. Households can be categorized into three groups depending on their marketing position for a particular food staple. Households whose value of production exceeds the value of their consumption are classified as net sellers; households whose value of consumption exceeds the value of production are classified as net buyers; and households who are self-sufficient in that food commodity (in the sense that their value of consumption equals the value of production) are classified as autarkic.

In the three countries studied, the net marketing position suggests that in the first round, food price inflation reduces welfare for the large majority of households. Table 2.2 shows that in Bangladesh 80 percent of households are net rice buyers, in Pakistan 77 percent of households are net wheat buyers, and in Nepal 72 percent of households are net rice buyers. To the extent that these distributions generally hold across different regions in each country, and since net marketing positions determine the first-order welfare effect of a price

[21] These data include the following national household surveys: Household Income and Expenditure Survey (HIES) 2005 for Bangladesh; Pakistan Social and Living Standards Measurement Survey (PSLM) 2005-06; and Nepal Living Standards Survey (NLSS) II 2004-05.

change, having a higher proportion of net buyers would suggest that rising food prices lead to welfare losses, at least in the short term.

TABLE 2.2. NET MARKETING POSITION (PERCENT OF TOTAL HOUSEHOLDS)

		Net rice marketing position		
	Location	Net buyers	Net sellers	Autarkic
Bangladesh	Urban	95	4	1
	Rural	75	24	1
	All	80	19	1
		Net wheat marketing position		
	Location	Net buyers	Net sellers	Autarkic
Pakistan	Urban	96	1	2
	Rural	29	70	1
	All	77	22	1
		Net rice marketing position		
	Location	Net buyers	Net sellers	Autarkic
Nepal	Urban	90	9	1
	Rural	69	31	0
	All	72	27	1

Source: Based on 2005 HIES (Bangladesh), 2005-06 PSLM (Pakistan), and 2004-05 NLSS (Nepal).

The full impact of food price inflation on poverty also depends on a range of other factors: (i) the distribution of initial income/expenditure across the net marketing continuum, i.e. whether net buyers have lower incomes than net sellers, or vice versa; (ii) whether households close to the poverty line are net sellers or net buyers; (iii) the concentration of households around the poverty line—which determines whether a price shock could cause movements in and out of poverty; (iv) the size of the price increase; and (v) the extent to which medium-term adjustments in production and consumption—"second-round effects"—are able to reverse some of the short-term welfare loss. In what follows we first review influences on the supply response of farmers in the selected countries, and then describe the second-round effects of food price changes.

INFLUENCES ON THE SUPPLY RESPONSE

Access to land is an important determinant of supply response but problematic in South Asia. A defining characteristic of South Asian agriculture is poor access of farm households to cultivable land. Bangladesh provides a good example. Data from the most recent nationally representative household survey[22] shows that nearly 50 percent of households in rural Bangladesh do not own agricultural land and various land market mechanisms increase access only by about 10 percentage points, leaving 40 percent of rural households without access to land (Figure 2.1). The inability of land markets to significantly influence access to land is perhaps related to the fact that most land-owning households in Bangladesh have average holdings of only 0.70

[22] Bangladesh 2005 Household Income and Expenditure Survey (HIES).

acres. Further, average land holdings tend to be smaller in regions that have better potential for agriculture. For example in Chittagong, the average is 0.49 acres per household, compared to 1.10 acre in Barisal, which has lower agricultural potential (Table 2.3).

Table 2.3. Landholding among rural households in Bangladesh and Pakistan

Country	Region	Mean landholding
Bangladesh	Barisal	1.10
	Chittagong	0.49
	Dhaka	0.63
	Khulna	0.77
	Rajshahi	0.77
	Sylhet	0.88
	Full sample	0.70
Pakistan	Punjab	3.92
	Sindh	14.74
	NWFP	2.44
	Balochistan	3.14
	Full sample	6.32

Source: Based on data from the 2005 Bangladesh HIES and the 2005-06 Pakistan PSLM.

Land distribution patterns differ significantly among countries. The mean landholding in Pakistan is 6.32 acres[23] (table 2.3) but about 90 percent of the rural population in Pakistan owns less land than the mean, and about 65 percent of Pakistan's rural households own barely any land. Market mechanisms improve land access by only about 10 percentage points, leaving more than half (55 percent) of rural households without access to land (figure 2.1).

Besides by cultivating more land, households may expand their agricultural output by intensifying production—making more use of inputs such as high yielding seed varieties, labor, and fertilizer. Intensification was the major driver of supply response during the food crisis in Bangladesh where the *boro* (dry season) crop increased from 15 million MT in 2007 to about 17.5 million MT in 2008.[24]

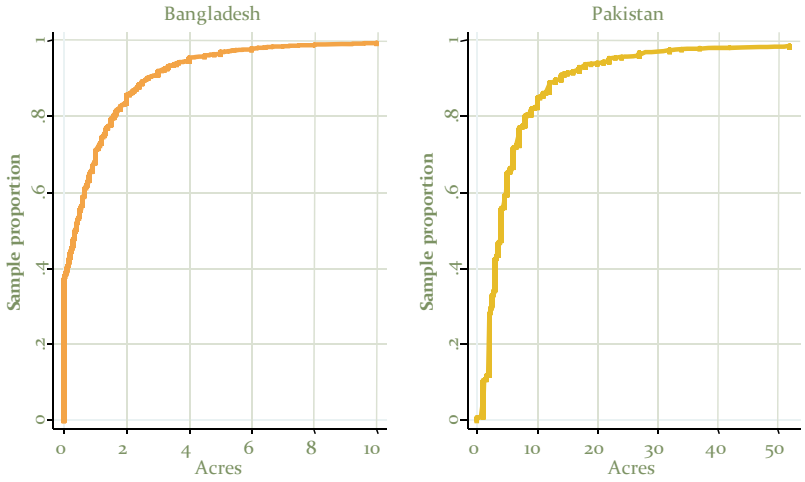
High food prices can provide incentives for a supply response even for households that do not currently sell in the markets. Farmers who already market part of their output would seek to produce and sell more, to

[23] Based on data from Pakistan Social and Living Standards Measurement Survey (PSLM) 2005-06.

[24] This increase of about 17 percent came in reaction to a price increase of about 40 percent in the domestic rice market (see also Annex 2), suggesting a price elasticity of supply elasticity of about 0.46, which is within a range of estimates from previous studies (Table 2.4).

increase their cash income from farming, while farmers who currently participate in the market only as buyers, not as sellers, would seek to increase their production to reduce expenditures on the now more expensive food commodity. Autarkic households, whose food production is approximately equal to their consumption needs, would also want to produce more in order to become net sellers and earn cash income from farming.

FIGURE 2.1. DISTRIBUTION OF ACCESS TO CULTIVABLE LAND IN BANGLADESH AND PAKISTAN



Source: Based on data from the 2005 Bangladesh Household Income and Expenditure Survey (HIES) and 2005-06 Pakistan Social and Living Standards Measurement Survey (PSLM).

SECOND-ROUND EFFECTS

We assess the poverty impact of food price inflation using the Equivalent Variation measure. Basically there are two measures that could be used to estimate the welfare effects of changing food prices, i.e. Equivalent Variation (EV) and Compensating Variation (CV). The EV measure is ex-ante in nature in the sense that it is based on production and consumption outcomes at "old" prices; the CV measure, in contrast, is based on outcomes in production and consumption after the price change has occurred. Since the data used in this chapter were collected before the onset of the food crisis, the results reported regarding the impact of food price inflation on poverty were generated using the EV measure (for more details see Appendices 2.1 and 2.2).

Second-round welfare effects depend on the price elasticity of supply, price elasticity of demand, and income elasticity of demand. Estimates of these parameters are available in the literature based on either detailed panel data or time series and using a variety of estimation techniques. The main studies and estimates are summarized in Table 2.4. The results reported below are based on an informed choice out of these secondary parameter estimates (see annex

2.1 for further details). For lack of information to do otherwise, we implicitly assume iso-elastic demand and supply curves and zero cross-price elasticities.

TABLE 2.4. PARAMETER ESTIMATES FROM SECONDARY SOURCES

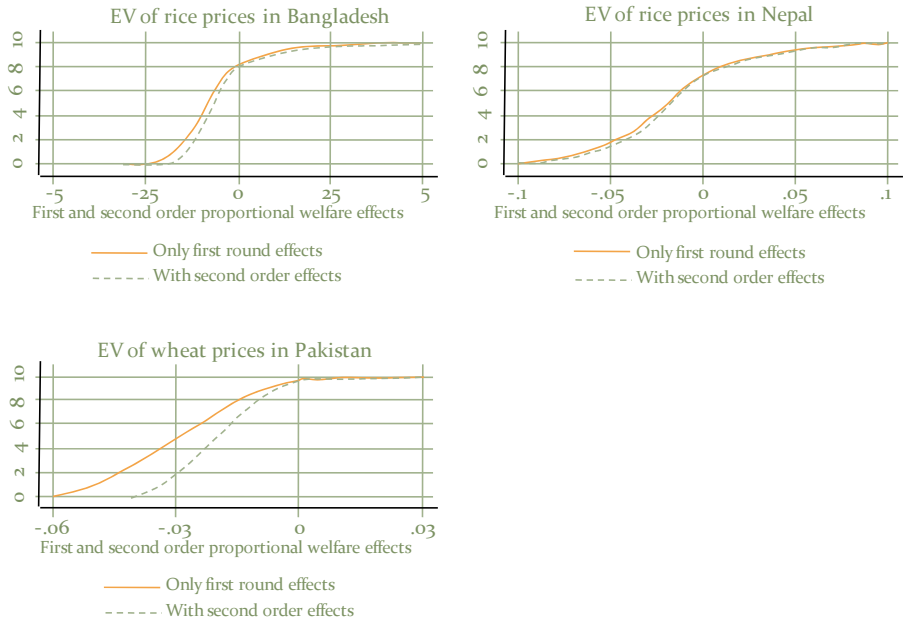
Parameter	Country	Commodity	Values
Income/ expenditure elasticity of demand	Bangladesh	Rice	0.125[a]
			0.64 (rural) 0.51 (urban)[b]
		Wheat	-1.00 (rural) 0.06 (urban)[b]
		Calorie	0.35 (at poverty line)[c]
	Nepal	Rice	0.435[a]
	Pakistan	Calorie	0.34 (at poverty line)[c]
Own price demand elasticity	Bangladesh	Rice	-0.55 (rural) -.89 (urban)[b]
		Calorie	-.51 (at poverty line)[c]
		Wheat	-.49 (rural) -2.64 (urban)[b]
	Pakistan	Calorie	-.47[c]
Own price supply elasticity	Pakistan	Rice	0.26[d]
	LDC	Aggregate	0.3-0.5 (literature survey)[e]
	LDC	Aggregate	0.4-0.5 (literature survey)[f]

Sources: a. Huang and others (1991); b. Dorosh and Haggblade (1997); c. Knudsen and Scandizzo (1982); d. Farooq and others (2001); e. Chhibber (1989); f. Rao (1988)

To gauge whether second-round responses in production and consumption are significant, Figure 2.2 compares the distributions of the proportional welfare effects with and without second-round effects. In each of the three countries, the distribution of the proportional welfare impact with second-round effects lies below the distribution with only first-order effects, implying that the latter has a higher probability of large negative values and small positive values compared to the measure that includes second-round effects. Since the equivalent variation measure is negative for households whose welfare decreases and positive for households that experience a welfare gain, these distributions show that second-round effects in production and consumption could reverse some of the welfare loss from the first-round effects.

The size and distribution of welfare effects differ greatly among the three countries (Figure 2.2). In Bangladesh, the most affected households incur welfare losses in the order of 25 percent as a result of the 50 percent increase in the rice price. In Nepal, the households that are affected most suffer welfare losses of about 10 percent. Welfare losses are smallest in Pakistan, where the maximum loss is about 6 percent. The EV measure is negative for about 80 percent of all households in Bangladesh, which means that there are many more losers than gainers. The majority of households in Pakistan and Nepal also suffer welfare losses.

FIGURE 2.2. EQUIVALENT VARIATION (EV) MEASURE OF PROPORTIONAL WELFARE EFFECT OF FOOD PRICE INFLATION



In Bangladesh, second-round responses significantly mitigate the poverty effect of food price inflation. Based on differences in poverty headcount ratios with and without second-round effects (see annex 2.2), the adjustment behavior of consumers and producers in Bangladesh decreases the first-order impact on poverty by about 2 percentage points or up to 30 percent in proportional terms. This is the case regardless of whether poverty is measured using an overall (upper) poverty line or a food (lower) poverty line (table 2.5).[25] However, within Bangladesh there are significant differences among regions, both in the size of the first-order impact on poverty and in its partial reversal through second-round responses. Food price inflation has the largest first-order impact on poverty in Chittagong province, but second-round responses are able to reduce this impact by 30 percent (2 percentage points). The smallest first-order impact (about 4 percentage points) is

[25] The poverty estimates are based on poverty lines developed by the Bangladesh Bureau of Statistics (in collaboration with the World Bank) using HIES 2005 data employing a Cost of Basic Needs (CBN) approach (World Bank, 2002). CBN poverty lines represent the level of per capita expenditure at which a household can be expected to meet their basic needs (food and non-food). This is measured by estimating a food poverty line as the cost of a fixed food bundle providing minimal nutritional requirements, while adding an "allowance" for non-food consumption to the food poverty line. For the *lower poverty line*, the non-food allowance is the average non-food expenditure of households whose *total* consumption is equal to the food poverty line; whereas for the *upper poverty line*, the non-food allowance is the average nonfood expenditure of households whose *food* consumption was equal to the food poverty line.

observed in Khulna, Rajshahi, and Sylhet, and second-round responses are able to decrease this by up to 75 percent (3 percentage points).

TABLE 2.5. CHANGE IN POVERTY HEADCOUNT RATIO

Country/region	Change in poverty headcount ratio from base expenditure data	
	With only first-round effects	With both first- and second-round effects
Bangladesh (upper poverty line)		
Barisal	+.06	+.05
Chittagong	+.07	+.05
Dhaka	+.06	+.04
Khulna	+.04	+.02
Rajshahi	+.04	+.01
Sylhet	+.04	+.01
Full Sample (national)	+.05	+.03
Bangladesh (lower poverty line)		
Barisal	+.08	+.06
Chittagong	+.08	+.06
Dhaka	+.07	+.06
Khulna	+.05	+.03
Rajshahi	+.05	+.03
Sylhet	+.07	+.06
Full Sample (national)	+.07	+.05
Pakistan		
Punjab	+.01	+.006
Sindh	-.02	-.02
NWFP	+.05	+.03
Balochistan	-.01	-.03
Full Sample (national)	+.02	+.001
Nepal		
Mountain	+.024	+.021
Urban Kathmandu	+.002	+.002
Urban Hill	+.013	+.013
Rural Hill	+.001	+.001
Urban Terai	+.006	+.006
Rural Terai	+.005	-.003
Full Sample (national)	+.005	+.004

In Pakistan, second-round responses have an even larger proportional effect on the national poverty headcount ratio than in Bangladesh. In Pakistan, wheat price inflation raises the national headcount ratio by an estimated 2 percentage points on average. This is a significantly smaller poverty effect than caused by the rice price increase in Bangladesh, for two main reasons. First, the price increase of wheat in Pakistan was smaller than that of rice in Bangladesh. Second, the average gap between household consumption and production is smaller for wheat in Pakistan than for rice in Bangladesh. However, just as in Bangladesh, second-round responses significantly reverse the impact of food price inflation on the poverty headcount in proportional terms, by up to 90 percent at the national level. The impact of the wheat price increase on poverty differs significantly by region: the first-order impact on the poverty headcount ratio ranges from an increase of 5 percentage points in NWFP to a decrease of 2 percentage points in Sindh province.

In Nepal, the impact of higher rice prices on the poverty headcount ratio is small: an increase of about 0.5 percentage points. This may be because most rural households are subsistence farmers and nearly autarkic with little participation in markets. Rice imports from India (licit and illicit) may also have played a role in mitigating the poverty impact. Yet these results need not mean that the poverty impact of rice price inflation in Nepal was trivial; while the headcount ratio measures changes in the extent of poverty, it does not provide information about the severity of poverty—i.e. whether the poor became even poorer or less poor. The Nepal data suggest that the increase in rice prices made households who were already poor even poorer (i.e. the poverty gap[26] increased), although the absolute number of poor may not have increased dramatically.

In all three countries, the first-round welfare loss from higher food prices is greater in urban areas than in rural. In Bangladesh the headcount ratio based on the upper poverty line increases by about 6 percentage points in urban areas, compared to 5 percentage points in rural areas (Table 2.6). A larger urban-rural disparity is observed in Pakistan where the urban headcount ratio rises by three percentage points and the rural ratio rises by less than one percentage point. In Nepal the disparity between rural and urban areas is less pronounced, because the overall effects of higher food prices are relatively small.

Second-round adjustments are more pronounced in rural than in urban areas. In Bangladesh, for example, second-round responses reduce the first-round impact by about two percentage points in rural areas and by only one percentage point in urban areas. A similar pattern is seen in Pakistan and Nepal. Unlike urban consumers who can only respond on the consumption side, many rural households can adjust both consumption and production. The combined adjustments enable rural households to mitigate a larger proportion of first-round welfare losses than their urban counterparts who have no control over factors of production.

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[26] The most common measure of the severity of poverty is the poverty gap but, unlike the headcount ratio, the values generated by this measure do not lend themselves to an intuitive interpretation and often they merely indicate whether the poor have become even poorer or less poor. See Foster and others (1984) for a generalized measure of poverty that combines information on the extent of poverty (as measured by the headcount ratio), intensity of poverty (as measured by the poverty gap), and inequality among the poor (as measured by the Gini coefficient and the coefficient of variation for the poor).

TABLE 2.6. CHANGE IN POVERTY HEADCOUNT RATIO IN RURAL AND URBAN AREAS

	Change in poverty headcount ratio from base expenditure data	
	With only first-roundeffects	With both first- and second-round effects
Bangladesh (upper poverty line)		
Rural	+.05	+.03
Urban	+.06	+.05
Full Sample (national)	+.05	+.03
Bangladesh (lower poverty line)		
Rural	+.07	+.05
Urban	+.07	+.06
Full Sample (national)	+.07	+.05
Pakistan		
Rural	+.006	-.007
Urban	+.03	+.02
Full Sample (national)	+.02	+.001
Nepal		
Rural	+.005	+.004
Urban	+.006	+.006
Full Sample (national)	+.005	+.004

The impact of food price increases varies considerably across households at different income levels. Table 2.7 presents the impact of high food prices on headcount ratio by household expenditure quintiles. As expected, the incidence of poverty (headcount ratio) is highest in the poorest (first) quintile and decreases as one moves to higher quintiles. In Bangladesh, the headcount ratio is one in the first quintile even before the food price increase—and regardless of whether it is measured using the higher or lower poverty line; this means that all households in this quintile are unambiguously poor. In the fourth and fifth quintiles, the headcount ratio is zero in all three countries, indicating per capita expenditures above national poverty lines.

TABLE 2.7. DISTRIBUTION EFFECTS OF HIGH FOOD PRICES

Per capita expenditure quintiles[1)]	Change in poverty headcount ratio from base expenditure data	
	With only first-round effects	With first and second -round effects
Bangladesh (upper poverty line)		
1[2)]	-.004	-.008
2	+.03	+.02
3	+.24	+.18
4	0	0
5 (highest)	0	0
Full Sample (national)	+.05	+.03
Bangladesh (lower poverty line)		
1 (lowest)	-.03	-.04
2	+.34	+.28
3	+.006	+.001
4	0	0
5 (highest)	0	0
Full Sample (national)	+.07	+.05
Pakistan		
1 (lowest)	-.06	-.07

Per capita expenditure quintiles[1)]	Change in poverty headcount ratio from base expenditure data	
	With only first-round effects	With first and second -round effects
2	+.11	+.07
3	0	0
4	0	0
5 (highest)	0	0
Full Sample (national)	+.02	+.001
Nepal		
1 (lowest)	+.01	+.01
2	+.01	+.01
3	+.001	+.001
4	0	0
5 (highest)	0	0
Full Sample (national)	+.005	+.004

[1)] The first quintile represents households with the lowest per capita expenditure while the fifth quintile represents those with the highest per capita expenditures. The distribution of per capita expenditures is centered in quintile 3.

[2)] Base expenditure data give a headcount ratio of 1 in the lowest quintile (with both high and low poverty lines).

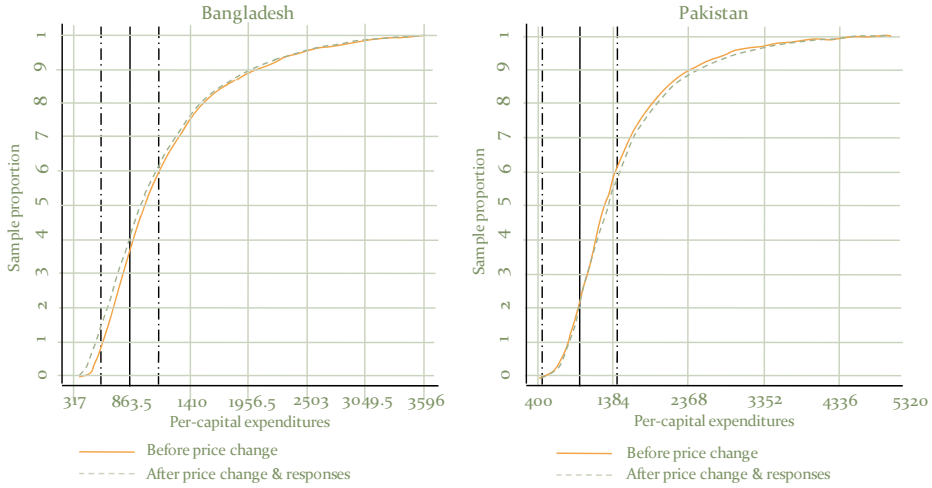
In Bangladesh and Pakistan, most of the welfare loss from high food prices is concentrated among middle-income households (Table 2.7). In Bangladesh the results using the upper poverty line indicate that the first-round impact of higher food prices on the poverty headcount ratio is about 24 percentage points in the third quintile. Similarly, the lower poverty line gives a 34 percentage point increase in the headcount ratio, but to households in the second quintile. Second-round adjustments reduce the first-round impact on the headcount ratio by about six percentage points regardless of which poverty line is used. Similarly, in Pakistan the second quintile is affected most: in the first round, the headcount ratio in this quintile increases by 11 percentage points, while the second-round effects reduce this increase to 7 percentage points.

The relatively large welfare loss near the middle of the expenditure distribution is explained by the high concentration of households around the poverty line. A high concentration of households around the poverty line means that price changes are likely to cause movements into and out of poverty. Figure 2.3 presents cumulative distributions of per capita expenditure in Bangladesh and Pakistan. The distance between the two vertical lines on either side of the poverty line is equivalent to half the standard deviation of per capita expenditure. In Bangladesh about 50 percent of households fall within half a standard deviation away from the poverty line. An even higher concentration is observed in Pakistan, where nearly 60 percent of the sample is within half a standard deviation from the poverty line.

Higher food prices lead to a slight decrease in the poverty headcount in the poorest expenditure quintile in both Pakistan and Bangladesh. In Bangladesh,

the headcount ratio is reduced in the poorest quintile by about 1 percentage point when using the upper poverty line and 4 percentage points based on the lower poverty line. Similarly in Pakistan, the headcount ratio in the poorest quintile is reduced by about 7 percentage points. This is because even in the poorest expenditure groups there are some households that are net sellers and therefore gain from food price increases. Since before the food price rise all households in this quintile were poor, the headcount ratio decreases as soon as one or more of these households crosses the poverty line.

FIGURE 2.3. DISTRIBUTION OF PER CAPITA EXPENDITURE, BANGLADESH AND PAKISTAN



High food prices clearly hurt households at the lower end of the expenditure distribution. Despite the reduction in the poverty headcount ratio in the poorest income quintiles in Pakistan and Bangladesh, households that remain below the poverty line are worse off with higher food prices. In Bangladesh, the poverty gap increases from 0.35 to 0.41 (upper poverty line) and 0.25 to 0.32 (lower poverty line). Similarly in Pakistan, the poverty gap increases from 0.17 to 0.18.

Despite the significant second-round effects, a considerable portion of the welfare loss caused by food price inflation is likely to persist. Losses will persist unless they are neutralized by general equilibrium effects. The comparative size of the general equilibrium effect would ideally be assessed empirically and would depend heavily on the extent to which the supply response leads to greater labor absorption in rural areas and to higher wages. Though several studies (Boyce and Ravallion 1991; Rashid 2002; Ravallion 1990) have suggested that the wage elasticity of output prices in South Asia is low, new work is needed in this area, based on a coherent set of information regarding changes in rural wage rates during the food crisis. Since most price projections suggest

that food prices are likely to remain higher than before the crisis[27], this begs the question of what are appropriate policy responses for both the short term and the long term.

[27] See Chapter 4 for a more detailed discussion of future food price projections.

ANNEX 2.1: METHODOLOGY FOR ESTIMATING SECOND-ROUND RESPONSES IN PRODUCTION AND CONSUMPTION

Two measures can be used to estimate the welfare effects of changing prices: Equivalent Variation (EV) and Compensating Variation (CV). While the EV measure is *ex-ante* in the sense that it is based on production and consumption outcomes *before* the price change (i.e. at "old" prices), the CV measure is based on outcomes in production and consumption outcomes *after* the price change. The EV measure thus computes attainable expenditures in the event of a price change based on production and consumption decisions before the price change. In other words, it gives the change in a household's income or expenditure level that would be equivalent to a price change in terms of its welfare impact. The CV measure computes counterfactual expenditures using "old" prices based on production and consumption decisions after the price change.

Because they are computed using different price vectors, the EV and CV measures lead to different estimates of the welfare effect. It can be shown (Mas-Colell and others 1995) that the estimated welfare effect of price changes is unambiguously larger under the EV measure when the food commodity is a normal good, but equal to the CV measure if there are no income effects, as would be the case under quasi-linear preferences. Both measures give a correct welfare ranking of the price alternatives under any type of preferences.

The welfare measure used in this chapter accounts for both price and income effects in consumption and supply response. Since the available household survey data were collected before the onset of the food crisis and therefore represent outcomes in production and consumption under "old" prices, the EV rather than the CV was used.

Let households be indexed by *i* and household indirect utility be given by $V_i[p_i; y_i + \pi_i(p_i)]$, where p_i is the household's price for the food commodity under consideration (in this case rice or wheat), y_i is income from sources other than production of the food commodity, and $\pi_i(\cdot)$ is profit from production of the commodity. The interest is in evaluating the welfare effect of prices changing from an initial level p_i^0 to a new higher level p_i^1. A proportional equivalent variation measure of the welfare effect of this price change on consumer *i* is given by an m_i that satisfies:

$$V_i\{p_i^1;[y_i + \pi_i(p_i^1)]\} \equiv V_i[p_i^0;(1+m_i)y_i + \pi_i(p_i^0)] \quad (1)$$

where m_i is the proportional addition in the income or expenditure of household *i* before the price change that would be equivalent to the price change in terms of its effect on utility. Therefore, $m_i > 0$ ($m_i < 0$) if the price change increases (decreases) welfare.

Taking a second-order Taylor's approximation of (1) at $(p_i^1, m_i) = (p_i^0, 0)$ results in the following proportional EV measure of the welfare effect:[28]

(2) $$m_i \approx (s_i^s - s_i^d)\lambda - 0.5[s_i^s \xi_i^{ps} - s_i^d \xi_i^{pd}]\lambda^2 + 0.5\{(R_i - \xi_i^{yd})[(s_i^d)^2 - 2s^d s^s] + R_i (s_i^s)^2\}\lambda^2$$

Here s_i^s is the share of rice/wheat production revenue in the household's total income, and s_i^d is the share of rice/wheat consumption expenditures in total income. Equation (2) depends on the following parameters: ξ_i^{ps} which is the household's own price elasticity of supply; ξ_i^{pd} which is the household's own price elasticity of demand; ξ_i^{yd} which is the household's income elasticity of demand; R_i which is the household's coefficient of relative risk aversion (a measure of the curvature of the household's indirect utility function in income); and $\lambda = (p^1 - p^0)/p^0$ which is the change in price as a proportion of the initial price level (p^0).

Equation (2) has two parts. The first part, expressed by $(s_i^s - s_i^d)\lambda$, measures the first-order effect of changing food prices. This is the measure that has been used in most studies including Barrett and Dorosh (1996), Budd (1993), Deaton (1989), Dessus and others (2008), Ivanic and Martin (2008), and Wodon and others (2008).

The second part of equation (2) is a second-order term which measures second-round responses in both production and consumption. As one would expect, the second-order term depends on parameters that include the price elasticity of supply, price elasticity of demand, and income elasticity of demand. Many studies have estimated these parameters, using either detailed panel data or time series and a variety of estimation techniques (Table 2.4). Based on these secondary sources, the analysis in Chapter 2 uses the following estimates for rice: ξ_i^{ps} =0.4, ξ_i^{pd} =-0.6, ξ_i^{yd} = 0.4 (urban) and 0.6 (rural), and the following estimates for wheat: ξ_i^{ps} =0.4, ξ_i^{pd} =-1.5, ξ_i^{yd} = 0.2 (urban) and 0.3 (rural). A value of R_i =1 was used for the household's coefficient of relative

[28] For a full derivation of equation (2) see Mghenyi and others (2010).

risk aversion. These values might be viewed as a conservative choice because they are based on much smaller variation in prices than occurred during the food crisis. However, sensitivity analysis (not reported) that varied the parameters by -50 percent and +50 percent did not significantly affect the results.

ANNEX 2.2: CALCULATION OF CHANGES IN POVERTY HEADCOUNT

For all three countries featured in the analysis (Bangladesh, Nepal, and Pakistan) the household surveys used provide information that allows the calculation of expenditures before the price changes occurred. These base expenditure data relate to the particular period when the surveys were conducted, i.e. 2005 for Bangladesh, 2005-06 for Pakistan, and 2004-05 for Nepal. For want of more recent comprehensive data, the results of our analysis are interpreted as if the same household expenditure structure were valid at the beginning of the food crisis.

To assess the impact of food price inflation on the poverty headcount, two vectors of expenditures were simulated from the base expenditure data: (i) attainable expenditures after the first-round effects of the price shock; and (ii) attainable expenditures after households adjusted their production and consumption to the new prices. These simulations are respectively based on the Equivalent Variation measure without and with second-round adjustments. The change in headcount ratio is then compared across the three vectors of expenditures, i.e. (i) base expenditure data, (ii) attainable expenditures after only first-round effects, and (iii) attainable expenditures after second-round adjustments in production and consumption. The headcount ratios were measured using poverty lines as estimated by the World Bank.

3. The Potential of the South Asian Free Trade Area Agreement for Improving Regional Food Security[29]

Discussions of the food crisis and food security in South Asia have tended to ignore the regional dimension of food price inflation and the possibility of improving food security by liberalizing, instead of restricting, trade. In this chapter we use a general equilibrium model of world trade to analyze the potential of regional trade liberalization for mitigating food price inflation in South Asia. In particular, and in view of the increasing attention to regional integration (Ahmed and others 2010), we explore the extent to which full implementation of the South Asian Free Trade Area (SAFTA) agreement could have mitigated some of the food price inflation in South Asia.

Introduction

Based on formal trade flows, South Asia is one of the world's least integrated regions.[30] Its global integration, measured by international trade as a ratio to GDP, was 49 percent in 2007; though higher than the 20 percent of the late 1990s, this is still the lowest among developing country regions. Intra-regional integration is particularly low, at only two percent of regional GDP, especially when compared to East Asia, where the share is 40 percent. In South Asia the share of intraregional trade in total trade was 18 percent in 1948 but averaged only 5 percent during 2000-07.

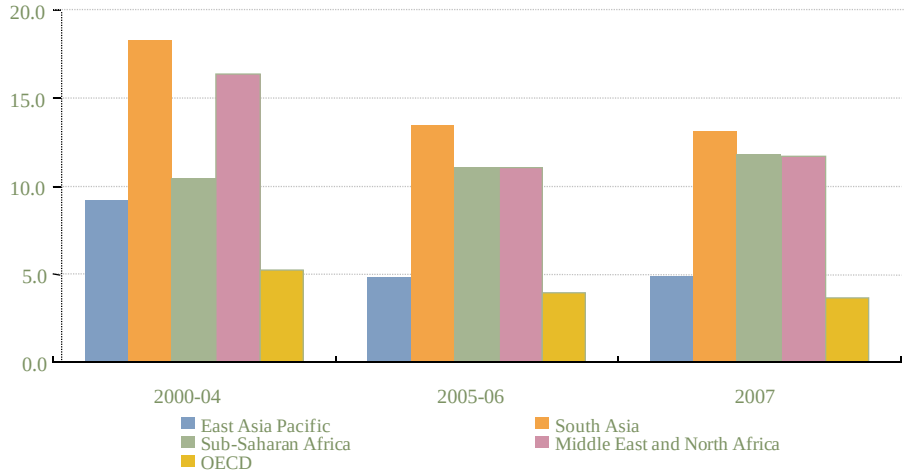
Tariff and non-tariff barriers make for high costs of intra-regional trade. The cost of trading across borders in South Asia remains very high (Figure 3.1) despite a gradual reduction in tariffs on intra-regional trade, first through the South Asian Association for Regional Cooperation (SAARC) Preferential Trade Area (SAPTA) and subsequently through the South Asian Free Trade Area (SAFTA) agreement. The import tariffs levied by South Asian countries (other than Sri Lanka) are roughly twice as high as the tariffs they face in export markets outside the region. But there is broad consensus that the high trading

[29] This chapter is largely based on Bouët and Corong (2009).

[30] As discussed later in this chapter, it is widely believed that data on intra-South Asian trade grossly underestimate informal trade flows (World Bank 2004).

costs are mainly due to the maintenance of non-tariff barriers to intra-regional trade.[31]

FIGURE 3.1. TRADE RESTRICTIVENESS INDICES



1/ Data for 2000-04, and 2005-06 are averages.
Source: World Bank's World Trade Indicators 2008.

SAFTA imposes a detailed tariff reduction schedule to be completed by 2016, and provides for preferential treatment and a longer tariff cutting schedule for its least developed (LDC) members. The SAFTA agreement was signed on January 6, 2004 and took effect on January 1, 2006. SAFTA's signatories are four least developed countries (Bangladesh, Bhutan, Maldives, and Nepal) and three middle-income countries (India, Pakistan, and Sri Lanka). SAFTA requires India, Pakistan, and Sri Lanka to bring their import duties down to 20 percent in the first phase of a two-year period which ended in 2007 (Table 3.1). In the final five-year phase ending in 2012 (six years ending in 2013 for Sri Lanka), the intention is to reduce the 20 percent duty to zero in a series of annual cuts. Nepal, Bhutan, Bangladesh, and Maldives have until 2016 to reduce their tariffs to less than 5 percent. The latter countries are also afforded technical assistance and compensation for revenue loss resulting from tariff reductions. Pakistan has signed but not yet ratified SAFTA; Afghanistan is not part of SAFTA. SAFTA has many rules of origin requirements and maintains an elaborate list of "sensitive" goods.

[31] These include but are not limited to anti-dumping regulations, specific duties, domestic content requirements, sanitary and phyto-sanitary measures, and technical barriers to trade.

TABLE 3.1. TRADE LIBERALIZATION UNDER SAFTA

		Non-LDC importers			LDC importers			
		India	Pakistan	Sri Lanka	Bangla-desh	Bhutan	Maldives	Nepal
Number of Sensitive Products								
Exporters	India Pakistan Sri Lanka	864 1190 1065			742 1190 1065			
	Bangladesh Bhutan Maldives Nepal	1254 157 671 1338			1249 157 671 1302			
Tariff Reduction Schedule								
Non-LDC exporters	India Pakistan Sri Lanka	Phase I (2006-08) Tariffs > 20% then reduce linearly to 20% by 2008 Tariffs < 20% reduce initial Margin of Preference tariff by 10% each year (2007 and 2008). Phase II (2008-2012): India and Pakistan (Reduce tariff linearly to within 0-5%) Phase II (2008-2013): Sri Lanka (Reduce tariff linearly to within 0-5%)			Phase I (2006-08) Tariffs > 30% then reduce linearly to 20% by 2008 Tariffs < 30% reduce initial Margin of Preference tariff by 5% each year (2007 and 2008). Phase II (2008-2016) Reduce tariff linearly to within 0-5% Compensations to LDCs: 2007-08: Not more than 1% of custom duty collected 2009: Not more than 5% of custom duty collected 2010: Not more than 3% of custom duty collected			
LDC exporters	Bangladesh Bhutan Maldives Nepal	2006-09: Linear reduction to within 0-5%			Phase I (2006-08) Tariffs > 30% then reduce linearly to 30% by 2008. Tariffs <30% reduce initial Margin of Preference tariff by 5% each year (2007 and 2008). Phase II (2008-2016) Reduce tariff linearly to within 0-5%			

Source: SAFTA agreement; SAARC (2008a); Bouët and others (2009).

The economic benefits of SAFTA remain hotly debated. Skeptics argue that taken in isolation, the economic case for SAFTA remains weak[32], and thus far intra-regional trade has indeed improved only marginally (World Bank 2004). On the other hand, and despite perceived moderate economic gains, Ahmed and Ghani (2007) maintain that SAFTA could pave the way for new economic opportunities—in the form of improved transport and trade facilitation, reduced cost of doing business, and cross-border energy trade. Ahmed and Ghani (2010) also argue that SAFTA and SAARC could also be useful vehicles for improving political relations in the region. During the 15th

[32] For example, Panagariya (2003) argues that there exists no persuasive economic case for tariff reductions within South Asia since these would lead to a loss in welfare at the regional level even though low-tariff countries may gain. He argues that South Asian countries would be better off liberalizing on a non-discriminatory basis.

SAARC summit held in Colombo in August 2008, government ministers identified vital avenues for further economic cooperation and possible ways to help alleviate the impact of high global food prices, and started designing a SAARC agricultural strategy (SAARC 2008b).

During the food crisis, however, most countries in South Asia increased their trade barriers instead of facilitating trade. Most of the economic measures taken to address high food prices were introduced under strong political pressure and had a nationalistic focus. In an effort to control domestic food prices, they included increasing public grain distribution and strategic grain reserves and reducing import taxes on essential food items and/or imposing export taxes or other levies.[33] Many countries decided to ban exports of certain food staples (table 1.6 and Appendixes 1-6). These "beggar-thy-neighbor" type policies aggravated price increases elsewhere, as in Afghanistan where wheat prices shot up after Pakistan introduced an export ban, and in Bangladesh where India's restrictions on rice exports contributed to rice price inflation. Policies that restrict trade also encourage smuggling and reduce economic returns for domestic farmers.[34] In the longer run, government policies that limit trade opportunities often are self-defeating since they may lead to panic purchases and drive international prices higher, in this way eventually pushing domestic prices up instead of lowering them.

The Regional Trade Economy

Trade has played an important role in South Asia's economic growth. While trade integration is still low in South Asia compared to other regions, trade with non-South Asian partners has been crucial for the region's economic growth (Ahmed and Ghani 2007). Between 1990 and 2006, the shares of exports, imports, and total trade in GDP increased in all countries of the region (except for a decline in the export-to-GDP ratios of Pakistan and Afghanistan) (Table 3.2). India raised its export-to-GDP and import-to-GDP ratios by roughly 200 percent, largely owing to its remarkable economic growth. Similarly, Bangladesh's export-to-GDP ratio grew from 6 percent to 19 percent, while its imports increased from 6 to 25 percent of GDP.

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[33] No single country has an incentive to unilaterally liberalize trade; in a simple stylized world consisting of two countries both of which aim at dampening food price inflation, the dominant strategy for each country (at least in the short term) is to limit exports no matter what the other country does. Since unilaterally revoking export bans is clearly an inferior strategy, both countries are likely to impose bans and thus miss the potentially superior solution brought by increased trade between countries based on comparative advantage.

[34] Lowering import tariffs may provide temporary relief to consumers but it may also reduce fiscal revenues and, depending on the commodity's importance in the food basket of the poor, may be either regressive or progressive. See Wodon and Zaman (2009) for experiences in Africa.

TABLE 3.2. EXPORT AND IMPORT-TO-GDP RATIOS, 1990 AND 2006

	Exports/GDP		Imports/GDP		Trade/GDP	
Country	1990	2006	1990	2006	1990	2006
Afghanistan*	33	12	66	56	99	68
Bangladesh	6	19	6	25	20	44
India	7	23	7	26	16	49
Nepal	11	14	11	32	32	45
Pakistan	16	15	16	23	39	39
Sri Lanka	30	32	30	43	68	75
South Asia	16	22	16	32	39	55
World	34	47	41	51	76	98

*Data for Afghanistan are for 2002 and 2006.

Source: World Bank (2008b).

South Asia remains a lagging region from a trade perspective. Although South Asia's international trade as a proportion of GDP increased from 39 to 55 percent between 1990 and 2006, this ratio is still only about half of the world average (Table 3.2). South Asian countries still have substantial bound tariff rates that greatly exceed their applied Most-Favored Nation (MFN) tariff rates, particularly in agriculture. For example, Bangladesh's bound tariff rates in agriculture are nine times higher than MFN tariffs; outside agriculture, like most other developing countries, Bangladesh has a smaller disparity between bound and MFN tariffs. Afghanistan has the lowest tariffs with 5.7 and 5 percent MFN tariff rates for agriculture and non-agriculture respectively, with no bound tariffs.

International trade in South Asia is largely directed outside the region (Table 3.3), except in Nepal, with its proximity to and special relations with India. Intra-regional trade accounts for only 5 percent of South Asia's total trade. Intra-regional exports account for less than 10 percent of total exports for almost every country in South Asia. The picture is similar for intra-regional imports: India and Pakistan source only about 2 and 3 percent respectively of their total imports from other South Asian countries. The corresponding figure for both Bangladesh and Sri Lanka is somewhat higher at about 15 percent. Extensive trade preferences mean that most of South Asia's exports go to the EU and the US (for example, more than 30 percent in the case of India and 81 percent in the case of Bangladesh).

TABLE 3.3 INTRA-REGIONAL TRADE FLOWS IN SOUTH ASIA, 2004 (MILLION US$)

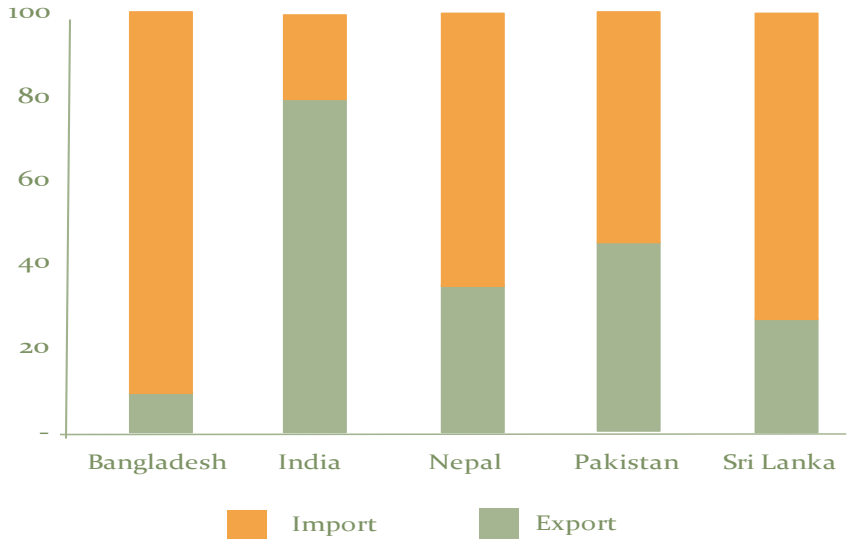
	Destination						
Origin	Bangladesh	India	Nepal	Pakistan	Sri Lanka	SAFTA	World
Bangladesh		97.2	5.0	45.3	12.5	163.8	8,739.4
India	1,408.7		698.4	452.9	1,191.8	3,926.4	73,141.0
Nepal	5.5	373.0		3.7	1.4	385.3	395.2
Pakistan	175.3	160.1	9.1		97.7	445.0	12,869.0
Sri Lanka	17.8	339.3	3.4	43.3		492.3	5,512.7
SAFTA	1,610.0	1,032.3	716.9	545.6	1,336.2	5,512.3	
Afghanistan	7.1	35.8		47.1	0.4	90.5	135.2

Source: 2004 MAcMap HS6 Database.

But intra-regional trade is high in a few specific commodities. Pakistan, for example, sends about 86 percent of its milk and dairy exports to the "Rest of South Asia"[35], half of its wheat exports to Bangladesh, and one-third of its cereal exports (mainly rice) to the Rest of South Asia. Sri Lanka sends almost 80 percent of its oil seeds exports to Pakistan, 85 percent of its vegetable oil exports to India (despite the 46 percent tariff protection), and 65 percent of its milk and dairy exports to the Rest of South Asia. The rest of South Asia sends 83 percent of its exports of vegetable oils and fats to India.

Individual countries' shares in the region's trade vary greatly. India accounts for about 78 percent of total intra-regional exports but only 19 percent of intra-regional imports. All South Asian countries except India have intra-regional trade deficits (figure 3.2).

FIGURE 3.2. INTRA-REGIONAL TRADE BALANCES, SOUTH ASIAN COUNTRIES



Source: 2004 MAcMap HS6 Database.

Regarding intra-regional trade, India and Sri Lanka are respectively the most and least protectionist economies in South Asia. India's import tariffs differ widely across its South Asian trading partners. India has bilateral free trade agreements with Bangladesh, Pakistan, and Sri Lanka, but the tariffs it imposes on imports from the other countries remain relatively high and uneven, especially on agricultural and food products. India imposes comparatively lower tariffs on imports from Bhutan and Nepal. Sri Lanka has the lowest tariff on non-agricultural products, but moderately high agricultural/food tariffs—mostly in retaliation to India. Pakistan, Bhutan,

[35] The "Rest of South Asia" is GTAP7 nomenclature (see Appendix 3.1) and comprises Bhutan, Maldives, Nepal, and Afghanistan.

Maldives, and Nepal have relatively low import tariffs by South Asian standards.

Effects of Changes in Trade Policy on Food Security

We analyze the impact of SAFTA with the MIRAGE model. Analyzing the impact of SAFTA on the economies of South Asia and the rest of the world requires a model capable of tracing the economy-wide feedback arising from global resource reallocation effects. The results in this chapter were generated using the MIRAGE (Modeling International Relationships in Applied General Equilibrium) model. To simulate a number of counterfactual scenarios with MIRAGE, the tariff database (called MAcMap) was adjusted to account for changes since 2004 (the base year) that had resulted from the various regional trade agreements and the enlargement of the European Union. Based on this information and exogenous population and economic growth projections from FAO and the World Bank, the MIRAGE model was solved to generate a baseline path from 2004 to 2020. Simulation results are compared to this baseline path. Annex 3.1 provides details of the modeling approach and databases used.

Six trade simulation scenarios were analyzed, relative to the baseline scenario where there is no SAFTA (table 3.4). These can be classified into cooperative scenarios (scenarios 1, 2 and 3); non-cooperative scenarios (scenarios 4 and 5); and an informal trade scenario (scenario 6).

Table 3.4. Scenarios analyzed

#	Scenario name	Scenario description
1	SAFTA	Simulates the SAFTA agreement. Tariff rates of non-sensitive products are reduced based on the tariff reduction schedule as stipulated in the SAFTA agreement. All tariff rates imposed on sensitive products are maintained.
2	SAFTA-PLUS	Simulates a modified SAFTA agreement in which tariff reductions would apply to all products (i.e. sensitive as well as non-sensitive products).
3	SAFTA-SUB	Simulates the SAFTA agreement in combination with the removal of subsidies on intra-regional exports, factor inputs and production. All subsidies are reduced linearly between 2008 and 2015, and are completely eliminated by 2016.
4	SAFTA-BANS	Simulates the SAFTA agreement plus a 100 percent export tax on rice, wheat, other cereals, and processed rice by major exporters in 2007 and 2008.
5	BANS	Simulates a 100 percent export tax on rice, wheat, other cereals, and processed rice by major exporters in 2007 and 2008, but no SAFTA.
6	INFORMAL	Simulates informal trade among SAFTA countries.

Results from six scenarios

The impact of SAFTA on GDP is generally positive but small. The simulation results suggest that dismantling tariffs on non-sensitive goods under the SAFTA agreement results in small but positive increases in real income for all countries in South Asia, except for a very small decrease (0.03 percent) in Bangladesh (figure 3.3). The effect on GDP is largest in Sri Lanka (a 0.29 percent increase, see Figure 3.4) followed by increases of 0.13 percent in Pakistan (figure 3.5), 0.06 percent in the Rest of South Asia (figure 3.6), and 0.04 percent in India (figure 3.7). The slight income loss in Bangladesh stems from a deterioration in the country's overall terms of trade of 0.09 percent (related to trade diversion effects and high protection levels prior to the start of the SAFTA agreement in 2006), which outweighs a gain in allocation efficiency of 0.06 percent. Sri Lanka's gains are due to improvements in both allocation efficiency and terms of trade, helped by low initial levels of protection. Income gains in India and Pakistan are smaller than in Sri Lanka, because of initially high tariff rates in India, moderately high tariffs in Pakistan, and the lesser importance of intra-regional trade—relative to total trade—in both these countries as compared to Sri Lanka.

Figure 3.3. Impact of SAFTA, SAFTA-PLUS, and SAFTA-SUB on real GDP in Bangladesh

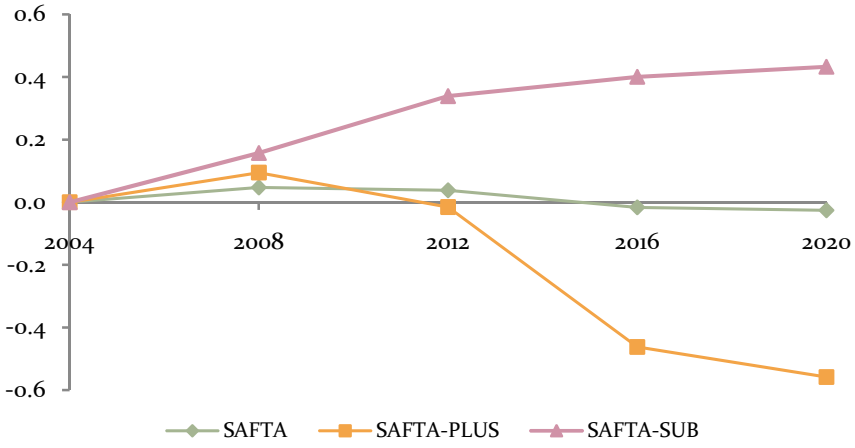


FIGURE 3.4. IMPACT OF SAFTA, SAFTA-PLUS, AND SAFTA-SUB ON REAL GDP IN SRI LANKA

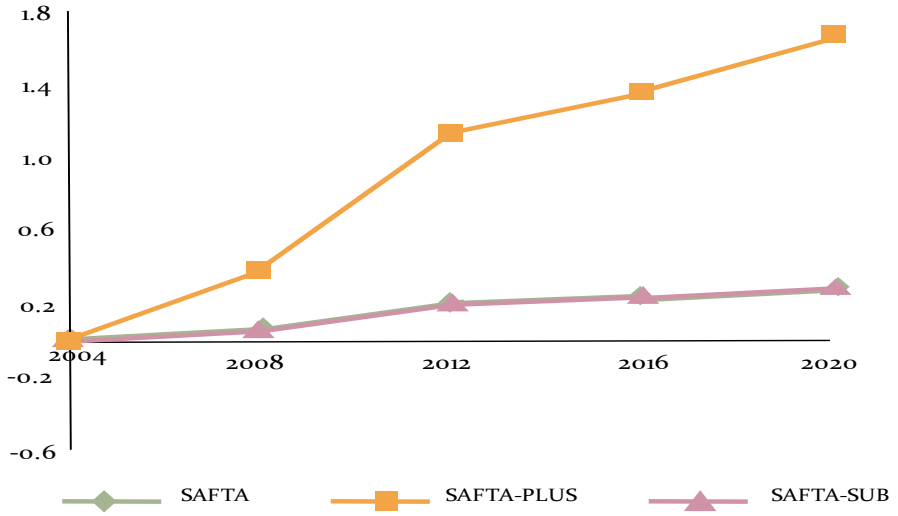


FIGURE 3.5. IMPACT OF SAFTA, SAFTA-PLUS, AND SAFTA-SUB ON REAL GDP IN PAKISTAN

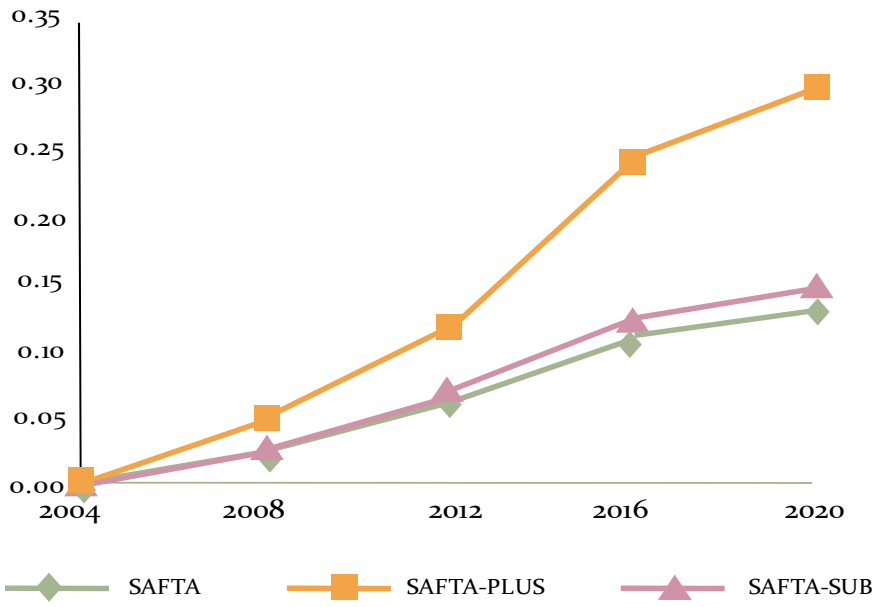


FIGURE 3.6. IMPACT OF SAFTA, SAFTA-PLUS AND SAFTA-SUB ON REAL GDP IN REST OF SOUTH ASIA

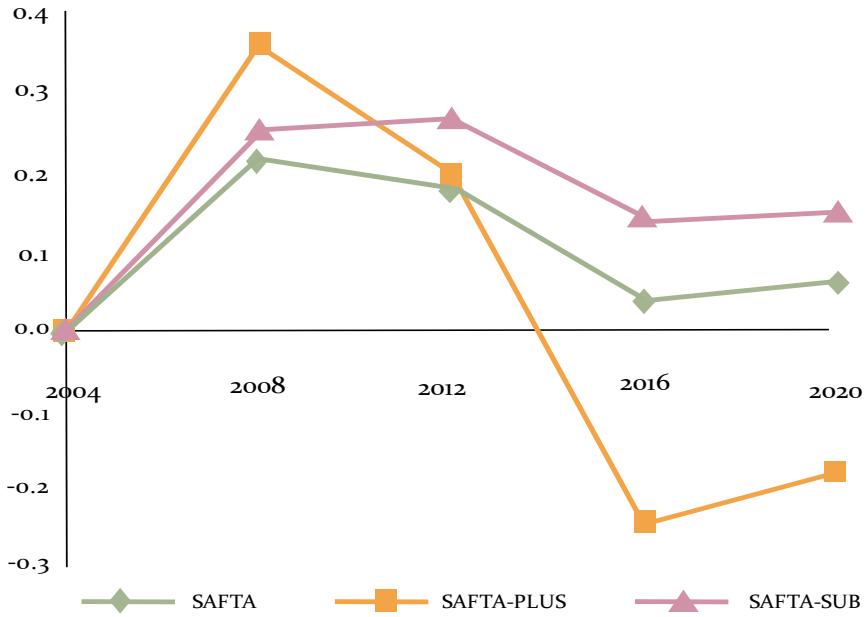
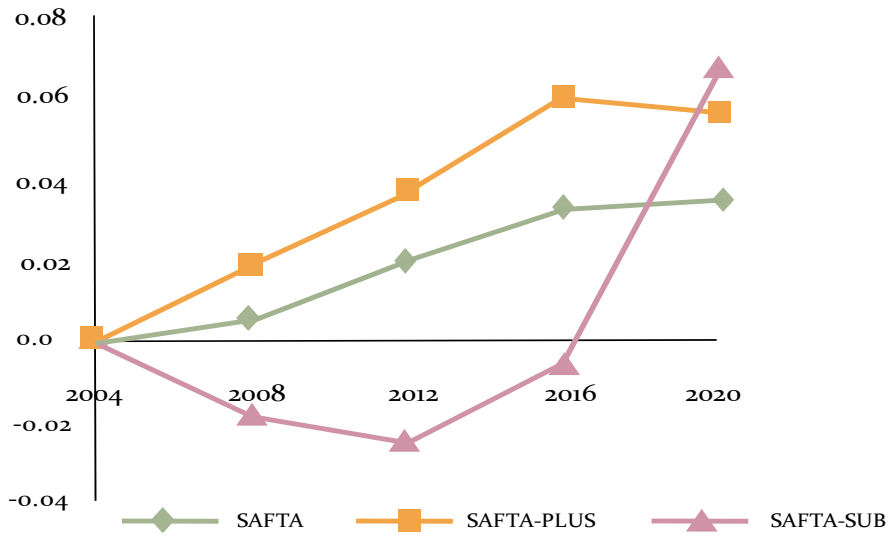


FIGURE 3.7. IMPACT OF SAFTA, SAFTA-PLUS AND SAFTA-SUB ON REAL GDP IN INDIA



Agricultural laborers gain from SAFTA in Bangladesh and Pakistan but not elsewhere. In Bangladesh and Pakistan, SAFTA increases the wages of unskilled labor in agriculture relative to non-agriculture, but in Sri Lanka, the Rest of South Asia, and India, both the relative wages of agricultural workers and the number of agricultural jobs decrease. Non-agricultural employment remains unchanged in India, falls slightly in Bangladesh and Pakistan, and increases slightly in Sri Lanka and the Rest of South Asia.

SAFTA-PLUS would strengthen the impact of SAFTA. Extending tariff reductions to sensitive goods (in addition to the tariff reductions for non-

sensitive goods under SAFTA) further increases the income gains in Sri Lanka, Pakistan, and India. However, it reinforces the terms of trade losses in Bangladesh and the Rest of South Asia, because under SAFTA-PLUS Bangladesh and the Rest of South Asia give up their relatively high protection of their domestic industries. In India under SAFTA-PLUS, unskilled wages and employment fall further in agriculture, relative to non-agriculture, than under SAFTA. Bangladesh and the Rest of South Asia also experience a slight decrease in agricultural employment.

Bangladesh would benefit more than the rest of the region from SAFTA-SUB. Combining SAFTA with the elimination of subsidies does little to change the impact of SAFTA in Sri Lanka and Pakistan. But in the Rest of South Asia and especially in Bangladesh the removal of trade-distorting subsidies leads to significant income gains. These gains come mostly from substantial improvements in efficiency, which more than offset losses in terms of trade. In India the removal of subsidies would lead to losses in income until 2016, after which income would improve significantly.

Dismantling tariff barriers as foreseen under SAFTA is trade diverting. With the notable exception of Bangladesh, whose trade would increase across the board, SAFTA would considerably increase the importance of intra-regional trade relative to trade with non-South Asian countries. This trade diversion effect is especially large for the Rest of South Asia (see tables A3.2.1 and A3.2.2 in annex 3.2). Depending on the individual country, intra-regional exports would grow by between 8 and 86 percent under SAFTA, though from relatively small base values (table A3.2.1, annex 3.2). Relative to SAFTA, export increases under SAFTA-PLUS (which removes tariff barriers for sensitive products as well) would be about twice as high, while changes in trade flows under SAFTA-SUB (which removes trade-distorting subsidies but not tariffs on sensitive products) lie between the two previous scenarios. The changes in imports by origin show a trade-diverting pattern similar to that for exports (table A3.2.2, annex 3.2): intra-regional imports increase significantly, especially for the Rest of South Asia. The SAFTA-PLUS scenario amplifies the import diversion effect. The results for the SAFTA-SUB scenario for imports are again between those of SAFTA-PLUS and SAFTA.

Consistent with positive but relatively small impacts on income, SAFTA has a small but positive impact on sectoral production levels. In all countries, implementation of SAFTA leads production to expand in all major economic sectors, except for agro-food and services in Sri Lanka and services in the Rest of South Asia (table 3.5). In Bangladesh, the expansion of the agro-food sector is mainly on account of increases in the wool, silkworm, and cocoons sub-sector and in the plant-based fibers category. In Pakistan, increases in economic activity in the sugar sub-sector drive the growth in the agro-food sector. SAFTA-PLUS, which allows for elimination of tariff protection on

sensitive commodities, would cause agro-food production levels to fall in Bangladesh and India, mainly because of competition from cheaper imports (table 3.5); for example, dairy production would decrease substantially in Bangladesh, while the processed sugar sub-sector would contract in India. SAFTA-SUB, which includes the elimination of trade-distorting subsidies, would cause a significant reduction in agricultural output in India.

Table 3.5. Changes in production by sector by 2020 (percentage deviations from baseline scenario)

	Bangladesh	India	Pakistan	Sri Lanka	Rest of South Asia
	SAFTA				
Agro-food	0.1	0.0	0.2	-0.4	0.4
Industry	0.2	0.1	0.2	2.5	1.2
Services	0.0	0.0	0.0	-0.4	-0.1
	SAFTA-PLUS				
Agro-food	-0.9	-0.1	1.0	4.6	2.6
Industry	1.8	0.3	0.0	0.1	1.4
Services	-0.4	0.0	0.1	-1.0	0.0
	SAFTA-SUB				
Agro-food	1.8	-1.1	0.2	0.0	1.0
Industry	-6.5	1.0	0.3	1.1	-4.1
Services	1.3	0.6	0.0	0.0	0.3

Source: Simulations with MIRAGE.

The SAFTA agreement hardly influences world food prices. Table 3.6 presents changes in world prices under the SAFTA-BANS and BANS scenarios, respectively. It shows that a 100 percent export tax on rice, processed rice, wheat, and other cereals by the major exporters of these commodities in 2007 and 2008 would have increased world market prices by between 24 and 68 percent. But the SAFTA agreement alone (difference between the results of BANS and SAFTA-BANS) would hardly dampen the effects of global food price increases. This is not surprising, given that South Asia's intra-regional trade in these commodities is small compared to world trade.

Table 3.6. Changes in world prices (percentage deviations from baseline scenario)

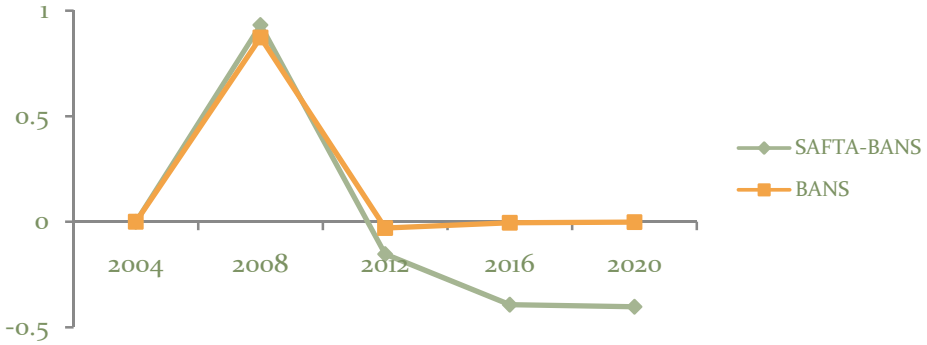
	SAFTA-BANS					BANS			
Product	**2008**	**2012**	**2016**	**2020**	**Product**	**2008**	**2012**	**2016**	**2020**
Paddy	28.9	-0.1	0.0	0.0	Paddy	28.9	-0.1	0.0	0.0
Wheat	23.7	-0.2	0.0	0.0	Wheat	23.7	-0.2	0.0	0.0
Cereals	67.6	0.1	0.0	0.0	Cereals	67.6	0.1	0.0	0.0
Processed Rice	46.0	-0.30	0.0	0.0	Processed Rice	45.9	-0.3	0.0	0.0

Source: Simulations with MIRAGE.

SAFTA's impact on domestic consumer price indices is also small. The large number of sensitive products (negative list) and the absence of agreements regarding non-tariff trade barriers and subsidies in SAFTA severely limit the impact of the agreement on domestic food prices. A comparison between the results of the BANS and the SAFTA-BANS scenarios in Figures 3.8 – 3.12 shows that changes in the domestic consumer price index (CPI) of each

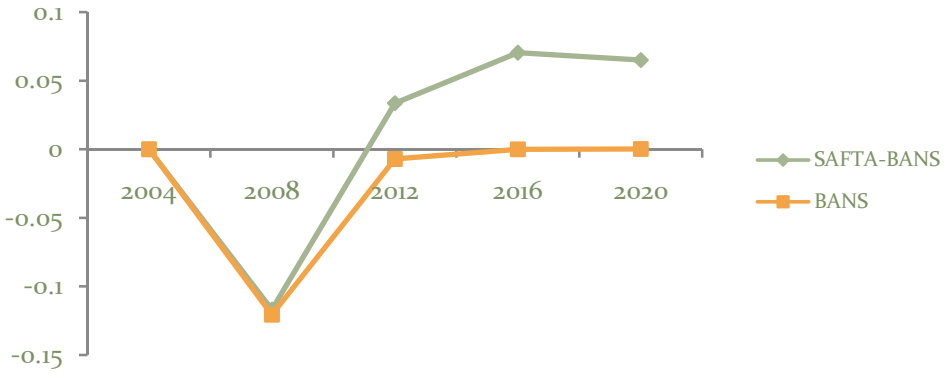
country resulting from SAFTA are relatively small. In other words, SAFTA could only marginally influence domestic food prices in South Asia.

FIGURE 3.8. EVOLUTION OF CONSUMER PRICE INDEX: BANGLADESH (PERCENTAGE DEVIATIONS FROM BASELINE SCENARIO)



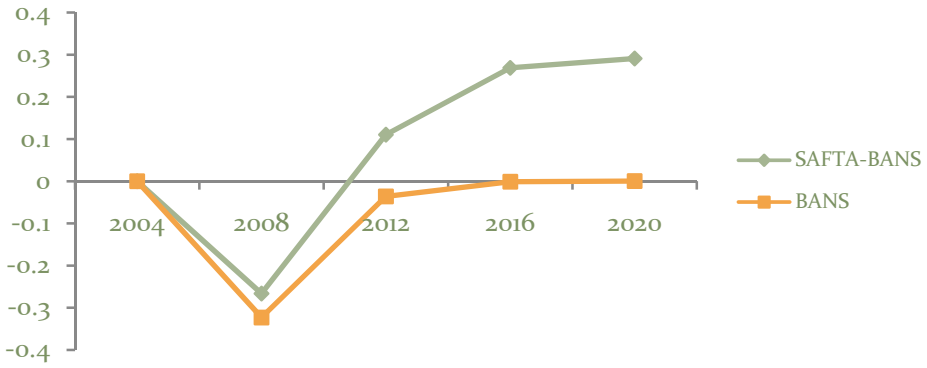
Source: Simulations with MIRAGE.

FIGURE 3.9. EVOLUTION OF CONSUMER PRICE INDEX: INDIA (PERCENTAGE DEVIATIONS FROM BASELINE SCENARIO)



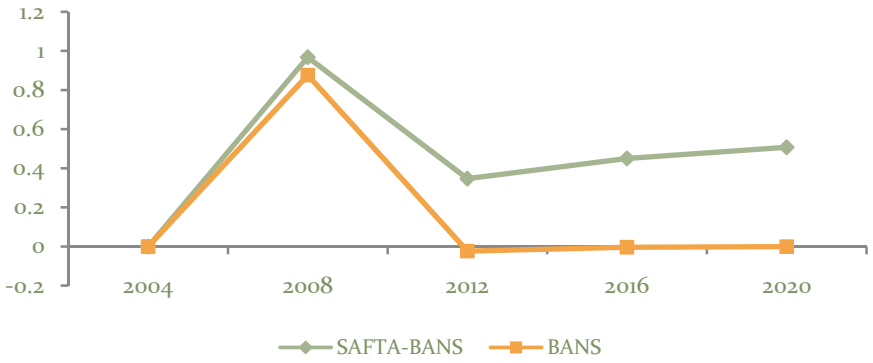
Source: Simulations with MIRAGE.

FIGURE 3.10. EVOLUTION OF CONSUMER PRICE INDEX: PAKISTAN (PERCENTAGE DEVIATIONS FROM BASELINE SCENARIO)



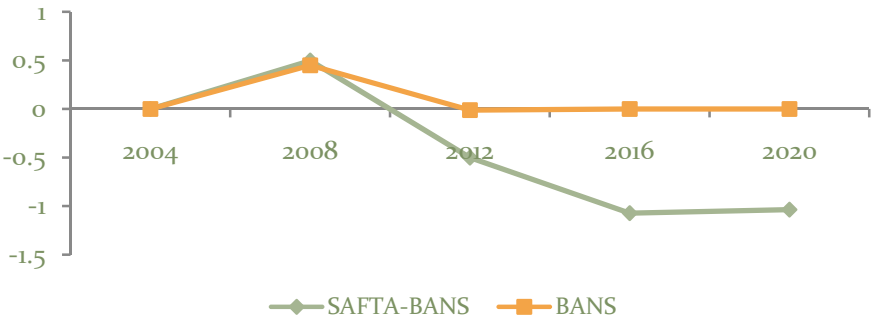
Source: Simulations with MIRAGE.

FIGURE 3.11. EVOLUTION OF CONSUMER PRICE INDEX: SRI LANKA (PERCENTAGE DEVIATIONS FROM BASELINE SCENARIO)



Source: Simulations with MIRAGE.

FIGURE 3.12. EVOLUTION OF CONSUMER PRICE INDEX: REST OF SOUTH ASIA (PERCENTAGE DEVIATIONS FROM BASELINE SCENARIO)



Source: Simulations with MIRAGE.

The impact of global export restrictions on domestic prices in South Asia is relatively minor. The simulation results in table 3.7 suggest that a 100 percent tax on global exports of paddy rice, cereals, wheat, and milled rice would lead to only relatively small changes in domestic prices in South Asia. This is not surprising, given the region's small share in world trade. Nevertheless, the domestic prices of these commodities would increase in all countries except Pakistan and India. In the case of rice, since both India and Pakistan are significant rice exporters,[36] export taxes imposed by these countries would increase supplies in their domestic markets, lowering domestic prices. In the trading partners of India and Pakistan affected by the rice export restrictions—importing countries such as Bangladesh, Sri Lanka, and the Rest of South Asia—rice imports would become scarcer and more costly and domestic rice prices would rise. Similarly for wheat, export taxes

[36] In 2004 India and Pakistan accounted for respectively 8.7 and 3.7 percent of total world paddy exports; and 14.6 and 7.6 percent respectively of total world processed rice exports (Narayanan and Walmsley 2008).

would result in higher domestic prices in importing countries including Sri Lanka, Bangladesh, and the Rest of South Asia. However, these increases would be quite small, mostly because only quite small shares of these countries' wheat supplies come from imports.

TABLE 3.7. CHANGES IN DOMESTIC COMMODITY PRICES (PERCENTAGE DEVIATIONS FROM BASELINE SCENARIO, 2008)

Product	Bangladesh	India	Pakistan	Sri Lanka	South Asia
	SAFTA-BANS				
Paddy Rice	3.0	-1.0	-4.1	10.6	1.9
Wheat	2.4	0.6	1.5	8.3	2.0
Cereals	1.4	0.6	2.4	1.3	1.6
Rice	2.2	-0.4	-12.4	9.6	1.5
	BANS				
Paddy Rice	0.5	-1.7	-12.7	9.0	0.9
Wheat	2.2	-1.4	-0.6	3.0	0.4
Cereals	13.0	-1.6	-0.6	15.9	1.5
Rice	0.5	-0.6	-18.8	8.1	0.7

Source: Simulations with MIRAGE.

Combining trade liberalization with the elimination of trade-distorting subsidies would be highly beneficial for the region. Based on the simulated trends in consumer prices (figures 3.8 – 3.12 above) and income gains (Ffigures 3.3 – 3.7 above) across South Asian countries, it seems that the SAFTA-SUB scenario—which combines the provisions of the SAFTA agreement with the elimination of all trade-distorting subsidies within South Asia—is the most development friendly scenario. Under this scenario all countries of the region would achieve real income gains over time, and the largest benefits would accrue to the poorest countries (Bangladesh and the Rest of South Asia).

POSSIBLE EFFECTS OF TRADE LIBERALIZATION ON INFORMAL TRADE

Informal cross-border trade is important in South Asia. Despite the restrictions on formal trade, informal trade flows (including those for agricultural products) among South Asian countries are thought to be substantial, probably making the region more integrated than it seems on the basis of official trade flows. Evidence suggests that informal trade between India and its South Asian neighbors is particularly important, although it seems that informal cross-border trade between Pakistan and Afghanistan has also flourished in recent years. Estimates based on a survey of informal traders by Taneja and others (2002) suggest that unrecorded trade between India and its neighbors may surpass formally recorded trade by 2 percent for Indian exports to Nepal; 38 percent for Nepali exports to India; 30 percent for Indian exports to Sri Lanka; and 31 percent for Sri Lankan exports to India. No formal estimates are available of unofficial trade between Afghanistan and Pakistan,

aside from an estimated 1.5 million MT of wheat exports from Pakistan to Afghanistan during 2008 (see Appendix 5).

Could a reduction in import tariffs reduce tariff evasion, as reflected in the volume of informal trade? Modeling informal trade flows is complicated and requires strong assumptions. In an attempt to simulate the possible impact of SAFTA on informal trade in South Asia, a number of assumptions were made. First, total intra-regional trade in the GTAP database was assumed to consist 70 percent of formal trade and 30 percent of informal trade. Second, to the extent that elasticities of tariff evasion are not available for individual commodities, three different scenarios were analyzed: (i) Low elasticity value: elasticity of evasion is equal to the Armington parameter in the GTAP database; (ii) Medium elasticity value: one and one-half times the low elasticity value; and (iii) High elasticity value: twice the low elasticity value. The analysis is limited to changes in volumes of informal trade of agro-food commodities. It should be kept in mind that the results presented are only an initial attempt to model informal trade and therefore should be interpreted with caution.

Tariff reduction alone under SAFTA may be not enough to reduce informal trade in South Asia, even if tariff evasion is highly sensitive to tariff rates. The simulation results in table 3.8 suggest that in general terms SAFTA has only a limited impact on informal trade flows across all countries, except for the Rest of South Asia. Even though this impact becomes more pronounced as the assumed elasticity of tariff evasion rises, SAFTA is highly unlikely to completely eliminate informal trade in the region. The 0.4 percent *increase* in Sri Lanka's demand for informal trade under the low elasticity scenario also suggests that informal trade cannot be deterred by a reduction in tariff rates alone. Under SAFTA, Bangladesh's informal imports from India would fall the most (especially under the high elasticity scenario) although Bangladesh's demand for informal imports from Pakistan would still increase (even if at a declining rate) as the assumed elasticity of evasion rises. Whereas the Rest of South Asia's demand for informal imports from India falls, informal imports from Pakistan would remain positive. Implicitly, this suggests that SAFTA alone, in the absence of institutional enforcement, would not eliminate illegal cross-border trade, especially between Pakistan and Afghanistan.

TABLE 3.8. IMPACT OF SAFTA ON INFORMAL IMPORT DEMAND BY 2020 (PERCENTAGE DEVIATIONS FROM BASELINE SCENARIO)

Country	Elasticity		
	Low	Medium	High
Bangladesh	-1.8	-4.6	-7.0
India	-0.9	-10.9	-18.4
Pakistan	-0.3	-11.8	-21.4
Sri Lanka	0.4	-2.1	-4.1
Rest of South Asia	-9.0	-18.5	-26.1

Source: Simulations with MIRAGE.

Conclusions

Some key conclusions follow from the simulation results. First, and perhaps most important, full implementation of the SAFTA agreement would provide a stimulus (even if a relatively small one) to economic growth in all South Asian economies except Bangladesh. Second, full implementation of SAFTA would help to reduce consumer prices in Bangladesh and the Rest of South Asia. Though it would slightly raise prices in Sri Lanka, Pakistan, and India, the increases would be small and outweighed by larger increases in nominal incomes (i.e. real incomes rise). Third, SAFTA increases intra-regional trade at the expense of trade with the rest of the world. Fourth, removal of the current list of sensitive products in SAFTA would hurt Bangladesh and the Rest of South Asia, which therefore would need to be assisted. Finally, combining SAFTA with the elimination of all trade-distorting subsidies in South Asia would be the preferred policy because it would raise real incomes throughout the region while providing the largest benefits to the poorest countries: Bangladesh and those making up the Rest of South Asia.

Annex 3.1: The MIRAGE model

MIRAGE is a multi-country and multi-region recursive dynamic CGE model for trade policy analysis (Decreux and Valin 2007). MIRAGE was run with real-world data from the GTAP7 database (Narayanan and Walmsley 2008) and supplementary information on population, employment (urban and rural), and GDP projections from the World Bank and the Food and Agriculture Organization (FAO). MIRAGE takes detailed tariff line information from the MAcMap-HS6 database, which provides an equivalent measure of bilateral applied protection at the 6-digit Harmonized System (HS) level for 5,111 products and 208 trading partners. This measure of applied protection is aggregated across countries and products using a weighting scheme based on a reference group of countries. This weighting reduces the endogeneity bias in measuring protection that is inherent in the normal weighting scheme based on import volume (for technical details see Bouët and others 2008). The GTAP7 and MAcMap-HS6 databases are both based on data from the year 2004.

The current geographical decomposition in MIRAGE identifies 26 regions, composed of seven developed and nineteen developing economies. Of these, four South Asian economies (Bangladesh, India, Pakistan, and Sri Lanka) and an aggregated "Rest of South Asia" (Bhutan, Maldives, Nepal, and Afghanistan) are treated as distinct regions. The United States and the European Union are treated as separate regions since they not only constitute the world's largest market but also grant the most extensive trade preferences. The rest of the OECD countries are grouped together, to account for rich countries having substantial agricultural protection, while Australia and New Zealand represent agricultural exporting countries with significantly lower protection. Japan, Korea, and Chinese Taipei (Taiwan) are treated distinctly owing to their very high rates of agricultural protection, especially with respect to rice. Brazil, most South East Asian countries, and an aggregated Rest of Western Asia are classified as separate regions to highlight their increasing importance to South Asian trade. Finally, the rest of North and Latin America is aggregated, as is Africa, to represent net food importing regions.

The results discussed in Chapter 3 were generated through an extensive sectoral decomposition of 32 commodities, in order to identify key South Asian sectors and capture products with sizeable distortions. Given the focus of the analysis on the potential impact of regional trade liberalization on food prices, 17 agro-food sectors were distinguished. This detailed commodity aggregation enabled the capturing of highly protected agricultural commodities such as paddy rice, wheat, cereals, and oil seeds, as well as a number of agro-industrial food items.

Annex 3.2: Trade diversion in SAFTA

Table A3.2.1 Changes in export values by destination (percentage deviations from baseline scenario)

	SAFTA					SAFTA-PLUS					SAFTA-SUB				
	Bangladesh	India	Pakistan	Sri Lanka	Rest of South Asia	Bangladesh	India	Pakistan	Sri Lanka	Rest of South Asia	Bangladesh	India	Pakistan	Sri Lanka	Rest of South Asia
Australia and New Zealand	2.4	-0.3	-1.2	-1.8	-7.8	10.3	-0.7	-3.4	-8.6	5.2	7.2	0.5	-1.2	-2.8	4.3
Rest of the world	2.0	-0.3	-1.2	-1.7	-21.8	9.7	-0.7	-3.5	-15.0	7.0	-2.0	0.2	-1.2	-2.1	8.9
China and Hong Kong	1.6	-0.5	-1.2	-2.1	-17.2	8.1	-1.0	-3.6	-9.7	5.7	11.1	0.3	-1.3	-1.2	7.2
Japan	2.7	-0.3	-1.1	-1.6	-7.5	11.8	-0.8	-3.0	-8.6	4.8	-8.0	0.3	-1.2	-1.6	5.5
Korea	2.2	-0.3	-1.1	-2.0	-6.6	10.8	-0.7	-3.2	-8.0	5.2	15.7	0.2	-1.3	-1.7	4.1
Chinese Taipei	1.9	-0.3	-1.1	-1.9	-6.4	8.8	-0.7	-3.2	-10.0	5.9	15.9	0.1	-1.2	-2.8	6.0
Other ASEAN Countries	2.7	-0.3	-1.3	-2.6	-5.0	10.0	-0.8	-3.9	-10.9	7.8	18.0	0.2	-1.2	-7.4	7.4
Indonesia	2.2	-0.3	-1.1	-1.9	-15.7	9.0	-0.6	-3.6	-8.8	3.8	7.5	-1.2	-1.1	-1.1	4.4
Malaysia	2.0	-0.3	-1.1	-1.8	-20.6	8.8	-0.7	-3.4	-9.8	4.4	-4.8	-0.4	-1.1	-2.3	4.9
Philippines	2.4	-0.3	-1.2	-0.9	-12.5	9.1	-0.5	-3.5	-7.2	7.5	15.0	-0.9	-1.3	-1.2	8.2
Singapore	3.0	-0.3	-1.1	-1.4	-22.6	13.5	-0.8	-3.2	-7.7	7.8	-15.1	0.5	-1.1	-1.7	6.5
Thailand	1.8	-0.3	-1.0	-0.9	-15.6	8.2	-0.8	-3.0	-8.0	6.0	2.1	0.5	-1.1	0.0	3.8
Viet nam	2.1	-0.3	-1.2	-4.1	-14.2	9.5	-0.6	-3.7	-14.0	6.9	15.2	-0.5	-1.4	-4.4	-1.6
Bangladesh		31.4	78.4	86.0	72.2		112.9	268.0	190.2	123.0		25.6	85.1	72.1	52.8
India	86.5		57.9	53.9	27.2	191.1		193.2	234.7	61.2	98.6		59.7	54.5	24.1
Pakistan	22.8	54.7		41.3	61.2	111.3	113.4		96.4	93.7	39.3	54.3		33.6	70.3
Sri Lanka	25.0	16.3	8.2		31.5	81.6	48.0	45.9		63.0	21.3	15.7	10.3		17.7
Rest of South Asia	41.8	37.9	43.4	39.0	350.8	142.1	76.1	66.3	55.9	369.3	4.7	38.9	43.8	48.9	359.3
Canada	3.3	-0.3	-1.3	-2.3	-7.1	16.3	-0.9	-3.9	-9.9	7.6	-5.5	0.2	-0.9	-2.9	4.9
United States of America	2.0	-0.3	-1.1	-2.3	-7.0	9.7	-0.8	-3.3	-10.1	6.3	4.8	0.5	-1.2	-3.8	2.2
Rest of North and Latin America	2.5	-0.3	-1.2	-2.1	-14.0	11.9	-0.7	-3.5	-13.4	6.2	4.5	0.5	-1.3	-3.4	4.2
Brazil	2.1	-0.2	-1.1	-2.6	-6.7	8.9	-0.6	-2.8	-10.2	13.7	18.5	0.3	-1.3	-3.2	18.9
EU27	2.8	-0.3	-1.3	-2.3	-6.9	14.0	-0.8	-3.8	-10.2	7.0	-5.8	0.4	-1.0	-1.9	5.4
Rest of OECD	2.7	-0.3	-1.2	-1.5	-5.9	13.4	-0.8	-3.4	-8.2	8.4	-5.1	0.4	-0.9	-0.4	8.3
Western Asia	1.5	-0.3	-1.1	-1.6	-17.6	7.1	-0.7	-3.2	-11.5	5.1	6.3	-0.1	-0.3	-1.5	3.4
Africa	1.9	-0.3	-1.0	-2.0	-7.2	8.4	-0.7	-2.9	-10.1	10.2	-0.5	-0.3	-0.8	-4.3	8.7

Source: Simulations with MIRAGE.

Table A3.2.2 Changes in import values by destination (percentage deviations from baseline scenario)

	SAFTA					SAFTA-PLUS					SAFTA-SUB				
	Bangladesh	India	Pakistan	Sri Lanka	Rest of South Asia	Bangladesh	India	Pakistan	Sri Lanka	Rest of South Asia	Bangladesh	India	Pakistan	Sri Lanka	Rest of South Asia
Australia and New Zealand	-1.9	0.3	0.5	1.7	-7.8	-12.2	0.4	3.1	6.0	0.1	-8.3	0.7	0.6	2.8	-10.5
Rest of the world	-2.1	-0.2	-0.6	0.6	-21.8	-7.6	-0.2	-1.1	2.7	-30.9	-26.7	-0.1	-0.4	0.6	-22.4
China and Hong Kong	-7.4	-0.3	-0.2	-1.0	-17.2	-23.2	-0.2	-0.6	-1.2	-25.1	-6.1	0.0	0.0	-0.5	-15.3
Japan	-2.6	0.2	0.4	-0.6	-7.5	-10.1	0.5	0.9	-2.0	-15.2	-2.7	0.4	0.5	-0.7	-7.8
Korea	-2.9	0.2	0.2	-0.1	-6.6	-9.5	0.5	0.4	-1.4	-13.2	-6.5	0.4	0.4	0.8	-4.1
Chinese Taipei	-2.5	0.2	0.2	-0.4	-6.4	-9.0	0.5	0.6	-2.5	-10.1	-3.5	0.5	0.4	0.7	-7.7
Other ASEAN Countries	-2.4	0.2	-0.1	-1.8	-5.0	-9.4	0.1	-3.5	-2.4	-11.3	-14.4	1.1	-0.5	-2.2	-8.5
Indonesia	-6.6	0.1	-0.5	-1.9	-15.7	-18.8	-3.3	0.0	-1.9	-22.6	-10.6	1.6	-0.4	-1.4	-16.7
Malaysia	-3.7	0.1	-0.5	-1.8	-20.6	-11.8	-1.5	0.0	0.8	-27.1	-4.3	0.8	-0.2	-1.7	-21.1
Philippines	-7.2	-0.2	0.2	-0.6	-12.5	-20.2	-0.2	0.4	0.9	-24.6	-12.3	-0.1	0.4	-0.1	-13.0
Singapore	-7.8	-0.1	-0.5	-1.9	-22.6	-19.8	0.0	-1.4	-0.8	-30.4	-3.9	-0.2	-0.3	-1.7	-22.0
Thailand	-6.1	-0.3	-0.7	-0.7	-15.6	-19.5	-0.7	-1.8	-2.4	-26.7	-11.1	0.2	-0.5	0.0	-13.4
Viet nam	-7.9	0.1	0.0	0.1	-14.2	-24.3	-7.8	1.7	5.6	-21.6	-7.3	3.2	0.0	0.3	-14.0
Bangladesh		86.5	22.8	25.0	41.8		191.1	111.3	81.6	142.1		101.4	41.8	21.1	4.8
India	31.4		54.7	16.3	37.9	112.9		113.4	48.0	76.1	23.9		54.5	15.5	38.8
Pakistan	78.4	57.9		8.2	43.4	268.0	193.2		45.9	66.3	85.4	60.4		10.4	42.1
Sri Lanka	86.0	53.9	41.3		39.0	190.2	234.7	96.4		55.9	71.9	55.1	34.4		48.5
Rest of South Asia	72.2	27.2	61.2	31.5	350.8	123.0	61.2	93.7	63.0	369.3	52.2	24.7	69.7	18.7	349.4
Canada	-2.1	0.2	0.5	0.8	-7.1	-12.6	0.1	1.8	16.3	-14.6	-6.1	1.0	0.7	3.9	-8.9
United States of America	-1.6	0.2	0.4	0.9	-7.0	-7.0	0.4	1.5	2.6	-10.5	-10.2	0.6	0.6	0.8	-7.8
Rest of North and Latin America	-2.6	0.3	0.4	0.6	-14.0	-9.7	-1.3	1.7	1.3	-19.1	-5.0	1.2	0.6	4.0	-14.8
Brazil	-1.6	-0.7	0.2	0.2	-6.7	-7.4	-4.2	2.2	-7.7	-10.6	-9.7	0.8	0.3	0.3	-10.3
EU27	-2.6	0.3	0.5	0.8	-6.9	-8.7	0.5	1.4	3.1	-14.6	-6.0	0.6	0.7	0.6	-7.6
Rest of OECD	-2.9	0.2	0.3	1.5	-5.9	-9.1	0.4	0.9	4.8	-9.6	-4.9	0.4	0.5	1.3	-7.2
Western Asia	-7.3	0.4	-1.1	-0.2	-17.6	-13.9	0.5	-1.3	2.3	-32.9	-0.4	0.6	-1.1	-0.7	-16.4
Africa	-1.4	0.2	-0.2	0.8	-7.2	-6.3	0.1	1.1	3.9	-17.3	-24.8	0.8	-0.1	0.4	-7.6

Source: Simulations with MIRAGE.

4. Lessons Learned and the Way Forward

Food policies in South Asia evolve around careful balancing of consumer and producer interests. This chapter draws lessons from the varied experiences and policies adopted in the region in response to the food price crisis.[37] It also analyzes the food price situation as of mid-2009 and offers suggestions on how to improve South Asia's food security and minimize the probability of another food crisis hitting the region.

Lessons From Policy Reactions to the Food Crisis in South Asia

Most of the policies that South Asian governments adopted in response to food price inflation sought to dampen the negative effects on consumers. For obvious political economy reasons, South Asian governments put high emphasis on protecting consumers (many of whom were already poor) from food price increases. Supply-response policies and producer welfare considerations received much less attention.

The extent to which food price inflation affects consumer welfare depends importantly on the degree of price transmission. The degree of transmission of world market prices to domestic prices is at the heart of national food security policies throughout South Asia. To protect consumers, different countries have used different combinations of trade, price, and stock policies, often combining them with other forms of government intervention. Afghanistan and Nepal are the only two countries whose domestic prices are largely left to market forces; Afghanistan faced the highest food price increases in all of South Asia, even though Nepal was able to limit domestic food price inflation, due to its dependence on India and the latter's price stabilization policies.

The stark differences in price transmission, with India and Afghanistan at opposite ends of the price transmission spectrum, to a large extent reflect the following factors: the share of domestic consumption met by imports; fiscal and institutional/administrative capacity to manage public food stocks and social protection; supply response capacity; and other economic policies including trade policies and price policies. More analytical work is needed to understand the effectiveness and costs of the wide range of trade, price, and stock policies used by South Asian governments in managing price transmission.

Price controls alone have not been not very effective at limiting food price inflation. In an effort to control domestic price inflation, especially of rice, Sri Lanka

[37] Details of individual countries' experiences are in Annexes 1-6.

relied nearly exclusively on pricing measures, abolishing import tariffs and introducing controls on consumer prices. Such policies are relatively quick and easy to implement, but in Sri Lanka they could not prevent a 70 percent increase in the rice price between mid-2007 and mid-2008. Price controls negatively affect supply by creating perverse incentives to producers. In Pakistan, for example, attempts to control smuggling by placing temporary restrictions on private traders' movement of wheat between provinces prevented the flow of wheat from surplus to deficit areas and may have widened the price variations among provinces.

Liberal trade policies benefit consumers. This is most vividly illustrated by Bangladesh which is a net importer of rice even in an average production year. Adverse weather during the second half of 2007 more than tripled Bangladesh's rice import requirements compared to previous years. Private traders played a crucial role in satisfying these substantial needs and though domestic prices in Bangladesh were relatively high, due to India's export restrictions, they increased by substantially less than international rice prices. Pakistan's trade liberalization measures included removing a 10 percent import duty on wheat imports and liberalizing wheat imports by the private sector; both these measures are believed to have helped avoid even higher wheat price increases.

Efforts to curtail food exports rarely succeed, and they generate significant negative externalities. Several South Asian governments introduced restrictions (including export taxes, export bans) on exports of mainly staple foods in an attempt to safeguard domestic supplies and mitigate domestic price increases. These measures imposed substantial costs on countries that depend on these exports for part of their food supplies. This is vividly illustrated by the experience of Afghanistan, whose 2007-08 wheat prices reached unprecedented levels that were largely the result of Pakistan's export bans on wheat and wheat flour. In Bangladesh, part of the increase in domestic rice prices was explained by the rise in prices of rice imports from India, resulting from India's export restrictions.

Well designed and adequately funded social protection programs can play an important role in safeguarding consumer welfare. India has by far the most extensive safety net system in South Asia. The system consists of public distribution of essential food commodities, food-for-work programs, child development schemes, school meal programs, and a national rural employment guarantee scheme. Even though it is fiscally very expensive and considered wasteful by many observers, there can be little doubt that it played an important role in safeguarding food security and keeping food price inflation in India at bay. In Bangladesh, the government significantly expanded its already elaborate system of targeted food-based safety net programs and established a new rural employment guarantee program.

The importance of adequate targeting, coverage, and funding, in order for safety nets to significantly protect the welfare of poor consumers, is illustrated by the experience of India, Pakistan, and Sri Lanka. India's safety net programs, despite their large size and high fiscal costs, only partially cushioned the impact of food price rises because of

significant exclusion errors. Pakistan's safety net system is not very effective because it is fragmented, duplicative, and poorly targeted, while covering only about 13 percent of the total population (though the situation has recently improved somewhat as a result of the introduction of the Benazir Income Support Program). In Sri Lanka, social safety nets reach about 40 percent of households, but the two main programs carry relatively small benefits and suffer from overlap, poor targeting, and large exclusion errors. Nepal and Afghanistan do not have significant safety net systems and had to rely heavily on foreign donor assistance to deal with the food crisis. In both these countries the food crisis has renewed interest in such systems.

Public grain reserves have played an important role in dealing with the food crisis. India, Pakistan, and Bangladesh have a long tradition of public grain reserves intended to assist with emergency response capacity, price stabilization, and food-based safety net programs. Whereas public grain reserves tend to be surrounded by difficult issues of size, management, and fiscal costs, some countries in South Asia that did not have them expressed regret during the food crisis. For example, Afghanistan is now establishing a relatively modest public grain reserve consisting of 200,000 MT of wheat largely for emergency purposes. It is important for countries that are interested in establishing such reserves to learn from experiences in other countries in order to achieve an efficient as possible a management structure, minimize size and fiscal costs, and maximize sustainability.

Some observers have called for collective action on stocks, whereby individual countries would set aside some of their grain reserves as part of a new international coordinated global food reserve managed by a high-level technical committee.[38] Their main argument is that when individual countries try to rebuild their own public reserves independently from each other, the results are likely to be an inefficient global production system, an excessively large global reserve, and a further thinning of global grain markets. If prices spiked, the technical committee managing the proposed global food reserve would decide to release from stock; in this way the global reserve would serve as a price stabilization mechanism rather than as a general stabilization fund.

As a crisis prevention tool, supply-side measures have been relatively ignored in most South Asian countries but urgently need renewed attention if further food crises are to be avoided. Bangladesh was virtually the only South Asian country that combined consumer side policies with measures on the producer side in order to boost rice production and productivity. These measures mainly consisted of a 50 percent increase in the procurement price of rice and improved availability and timely delivery of inputs. The government in Afghanistan took a number of measures supported by donor agencies, including a wheat seed purchasing and distribution program and a subsidized input voucher scheme. By contrast, Pakistan and Sri Lanka limited their interventions to the consumer side, and in Nepal, government policies did little to deal

[38] For example, Von Braun and others (2009).

with the food crisis. In India, existing programs and policies made that country relatively shock-proof to the 2007-08 food crisis.

Since trade liberalization under SAFTA is unlikely to significantly reduce domestic food price variability, South Asia may want to explore new ways to achieve greater price stability. As shown in Chapter 3, SAFTA as currently constituted will have little impact on domestic food prices. Other possible ways for achieving greater price stability include the establishment of regional grain stocks on which countries could draw in emergency situations,[39] and the use of derivative markets for reducing price variability.

Current Situation

International food prices are currently high and there is now widespread agreement that the era of cheap food may well be over (table 4.1; Dewbre and others 2008). Despite the global economic crisis, FAO's food price index rose by 20 percent between December 2008 and December 2009. Most food prices are still near record highs and have started rising again after reaching two-year lows earlier in 2009. Compared to the past food prices are expected to remain higher and also to become more volatile. For example, even though wheat and maize prices in the world market have decreased from their highs in June-July of 2008, they both increased again (by about 17 percent) in the first half of 2009 and remain higher than four years ago. Rice is still much more expensive (in the order of 75-100 percent) than it has ever been over the past two decades. Soybean prices are up more than 50 percent from their December 2008 lows and sugar and oilseed prices also remain high.

Table 4.1. Index of projected real food crop prices, 2004=100

	2007	2008	2009	2010	2015
Real Prices					
Maize	138	182	197	194	148
Wheat	144	201	179	156	131
Rice	128	231	208	155	160
Soybeans	119	156	149	142	115
Soybean oil	136	187	173	160	110
Sugar	133	157	167	176	182

Source: World Bank Development Prospects Group.

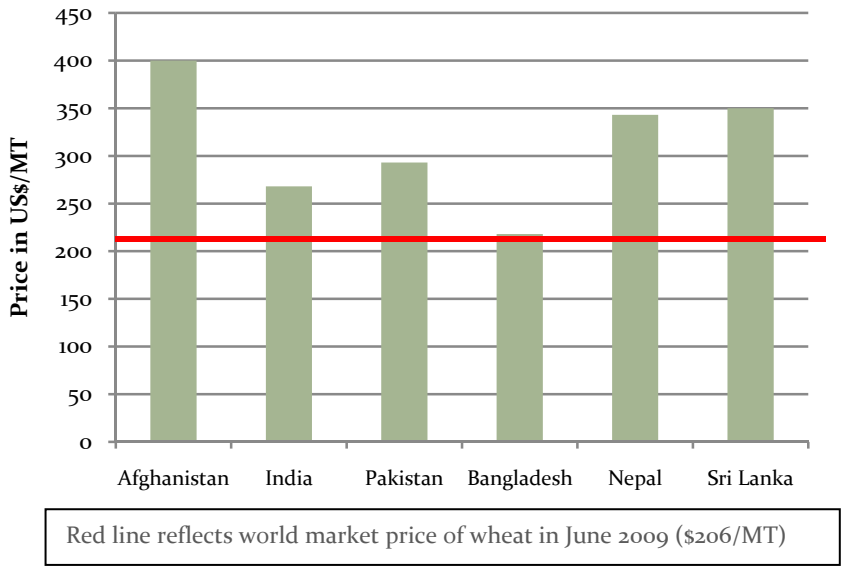
Domestic food prices remain high in most developing countries. For food consumers and producers, domestic market conditions are even more important than

[39] At the 15th SAARC Summit in Colombo a principle agreement was reached regarding the establishment of a Food Bank meant to act as a regional food security reserve for SAARC countries during food shortages and emergencies and solve regional food shortages through collective action. It would replace the earlier SAARC Food Security Reserve which was established in 1988. The earlier Food Security Reserve initiative largely failed due to its complicated processes and foreign exchange shortages prevailing throughout the region at the time. The Food Bank initiative foresees a regional food stock of limited size (242,000 MT of wheat and rice) even though there also has been talk about making it larger. Until now, however, the Food Bank has not yet been operationalized.

world market price developments. As of July 2009, food prices remain high throughout South Asia. FAO (2009) shows that domestic food prices in 78 percent of 58 developing countries surveyed remain significantly above their early 2008 levels.

Wheat is now more expensive in South Asia than in the world market. The June 2009 domestic price of wheat exceeds the world market price in all countries except Bangladesh (Figure 4.1). For India and Pakistan this is a reversal from the situation until mid-2008 (compare Figure 1.6 in Chapter 1). In India, the reversal is almost wholly due to the lowering of the international wheat price. In Pakistan, both the lower international price and the substantially higher domestic price (resulting from the very steep increase in the procurement price for the 2009 harvest, from about US$240/MT in 2007-08 to US$300/MT in 2008-09) play a role. Bangladesh keeps its domestic wheat price closest to the world market price. In Afghanistan, Sri Lanka, and Nepal (in that order) the differences between the domestic price of wheat and the world market price remain large, at 70 – 90 percent.

FIGURE 4.1. WHEAT: DOMESTIC PRICES VERSUS WORLD MARKET PRICE, JUNE 2009



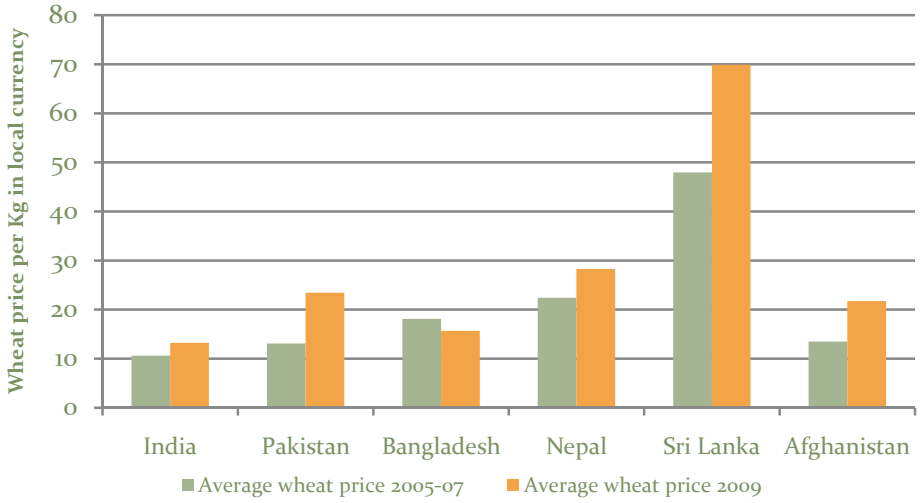
Source: Based on FAO data.

The domestic price of wheat is significantly higher now than before the food crisis. Domestic wheat prices (averages for first half of 2009) exceed their 2005-07 levels in all South Asian countries except Bangladesh (figure 4.2). The persistence of the high prices is what really concerns consumers, especially in Pakistan and Afghanistan where wheat is the main staple food.

Unlike for wheat, the domestic price of rice is kept below the world market price in all South Asian countries. All countries in South Asia since 2005 have consistently kept their domestic rice prices below the world market price (figure 4.3). The deviations from the world market price differ greatly by country: while Sri Lanka and Nepal keep their domestic rice price rather close to the world market price, rice is

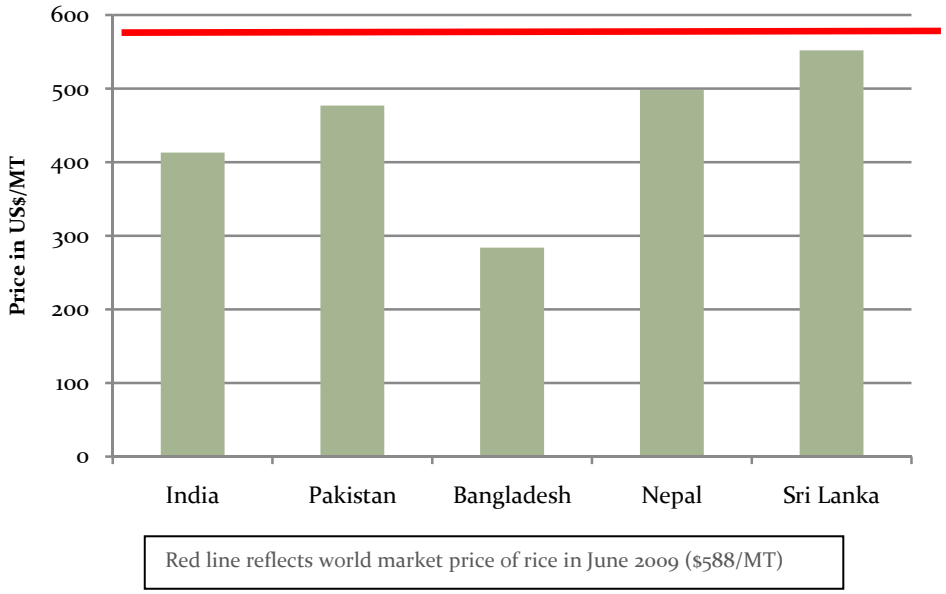
by far the cheapest in Bangladesh, at about half the cost in the world market. The price of rice in India in mid-2009 stood at about 30 percent below the world market price.

FIGURE 4.2. AVERAGE DOMESTIC WHEAT PRICES, 2005-07 VS. 2009



Source: Based on FAO data.

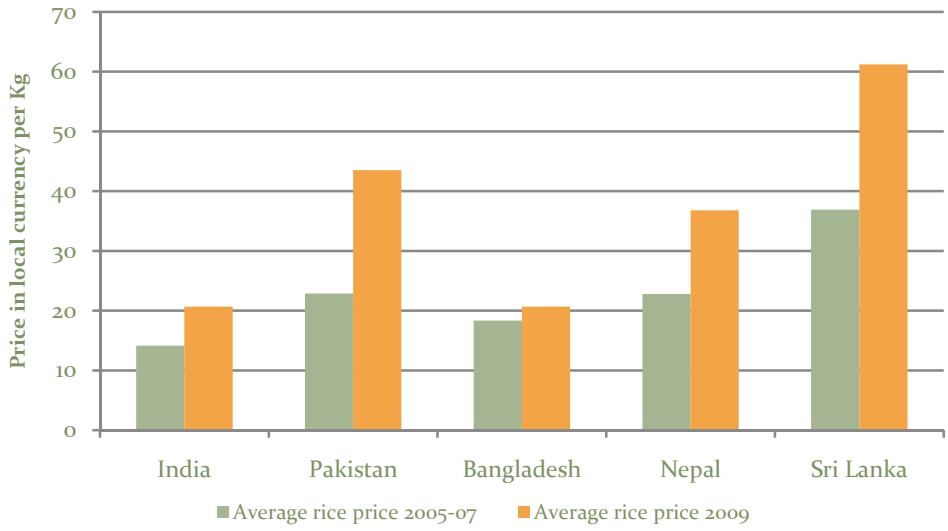
FIGURE 4.3. RICE: DOMESTIC PRICES VERSUS WORLD MARKET PRICE, JUNE 2009



Source: Based on FAO data.

The domestic price of rice, like that of wheat, is significantly higher than before the food crisis in all South Asian countries (figure 4.4). The differences are especially stark in Sri Lanka, Pakistan, and Nepal. Bangladesh and India have limited the increases in their domestic rice prices.

FIGURE 4.4. AVERAGE DOMESTIC RICE PRICES, 2005-07 VS. 2009



Source: Based on FAO data.

The long-term challenge to produce enough food to satisfy demand has not disappeared. Tension remains between uncertain supplies and flattening yield growth on the one hand, and rising demand, mainly fuelled by continuing population growth in developing countries, on the other hand. The International Grain Council (ICG) forecasts that global grain supplies will fall in the July 1 2009-June 30 2010 season to 1,721 million MT, down 3.4 percent from 1,782 million MT in 2008-09. The ICG also expects world grain production to fall short of demand in 2009-10, eroding some of the gains in stocks achieved after the bumper 2008-09 harvests.

Higher energy prices exert upward pressure on food prices. Energy prices are on an upward path again, pushing food prices up. This is because rising energy costs push up production and transport costs, and increase the demand for ethanol, which is starting to be competitive again.

Continuing demand increases will create further upward pressure on food prices. Demand for food in general and cereals in particular will continue to increase, for four main reasons. First is the cyclical effect of re-stocking. During 2000-08, cereal stocks greatly decreased as prices rose and now they need to be replenished. In 2006 and 2007, world cereal stocks fell below 450 million MT or about 20 percent of worldwide consumption. Stocks have since risen (by about 23 percent) to more than 520 million MT and can be expected to rise further, since many developing countries are interested in building up their stocks further as an emergency reserve, input into food-based safety net programs, and/or for price stabilization purposes. Second, the fall in the US dollar has made dollar-denominated food imports cheaper in terms of local currencies. Third, demand for food in general is being pushed up by continuing population and economic growth in developing countries. In South Asia, population growth rates remain high throughout the region (except in Sri Lanka) and ensure that consumption growth will continue in the foreseeable future. Food demand is also

stimulated by economic growth in the largest emerging markets, especially India and China. Finally, the wave of new cash transfer programs for the poor that were established and/or expanded in many countries after the food crisis acts as another demand stimulus.

Higher food prices are not unequivocally bad. The main problem with the 2007-08 food price rise was the suddenness with which prices reached unprecedented levels. Unregulated speculation and policy failures caused prices to rise to levels unjustified by economic fundamentals. As seen in Chapter 1, this, combined with the associated enormous market volatility, caused many observers to conclude that higher food prices are wholly undesirable. But higher prices benefit farmers who are net sellers of foodgrains, providing them with incentives to increase food production and thus potentially stimulating a supply response. Higher food prices may also stimulate innovative developments in the food aid system, in particular a shift from traditional food aid to food assistance through local food purchases combined with cash transfers and vouchers. Sustained higher food prices could also help the implementation of responsible international trade policies that benefit low-income countries, and help reform developed countries' agricultural support programs in a way that may remove the remaining barriers to progress on the WTO Doha trade negotiations.[40]

A Two-track Approach

Going forward, reconciling the interests of consumers and producers will require continuing increases in food production: this seems the only way to keep consumer prices low while simultaneously providing adequate farmer incomes. There is increasing consensus that to deal with higher food prices requires a two-track approach. Increased investments in safety nets to protect the poor (safety nets tend to be better targeted than economy-wide policies) need to be combined with investments in stimulating broad-based agricultural productivity growth, giving major emphasis to food staples (FAO 2009).[41]

To increase production requires boosting farm productivity. Future increases in agricultural production in South Asia will need to come largely from higher yields, given that land is becoming increasingly scarce and most productive land is already under cultivation. Raising agricultural productivity has become even more important

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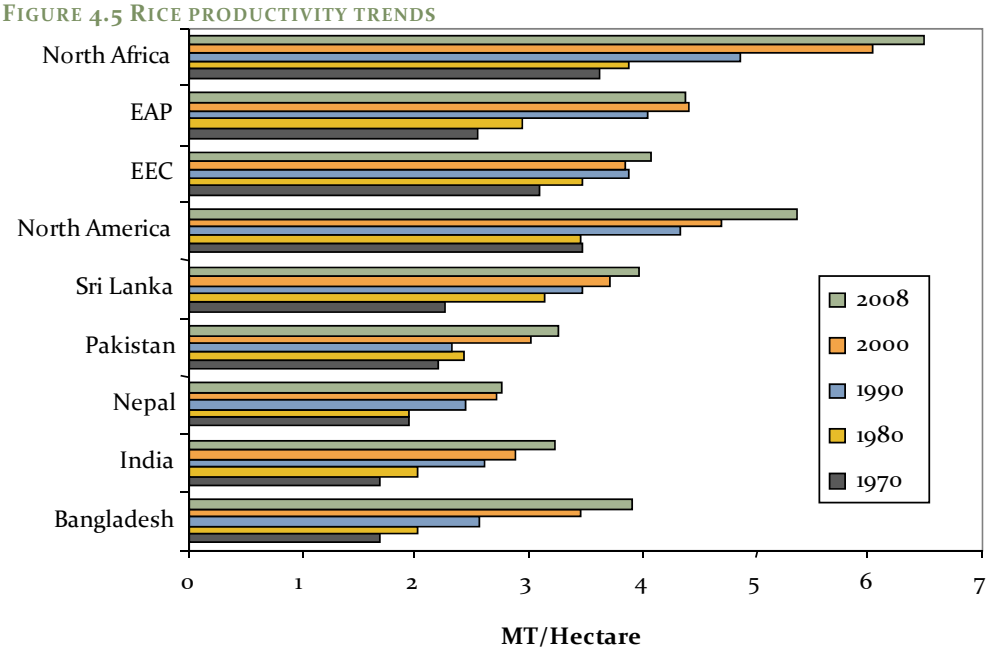
40 The centerpiece of the Doha trade round is freer trade in farm goods, which would benefit developing countries disproportionately because the distorted economic signals that subsidies and protectionist tariff and non-tariff measures provide would be taken away. Since the round was launched in 2001, well before the commodities boom, its main emphasis was on government policies that kept prices artificially low (mainly production and export subsidies in rich countries). Then, as of late 2007, the main concern became policies that contributed to the food crisis: unilateral export bans, subsidies for consumers, and the pursuit of biofuels. Now that most prices have eased, food security concerns in the Doha talks have subsided somewhat. On the other hand there is also a fear that the EU and the US could revert back to subsidies and other forms of support for their own farmers.

41 See Wodon and Zaman (2009) for a discussion of similar issues in Africa.

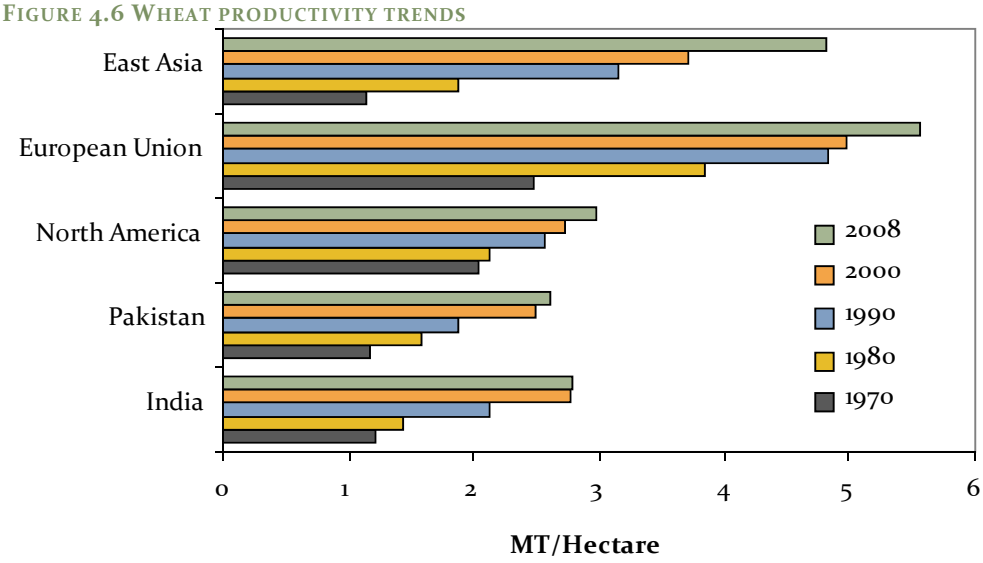
now that world prices of energy and fertilizer are expected to remain substantially higher than before. The only sustainable way to reconcile higher input costs and farmers' incentives with low and stable consumer prices of wheat and rice is to raise farm productivity. In bio-physical terms, crop yield increases would seem entirely feasible: in rice, South Asia's productivity gap is 30-50 percent with Southeast and East Asia (EAP) (figure 4.5), and in wheat it is 50 percent with East Asia and 70 percent with the EEC (figure 4.6).

FIGURE 4.5 RICE PRODUCTIVITY TRENDS



Source: Ahmed (2010).

FIGURE 4.6 WHEAT PRODUCTIVITY TRENDS



Source: Ahmed (2010).

Evidence is limited, thus far, regarding the impact of higher food prices on agricultural yields. Higher output prices should be conducive to productivity increases. But there is only limited evidence that higher food prices have led to significant yield increases across substantial growing areas in South Asia; despite the occasional exception,[42] production increases in the 2008-09 season stemmed mostly from area expansion. On a worldwide scale, by far the largest share of that season's increase in cereal output came from developed countries, whose combined harvests increased by 11 percent (as opposed to a mere 1 percent in developing countries) mostly because of area expansion.[43]

Raising agricultural productivity in South Asia requires a combination of technical interventions and socioeconomic policies and measures. A wealth of "on-the-shelf" technologies could be readily applied using successful models of agricultural extension and education. These technologies involve improvements in land preparation, seed varieties and seed placement, pest management, soil health and nutrient management, efficient use of irrigation water, and post-harvest management.

Socioeconomic and policy considerations are at least as important. First, policymakers should ensure that the global economic crisis does not jeopardize public investment in the agricultural research and rural infrastructure that are needed for increased production and productivity. Second, government policies must allow price incentives to reach farmers. And third, many farmers in South Asia are constrained in their capacity to respond to price changes, because they cannot find quality inputs at accessible prices and because they lack suitable marketing opportunities. Public investment in rural infrastructure is required to boost farmers' response capacity. Higher food crop prices provide an opportunity to policymakers to re-examine the complex system of input-output pricing interventions, with the goal of reducing spending on input subsidies in favor of investing in infrastructure to help raise farm productivity (irrigation, rural roads, electricity) as well as improving social protection measures. Improving access to land, a contentious issue throughout South Asia, also holds potential for increasing agricultural productivity.[44]

South Asia should seize the moment to increase its agricultural productivity. Agriculture remains crucial to economic growth and poverty reduction in South Asia. Most of the region's poor live in rural areas and a large proportion of rural people remain poor. Moreover, between 35 and 50 percent of the labor force in South Asian

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[42] For example, the record wheat harvest obtained in Afghanistan in 2009 was mostly due to yield increases, but yields in 2008 were exceptionally low.

[43] For example, the European Union shelved a program that had obliged farmers to leave 10 percent of their land fallow.

[44] A recent analysis by De Janvry and Sadoulet (2009), using household data for India, illustrates the importance of promoting access to even tiny plots of land for landless rural households and maximizing the productivity of these plots in order to enable their cultivators to satisfy more of their own food needs.

countries still works in agriculture.[45] Recently, agricultural development has received renewed attention from governments and donors. Improving agricultural productivity in general and that of food crops in particular should receive top priority.

To help policymakers decide on expenditure priorities, it is important to do more research on what changes should be made in public budgets (e.g. lowering subsidies and raising expenditure on infrastructure) in order to evoke the required supply response while still leaving enough resources for appropriately scaled safety nets.

[45] Employment shares range from 35 percent in Sri Lanka to 50 percent in Bangladesh.

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Appendix 1: Afghanistan

Among all South Asian countries, the food price crisis probably hit hardest in Afghanistan, one of the poorest countries in the region and indeed the world. Per capita income is US$426 per year (FY2008-09) and an estimated 36 percent of the population is classified as poor with another 20 percent living just above the poverty line. According to the 2005 National Risk and Vulnerability Assessment (NRVA) conducted by the Ministry of Rural Rehabilitation and Development (MRRD) and the Central Statistical Office (CSO), even before the food crisis about 30 percent of all Afghan households were unable to meet their minimum daily caloric intake requirements, and 46 percent had an insufficiently diverse diet. These percentages likely increased significantly during the food crisis. Since wheat is the major staple food in Afghanistan (accounting for about 70 percent of total cereal consumption and 50 percent of total caloric intake) and was most severely affected by the food crisis, the analysis in this Appendix mostly focuses on wheat.[46]

Afghanistan is a cereal deficit country. Cereal supply in Afghanistan is usually unable to meet cereal demand even in good harvesting years (Table A1.1). Average wheat production during the five-year period between 2003 and 2007 amounted to 3.7 million MT but ranged from 2.3 million MT in 2004 to 4.3 million MT in 2007. Combined with other cereals (i.e. rice, maize, and barley) total average cereal production was 4.7 million MT but with a range between 3.1 million MT (2004) and 5.4 million MT (2007). The average self-sufficiency rate in cereals during 2003-07 was about 80 percent but varied widely over time, from 53 percent in 2004 to 89 percent in 2005.

Domestic production of cereals in Afghanistan is very sensitive to weather conditions. Agricultural production in Afghanistan is highly dependent on rain and snowfall. Approximately 45 percent of Afghanistan's wheat area in a normal year is irrigated, while the remaining 55 percent depends entirely on rainfall. The timing and quantity of the annual snowmelt is a key factor in determining the quantity and duration of water availability for irrigation throughout the cultivated areas of Afghanistan. Productivity of wheat differs significantly between irrigated and rain-fed areas. Average wheat yield (without fertilizers) on irrigated land is about 2.7 MT/ha (3.5 MT/ha with fertilizer) versus only 1.1 MT/ha on rain-fed land.

[46] Wheat is by far the most important cereal crop in Afghanistan, accounting for about 80 percent of total cereal production in most years. The remaining 20 percent is made up by rice, maize, and barley.

Table A1. 1 Supply-demand balance of cereals in Afghanistan ('000 MT)

	2003	2004	2005	2006	2007	03-07 Avg.	2008
Irrigated wheat	3,017	1,867	2,728	2,604	2,878	2,619	-
Rain-fed wheat	1,345	426	1,538	759	1,465	1,135	-
Total wheat production	4,362	2,293	4,266	3,363	4,343	3,725	2,767
Milled rice	291	310	325	361	370	331	-
Maize	310	234	315	359	360	316	-
Barley	410	220	337	364	370	340	-
Total cereal production	5,373	3,057	5,243	4,447	5,443	4,713	3,860
Total demand	5,572	5,717	5,866	6,018	6,175	6,335	6,500
Demand-supply gap	199	2,660	623	1,571	732	1,594	2,640
Self-sufficiency rate (%)	96	53	89	74	88	75	59

Source: Agriculture Prospects Report, Ministry of Agriculture, Irrigation and Livestock (MAIL) May 2009; World Bank; and own calculations.

The 2008 domestic wheat harvest was particularly poor. The main reason was widespread drought, in particular a lack of rainfall in the rain-fed areas in the northern and western parts of the country; exacerbated by below-normal snowfall and earlier-than-normal melting of snow, both of which adversely affected the timing of water availability in irrigated areas. Compared to the previous year, wheat production in 2008 declined by nearly 40 percent to about 2.8 million MT (Table A1.2). As a result, total cereal production in 2008 was about 3.9 million MT, meeting only 59 percent of total cereal demand.

Table A1. 2 Area, production, and yield of wheat, 2007-08

			Irrigated	Rain-fed	All wheat
2007	Area	'000 ha	1,071	1,395	2,466
	Yield	MT/ha	2.69	1.05	1.76
	Production	'000 MT	2,878	1,465	4,343
2008	Area	'000 ha	994	1,149	2,143
	Yield	MT/ha	2.37	0.35	1.29
	Production	'000 MT	2,360	407	2,767
% change	Area		-7	-18	-13
	Yield		-12	-67	-27
	Production		-18	-72	-36

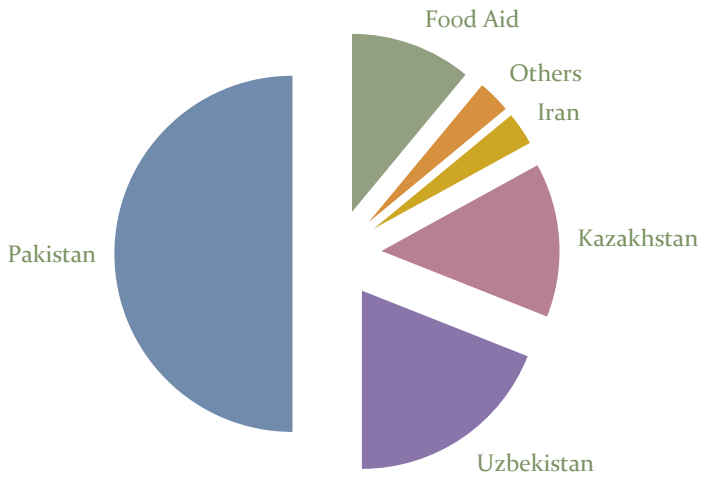
Source: Ministry of Agriculture, Irrigation and Livestock (MAIL).

Afghanistan traditionally depends on imports from neighboring countries for part of its food security. Once self-sufficient in cereals and in some years a small exporter, Afghanistan now imports wheat virtually every year. These imports consist nearly entirely of private imports (legal or illegal) from neighboring countries supplemented by food aid shipments. The import share of domestic wheat consumption has varied between 11 and 47 percent over the past five years and correlates nearly perfectly with droughts. The latter now seem to hit in a regular sequence virtually every other year (e.g. 2002, 2004, 2006, 2008).[47] Most wheat-producing households are net buyers of wheat, having food self-sufficiency for only a few months of the year. In 2007,

[47] But not in 2009 and 2010.

total wheat imports into Afghanistan amounted to about 1 million MT (including food aid). Pakistan supplied 50 percent of the total, followed by Uzbekistan (20 percent) and Kazakhstan (15 percent) (Figure A1.1).

FIGURE A1.1 AFGHANISTAN IMPORTS OF WHEAT AND WHEAT FLOUR, 2007



Source: Northern Wheat Trader Survey and Afghan Food Security, FEWS NET, August 2007.

The demand-supply gap of wheat in 2008 was largely filled by imports. The total requirement for cereals in Afghanistan is about 6 million MT. But in 2008 Afghanistan produced only about 4 million MT (including 2.8 million MT of wheat). Average wheat consumption in Afghanistan is 0.48 kg/capita/day (nearly three times as much as the world's average) implying a requirement of about 5 million MT per year (based on an assumed population of 28.5 million[48]), leaving a gap of 2.2 million MT of wheat in 2008. In 2008, the World Food Program distributed 0.28 million MT of wheat and the government (through private companies) imported 70,000 MT from Kazakhstan and also received 50,000 MT from Pakistan under a government-to-government deal. This implies that about 1.8 million MT (80 percent of the wheat deficit) were imported by the private sector, which therefore played a crucial role in stabilizing market supplies.[49] This was despite the fact that in 2008 legal private sector imports from Pakistan had dried up following Pakistan's export ban on wheat introduced in February 2008. Also, Pakistan

[48] Since the latest population census in Afghanistan dates from 1979, no official figures regarding the current population are available. But the consensus is that the current population is between 28 and 29 million.

[49] It can be argued that private wheat imports helped stabilize prices as well since there is evidence that wheat delivered through food aid is at least US$125/MT more expensive than wheat supplied through private markets. See World Bank (2005a).

had tightened border controls in an attempt to contain smuggling. Iran and Kazakhstan also imposed export bans on wheat.

Even though private sector wheat imports filled the demand-supply gap, the food security of many households was seriously compromised. While private imports (mostly illegal imports from Pakistan) more or less safeguarded food security from a national perspective in quantity terms, there are two important caveats. First, national estimates assume uniform distribution of wheat within Afghanistan, but the reality is quite different. While there are some areas with a wheat surplus, most areas are wheat-deficit and transport within the country is costly and sometimes even impossible. Second, even if there had been no shortfall of wheat, prices increased to levels at which many people could no longer afford to buy the necessary quantities.

The poor domestic harvest in 2008 was the primary reason for the sharp increases in wheat prices. The poor 2008 domestic wheat crop, in combination with large global food price increases[50] and export restrictions (in particular Pakistan's ban on private exports of wheat and wheat flour) led to unprecedented inflation in Afghanistan. On a year-to-year basis the index of consumer prices in Kabul increased by 33 percent in June 2008 (Figure A1.2) and 52 percent in August 2008. Inflation was mainly driven by food price increases: the increase in the domestic food price index (year-to-year) was 49 percent in June 2008 and 76 percent in August 2008. Among food items, year-to-year prices of bread and cereals increased by 92 percent in June 2008 and 145 percent in August 2008. Although the increase in food prices was a nationwide phenomenon, the magnitude of the increase differed across Afghanistan, mainly as a function of accessibility[51], local supplies (i.e. whether a region had a surplus or a deficit in wheat) and transport and other transaction costs. For example, in Kabul, wheat prices increased by 193 percent from Afs 13.3 (US$0.26)/kg in May 2007 to Afs 39.0 (US$0.79)/kg in May 2008. In Mazar (northern part of Afghanistan) wheat prices increased by 259 percent to Afs 35.5/kg. At the national level the wheat price increase was nearly 160 percent (Table A1.3).

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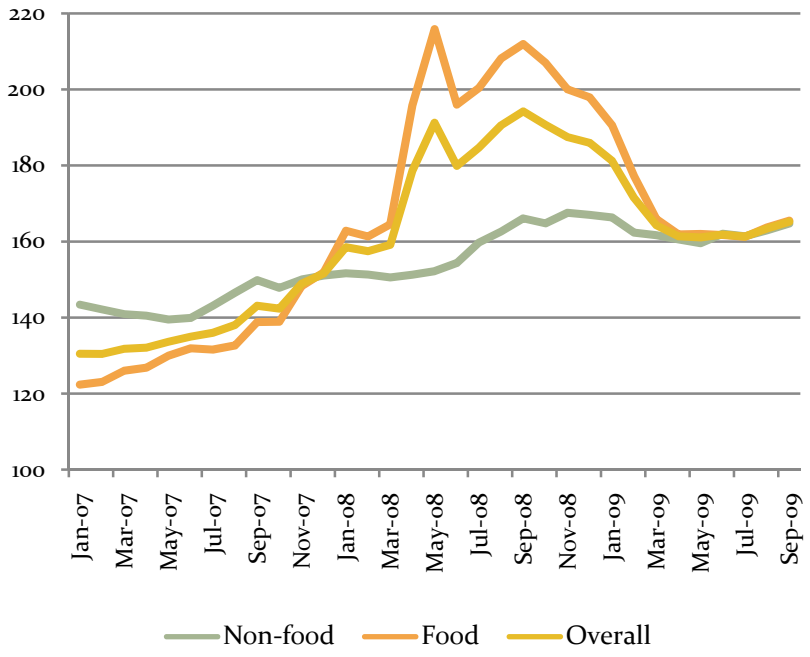
[50] International price increases translated directly into food price increases in Afghanistan, given the latter's free market and dependence on imports to meet a significant part of total domestic consumption.

[51] Difficult mountainous topography, poor roads in many parts of the country, and the seasonal isolation of remote areas that are snow-bound in the winter make for substantial interregional price differences. Regional markets for wheat are often better integrated with markets in bordering countries (especially Pakistan) than with other markets in Afghanistan.

FIGURE A1. 2 MONTHLY CONSUMER PRICE INDICES



Source: Based on data from Ministry of Agriculture, Irrigation and Livestock (MAIL).

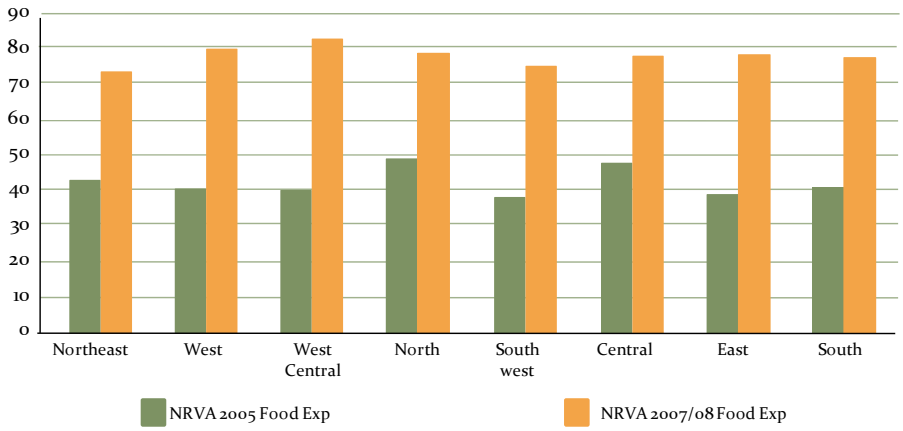
TABLE A1. 3 WHEAT PRICES BY REGION

Region	Prices (Afs/kg)		% Change from May 2007
	May 07	May 08	
Kabul	13.3	39.0	193%
Kandahar	12.0	35.8	198%
Jalalabad	11.2	35.8	221%
Herat	11.7	34.0	190%
Mazar	9.9	35.5	259%
Faizabad	17.3	44.4	157%

Source: World Food Program (Kabul office)

The share of food in total household expenditure increased by more than 50 percent during the food crisis. Before the food crisis the average Afghan household spent 40 to 50 percent of its income on food. Based on the 2007-08 National Risk and Vulnerability Assessment (NRVA) this percentage increased dramatically to above 70 in 2007-08 (figure A1.3).

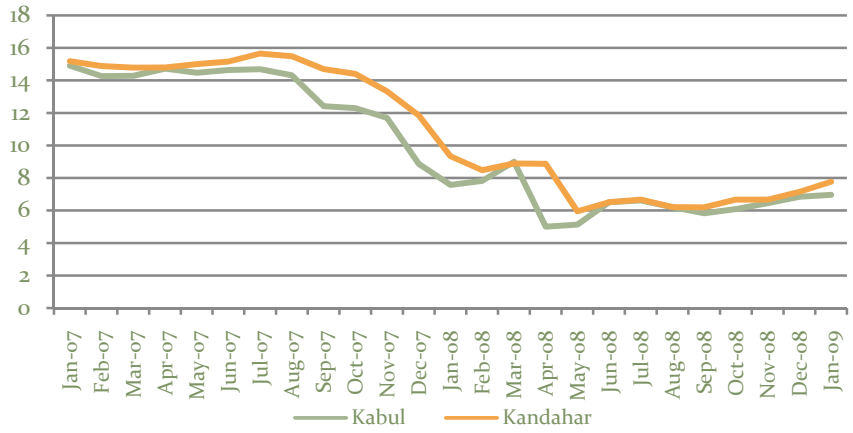
FIGURE A1. 3 SHARE OF FOOD IN TOTAL HOUSEHOLD EXPENDITURE, BY REGION



Source: Afghanistan Food Monitoring Bulletin, various issues.

The rise in food prices particularly hurt the poor. The increase in food prices had a significant negative impact on the poor and other vulnerable people. Purchasing power, as measured by the ratio between the daily wage rate of unskilled labor and the price of wheat, substantially declined due to a combination of significant wheat price increases and virtually stagnant nominal wage rates (figure A1.4). In Kabul, the daily wage of unskilled labor was enough to purchase 15 kg of wheat in January 2007, but barely enough to purchase 5 kg in May 2008.

FIGURE A1. 4 DECLINE IN PURCHASING POWER (RATIO OF DAILY WAGE FOR UNSKILLED LABOR AND WHEAT PRICE PER KG)



Source: Based on data from Ministry of Agriculture, Livestock, and Irrigation (MAIL).

The government reacted to the steep rise in food price inflation by facilitating imports and trying to stimulate a supply response. First, to lower the costs of wheat and wheat flour imports, the government lowered the import tariff on wheat and wheat flour from 2.5 percent to zero percent in February 2008. However, the impact of this measure was limited in view of the export bans

imposed by neighboring countries (e.g. Pakistan) and the low tariff level to begin with. Second, the government of Afghanistan managed to secure 50,000 MT of wheat from the government of Pakistan despite that country's ban on exports of wheat and wheat flour. Third, in cooperation with FAO, the Ministry of Agriculture, Irrigation, and Livestock (MAIL) in May 2008 started designing an emergency program (Government of Afghanistan 2009a). The main thrust of the program is to improve agricultural productivity and facilitate an agricultural supply response. To achieve these objectives a number of specific measures were undertaken as discussed below.

The government, in cooperation with FAO, embarked on a substantial wheat seed purchasing and distribution scheme. Use of improved seeds could potentially increase yields of irrigated wheat by about 1 MT/ha, and adequate fertilizer use may add another 0.5 MT. FAO estimates the total requirement of wheat seed in the country at 100,000 MT. In 2008, in cooperation with FAO, a total quantity of 10,000 MT of improved seed (certified and quality-declared) was produced by contract growers and purchased by private seed firms for distribution to farmers for the 2009 crop. This quantity increased to about 16,000 MT in 2009 for the 2010 wheat harvest.

The government in cooperation with donors established a substantial input voucher scheme. USAID and DFID are funding a program called Afghanistan Vouchers for Increased Production in Agriculture (AVIPA). The program is assisting approximately 200,000[52] drought-affected farmers in a number of priority provinces selected by MAIL. It is mostly limited to the Northern and Western provinces[53] because the prevailing security situation does not allow its extension to the Southern part of the country. Under the program farmers in targeted areas purchase a menu-type voucher which they can use to obtain agricultural inputs (seeds, tools, fertilizer, etc). The vouchers represent a value of US$165 each including a mandatory 10 percent own contribution (90 percent subsidy). Inputs purchased with vouchers are provided through private agricultural input dealers. The AVIPA program is continuing but at decreased subsidy rates.

The government has taken the first steps towards the establishment of a strategic grain reserve (SGR). With the help of technical assistance provided by FAO, the government is planning to establish a strategic grain reserve for emergency purposes. The planned size of the reserve is 200,000 MT. A proposal has been developed for the Japan Social Development Fund to

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[52] Even though the current size of the voucher program is able to serve about 200,000 farmers, according to MAIL there exists a need to serve an estimated 800,000 additional farmers.

[53] These provinces include Kabul, Balkh, Khost, Ghor, Kunduz, Sari-Pul, and Faryab.

rehabilitate existing storage facilities, construct limited new capacity, and develop options for an appropriate management structure of the SGR.

The desire to have a strategic grain reserve is understandable but the scope and size of the reserve should be limited. The key objectives should be to provide emergency food support for vulnerable households in case of man-made and/or natural calamities (i.e. helping to overcome transitory food insecurity) and to assist particular groups of households who cannot achieve food security even in times of good harvests. In addition, the SGR may play a role in smoothing regional food imbalances in areas that are seasonally inaccessible. The government should not let the size of the SGR exceed 200,000 MT since excessive public grain stocks could discourage the private sector import trade that traditionally has successfully augmented domestic wheat supplies in Afghanistan.

The government should pay careful attention to the management of the SGR. Rather than creating a potentially expensive and inefficient public grain procurement and distribution system, the government may want to rely on the private sector instead, for both procurement and distribution of wheat. Private sector efforts may be complemented by wheat distribution under the auspices of WFP since the latter would presumably concentrate its efforts on reaching geographical areas that are not of interest to the private sector. At times when public wheat imports would be required to meet national food security needs, part of these imports could also be channeled through WFP while auctioning off the remainder to the private sector. The latter would subsequently inject these imports into the domestic supply system, under a carefully designed public regulatory and monitoring system. It is important that the government maintain adequate incentives for private commercial imports of wheat.

The fiscal impacts of the SGR should be minimized. The burden of the SGR on the state budget should be kept to a minimum. Therefore government-owned wheat should be disposed of at prices as near as possible to prevailing market prices. In case the government opts to subsidize (part of) its wheat sales, the latter should be clearly targeted to the neediest populations. Before the SGR is established, a set of clear guidelines regarding pricing and targeting policies will be required.

Afghanistan does not have an operational safety net system. Protection of poor and vulnerable households during the food crisis and in case of future shocks is compromised by the virtual lack of an effective safety net system.[54] The government has expressed interest in developing a basic safety net system

[54] The exceptions are two relatively small pension programs for public sector employees and minimal cash benefits for disabled people and survivors of martyrs.

adapted to its fiscal and administrative capacity and based primarily on a (conditional or unconditional) cash transfer program.

In the absence of a substantial safety net system, WFP and other donors played an important role during the food crisis. Well before the onset of the 2007-08 food crisis, WFP already had a food-for-work program in place, serving nearly 3 million people. As part of its regular program in Afghanistan and in cooperation with the government, non-government partners, and communities, each year WFP pre-positions approximately 25,000 MT of wheat in 75 snowbound districts. These programs were substantially scaled up during the food crisis and WFP also played a major role in acquiring and distributing imported wheat to areas that suffered most from the poor 2008 wheat harvest. In 2008 WFP distributed a total of 280,000 MT of wheat to cover the needs of 7-8 million people during the three most critical months. In addition to WFP, the European Commission's Humanitarian Aid Office and USDA also had food aid programs.

Following the disastrous 2008 harvest, Afghanistan harvested a bumper wheat crop in 2009. At 5.06 million MT, the 2009 harvest was nearly double the 2008 harvest and enough to satisfy at least 95 percent of the domestic wheat demand of 5.3 million MT (Government of Afghanistan 2009b). The 2009 bumper wheat crop is mainly attributed to good rainfall (56 percent of the total wheat area of 2.56 million ha is rain-fed) but also to the donor-supported input voucher program. MAIL estimates that about one-quarter of the total increase in wheat production can be attributed to increased area under cultivation (which went up by 420,000 ha over 2008) and three-quarters to higher yields. Unlike the record wheat import requirements of 2008, Afghanistan imported less than 250,000 MT in 2009.[55]

Starting in the last quarter of 2008, wheat has become increasingly cheaper in Afghanistan, The price of wheat in Afghanistan started decreasing from September 2008 onwards, dropping from a high of up to US$700/MT in August 2008 to about US$330/MT a year later. Between October 2008 and April 2009 this trend largely reflected decreasing wheat prices in the global wheat market. As of May 2009 the continuing decreasing trend is more a reflection of the excellent domestic wheat harvest.

The domestic food price index has also significantly decreased. After an unprecedented rise of more than 75 points between July 2007 and July 2008 (from 134 to 210, or an increase of 57 percent), the national food price index decreased by 49 points between July 2008 and June 2009. However, the decrease was almost wholly due to the steep decreases in the prices of "bread

[55] In this context it should be kept in mind that (1) certain regions may always receive imports because of their geographical proximity to wheat exporters; (2) significant regional imbalances in both wheat production and consumption remain.

and cereals" and (to a lesser extent) "oils and fats." The price indices of most other food categories increased (Table A1.4).

TABLE A1. 4 CHANGES IN CONSUMER PRICE INDICES* OF DIFFERENT FOOD CATEGORIES

Food category	July 2007 - July 2008	July 2008 – June 2009
General food price index	+ 76.4	- 49.4
Breads and cereals index	+ 144.8	- 106.5
Meat index	+ 1.5	+ 5.7
Dairy products index	+ 17.8	+ 2.8
Oils and fats index	+ 43.1	- 46.1
Fruits index	+ 10.8	+ 17.7
Vegetables index	+ 40.6	- 6.6
Sugar index	- 0.7	+ 16.2
Spices index	+ 12.7	+ 18.6
Beverages index	+ 14.5	+ 7.4

* Indices are based on March 2004 = 100.

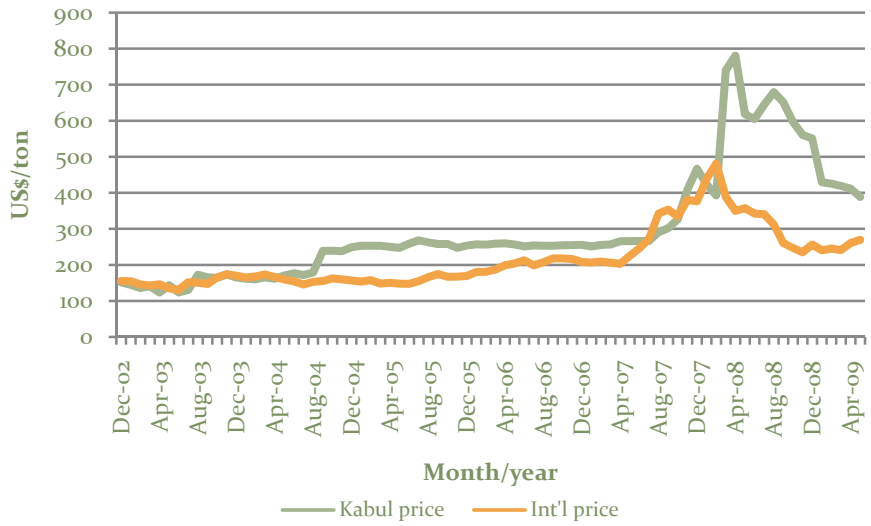
Source: Own calculations based on data in various issues of the Agricultural Commodity Prices Bulletin published by MAIL.

The steep decrease in the price of wheat has improved food security. The average wage of an agricultural laborer in Afghanistan increased from Afs 198/day in August 2008 to Afs 227/day in August 2009. This implies that on average a day of labor now enables an agricultural worker to purchase 13.6 kg of wheat, as opposed to only 6.4 kg one year earlier.

But wheat in Afghanistan remains relatively expensive. Retail wheat prices in Kabul were rather stable at US$250-260/kg until mid-2007 but exceeded international prices (for US No.2, hard red) by 20-70 percent, depending on international prices (Figure A1.5). In August 2009, at US$332/MT the average price of wheat in Afghanistan still exceeds the world market price by about 45 percent. Wheat also remains more expensive in Afghanistan than in most other South Asian countries (Figure A1.6); for example, wheat in Pakistan, where per capita GDP is twice that of Afghanistan, is usually 20-30 percent cheaper than in Afghanistan (Figure A1.7). Finally and perhaps most importantly, the average domestic wheat price in Afghanistan during 2009 (Afs 21.75/kg) is still more than 60 percent higher than the average domestic wheat price during 2005-07 (Afs 13.50/kg).[56] Whereas these price differences and variations can be attributed to a number of factors (transport costs, trade policies, conflict,) they probably would be more subdued if Afghanistan's own domestic wheat production were higher and more stable.

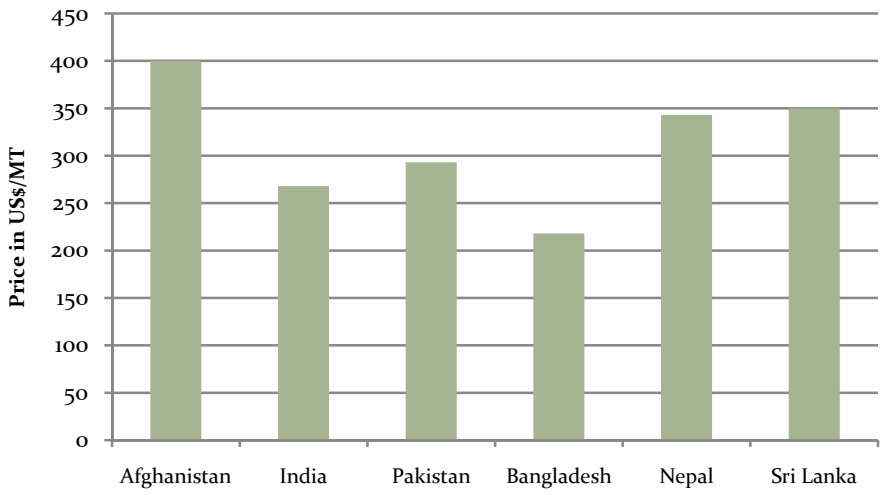
[56] Average wheat prices had decreased further to about Afs 15/kg by the Spring of 2010.

FIGURE A1. 5 WHEAT PRICES IN AFGHANISTAN AND WORLD MARKET



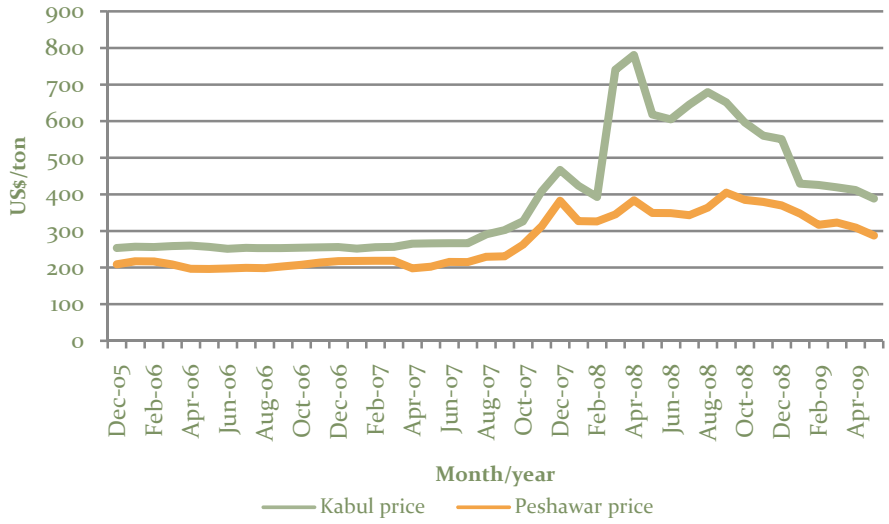
Source: Based on data from WFP Afghanistan, International Grains Council, and USDA.

FIGURE A1. 6 DOMESTIC PRICES OF WHEAT IN SOUTH ASIAN COUNTRIES, JUNE 2009



Source: Based on FAO data.

FIGURE A1. 7 WHEAT PRICES IN KABUL AND PESHAWAR



Source: Pakistan Bureau of Statistics (http://www.statpak.gov.pk) and FAO data.

To reconcile the twin objectives of consumer access to wheat at accessible prices and attractive economic returns to farmers, productivity increases in wheat are needed. Sustainable reductions in the retail prices of wheat and wheat flour can be achieved only by lowering the unit production costs of wheat. The obvious way to lower costs would be through yield increases, which in turn would require greater use of improved inputs (especially wheat seed and fertilizer) and better water management. Since the price elasticity of demand for wheat in Afghanistan is likely to be below unity, increased production resulting from higher yields would also benefit farmers' incomes.

There exists plenty of unused potential to improve wheat yields in Afghanistan. Current average wheat yields in Afghanistan are below 2 MT/ha (about 3 MT/ha on irrigated land and 1-1.5 MT/ha on rain-fed land) but yields in a particular year greatly depend on weather conditions. There exists ample scope for productivity increases through improved production technologies and crop management practices. In this context the government's ongoing efforts to provide farmers with improved wheat seed and fertilizer should be applauded. But achieving sustainable productivity increases for the medium and longer term cannot depend on handouts and/or subsidies from the government and donors. Rather, deliberate efforts and substantial new investments are required to strengthen the agricultural production base in Afghanistan, including improvements in input supply delivery systems and water use efficiency.

Irrigation rehabilitation is a key element in increasing agricultural productivity and improving food security. Because of the arid climate in Afghanistan, wheat yields in irrigated areas are up to three times higher than in rain-fed areas. Given this large differential the government assigns high

priority to the rehabilitation of irrigation schemes. As a result of the prolonged conflict, damaging floods, and neglected maintenance, Afghanistan's irrigation infrastructure is in a serious state of disrepair. Irrigation schemes are operating at about 25 percent efficiency, compared to the norm of 40 to 60 percent in South Asia, and cover only about one-half of the pre-conflict area. River diversion structures feeding the canals are dysfunctional or of a temporary nature, and canal networks are damaged and partly or wholly dysfunctional. About 60 to 70 percent of *karezes*[57] are damaged and out of use (Jansen and Qamar 2009).

In irrigation, rehabilitation has quicker and higher economic returns than extension. Rehabilitation is the quickest and most cost-effective means of restoring irrigation supplies to areas that used to receive water before but are currently out of command because of the dilapidated state of the system. Rehabilitation also improves the reliability of supplies to areas that currently do receive water. Irrigation extension is crucial for the long run but is relatively much more expensive, has longer gestation periods, and involves social, environmental, and trans-boundary water issues, since Afghanistan shares most of its rivers with neighboring countries. Recognizing that rehabilitation represents the "low-hanging fruit" in the present context, the government has appropriately assigned high priority to rehabilitating the traditional irrigation systems that constitute 90 percent of the irrigation system in the country. For irrigation expansion, closed river basins offer a good opportunity for investments in small dams and related water distribution systems without being hindered by trans-boundary water issues.

The remaining needs for irrigation rehabilitation are still large. Despite its significant achievements up to now, Afghanistan still has large needs for irrigation rehabilitation. The total irrigated area in the country prior to 1979 (pre-conflict) was about 3.2 million ha but in 2007 (a year in which water availability was good) it was only 1.8 million ha. Of this irrigated area, so far only about 0.6 million ha has been rehabilitated. More than one million ha of existing irrigated area remain to be rehabilitated. If the pre-conflict irrigated area is taken into account the rehabilitation needs are even larger. Furthermore, the rehabilitation investments undertaken so far have focused on the upstream ends of the irrigation systems (intakes, main canals, flood protection, etc) while the downstream ends of the systems closer to the end-users and on-farm have yet to be rehabilitated. Dove-tailing downstream and on-farm investments with the upper-end rehabilitation already carried out would yield major synergies and agricultural and economic benefits.

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[57] *Karezes* are traditional underground water channels that tap subsurface water streams in foothills. These channels connect with surface water channels that irrigate the command area.

Appendix 2: Bangladesh

In Bangladesh, rice is the main staple food and about 50 percent of all households are involved in rice production. Food security is to a large extent associated with rice consumption and production. Therefore this Appendix focuses on rice.

Bangladesh managed to avoid shortages of rice during the food crisis but price increases were substantial. On average Bangladesh is nearly self-sufficient in rice. Between 1998-99 and 2007-08 the country imported an average of about 850,000 MT of rice per year, or less than 5 percent of total net availability. But geographical conditions make agricultural supply in Bangladesh especially sensitive to extreme weather events which greatly influence production levels from year to year.[58] This became particularly obvious during 2007 when two monsoon floods (respectively in July and September) and Cyclone Sidr (in November) led to significant losses in the *aman* and *aus* rice crops. Losses were estimated at 1.8 million MT from the *aman* crop alone.[59] In the last quarter of 2007, increases in the international price of rice started causing panic in the rice market. Market instability was aggravated by the export restrictions placed on rice by a number of countries, leading to steep price hikes in the world market. In Bangladesh a matter of particular relevance was that India, its primary source of rice imports, had set minimum prices for rice exports. Facing its own foodgrain problems, India had raised its minimum rice export price from US$425/MT in October 2007 to US$505/MT in December 2007. In March 2008, the Indian government placed new restrictions on rice exports, allowing shipments of coarse varieties of rice at US$650/MT or above, and a week later it raised the minimum export price to US$1,000/MT. With a thinly trading international rice market, domestic rice prices in Bangladesh started increasing as well. The price of coarse rice in Bangladesh peaked at Tk36 (about US$0.55) per kg in April 2008, double the price of January 2007 and about 50 percent higher than in October 2007. Around the same time the world market price of rice reached about US$850/MT or about Tk55/kg. It is worth noting that unlike in the food price crisis of 1974, when the price of rice in the world market reached US$540/MT and the domestic price in Bangladesh peaked at US$830/MT, this time the domestic price was kept well below the world market price.

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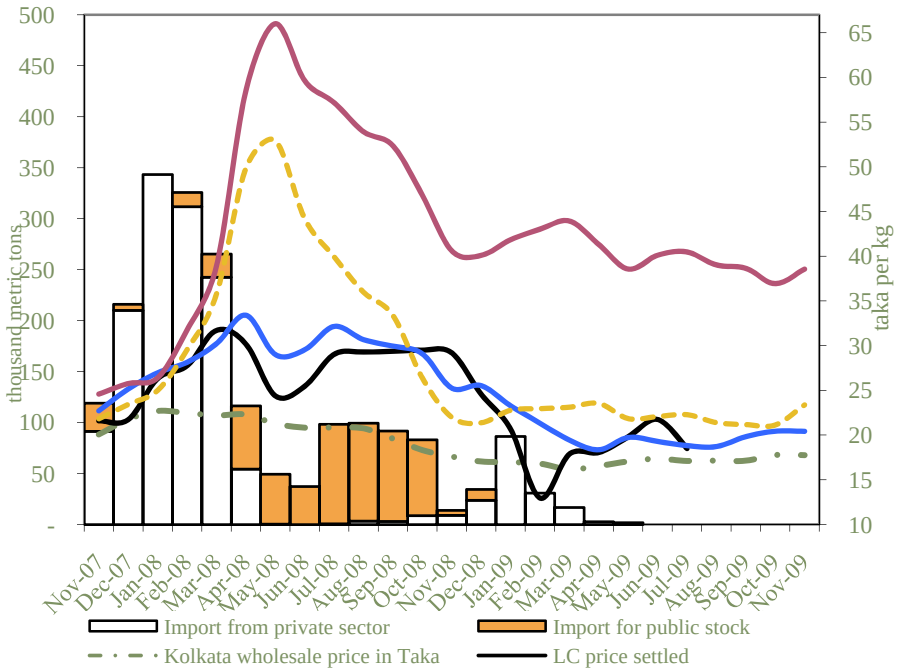
[58] For example, Bangladesh imported more than 3 million MT of rice and wheat during 1987-88, 1997-98 and 2004-05, each time in a reaction to the previous year's flood.

[59] *Aman* is the main monsoon season in Bangladesh (June to October) and *aus* is a short season (April-May) that follows the dry season or *boro* (November-December to March-April).

Private sector imports played a crucial role in mitigating price increases. Despite the export restrictions imposed in most rice-exporting countries, the private sector in Bangladesh managed to import about 1.7 million MT of rice during the period July 07-June 08 (mainly from India but also from Myanmar), or about three times the level of imports in the previous year (Figure A2.1). These imports, combined with a series of prudent measures that the government took to stimulate the 2008 *boro* crop[60], contributed significantly to stabilizing the domestic rice market. On the other hand, the fact that prices still increased substantially suggests that private stock demand also increased substantially—in the order of about 10 percent according to Dorosh (2009). The same author suggests that additional injections of about 1 million MT into the domestic market would have been sufficient to avoid any price increase at all.

FIGURE A2.1 RICE TRADE AND PRICES



Source: FAO Dhaka office.

The government took several measures to tackle food price inflation; these helped to prevent a full-fledged food crisis. The government enacted a proactive policy to boost agricultural production and productivity. Government measures included an attractive procurement price of Tk28/kg of rice in 2008 (compared to Tk18/kg in 2007 and an estimated average cost of

[60] The dry season or *boro* crop typically accounts for about 55 percent of total annual rice production in Bangladesh.

production of about Tk21/kg in 2008 and Tk15/kg in 2007)[61]; timely delivery of crucial inputs such as seeds and electricity; maintenance of subsidies on chemical fertilizers and diesel for irrigation, despite the rapid rise in the price of these inputs in the world market; improved availability of urea from emergency stocks and increased domestic production; and expansion of the fertilizer distribution network by about 20,000 sales outlets.[62] The Bangladesh Bank issued a directive to commercial banks to increase the disbursement of agricultural credit to meet the working capital needs of small and marginal farmers, particularly targeting areas affected by the floods and cyclone. Many private sector commercial banks (which did not have branches in rural areas) channeled agricultural credit through NGOs engaged in micro-credit operations. The disbursement of agricultural credit increased by nearly 57 percent in 2007-08 compared to 2006-07. Together these measures contributed to a favorable 2008 *boro* harvest of 17.5 million MT, an increase of 17 percent over the previous year. The figures in Table A2.1 show that the availability of rice for human consumption during the food crisis (2007-08) was kept at a satisfactory level. The picture looks rather less favorable if one uses the population figures of the UN, which exceed those of the government (Bangladesh Bureau of Statistics) by about 10 million people.

TABLE A2.1 RICE AVAILABILITY 2007-08, ('000 MT, JULY-JUNE)

Production	28,668
Aus	1,506
Aman	9,662
Boro	17,500
Imports	
Private	1,680
Public (includes food aid)	370
Total	2,050
Total availability	**30,718**
Uses other than human consumption (12% of production, incl. losses)	3,440
Annual per capita rice availability for human consumption (g/day):	
- based on population of 146 million	512
- based on population of 156 million	479

The government set a sensible rice procurement price of Tk28/kg, which provided a reasonable balance of the interests of farmers and consumers. The

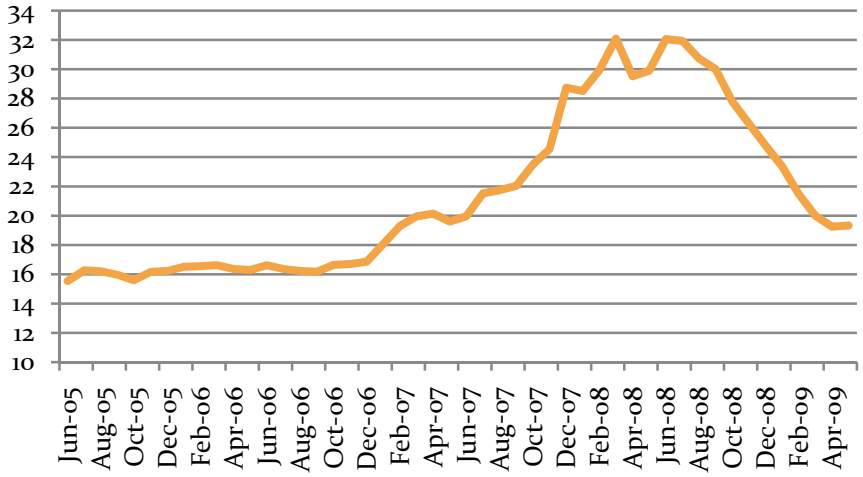
[61] Average wholesale prices in 2006-07 and 2007-08 were about Tk19 and Tk31/kg respectively.

[62] On the other hand subsidies and timely delivery of fertilizer remain issues for concern; in 2007-08 fertilizer subsidies cost about 1 percent of GDP.

procurement price for 2007-08 was increased to Tk28/kg; this was a substantial increase from Tk18/kg in 2006-07 and gave an incentive to increase paddy production. On the other hand, the 2007-08 procurement price remained well below the import parity price of rice, which was about Tk55/kg at the time. Thus, the government made sure that net rice consumers in Bangladesh felt only part of the burden caused by rapidly rising international prices. It is important to note that net rice consumers in Bangladesh not only include the urban population but also a large proportion of rural households, given that land ownership distribution is highly skewed and a large majority of farmers are sharecroppers.

Even though domestic rice consumers paid significantly less than world market prices, the domestic retail price rose substantially. The domestic retail price of rice (in nominal terms) increased by about 50 percent during the period July 2007-July 2008 (figure A2.2).[63] This is despite the fact that the shortfall in the 2007 *aman* rice crop was for the most part offset by higher private sector imports. While higher prices of rice imports put some upward pressure on the domestic price, the size of the increase in the domestic rice price suggested that private stock demand also increased significantly.

FIGURE A2.2 AVERAGE RETAIL PRICE OF RICE (TAKA/KG)



Source: Based on FAO data.

The increase in the price of rice led to a substantial rise in general inflation. Since rice is a major item in the consumer basket, the rapid surge in price contributed to substantial inflationary pressure in the economy. The annual inflation rate in Bangladesh increased to 10 percent in March 2008 from 6.9 percent in March 2007. As food prices rose much faster than non-

[63] The average daily retail price of rice in Dhaka in July 2008 was Tk35/kg or about 22 percent above the procurement price of Tk28/kg.

food prices, food inflation stood at 12.9 percent and non-food inflation at 5.6 percent. A report prepared by a private think-tank, based on current period weights, suggests a higher rate of food inflation of about 20 percent, and an even higher one for the poor population (Deb 2008).

The rice price increase wiped out a significant part of the poverty reduction that Bangladesh had achieved before the food crisis. According to estimates by the Centre for Policy Dialogue (CPD) in Dhaka, an additional 8.5 percent of households fell below the poverty line during the period January 07 – March 08.[64] The analysis in Chapter 2 above, based on data from the 2005 Household Income and Expenditure Survey (HIES), estimates that the poverty headcount rose by 6 percentage points as a result of the rice price increase alone. Since income growth between 2005 and 2008 resulted in a 5 percent decrease in poverty, overall poverty may have stayed more or less constant during that period.

The government operates an elaborate system of targeted food-based safety net programs to protect vulnerable people from the negative effects of food price increases. The government distributes rice (and some wheat as well) under the Public Foodgrain Distribution System both through monetized channels such as the Open Market Sales Program and through non-monetized (targeted) channels such as Food-for-Work, the Vulnerable Groups Development Program, and a number of smaller programs.[65] To mitigate the negative effect of food price inflation on poverty, the government stepped up its food-based safety net interventions. The budget for these programs for FY08-09 was increased to Tk90 billion (about 1.6 percent of GDP), an increase of 46 percent compared to the previous year.[66] This amount is inclusive of a newly established Tk. 20 billion Employment Guarantee Scheme that provides temporary employment at Tk100/day (about US$1.50) for about 2 million rural poor. But not nearly all the poor in Bangladesh benefit from safety nets: only about 13 percent of all households benefit from at least one program and this percentage is much lower than the national poverty headcount. The coverage of safety net programs is better in rural areas (15.5 percent) than in urban (5.5 percent).

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[64] Of course rice prices were not the only culprit: increases in the price of energy and non-rice food items also played a role as did money supply growth in excess of money demand.

[65] In addition to food-based safety net programs, Bangladesh also has a number of cash-based safety net programs including the Primary Education Stipend Program and the Employment Guarantee Scheme, which was introduced in October 2008.

[66] To partially relieve the fiscal burden of the additional spending on safety nets (and on fertilizer subsidies as well) the World Bank provided budget support resources to the extent of US$130 million under a Development Policy Loan arrangement which was processed under the Bank's Global Food Crisis Response Program.

The government stepped up its grain reserves. Though Bangladesh has mostly relied on private sector imports to supplement any shortfalls in domestic production, it has also traditionally held public stocks of cereals. The composition of these stocks has increasingly moved towards rice while their level has decreased over time (table A2.2).

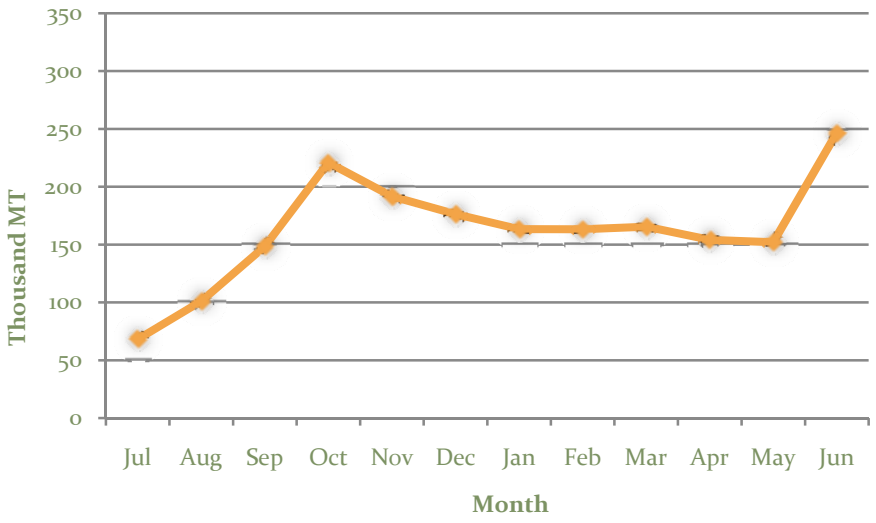
TABLE A2.2 BANGLADESH PUBLIC STOCKS OF CEREALS, 1988-89 TO 2007-08 ('000 MT)

	Rice	Wheat	Total
1988-89 to 1992-93	556	529	1,086
1993-94 to 2001-02	461	410	871
2002-03 to 2007-08	677	156	726

Note: Figures shown are averages of end-June stocks for the periods shown.
Source: Calculated by P. Dorosh using Bangladesh FPMU data.

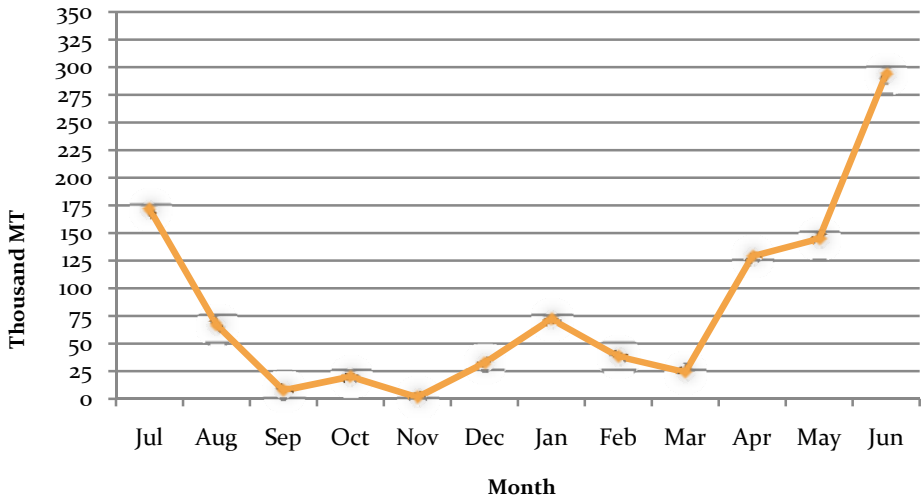
Public grain stocks can serve three purposes: operation of existing food-based safety net interventions to protect the food security of the poor; market price stabilization; and emergency relief in times of food shortages. The export bans that many traditional grain exporting countries imposed in reaction to the 2007-08 food crisis caused Bangladesh's senior policymakers serious concern that international trade might be disrupted at times of distress. As a result, the government set a public stock target of 1.5 million MT of rice and wheat. Since the price stabilization objective in Bangladesh has traditionally been taken care of by private traders, public stocks are mainly for emergency purposes and for operating food-based safety net systems, which are largely a function of the volume and timing of planned distribution. Given the public distribution to food-based safety nets of about 1.9 million MT in FY08-09, the maximum monthly public distribution of food grains to food-based safety net systems amounted to just above 250,000 MT (figure A2.3). Government procurement of wheat and rice typically varies from less than 20,000 MT per month during the period September-November to nearly 300,000 MT in June (figure A2.4). The difference between distribution and procurement is an indication of the minimum stock holdings that are needed to ensure smooth operation of the government's food-based safety net systems. These minimum stock holdings can be estimated at about 200,000 MT (see figure A2.5) even though in most months they may fall below that level without threatening food distribution operations.

FIGURE A2.3 PROJECTED FY08-09 PUBLIC FOODGRAIN DISTRIBUTION TO SAFETY NETS USING AVERAGE DATA FOR FY02-03 UNTIL FY06-07



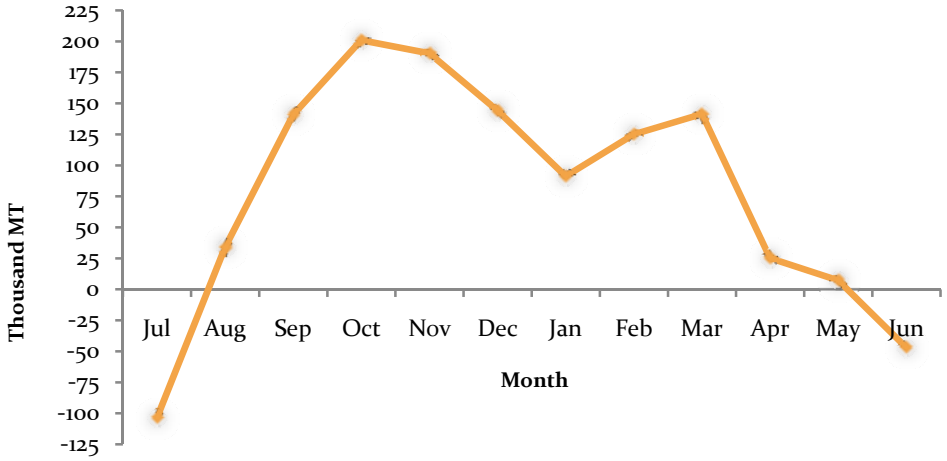
Source: Own calculations.

FIGURE A2.4 PROCUREMENT OF RICE AND WHEAT FOR SAFETY NET SYSTEMS



Source: Own calculations.

FIGURE A2.5 MINIMUM REQUIRED STOCK LEVELS FOR SMOOTH OPERATION OF FOOD-BASED SAFETY NETS



Source: Own calculations.
Note: Negative values arise for months where grain procurement exceeds grain distribution.

The government's target for public grain stocks of 1.5 million MT seems adequate. Adding the stocks required for emergency purposes (about 1 million MT, which is equivalent to about two weeks of consumption) and for safety nets (about 250,000 MT) suggests that 1.5 million MT is more than sufficient to serve both purposes. Going beyond that level is not advisable in view of the fiscal and opportunity costs, the institutional burden, and storage considerations.

To maintain an acceptable level of food security, Bangladesh needs to continuously increase domestic rice production. Bangladesh is adding about 2 million people to its population every year and will continue to do so for the foreseeable future. Although the current level of rice production at the national level is satisfactory, rice demand is projected to grow at 2-2.5 percent per year, based on population and income growth. Therefore rice production needs to increase by a minimum of 330,000 MT/year. The country has very limited potential for net expansion of the area cultivated; in practice the cultivable area has been falling by about 1 percent per year for more than a decade as land has been diverted to other uses including housing, industrialization, and infrastructure development.

Reducing the yield gap in rice production merits top priority. In the medium and longer term, food security must be enhanced primarily through technology-driven productivity improvement rather than through area expansion or government subsidies. Average rice yields in Bangladesh are only about 2.5 MT/ha even though they are about 3.5-4.0 MT/ha in the dry winter season (*boro*). These yields are about 25 percent and 40 percent below the average yields in Vietnam and China, respectively. Farmers' yields are also

much below the yields obtained in demonstration plots. Field experiments conducted by the Bangladesh Rice Research Institute and the Department of Agricultural Extension have shown that rice productivity can be increased by 30 percent to 60 percent by using hybrid seed, rationalizing input utilization, and improving other crop and water management practices. But the adoption of hybrid rice has been limited so far, because hybrid rice seed costs much more than seed from inbred rice varieties. Another way to increase yields is by rationalizing input use and improving other crop management practices–for example transplanting rice seedlings at the optimum time, fine-tuning irrigation application, and applying recommended quantities of fertilizers at the right time.

Improving the supply of quality seed to farmers holds large potential for quickly increasing rice production. Lack of adequate and timely supply of fertilizer and hybrid seeds seriously limits the opportunities to increase rice productivity. About 90 percent of all seeds used in rice production in Bangladesh are seeds that farmers have saved from their earlier harvests. Farmers' traditional methods of growing and saving rice seeds encourage seed quality deterioration. Improving the timely supply of high-quality rice seed is likely to have a significant impact on rice production, especially when combined with timely supply of urea.

Besides seed and fertilizer, water is another crucial input in rice production. To promote efficient use of water, reliable electricity supply for irrigation and proper agricultural water management and drainage practices need attention. Increasing the pace of rehabilitation of irrigation canals whose poor condition leads to large losses of water is also needed.

Several other areas also need attention in order to facilitate farmers' supply response. Delivering price information to farmers would improve their capability to react to changing market conditions. This could be achieved through setting up information points (kiosks) at the union (below sub-district) level where farmers can access price information as well as other relevant information such as weather forecasts and crop management information. Other possible models include subscription-based information access through mobile phones, which has successfully been implemented in parts of India and China, among other countries (Jansen and others 2010).

Lowering farmers' production risk may also improve their supply response. Besides better access to market information, there are a number of ways in which farmers' production risk may be reduced. Examples include enhancing disaster preparedness and post-disaster rehabilitation of agricultural systems in disaster-prone areas; and piloting insurance instruments such as weather-based insurance. This is especially important in view of the possible implications of climate change (Yu and others 2010).

Appendix 3: India[67]

In India, rice and wheat are the two major food staples. India produces about 220 million MT[68] of foodgrains each year including about 90 million MT of rice and 75 million MT of wheat. The remainder is coarse cereals and pulses. The marketed surplus of rice and wheat is about 60 million MT. After accounting for 35 million MT for subsidized distribution to the poor and other welfare schemes, about 25 million MT reaches the open market (2006-07 data). Rice and wheat together account for close to 50 percent of total dietary energy supply (DES 2003-05 data). On average during 2004-08, per capita annual consumption of rice and wheat was respectively 76 kg and 62 kg. While India is self-sufficient in rice and (at least in normal years before the food crisis) is a large rice exporter[69], India regularly imports wheat in times of weak harvests or when its public food stocks fall below certain thresholds.

Of all countries in South Asia, India was least affected by the food crisis. In India, domestic food prices increased by 5.5 percent in 2007-08 compared to 2006-07. This increase was significantly lower than the rise in consumer prices, which ranged between 7.3 percent and 11.9 percent, depending on the index used.[70] The increase in the prices of foodgrains during the same period was even lower (4.7 percent). Thus, India allowed only a very small part of the increase in world market prices to be transmitted to domestic consumers. For example, while the international rice price increased by 160 percent between June 2007 and its peak in June 2008, Indian wholesale prices of rice increased by 7.9 percent.[71] International wheat prices basically doubled between June

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67 This section is partially based on a note prepared by Dipak Dasgupta and Abhijit Sen Gupta (World Bank SASEP).

68 In 2007-08 India produced an exceptionally large quantity of foodgrains: 230 million MT, of which 95 million MT was rice and 78 million MT was wheat. Foodgrain production in 2004-05, 2005-06, and 2006-07 was respectively 198, 209, and 217 million MT. See www.Indiastat.com.

69 Depending on the size of the domestic harvest, India exports between 4 and 5 million MT of rice each year. This makes it one of the price setters in the international rice market, given the latter's size of about 30 million MT.

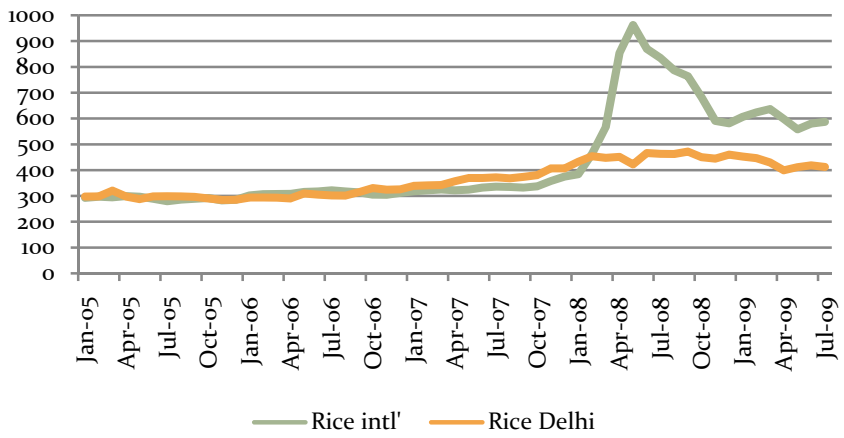
70 In India there are four consumer price indices (CPIs) that are specific to different groups of consumers, i.e. CPI-IW for industrial workers, CPI-UNME for urban and non-manual workers, CPI-AL for agricultural workers, and CPI-RL for rural workers. Increases in these indices between June 2007 and June 2008 were respectively 7.7, 7.3, 8.8, and 8.7 percent (calculated using data from www.Indiastat.com).

71 See website of the Central Statistical Office of the Ministry of Statistics and Programme Implementation (http://mospi.nic.in/cso_test1.htm).

2007 and their peak in March 2008, while domestic wholesale prices in India increased by only 7.5 percent.[72]

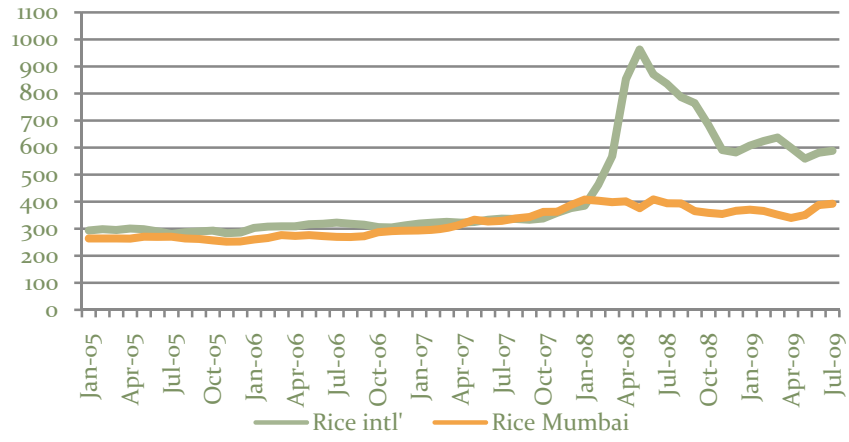
Domestic rice and wheat prices in India are less variable than international prices. India has kept the domestic price of rice below the international price since early 2008 (figures A3.1 and A3.2). In the case of wheat, India traditionally has kept the domestic price above the international price; only during at the height of the food crisis did the domestic price of wheat fall below the world market price and even then only for short periods (figures A3.3 and A3.4). Domestic prices of both wheat and (especially) rice are also much more stable than international prices.

FIGURE A3.1 DELHI RETAIL VS. INTERNATIONAL RICE PRICES



Source: Own calculations based on FAO data and data from www.exchange-rates.org.

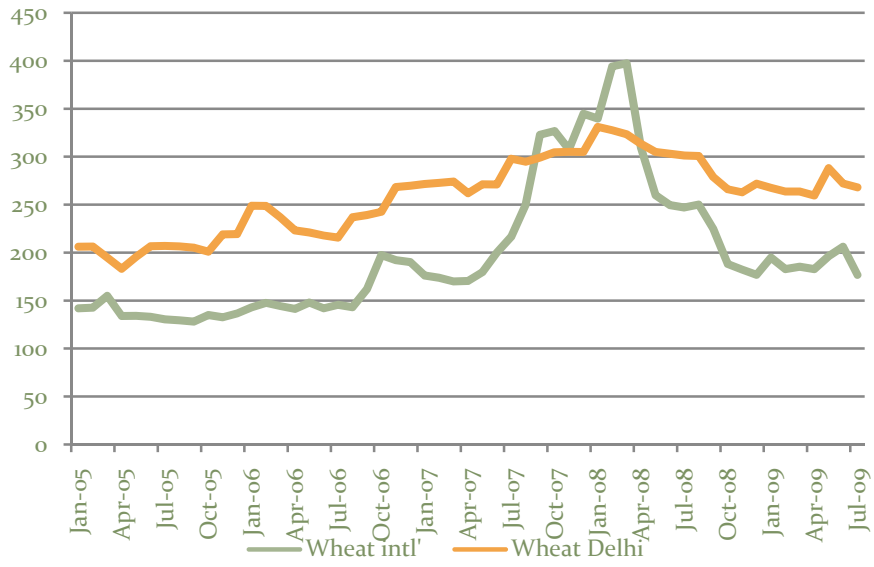
FIGURE A3.2 MUMBAI RETAIL VS. INTERNATIONAL RICE PRICES



Source: Own calculations based on FAO data and data from www.exchange-rates.org.

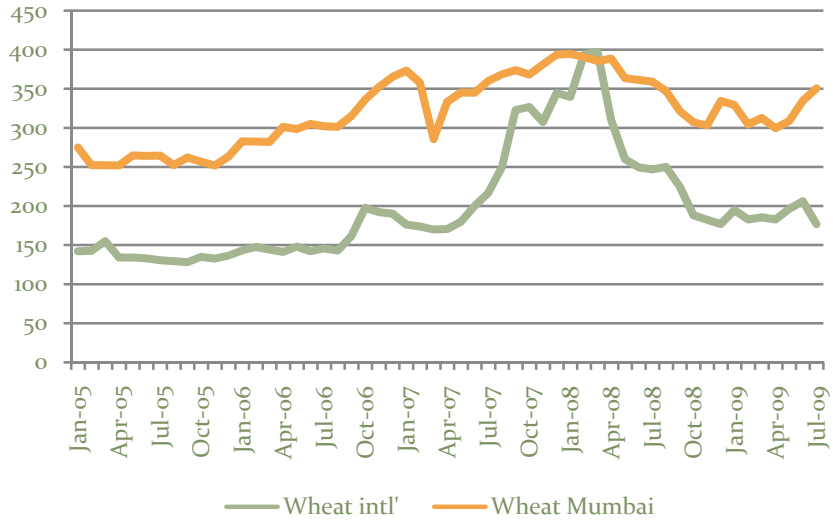
[72] Oilseeds experienced a much larger domestic price increase of about 25 percent between mid-2007 and mid-2008 but their prices in the international market increased by 70 percent.

FIGURE A3. 3 DELHI RETAIL VS. INTERNATIONAL WHEAT PRICES



Source: Own calculations based on FAO data and data from www.exchange-rates.org.

FIGURE A3.4 MUMBAI RETAIL VS. INTERNATIONAL WHEAT PRICES



Source: Own calculations based on FAO data and data from www.exchange-rates.org

India's food policies are mainly guided by self-sufficiency objectives. Since Independence in 1947 India's food policies have placed heavy emphasis on self-sufficiency. Thanks in part to the Green Revolution, this goal has largely been attained. India is now basically self-sufficient in food grains and achieved record harvests in 2007/08 which were largely attributed to attractive support prices (and to a lesser extent to good weather).

The Indian government intervenes heavily in the agricultural sector. The course of agricultural development in India has led to a sector that is

heavily dominated by government intervention. This includes a wide range of input subsidies; a system of floor prices for 24 commodities (but foremost for rice and wheat); a large buffer stock consisting mainly of rice and wheat with a minimum norm of 20 million MT (average during the year)[73]; and an extensive food-based safety net system.

India's relatively low food price inflation, and food price stability, can to a large extent be attributed to large oil and fertilizer subsidies. One of the most important factors responsible for the increase in global food prices has been the increase in the crude oil price and its impact on the cost of fertilizer and other agricultural inputs. India imports large amounts of crude oil and fertilizers at substantial costs. However, the increases in prices of crude oil and fertilizers have not been passed on to farmers and consumers. For example, India's fertilizer subsidies in 2007-08 amounted to about Rs. 1.3 trillion (US$28 billion). Similarly, only a small part of the increase in diesel prices was passed on to farmers.

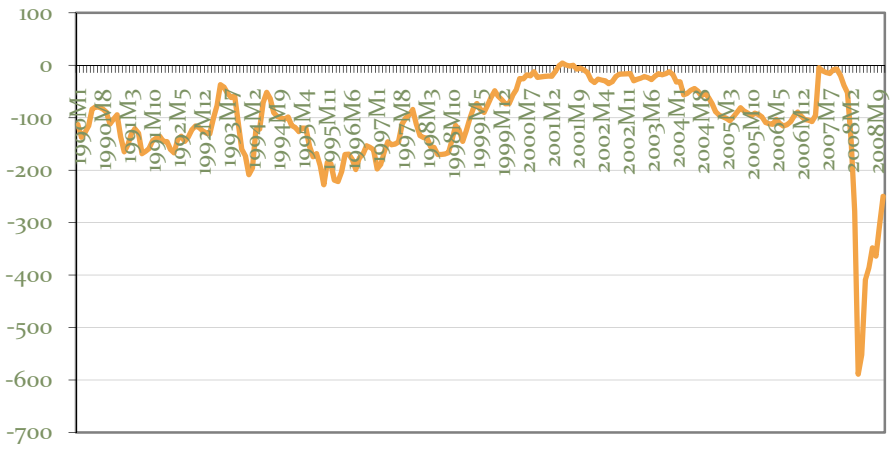
The government's price support system plays an important role in keeping domestic prices relatively stable. The Indian government operates a system of minimum support prices (MSP) at which it stands ready to procure farmers' harvests. This system covers 24 crops among which paddy and wheat are the most important. Together with buffer stocks and the public distribution system, government procurement at MSP lies at the heart of the Indian food security policy. On average the government buys about 20 percent of the total wheat harvest and 25 percent of the rice harvest. Each year the Commission for Agricultural Costs and Prices sets the MSP for rice and wheat based on the cost of production using the cost-plus principle. Final MSP levels are determined not only by production costs but also by political economy considerations related to food security and price stabilization. Consistent with India's overriding food self-sufficiency objective, the MSP system is to a limited degree guided by international prices but it certainly does not mimic them. Moreover, for socio-political reasons the issue prices of wheat and rice that are used in the food-based safety net systems have been kept constant since 2002. While this policy encourages price stability, it also has a large fiscal cost (and is likely to crowd out other public investment) given that the MSP increases every year.

The MSPs for rice and wheat have traditionally been below international prices. While the MSPs for wheat and paddy rice are set on a

[73] Actual average buffer stock levels in India fluctuate greatly between years and during 1997-2007 they varied from nearly three times the norm (58 million MT) in 2002 to less than the norm (17.5 million MT) in 2007. Further, buffer stock norms differ within the year, varying from 16.2 million MT in April (12.2 million MT of rice and 4.2 million MT of wheat) to 26.9 million MT in July (9.8 million MT of rice and 17.1 million MT of wheat). See Government of India (2008).

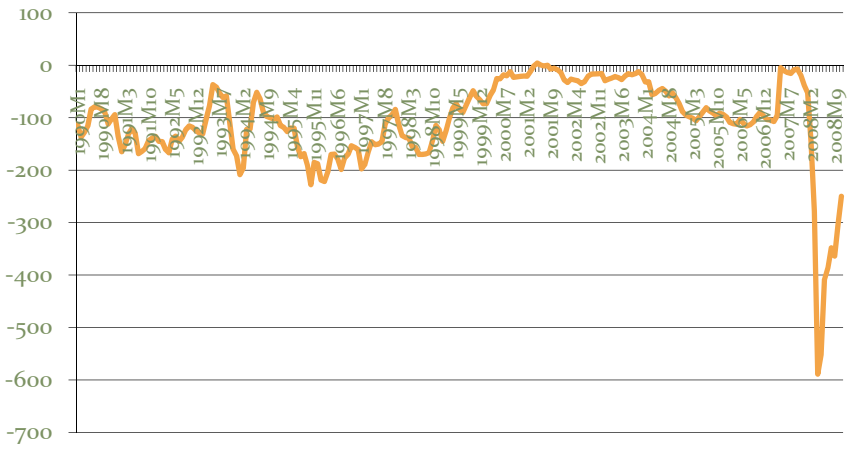
cost-plus basis so as to provide an attractive return to farmers, they remain below international prices in most years (figures A3.5 and A3.6). The objective of keeping food prices stable has led the Indian government to adjust the MSP in such a way that only a relatively small part of the international price changes is transmitted to farmers. This policy acts as an implicit tax on farmers in favor of consumers. The gap between the MSP and international prices was especially large during the food crisis, even though the MSP for wheat was raised from Rs. 850 per 100 kg in 2006-07 to Rs. 1,000 in 2007-08, and the MSP for paddy was raised from Rs. 650 to Rs. 775.

Figure A3.5 Difference between MSP and international price, rice



Note: The MSP for paddy has been converted to rice equivalent.
Source: Own calculations based on online databases of Ministry of Agriculture, Ministry of Consumer Affairs, Food, and Public Distribution, and www.Indiastat.com.

Figure A3.6 Difference between MSP and international price, wheat



Source: Own calculations based on online databases of Ministry of Agriculture, Ministry of Consumer Affairs, Food, and Public Distribution, and www.Indiastat.com.

To keep up government procurement, the MSPs for wheat and rice saw significant increases in recent years. Though there were only small increases in the MSPs of wheat and paddy during 2000-01 to 2004-05, the wheat MSP rose by more than 30 percent during 2005-06 to 2007-08. The main reason was the government's wish to increase buffer stocks of wheat and avoid the need for imports. This policy worked: government procurement of wheat reached 22.6 million MT in 2008-9, nearly double the previous year's level. Unlike in wheat, there was no major supply problem in rice. Nevertheless the MSP for paddy increased by nearly 50 percent over the three-year period 2006-07 to 2008-09 (table A3.1), mainly reflecting higher world market prices and the wish of the government to maintain certain minimum buffer stock levels.

TABLE A3. 1 MINIMUM SUPPORT PRICES FOR WHEAT AND PADDY, 2000-01 TO 2008-09

	Wheat		Paddy	
Year	MSP (Rs./quintal)	Percent change	MSP (Rs./quintal)	Percent change
2000-01	610		510	
2001-02	620	1.6	530	3.9
2002-03	630	1.6	550	3.8
2003-04	630	0.0	550	0.0
2004-05	640	1.6	560	1.8
2005-06	750	17.2	570	1.8
2006-07	850	13.3	620	8.8
2007-08	1000	17.6	745	20.2
2008-09	--	--	900	20.8

Source: Ministry of Agriculture.

A number of other government interventions also played a role in maintaining food security. Besides the long-standing system of minimum support prices for major food crops, the government took a number of special measures, before and during the food crisis, that had a beneficial impact on domestic food security. First, in view of declining wheat stocks in 2006 and 2007, India resorted to imports in order to keep up buffer stock levels. It imported 2.2 million MT of wheat in 2006 and another 1.8 million MT between July and December 2007. In 2008, India imported wheat but at substantially higher prices than before. Even though these imports were substantial, their quantities were too small relative to domestic production to have a discernable impact on international wheat prices. Second, the government undertook a number of measures to facilitate imports of food items and restrain their exports, with a view to increasing the domestic availability of food. These included reductions in the import duties/tariffs on edible oils, wheat flour, milled rice, maize, butter and clarified butter; a ban on exports of non-basmati rice, wheat, pulses, and edible oils; an increase in the minimum export price of basmati rice; and asking states to impose limits on stocks of commodities under the Essential Commodities Act. Finally, the government made sure that buffer stocks of rice and wheat were sufficient. In fact, stocks of rice and wheat

in April 2008 (during the height of the food crisis) exceeded buffer norms by 0.5 million MT.

There have been many and repeated calls for reform of government intervention in the agricultural sector. India has long attempted to reconcile the interests of food consumers and producers through an extensive system of subsidies on both sides. A large number of studies[74] have called for reform of the Indian agricultural support system on efficiency grounds—arguing that a system of decoupled income compensation would reach the same welfare objective but be less expensive—as well as on equity grounds—arguing that out of India's 127 million farmers it is the larger farmers who benefit most. The present system has been widely characterized as inefficient, with large costs implied in government procurement of food commodities, buffer stock maintenance, and storage losses by the Food Corporation of India (FCI), while preventing greater efficiency in the wholesale food trade and sufficient links between global and local prices. India also operates an extensive system of implicit and explicit subsidies on agricultural inputs, especially water and power.

The Indian government recognizes the inefficiencies of many of its interventions in the agricultural sector but sees reforms as politically extremely difficult. The pronounced market cycles, declining per capita consumption of India's major food staples, and ballooning fiscal cost of government intervention are creating pressure for Indian policymakers to adjust longstanding policies. However, there is no political consensus regarding the extent, type, and timing of any changes and no tangible progress is being made either on input subsidies or on output price support. This is illustrated by the substantial increases in the MSP of 21 percent and 37 percent, respectively, for wheat and paddy in 2007-08 relative to 2006-07.

Converting the MSP into an income support program for all farmers would be prohibitively expensive. Based on the simple difference between the MSP and cost-of-production estimates, the extent of government price support to wheat and rice farmers can be estimated at between US$2.4 - 3.3 billion. Converting this price support to income support via a cash payment program for all farms (not only wheat and rice farms), based on compensating 1.5 ha of rice and/or wheat per farm, would involve a cost of between US$20 billion-40 billion per year, depending on the level of compensation and some other assumptions (Jansen 2008).

Poverty and food prices in India are intrinsically linked. Food prices, particularly relative food prices, are one of the most important determinants of poverty in India. India experienced a faster decline in the poverty headcount

[74] For example Gulati and Narayanan (2003); Pursell and others (2007).

during 1999-2005 than during 1993-2000; relative food prices were also lower during 1999-2005 than during 1993-2000.

Cereal consumption continues to be important for the poor. Between 1970-71 and 2004-05 the share of cereal expenditure in total household expenditure decreased from 38 percent to 18 percent in rural areas and from 22 percent to 10 percent in urban areas. However, the cereal share remains substantial for the poorest 30 percent of the expenditure distribution in rural areas (29 percent) and urban areas (20 percent). Moreover, the share of cereals in total food expenditure remains around 40 percent for the poorest 30 percent of the expenditure distribution. Households in this expenditure class still get about 60 percent of their total calorie intake from cereals. Thus, cereal prices remain very important for the poor.

The government operates an extensive and fiscally expensive set of food-based safety net programs. Besides for meeting buffer stock requirements, the government procures rice and wheat for the operation of a wide array of very large safety net programs. By far the largest among these is the Targeted Public Distribution System (TPDS). The TPDS operates through a large country-wide distribution network of about 489,000 government stores (popularly known as fair price shops) that sell wheat, rice, and a number of other basic commodities at heavily subsidized rates to so-called BPL (Below the Poverty Line) households. The TPDS covers about 37 percent of the total population. Under the TPDS, the central government is responsible for procuring and transporting foodgrains up to the principal distribution centers of the Food Corporation of India, while the state governments are responsible for identifying BPL families, issuing ration cards, and distributing foodgrains through the fair price shops. In addition to the TPDS, the Indian government operates a number of other welfare programs, the largest of which is the National Rural Employment Guarantee Scheme (NREGS). The NREGS guarantees 100 days of work (or payment of unemployment benefits) to all eligible workers and covers about 30 percent of all rural households. Other food-based safety net schemes include food-for-work programs, mid-day school meals[75], and a range of smaller programs. The amount of resources spent on food subsidies in India is very high and it increased significantly during the food crisis, from Rs. 238 billion (US$5.3 billion) in 2006-07 to Rs. 313 billion (US$6.5 billion) in 2007-08.[76] Unlike some other South Asian countries, India did not introduce any new safety net programs in reaction to the food crisis.

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[75] The so-called Mid-day Meal Scheme has developed into one of the most significant safety net programs in India, covering about 180 million children.

[76] The total food subsidy bill is basically the sum of the economic cost of foodgrains procured by the FCI and their sales at the (lower) central issue price plus the carrying cost of buffer stocks.

The major beneficiaries from the safety net measures are the rural poor. In India, 77 percent and 23 percent of all poor are classified as rural and urban respectively. The conventional wisdom is that the urban poor are the main beneficiaries of the safety nets that protect consumers from rising food prices. However, a recent analysis (De Janvry and Sadoulet 2009) that simulated the effects of a hypothetical full transmission of world market price changes to Indian domestic markets, shows that the main category of poor households that would be negatively affected is rural, not urban.

Despite their high costs, the government safety net programs only partially cushion the impact of food price rises. There is now ample research-based evidence that shows that the TPDS, the Integrated Child Development Scheme, and the Mid-Day Meal Scheme fail to reach many food-insecure households. Two recent reports (Government of India 2002, 2005) discuss the main problems related to the TPDS including high exclusion errors, questionable economic viability of the fair price shop system, difficulties in meeting the price stabilization objective, and leakages. Regarding exclusion errors, recent evidence suggests that identifying BPL families purely on the basis of the income/expenditure criterion leaves out many food-insecure households that are just above the poverty line. Many fair price shops serving only BPL customers face difficulties surviving. Determination of the demand for cereals at the state level by the central rather than the state governments complicates the balancing of demand and supply of foodgrains at the state level. The degree of leakage in the system differs significantly by state and stronger monitoring and evaluation as well as accountability is needed to reduce leakages. In this respect the possible introduction of an ID-based "smart card" is currently under discussion. On the more positive side, growing evidence suggests that effective and efficient implementation of supplementary nutrition programs is possible through decentralization and the proactive engagement of local governments and community-based self-help groups.

Agricultural growth in India has slowed down over time. The agriculture sector grew at an average annual rate of 3.7 percent during 1991-92 to 1996-97 but slowed down to 2.5 percent during 1997-98 to 2006-07. Annual growth in foodgrain production has exceeded population growth when calculated for the period 1950-51 to 2006-07 (2.5 percent vs. 2.1 percent), but not when calculated for the sub-period 1976-77 to 2006-07 (1.2 percent vs. 1.9 percent).

Sustained increases in agricultural productivity are needed to contribute to India's future food security. In India as in most other South Asian countries, agriculture suffers from relatively low average productivity.

Even though agricultural productivity is bound to differ greatly across states[77] and even districts, average crop productivity remains much below its potential. For example, India's average rice yield is 2.9 MT/ha compared to 6.3 MT/ha in China. Growth in wheat productivity has slowed down significantly, from 2.1 percent per year during 1992/93-1996/97 to 1.4 percent during 1997/98-2001/02, and even turned negative (-0.7 percent) during 2002/03-2005/06. Total factor productivity has long shown a decreasing trend throughout India's major rice-wheat belt (Kumar and others 2008). The decline in total factor productivity is mainly caused by unsustainable cropping practices which in turn are largely caused by perverse agricultural policies and subsidy regimes. Rather than climate change, unsustainable crop management practices are now seen as the main reason for the recent stagnation in food grain production in India (Milesi and others 2010). Insufficient investment in irrigation and watershed management is another important factor that limits yield growth—whereas the 30 percent of India's cropland that is irrigated accounts for about half of total crop output, the area of irrigated land has been largely stagnant during the past decade.

[77] For example, average wheat yields are less than 1.5 MT/ha in Maharashtra but exceed 4 MT/ha in the Punjab.

Appendix 4: Nepal[78]

Food price inflation is of particular concern in Nepal in view of the country's low average per capita income (US$320/year based on 2006 data) and consequent high overall poverty rate (31 percent according to 2004 data, with half of the poor classified as extremely poor); large numbers of people living just above the poverty line; high proportion of income spent on food (average before the food crisis was 59 percent but 73 percent for the poorest quintile); high malnutrition rate (41 percent) and high prevalence of child stunting (50 percent); lack of an institutionally well-established food-based safety net programs; small average farm size and low agricultural productivity; and a rather fragile government that faces high political pressure to provide relief from high food prices and chronic fuel shortages.

In Nepal, rice is the principal staple food, accounting for about 67 percent of total cereal consumption; wheat and maize constitute 12-15 percent each, and millet and barley account for 3-5 percent. Consequently this Appendix focuses mostly on rice.

The determinants of rice prices in Nepal are various but policy decisions by India play an important role. In the short run, the main determinants of the price of rice in Nepal's domestic markets include production, demand, and trade. Whereas weather conditions are an important determinant of production, trade is largely driven by price differentials with India; and demand is mostly determined by growth in population and income (including remittances). Rising input and transport costs, private stock demand, and the occasional sheer panic of shortage also play a role. Nepal has been a net rice importer for most years during the last two decades, mainly from India either through formal or informal channels despite formal export bans.[79] Given the 1,800 km long and largely unregulated and porous border, price levels in Nepal are highly correlated with those in India (figure A4.1).[80] This holds also for rice prices which need to align with those in India, making Nepal a price taker. India's export restrictions on rice since October 2007 put upward pressure on

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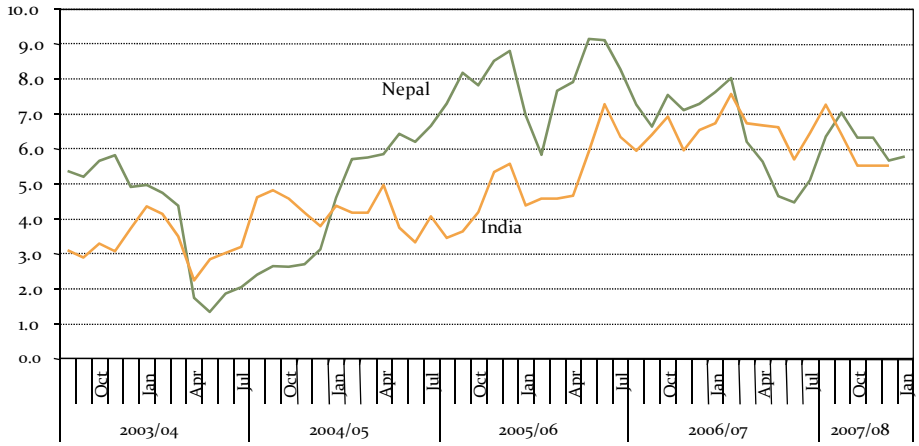
[78] This section is partially based on a note prepared by a World Bank team led by Roshan Darshan Bajracharya (SASEP) and consisting of Abhishek P. Basnyat (SASEP), Johannes (Hans) Jansen, Gayatri Acharya, and Shyam Ranjitkar (SASDA), and Ihsan Ajwad and Philip O'Keefe (SASHD).

[79] According to the Nepal-India Trade Treaty, the trade in primary agricultural products between Nepal and India is free of customs duty and quantitative restrictions, or at least was until October 2007 when export bans were imposed from both sides.

[80] A recent study by the Nepal Central Bank (Nepal Rastra Bank 2007) finds that a 1 percentage point increase in Indian inflation raises inflation in Nepal by 1.37 percentage points. The fixed exchange rate regime (IRs. 1 = NRs. 1.6) further facilitates trade relations. Indeed, Nepal's trade in food items is only significant with India.

prices in Nepal and increased the price differential between prices on both sides of the border, even though the effects became visible only in 2008, due to a lagged information transmission effect and inventories in the market after the rice harvest. The export ban did not notably affect the quantities imported from India.

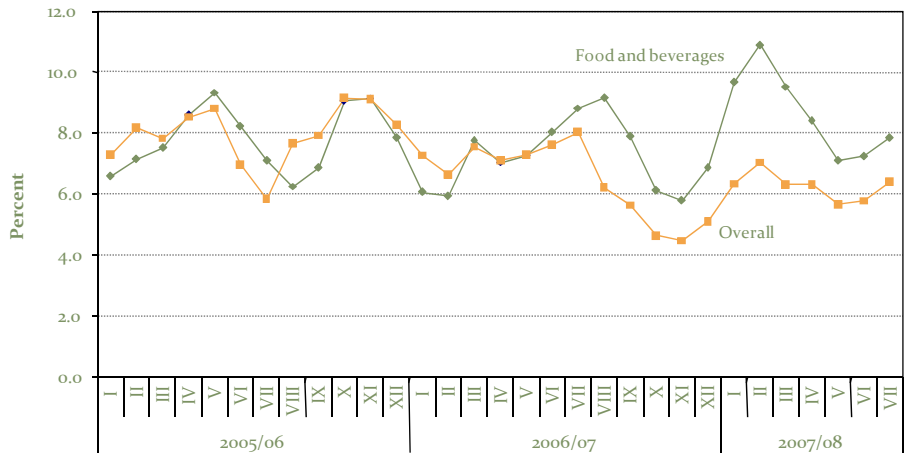
FIGURE A4.1 CPI INFLATION IN NEPAL AND INDIA, 2004-08, YEAR-ON-YEAR



Source: CBS and IFS.

Food price inflation in Nepal initially appeared more subdued than in Afghanistan, Bangladesh, or Pakistan. At least until July 2008, food price inflation in Nepal stayed below 12 percent (Figure A4.2) though it reached nearly 15 percent for that year as a whole. Food price inflation was considerably higher than general inflation but lower than in most other South Asian countries (with the notable exception of India, see Appendix 3). The (initially) lower food price inflation in Nepal compared to other countries can be largely attributed to open border trade (formal as well as informal) with India, and the relatively good 2008 paddy harvest. A statistical analysis using data for 2001-08 reveals that about one-third of the change in world market cereal prices is transferred to the domestic market in Nepal, again pointing to the influence of Indian prices on domestic prices in Nepal (Pokharel 2010).

FIGURE A4.2 GENERAL AND FOOD PRICE INFLATION IN NEPAL, 2007-08 (YEAR-ON-YEAR)



Source: NRB

Food-price inflation in Nepal is mainly driven by the price of cereals (rice in particular) and edible oil/ghee. Together these two food categories make up nearly 40 percent of the total food basket. The Central Bank's Consumer Price Index (CPI) measures urban inflation and shows that the price of rice and rice products increased by 12.4 percent during FY08 (July 2007 – June 2008) compared to 2.8 percent in FY07. The price of oil/ghee rose by 13.5 percent in FY08 compared to 6.7 percent in FY07. For other food items such as meat, fish, eggs, and milk, price inflation remained at more manageable levels. On the other hand, World Food Program data (WFP 2008) show that most of the price increases during FY08 occurred in the second half of that year (i.e. the first half of calendar year 2008) when the prices of coarse rice and oil/ghee went up by respectively 22 and 31 percent in urban areas, and 28 and 29 percent in rural areas. The price of coarse rice (the main food staple for the poorer segment of the population) increased by 20 percent for all of calendar year 2008.

Initial food price increases were most severe in the hills and mountains of Far and Mid-Western Nepal. In Nepal food availability and access are geographically very unevenly distributed and the concept of national food security is therefore of limited use. Areas with the lowest food production and greatest per capita food deficit have lower incomes and higher rates of poverty and malnutrition. These areas are typically also the most remote and inaccessible. On average during the food crisis, percentage changes in the price of coarse rice in the Terai and Hills exceeded those in the more remote mountain areas. However, average rice prices in the Eastern Mountains, Central Mountains, and Western Mountains exceeded those in the Terai by respectively 37, 123, and 177 percent (WFP 2009). Thus, absolute price increases were much higher in the mountain areas compared to the Terai and Hills. Unlike in the Terai area where markets are reasonably integrated both

domestically and with India, in Mid- and Western Nepal poor road access leads to high and increasing transport costs (aggravated by persistent fuel shortages) which in turn push up grain prices in these traditionally food-deficit areas. The hills and mountains of the Far- and Mid-West have faced a number of consecutive seasons of drought which unfortunately continued in 2009 and especially affected the wheat crop.[81]

Food price inflation accelerated during the second half of 2008 and varied significantly by region and commodity. During the second half of 2008 nominal consumer prices of cooking oil and coarse rice increased by 30 and 23 percent respectively on a year-to-year basis. In the Western Mountains where five out of every six households are below the poverty line, price inflation for coarse rice increased from 10 percent in the first half of 2008 to 40 percent in the second part of the year. As in most other South Asian countries (see Chapter 4), food prices in Nepal have resisted falling to their pre-crisis levels: for example, the price of coarse rice in June 2009 was still 25 percent higher than in November 2007 and year-on-year food price inflation in June 2009 was still high at 16.5 percent.

At the height of the food crisis an estimated 42 out of 75 districts in Nepal were reported as food deficit by FAO and WFP. These were mostly remote districts, particularly in the Mid- and Far-Western regions, which traditionally suffer from food deficits for most of the year.[82] Just as in Afghanistan, inaccessibility is the single most important factor that leads to extreme levels of food insecurity and vulnerability. Particularly affected are the landless, marginal farmers, and female-headed households with no access to remittance funds and who rely on market purchases to satisfy the part of their consumption that is not covered by their subsistence production.

Measures to protect the poor against higher food prices are limited in Nepal. WFP has an active program of food distribution in Nepal, which was scaled up substantially during the food crisis and benefited an estimated 2.7 million people (or nearly 10 percent of the total population). The size of WFP's activities in Nepal is significant (on average about 46,000 MT of rice per year) and mainly consists of food-for-work programs in remote areas, especially the Far- and Mid-Western hills and mountains. Both food aid and the distribution of subsidized rice by the Nepal Food Corporation (NFC, the public food distribution agency) that supply Nepal's food-insecure areas—mainly 26

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[81] According to World Food Program estimates, an additional 2 million people became food-insecure as a result of poor 2009 winter harvests. Together with droughts in India this is expected to lead to substantial food price inflation in FY10.

[82] This is to an important extent due to lack of access to land: WFP estimates that for an average household to be self-sufficient in rice, it needs a minimum land area of 0.45 ha in the Terai or 0.64 ha in the Mountains.

districts classified as remote and consisting of the Karnali belt, the Far-Western hills and mountains, and the Rapti-Bheri hills—have been negatively affected by rising prices. The capacity of the NFC is limited; in 2008 it handled 26,800 MT or less than 0.2 percent of the total edible foodgrain requirement. Less than half of this amount goes to the 26 districts classified as remote, where it is sold at a discount of about 35 percent below market rates. On average, people in remote districts receive less than 3 kg/year of subsidized food. Nepal has very few emergency stocks (less than 10,000 MT). Farmer subsidies no longer exist in Nepal, except for a transport subsidy on fertilizer in remote districts. Neither does Nepal have a social security system or safety net programs, except for a small monthly cash grant to elderly persons above 70 years of age, widows of more than 60 years of age, and the severely handicapped. Even though announced by the government in the FY09 budget speech, a system of fair price shops is yet to be established.

The composition of cereal consumption in Nepal differs significantly by region but rice dominates. Depending on the region, rice accounts for between 55 and 71 percent of total grain consumption (table A4.1). In the Mid-Western region, maize and wheat each make up about a fifth of the total grain basket. In the Far-West, maize is of much less importance, and wheat makes up 30 percent of the grain basket, twice the national average. But in the remaining three regions —Eastern, Central, and Western—rice makes up more than 2/3 of the basket. Since the Far and Mid-Western regions are chronically rice deficit areas, the relatively lower share of rice consumption in these areas may be by compulsion rather than choice. Coarse rice still constitutes a significant share (about 50 percent) of the total grain basket even in these areas.

TABLE A4.1 SHARE OF DIFFERENT GRAINS IN TOTAL CEREAL CONSUMPTION, BY REGION, 2003-04 (PERCENTAGES)

	Region				
Crop	East	Central	West	Midwest	Far-west
- Fine rice	12.3	35.1	15.4	4.4	3.8
- Coarse rice	56.4	30.2	52.2	50.0	51.2
- Beaten rice	2.5	2.9	2.6	1.0	0.4
Total rice	71.2	68.3	70.1	55.4	55.4
Maize	13.8	14.4	13.6	20.4	10.1
Wheat	10.4	13.7	8.6	21.2	30.4
Millet	4.6	3.6	7.7	3.0	4.0
Total grains	100	100	100	100	100

Source: National Living Standard Survey (NLSS-II); Central Bureau of Statistics.

The composition of cereal consumption also differs significantly by income group. Coarse rice makes up half the total grain consumption of the poor (table A4.2) who therefore are extremely vulnerable to increases in its price. Maize, particularly maize flour, is the next important food item for the poor, accounting for 17-19 percent of their cereal consumption. Wheat flour is slightly less important to the poorest and the richest quintiles, but constitutes

around 15 percent of the grain basket for the middle three quintiles. Millet makes up around 5 percent of the consumption of the poorer classes.

Table A4.2 Share of different grains in total cereal consumption, by income quintile, 2007-08 (percentages)

Crop	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
- Fine rice	8.4	10.5	13.9	20.2	43.8	19.3
- Coarse rice	52.5	50.8	47.1	44.9	30.4	45.2
- Beaten rice	1.0	1.4	1.8	2.6	4.7	2.3
Total rice	61.9	62.6	62.8	67.7	78.9	66.8
Maize	19.0	17.2	16.8	12.7	7.5	14.6
Wheat	13.8	15.5	14.9	15.0	10.6	14.0
Millet	5.3	4.7	5.5	4.5	3.0	4.6
Total grains	100.0	100.0	100.0	100.0	100.0	100.0

Source: National Living Standard Survey (NLSS-II); Central Bureau of Statistics.

Given that rice dominates cereal consumption in Nepal, rice price inflation has a large impact, particularly on urban consumers. For urban consumers, rice makes up 84 percent of the total grain basket (table A4.3). Rice is also important for rural consumers; coarse rice accounts for 47 percent of their total grain basket. On a national scale, 91 percent of the total coarse rice is consumed in villages mainly because 84 percent of Nepal's population lives in rural areas. On the other hand, while fine rice alone accounts for nearly half of the average urbanite's grain basket, coarse rice accounts for another 30 percent, indicating the importance of coarse rice throughout Nepal. Maize and millet together provide only 5 percent of the grain basket for urban consumers but are more important in rural areas, where they account for more than one-fifth of the grain consumption. At the national level, 96-97 percent of maize and millet is consumed in rural areas. Besides maize and millet, wheat flour, too, has a larger weight in the rural consumer's basket than in the urban consumer's basket.

Table A4.3 Cereal consumption in rural and urban areas, 2007-08

	Metric tons ('000)		Share 1		Share 2	
Crop	Urban	Rural	Urban	Rural	Urban	Rural
- Fine rice	308.6	625.6	33.0	67.0	48.7	15.5
- Coarse rice	191.3	1898.1	9.2	90.8	30.2	47.0
- Beaten rice	29.0	81.5	26.2	73.8	4.6	2.0
Total rice	528.9	2605.2	16.9	83.1	83.5	64.5
Maize	23.9	606.3	3.8	96.2	4.0	16.0
Wheat	73.0	579.6	11.2	88.8	11.5	14.4
Millet	5.7	207.1	2.7	97.3	0.9	5.1
Total grains	631.5	3998.2	13.6	86.4	100	100
Population (10^6)	4.6	23.8				

Share 1 = share of total national cereal consumption.

Share 2 = share of total rural or total urban cereal consumption.

Source: National Living Standard Survey (NLSS-II); Central Bureau of Statistics.

Net buyers of cereals constitute a substantial proportion of Nepali households and stand to lose from rising prices. For the poorest households, farm income and agricultural wages on average make up 71

percent of total income. The share of agricultural output sold in the market is generally small: 21 percent for paddy, 26 percent for wheat, 34 percent for potatoes, and 43 percent for vegetables. Most Nepalese households are net consumers of food and therefore suffer welfare losses as a result from food price inflation. This holds true not only for urban households but also for the majority of farm households whose average land holdings tend to be very small. Some of the poorest rural areas in Nepal (e.g. the Western hills and mountains) have the lowest rice yields and many households in these areas depend on purchased rice during substantial parts of the year, making them very vulnerable to price increases. It is estimated that the increase in the rice price alone has led to an increase in the poverty headcount of about 2 percentage points in Nepal (see also Chapter 2 above).

As households get richer the importance of rice and maize flour in the diet increases while wheat and millet become less important. Between 1996 and 2004, the share of rice in total cereal consumption increased for both poor and non-poor households (table A4.4). Meanwhile the shares of wheat, maize, and millet decreased.

TABLE A4.4 CHANGE IN SHARE OF DIFFERENT GRAINS IN TOTAL CEREAL CONSUMPTION, 1995/96–2003/04, POOR AND NON-POOR HOUSEHOLDS

	1995/96 Poverty line		2003/04 Poverty line		% change Poverty line	
Crop	Below	Above	Below	Above	Below	Above
- Fine rice	5.0	16.4	6.8	24.3	35	48
- Coarse rice	44.1	41.9	49.4	43.3	12	4
- Beaten rice	0.5	1.9	1.0	2.8	95	50
Total rice	49.6	60.2	57.2	70.4	15	17
Maize	23.3	13.3	23.0	11.4	-1	-36
Wheat	16.7	14.5	13.4	14.2	-20	-2
Millet	10.3	17.7	4.0	4.0	-38	-48
Total grains	100.0	100.0	100.0	100.0		
Population (%)	42.0	58.0	31.0	69.0		

Source: National Living Standard Survey (NLSS-II); Central Bureau of Statistics.

The proportion of total household income spent on food is negatively correlated with income level. Whereas on average households in Nepal spend 59 percent of their total expenditure (a convenient proxy for household income) on food, households in the poorest quintile of the population spend as much as 73 percent. These figures were derived from data from the 2003-04 Nepal Living Standard Survey (NLSS), and the share of food in total expenditure is likely to have increased significantly during the food crisis.

Food price inflation has hit the poor harder than the non-poor. Price inflation in coarse rice (the main food staple of the poorer parts of the population) has exceeded price inflation in other types of rice. During the first eight months of FY08 the price of coarse rice rose on average at 13.2 percent a month, measured on a year-on-year basis. Meanwhile the price of fine rice rose at only 4.4 percent every month. Thus, coarse rice, the "poor man's staple" has

been hit hardest with obvious consequences for poverty. Nepal is a nascent state that recently ended 13 years of conflict, and a rise in poverty and inequality could have important social repercussions.

Domestic production is sufficient to meet domestic demand for wheat and maize but not for rice. A simple comparison between cereal supply and cereal consumption would suggest that domestic cereal production exceeds demand in the case of wheat and maize, with a relatively small deficit in rice (table A4.5). However, this ignores three factors: first, post-harvest losses are in the order of 10-15 percent; second, part of the total supply of cereals is used to feed livestock and supply industry; and third, given that the comparison is based on actual human consumption patterns from National Living Standard Survey (NLSS) data, dietary requirements are not taken into account and therefore the comparison cannot show whether current demand is high enough to satisfy nutritional needs. This is especially relevant for rice since actual rice demand in Nepal is likely to be significantly below the level needed to satisfy dietary requirements. That is, a lack of purchasing power at the household level makes the rice demand-supply balance poverty-driven. This point is further illustrated by the fact that total rice consumption is highly income dependent with the poorest quintile consuming only two-thirds as much as the richest.

Table A4.5 Cereal balances in Nepal, 2007-08 ('000 MT)

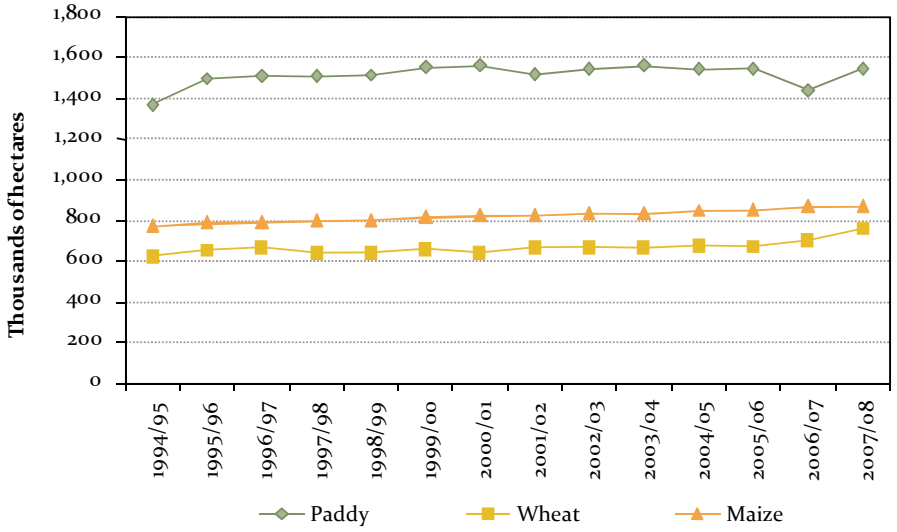
	Rice	Wheat	Maize	Millet
Consumption	3,168	663	685	218
Grain production	4,299	1,572	1,879	291
Paddy/Flour equivalent	2,838	1,289	1,634	233
Net imports	105	6		
Supply	2,943	1,295	1,634	233
Surplus/deficit	-225	632	950	15

Sources: Consumption data extrapolated from National Living Standards Survey (NLSS-II); import data from NRB (Central Bank) and Trade and Export Promotion Center (TEPC); production data from Department of Agriculture, Ministry of Agriculture and Cooperatives (MOAC).

Cereal supply at the national level has more or less kept pace with population growth. Three crops—rice (54 percent), wheat (19 percent), and maize (23 percent)—account for 96 percent of total cereal production in Nepal. Over the past decade the area under maize has shown a slow but steady increase while that under wheat and ricehas grown more slowly and erratically (Figure A4.3). Domestic production of maize and wheat has shown a near-linear increase over time and has kept up with population growth (Figure A4.4). Paddy production is more variable, due to its high dependence on the monsoon. Shortfalls in domestic paddy production are traditionally offset by imports from India. In 2008 compared to 2007, paddy production was up by 17

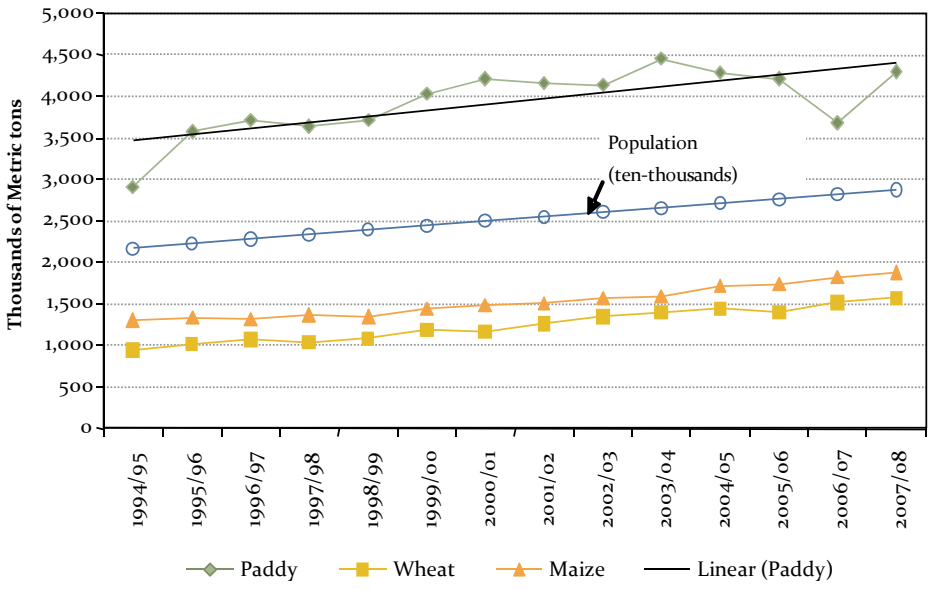
percent, while maize and wheat production increased by about 6 percent. Most of these production increases have been in the Terai, and percentage increases over 2007 are somewhat misleading given that 2006-07 was not a particularly good crop year (e.g. paddy production in 2006-07 was 12.5 percent below the 2005-06 level).

FIGURE A4.3 AREA UNDER CEREAL CROPS, 1995-2008



Source: MOAC

FIGURE A4.4 PRODUCTION OF CEREAL CROPS AND POPULATION GROWTH, 1995-2008



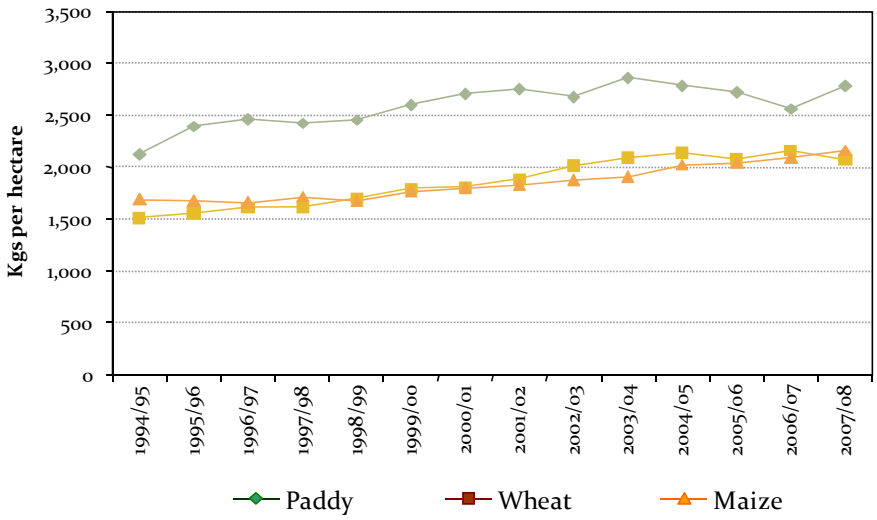
Source: MOAC

Analysis of cereal supply and demand at the national level hides large regional differences in food security. While the aggregate national supply and demand of cereals may be more or less in balance, three-fourths of the

mountain districts, 60 percent of hill districts, and about one-third of the Terai districts are classified as food deficit areas by WFP. Except in drought years, food insecurity in Nepal is largely a matter of poor accessibility and income poverty, rather than insufficiency of aggregate national production. Nepal has about twelve districts that are inaccessible by vehicle year-round, and about one-third of all districts (mostly hills and mountains) are not accessible by vehicle during the summer rainy season.

Cereal productivity growth has generally been slow. Between 2000-08, yields of rice were largely stagnant even though yields of wheat and (particularly) maize showed some limited growth (Figure A4.5).

FIGURE A4.5 CEREAL PRODUCTIVITY IN NEPAL, 1995-2008



Source: MOAC.

Cereal productivity levels in Nepal are on par with yields achieved in neighboring Indian states. At 2.7 MT/ha, rice productivity in Nepal is higher than in the neighboring Indian states of Uttar Pradesh (2.0 MT/ha), Bihar (1.5 MT/ha), and West Bengal (2.3 MT/ha) (World Bank 2005b). These three states are all considered "lagging states" in India. In terms of productivity of wheat and maize, Nepal's performance is somewhat below that of neighboring states in India.

But there exists a considerable yield gap for most crops in Nepal. Table A4.6 illustrates how low yields are in Nepal when compared with better performing states in India and with China and Vietnam.[83] This emphasizes the need to increase irrigation investments; to strengthen access to inputs, improved technologies, and appropriate farm management practices for

[83] The difference is even larger when compared with South Korea, whose average rice yields are 6.8 MT/ha.

farmers; and to increase the effectiveness of existing research, extension, and input supply systems.

TABLE A4.6 CROP YIELDS IN NEPAL AND OTHER ASIAN COUNTRIES, 2006/07

	Crop Yields (mt/ha)				
Country	Rice paddy	Wheat	Sugarcane	Pulses	Maize
Nepal					
Mountains	1.9	1.6	14.0	0.8	1.7
Hills	2.5	1.8	23.7	0.8	2.0
Terai	2.6	2.4	41.8	0.8	2.3
India					
Uttar Pradesh	2.0	2.6	58.2	0.9	1.1
Punjab	3.7	4.2	57.9	0.9	2.7
Vietnam	4.9		55.0	0.7	3.7
China	6.3	4.5	82.5	3.0	5.4

Improving irrigation facilities would increase cereal productivity. Production gains through area expansion will not be sufficient to meet future increases in demand for food. For supply to keep up with increasing demand, Nepal will have to raise its agricultural productivity considerably. The thus far slow growth in agricultural productivity in Nepal is mainly due to the slow growth of irrigation coverage: only about 10-15 thousand ha of additional land is being brought under irrigation each year. Of the total arable land in Nepal (2.65 million ha) about 1.7 million ha is irrigable (60 percent) but only just over 1 million ha is actually irrigated (40 percent). Most irrigation facilities only function during the monsoon season and are constructed to provide water to the paddy fields; only 38 percent of irrigated land has year-round irrigation. In other words, only about one-fifth of total irrigable land is currently under full year-round irrigation. This not only has resulted in low cropping intensity and low crop productivity but also severely constrains the supply response of farmers. Opportunities for expanding the area covered by year-round irrigation are high, subject to adequate water management and public resources. There exists particular potential for expanding tubewell irrigation (Pokharel 2010).

Besides irrigation, improved access to inputs is also needed to increase cereal productivity and improve supply response. Average fertilizer use in Nepal is about 30 kg/ha, which is low compared to the South Asian average of 115 kg/ha. The difficulty of access to many areas outside the Terai implies high transport costs and holds back the widespread use of yield-enhancing inputs. In Nepal's 20 most remote districts, where the private sector cannot profitably supply inputs, the government subsidizes the transport of fertilizer.[84] Higher energy prices also affect the costs of cultivation, both directly for the operation of machinery and indirectly in the form of more expensive fertilizers and other

[84] The subsidized fertilizer is shipped to the district headquarters but it is not entirely clear who ultimately benefits from it.

chemicals. Moreover, many farmers in the hills and mountains rely on their own seed production for next year's crop. Many of these seeds are of very low quality and may be diseased. Use of commercially traded high-yielding variety seeds is very low.

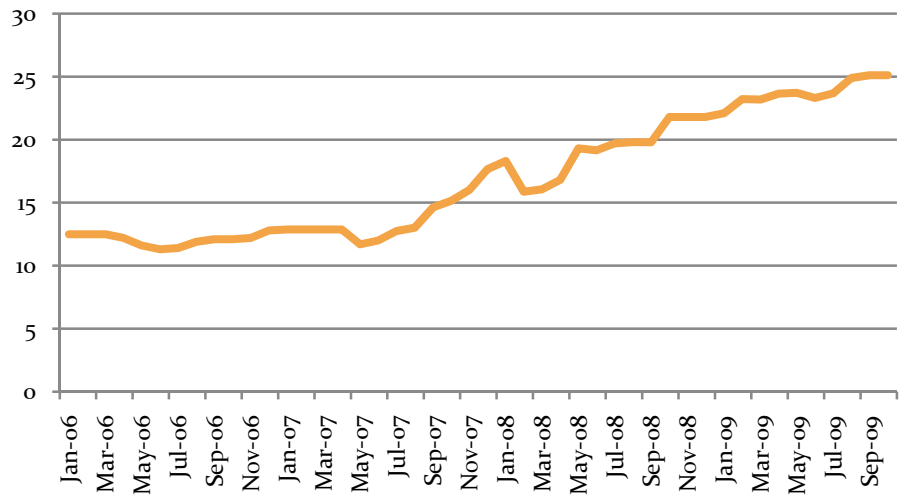
A declining trend in public investment in agriculture severely limits the supply response and farmers' ability to benefit from higher output prices. In Nepal, public spending in agriculture as a share of agricultural GDP is approximately 3 percent—lower than the average of 4 percent for agriculture-based countries, and significantly lower than in transforming countries, which invested at least 10 percent during their agricultural growth spurt (World Bank 2008a). Public spending on agricultural research and agricultural extension as a percentage of agricultural GDP is currently only about 0.15 percent and 1 percent respectively. Public investment in the irrigation sector has declined at an average annual rate of about 5 percent during the 1998-2007 period, and decreased from 0.86 percent of GDP in the 9th Five Year Plan (1997-2002) to 0.48 percent in the 10th Plan (2002-07). Long periods of underinvestment are compromising the supply response and many farmers face serious constraints on intensifying production in order to take advantage of higher output prices.

Appendix 5: Pakistan

In Pakistan, wheat is the main staple food and accounts for more than 55 percent of total caloric consumption; this share is significantly higher among the poorest households. Rice production is also substantial but is mainly for export. Food security is therefore to a large extent associated with wheat consumption and production, a fact that the government uses as a justification for intervening significantly in the wheat market. The analysis in this Appendix mainly centers on wheat.

The 2007-08 global food price crisis has profoundly affected Pakistan. Between mid-2007 and mid-2008 the price index of the overall food basket in Pakistan (124 items) increased by 35 percent. But prices of certain food staple items such as vegetables, edible oil, pulses, and milk increased by up to 50 percent, and the rice price nearly doubled. The price of wheat started rising in May 2007 and has been on an upward path ever since (figure A5.1). Because the share of total income spent on food is inversely correlated with income, food price inflation is the most regressive of all taxes, hurting the poor the most. Food price inflation contributes significantly to the general inflation in the Pakistan economy and the latter exceeded 20 percent in 2008-09.

FIGURE A5. 1 PRICE OF WHEAT (LAHORE, RS./KG)



Source: Pakistan Bureau of Statistics.

Pakistan accounts for 21 percent of South Asia's total wheat production. Wheat production in Pakistan has fluctuated widely from year-to-year but the trend is more or less flat if one considers the whole period 2000-08. This contrasts with wheat consumption, which shows a steadily upward trend, mainly due to population growth. In 2008 Pakistan needed to import significant quantities of wheat, because of a domestic production shortfall and

(especially) illegal exports to Afghanistan (see table A5.1 and also the discussion below). The situation regarding rice is quite different: on average rice production is more than double domestic consumption, resulting in sizeable and sustained exports (table A5.2).

Table A5. 1 Wheat supply and demand in Pakistan, 2007-08 ('000 MT)

Domestic availability	21,900	Feed use	400
Production	21,800	Seed use	765
Draw-down of stocks	100	Losses	1,415
Utilization	24,650	Exports (mostly informal)	2,000
Food use	20,070	Total import requirements	2,750

Source: UNDP (2008).

Table A5.2 Production and consumption of wheat and rice in Pakistan ('000 MT)

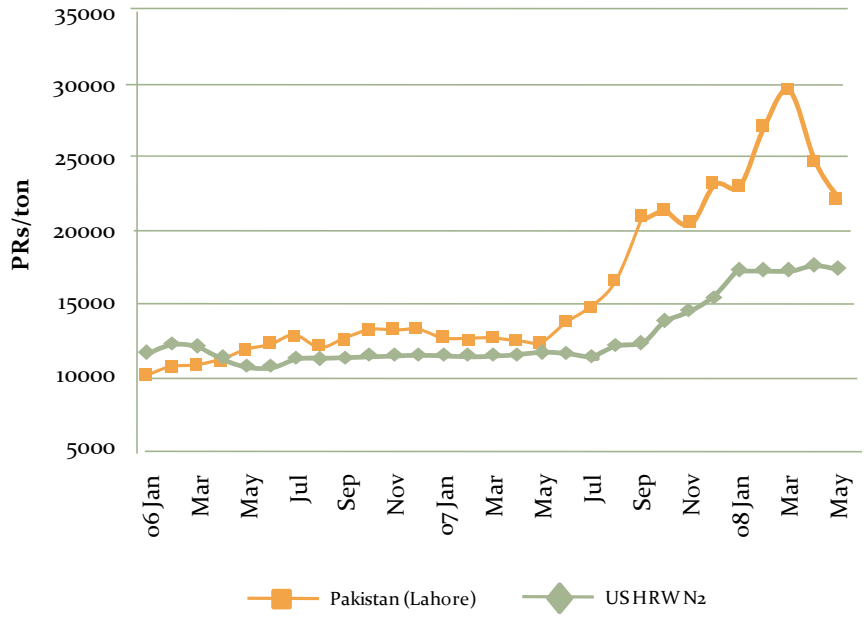
Years	Wheat production	Wheat consumption	Rice production	Rice consumption
2000/01	21,079	20,500	4,802	2,615
2001/02	19,024	19,800	3,882	2,540
2002/03	18,227	18,380	4,479	2,545
2003/04	19,183	19,100	4,848	2,595
2004/05	19,500	19,600	5,025	2,550
2005/06	21,612	20,900	5,547	1,896
2006/07	21,277	21,900	5,200	2,257
2007/08	23,300	22,400	5,500	2,450
2008/09	21,800	22,600	5,600	2,420

Source: Ministry of Food, Agriculture, and Livestock (MINFAL).

The domestic wheat price in Pakistan is influenced by developments in the international wheat market. Since wheat is the most important staple crop in Pakistan, the international and domestic price trends of wheat reveal a great deal about the food price situation in the country. In the two to three years before the food price crisis began to take off in the second half of 2007, Pakistan was self-sufficient in wheat production and even managed to export a modest amount. The sudden surge in the international wheat price that started in mid-2007 directly affected domestic wheat prices as well as supply and demand, and turned Pakistan from a net exporter into a net importer of wheat. Pakistan's domestic wheat price[85] remained stable at around Rs. 12,000 (US$182)/MT until July 2007, after which it started to rise (with occasional short periods of decline) reaching about Rs. 17,000 (US$256)/MT in July 2008, about 41 percent higher than pre- crisis levels (Figure A5.2). This sustained increase in prices was accompanied by higher volatility and increased disconnection of domestic wheat markets from the world market (figure A5.3).

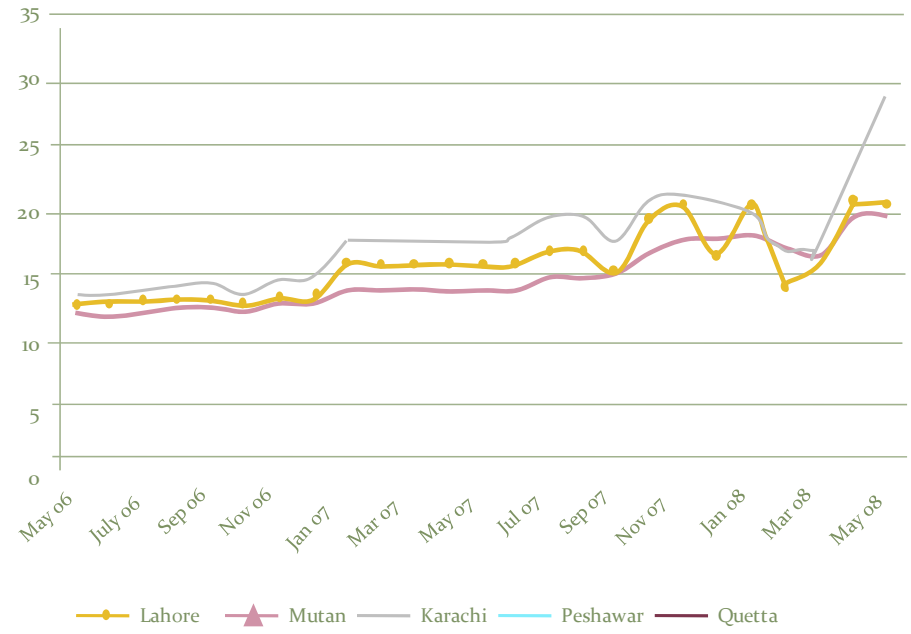
[85] The analysis uses the wheat price in Lahore.

FIGURE A5. 2 WHEAT WHOLESALE PRICES IN PAKISTAN AND WORLD MARKET



Source: Ministry of Food, Agriculture and Livestock (MINFAL).

FIGURE A5.3 PRICE OF WHEAT FLOUR IN MAJOR MARKETS IN PAKISTAN, MAY 2006 – MAY 2008



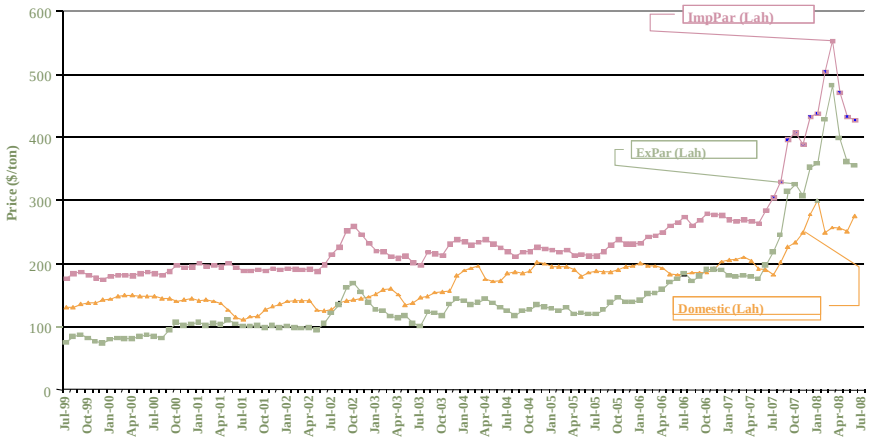
Source: MINFAL.

For wheat, the domestic price increase was not as great as the international increase. There are two main reasons why. First, while it is not quite self-sufficient, Pakistan relies largely on domestic wheat production to meet its consumption needs. Second, the government, in an effort to control

the domestic price, intervenes in the domestic wheat market, allowing only partial transmission of international prices of wheat to domestic markets.

Government intervention widened the gap between domestic and border prices. In Pakistan the state, through the provincial food departments and PASSCO (Pakistan Agriculture Storage and Supplies Corporation[86]) plays a big role in food procurement, handling, marketing, and storage. The government typically procures about 20 percent of the national wheat harvest or about 60 percent of the domestic marketable wheat surplus.[87] Between September 2007 and March 2008, the government released around 4.3 million MT of wheat into the domestic market at subsidized rates, causing a substantial gap between domestic and border (import and export parity) prices.[88] In July 2008, the domestic price of wheat was about 21 percent and 36 percent lower than export and import parity prices, respectively (figure A5.4). This in turn created a strong incentive for smuggling of wheat to neighboring countries including Afghanistan and Iran where wheat prices were substantially higher (see also Appendix 1).

FIGURE A5.4 IMPORT PARITY, EXPORT PARITY, AND DOMESTIC WHEAT PRICES



Source: Based on data supplied by P. Dorosh.

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[86] PASSCO was established in 1973 as a public limited company owned by the federal government and a number of public sector banks. Its tasks consist of procuring wheat (mainly) and other agricultural commodities, providing price support to farmers, ensuring adequate supplies in deficit areas, stabilizing prices, and maintaining strategic food reserves.

[87] The government no longer maintains rice stocks and normally does not interfere in the rice market.

[88] In a market without distortions one would expect the following relationship: the export parity price is less than the domestic price which in turn is less than the import parity price. In the case of Pakistan, the domestic price is indeed less than the import parity price but the export parity price (which is mainly determined by demand in Afghanistan) substantially exceeds the domestic price. This is the Pakistani rationale for the export ban; Pakistan has limited capacity to import wheat due to the de facto import subsidy, a precarious situation regarding foreign exchange reserves, and high current account and trade deficits.

Pakistan's public wheat procurement and distribution scheme is fiscally expensive and inefficient. The fiscal costs of the government's intervention in the wheat market are very high, mainly because it provides an untargeted subsidy to the entire population. Fiscal costs were especially high in 2007-08 due to the high costs of wheat imports. The efficiency of the government's wheat policies is low with most of the benefits of the wheat procurement and distribution scheme accruing to wheat flour millers and some traders. The current scheme has also created significant excess capacity in the wheat milling industry while crowding out private sector participation in wheat marketing.[89]

Wheat prices in Pakistan did not rise because of a domestic production shortfall. The 2006/2007 wheat harvest (in March-April 2007) set a new record, at 23.3 million MT, and together with carry-over stocks of 0.4 million MT from the previous year, meant that Pakistan had an estimated 23.7 million MT of wheat at its disposal. Against the annual domestic requirement of 22.6 million MT of wheat (estimated on the basis of fixed per capita demand for wheat with no responsiveness to changing prices), the country was expected to have around 1.1 million MT of surplus wheat for exports or to raise domestic consumption above the notional target per capita level.

The main cause of the wheat price increase in Pakistan was demand in Afghanistan. The increases in the wheat price in international markets in the second half of calendar year 2007, against the backdrop of controlled and low domestic wheat prices, created an incentive for private traders and farmers in Pakistan to export significant quantities of wheat, especially to Afghanistan where the 2008 wheat crop had failed miserably. The exports occurred legally at first, and then illegally as an export ban was imposed. The ban on private sector exports of wheat maintained domestic wheat prices in Pakistan significantly below export parity levels. As the difference between domestic and international/regional prices remained significant, hoarding increased based on expectations that the prices would rise further. As much as 1.5 million MT of wheat (some even claim up to 2 million MT) may have been smuggled to neighboring countries (primarily Afghanistan) where prices were significantly higher. This ultimately reduced domestic availability and raised domestic wheat prices.

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[89] The private sector handles less than 10 percent of the wheat produced, or about one-fourth of the marketable surplus (about 2 million MT). Traders and millers (the latter to supplement quotas given by the government) buy from farmers only after the procurement target is achieved (usually after June). Since both existing and new flour mills are eligible to receive government quotas, the number of flour mills in Pakistan has grown substantially, especially in border areas with Afghanistan where much wheat flour is smuggled. This overcapacity has led to a situation where a large number of mills operate only when subsidized wheat from government stocks is available.

Wheat remains expensive in Pakistan even after the food crisis. Unlike in most other South Asian countries, where prices of food staples came down significantly starting in late 2008/early 2009, wheat in Pakistan has remained more expensive than ever with prices some 60 percent higher than before the onset of the crisis (and in fact more expensive than during the crisis itself). As explained below, this is to an important extent due to policy failure.

Pakistan has insufficient agricultural policymaking capacity. Part of the need for wheat imports in 2008 stemmed from the fact that even though the government had raised the public procurement price for the 2008 harvest to US$240/MT (up from US$163/MT for the 2007 crop), it delayed the price announcement until April 2008.[90] As a result, the increase in the procurement price failed to affect the 2008 wheat harvest. To give farmers an incentive to grow more wheat and sell to the domestic market instead of smuggling and hoarding, the government raised its procurement price further, to about US$300/MT for the 2009 wheat crop, alas at a time when wheat prices in the international market had declined to much lower levels. These examples of policy failure point to the urgent need to improve agricultural policymaking capacity in Pakistan. In the 1970s and 1980s Pakistan had a number of well-respected institutions that carried out sound economic policy analysis. Most of this policy analysis capacity has been lost over time. There is also an urgent need for better information sharing; in particular, the government's capacity to monitor and analyze market developments needs strengthening, through the establishment of systems that more effectively share market and policy change information with the private sector.

The food price increase had a substantial impact on the poor. With between 17 and 38 percent of Pakistani households classified as poor,[91] and 56 percent of the total population classified as vulnerable (i.e. poor or likely to become poor in the case of an external shock), the food crisis had a direct and significant impact on poor and vulnerable people. Estimates based on the 2004-05 Household Income and Expenditure Survey and discussed in Chapter 2 above suggest that the national poverty headcount has increased by about 3 percentage points, though with large regional differences,[92] based on a simple

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[90] The government is supposed to announce the procurement price for the following year's harvest in September of each year to provide a clear signal to farmers well before planting commences.

[91] There is an ongoing debate regarding Pakistan's poverty headcount figure. The figure reported by the World Bank is 17 percent but the Planning Commission of the Government of Pakistan reports 38 percent. Part (but certainly not all) of this discrepancy has to with the timing of measurement (i.e. before or after the food crisis) which is important given that a high percentage of households live close to the poverty line.

[92] For example, the increase is as much as 8.4 percent in NWFP. This is because NWFP is the province with the largest wheat deficit and therefore most vulnerable to changes

net buyer-net seller analysis, and by about 2 percentage points when second-round effects are also taken into account. These results suggest that an additional 3-5 million people may have fallen below the poverty line as a result of the increase in food prices alone.[93]

Besides their effect on income-related poverty, higher food prices affected household welfare in non-monetary ways as well. Food price inflation raised the share of total income spent on food to 70 percent or more for the poorest families, severely constraining their ability to meet other essential needs such as health and education. Poor households also tend to change their diets away from protein and micro-nutrient rich foods in an effort to keep up their calorie consumption. These efforts are not always successful: according to UNDP (2008) the number of undernourished people in Pakistan may have risen by as much as 12 million (figure A5.5). The same 2008 UNDP report also maintains that the price shocks were most strongly felt in urban areas, where presumably up to two-thirds of the households were affected. Poor people in rural areas were affected less severely than the urban poor because each year farmers keep around 60 percent of their wheat crop for their own consumption and also as in-kind payments to agricultural laborers. On the other hand, many rural households in wheat-deficit provinces in the Western part of Pakistan have also been adversely affected. In all provinces, wage increases have been considerably below the increases in wheat prices (figure A5.6). The purchasing power of urban people in wheat deficit provinces was affected the most (table A5.3).

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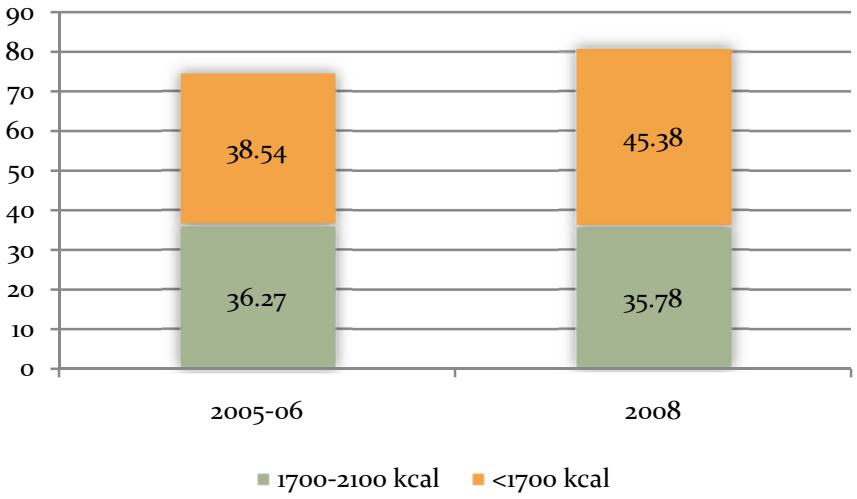
in wheat prices. This is exacerbated by porous borders with Afghanistan which made sure that a sizeable proportion of the wheat allocated by the government never reached its intended beneficiaries.

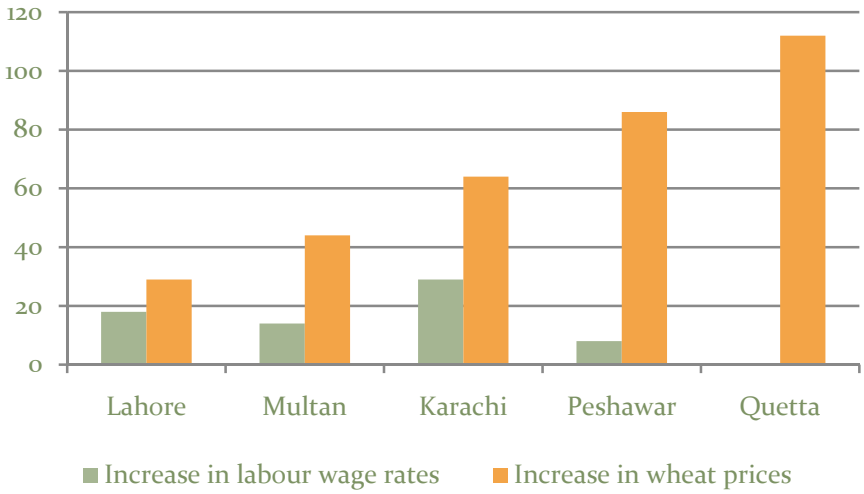
[93] Based on different methods than ours, other estimates regarding the additional number of people who have fallen into poverty as a result of higher food prices are much higher. For example, an analysis carried out by the Asian Development Bank for Pakistan (ADB 2008) found that a 10 percent increase in food prices would result in an additional 7 million people falling below the poverty line—suggesting that an additional 15 million people may have fallen below the poverty line in 2007-08 primarily because of food price inflation. Haq and others (2008) put the number at about 10 million. According to an UN Inter-Agency Assessment (UNDP 2008) and as a result of the food crisis, the share of the population that is severely food-insecure has increased from 23 percent in 2006 to 28 percent in 2008.

FIGURE A5.5 CHANGES IN NUMBERS OF UNDERNOURISHED PEOPLE RESULTING FROM THE FOOD CRISIS



Source: UNDP (2008).

FIGURE A5.6 INCREASES IN WHEAT PRICES AND WAGE RATES (PERCENT), MAJOR CITIES



Source: UNDP (2008).

TABLE A5.3 TERMS OF TRADE BETWEEN LABOR AND WHEAT, MAJOR CITIES, JUNE 2008

City	Wheat flour in kg/ one day wage labour
Lahore	14.5
Multan	10.0
Karachi	12.1
Peshawar	7.4
Quetta	10.0

Source: UNDP (2008).

The fiscal impact of the food crisis in Pakistan has been substantial. In the 2007/08 fiscal year, the government spent around Rs. 55 billion (US$750 million[94]) on wheat imports and distribution of subsidized flour to poor people through the Utility Stores Corporation outlets. In the same year the total outlays for the Bait-Ul-Mal scheme[95] and the Punjab Provincial Food Support Program were about US$100 million and US$350 million, respectively. The government also earmarked Rs. 34 billion (about US$500 million) for the Benazir Income Support Program for 2008-09. Fertilizer subsidies (mainly on di-ammonium phosphate or DAP) also became an increasingly large fiscal burden because of increased world market prices. The fiscal sustainability of such large spending is uncertain given Pakistan's already precarious macroeconomic situation.

The government responded to the food price increases in several ways. In response to the food price crisis in general and the escalating wheat price in particular, the government implemented a series of policy and trade measures in an effort to control the price increases and improve the domestic availability of wheat. These measures included: (i) a ban on wheat exports and increased border surveillance in an attempt to curb wheat smuggling; (ii) temporary restrictions on movement of wheat between provinces in another attempt to combat smuggling; (iii) removal of the 10 percent import duty on wheat, allowing private traders and millers to import freely; (iv) government imports of wheat from the international market to the extent of 1.7 million MT (at an average price of more than US$400/MT), which were subsequently sold in the domestic market at subsidized rates; (v) imposition of a minimum export price of rice; (vi) subsidies on imported fertilizers (particularly DAP); (vii) supply of subsidized wheat flour to the poor through Utility Stores Corporation outlets;[96] and (viii) various cash transfer schemes such as the Benazir Income Support Program (popularly known as the Benazir Card), the Punjab Provincial Food Support Program, and other programs such as the Bait-Ul-Mal and Zakat schemes.

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[94] An exchange rate of US$1 = Rs. 66, which prevailed during most of the food crisis, was used.

[95] The Bait-Ul-Mal scheme is a cash transfer scheme which pays very poor families about US$4/month/child, conditional upon keeping their children of 5-12 years of age in school.

[96] The Utility Stores (about 4,500 outlets, of which about one-third are in urban and two-thirds in rural areas) were established in a reaction to the food crisis. Together in 2008 they marketed about 1.6 million MT of wheat (about 25 percent of total marketed surplus) but without much explicit targeting. The amount allowed per family is only 5 kg/month and the geographical coverage is limited. The price of wheat flour in the Utility Stores in 2008 was around Rs. 13/kg, about 32 percent lower than the market price prevailing at the time.

To enable the government to scale down its public wheat procurement and distribution program, improvements in existing social safety net programs are needed. Pakistan traditionally has had a number of targeted safety net programs meant to primarily serve the chronic poor, ranging from (unconditional) cash transfers to social care services and microfinance programs. These mainly include the Food Support Program (the so-called Bait-Ul-Mal scheme) covering 1.8 million households at Rs. 3,000 per household per year; the Punjab Provincial Food Support Program covering 1.8 million households with cash transfers of Rs. 1,000 per household per month; and the Zakat and Ushr schemes. The programs are fragmented and duplicative and their aggregate coverage is relatively low (about 13 percent of the total population). More importantly, they are poorly targeted[97] and therefore have relatively little impact on poverty and vulnerability. Administrative arrangements for cash transfers, especially for payment systems, are inadequate and capacity for implementation and for monitoring and evaluation is low, negatively affecting program efficiency and service delivery. Beneficiaries face hurdles in accessing funds after being approved for assistance, and at times have to pay bribes to obtain their benefits. Weak human and technical capacity at payment centers often results in delays in payment reconciliation, contributing to overall delays in program payments. Thus, there is a need to adopt an improved targeting tool to raise the efficiency, effectiveness, and transparency of these programs.

The new Benazir Income Support Program is an important initiative for assisting the poor. This cash transfer program offers a monthly payment of Rs. 1,000 to qualifying households. In 2010-11 it is supposed to cover about 7 million households or about one-quarter of Pakistan's total population. The World Bank is currently assisting the government in the design of appropriate targeting mechanisms based on proxy-means testing. A pilot project is under implementation.

The future development of food price inflation and food security in Pakistan depends on a wide range of factors. Principal among these factors are international cereal prices; the wheat supply situation in Afghanistan (and India to some extent); domestic wheat policies; and the effectiveness of planned assistance to affected population groups. Promotion of a more competitive domestic market for wheat is essential, including ensuring access to credit for farmers, avoiding limits on private storage, and maintaining clear and consistent policy signals to increase the efficiency of production as well as marketing and trade. Pakistan's current policy of procuring a large share of the

[97] For example, only 46 percent of Bait-Ul-Mal's total expenditure (and 43 percent of total Zakat funds) reach the poorest 40 percent of the population. Respectively 25 and 32 percent of resources distributed by Bait-Ul-Mal and Zakat accrue to non-poor households.

marketed surplus of wheat, maintaining large public grain reserves, and selling most of the procured wheat to millers at subsidized prices warrants serious re-thinking.[98] The experience in Bangladesh has shown that a policy package consisting of liberalization of private sector-led international trade, giving clear signals regarding tariffs and import restrictions while ensuring a level playing field with no special advantages for government agencies, can go a long way in making up for shortfalls in domestic production of staple foods.

In the long term the only way to lower food prices in Pakistan is to reduce unit production costs by increasing productivity. During 2000-08, production of wheat in Pakistan grew by 0.3 percent per year but consumption grew by 1.2 percent per year, mainly driven by a population growth rate of nearly 2.5 percent per year—the highest rate in South Asia. Even though wheat yields have shown a slight upward trend, even the Punjab (Pakistan's best wheat growing area) produces only about 2.5 MT/ha on average, compared to about 4 MT/ha in the Indian Punjab, suggesting a substantial yield gap.

Achieving sustained productivity increases requires investing in agricultural research and extension. Sustained productivity increases can be achieved by actively supporting agricultural research and extension, including developing improved crop varieties and crop management technologies and promoting these in farmers' fields. Subsidies to adapt and spread certain existing technologies (e.g. fertilizer placement equipment, laser land leveling, drip and pressure irrigation) can be an acceptable strategy in the short run, especially where smallholder farmers are explicitly targeted. But in the medium- and long run there is no substitute for rebuilding an efficient, demand-led agricultural research system that can generate a flow of new technologies on a continuous need basis in order for the agricultural sector to maintain its competitiveness. Unfortunately, Pakistan's research and extension systems have significantly deteriorated. Spending on agricultural research in Pakistan declined by 40 percent between 1991 and 2003 and is now 30 percent lower than in Bangladesh.[99] Higher food prices present a unique opportunity to start reinvesting in agricultural development in Pakistan.

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[98] Reducing the volume of procured wheat and subsequent intra-annual sales would have little adverse effect on consumers, because wheat flour produced from government wheat is typically sold at open market prices anyway with millers reaping most of the profits.

[99] See Beintema and others (2007).

Appendix 6: Sri Lanka[100]

In Sri Lanka, rice is the principal staple food item, accounting for 39 percent of total dietary energy supply (average of 2003-05 data). Sri Lanka is not self-sufficient in rice: it imports on average about 5 percent of its total requirement even though this percentage has varied between 1 percent and 20 percent over the past two decades. Though rice has become less important over time (Table A6.1), it remains the largest single category in total food expenditure (together with fish). In 2006, the latest year for which detailed household expenditure data are available, the average person spent about Rs. 250 per month on rice (US$ 2.50), equivalent to 12.8 percent of total food expenditure. Per capita consumption of rice is 105 kg/year (average of 2004-08) or about 300 grams per day, which provides about 1,000 calories—or almost half of the average total daily calorie intake. Given the importance of rice in Sri Lanka, much of the discussion in this Appendix focuses on rice.

TABLE A6.1 SPENDING ON MAIN FOOD ITEMS, AND SHARE OF TOTAL FOOD CONSUMPTION, 2001 AND 2006

	Rice	Vegetables	Milk and Milk Products	Fish	Condiments
2001					
Monthly Per Capita Expenditure (Rs)	251	145.1	116.7	148.9	126.9
Share of Total Food Consumption (%)	17.1	9.9	7.9	10.1	8.6
2006					
Monthly Per Capita Expenditure (Rs)	252.56	211.4	188.1	252.3	179.9
Share of Total Food Consumption (%)	12.8	10.7	9.5	12.8	9.1

Source: Household Income and Expenditure Surveys 2001-02 and 2006-07, Department of Census and Statistics.

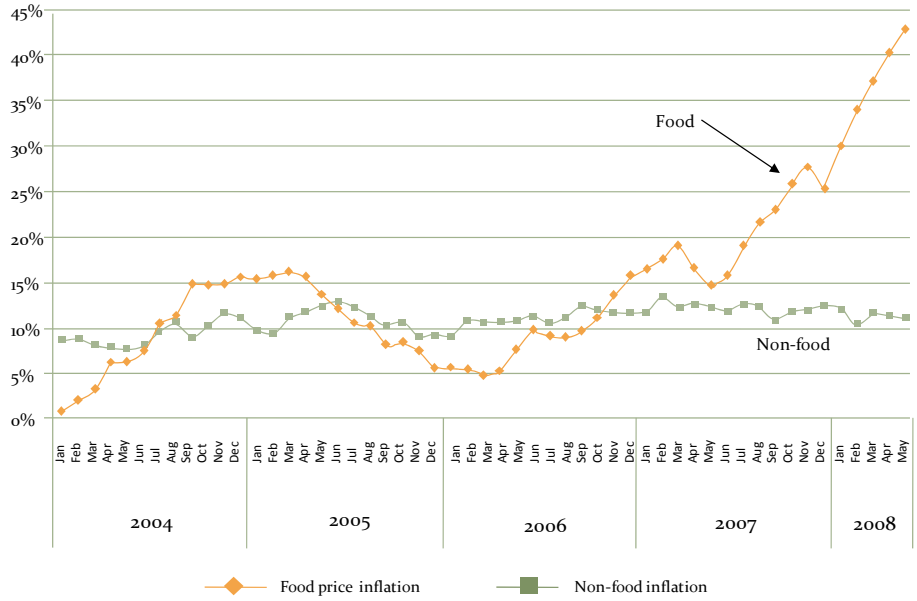
Food price inflation in Sri Lanka during the food crisis was substantial. According to data from the Department of Census and Statistics (DCS), average food prices were 40 percent higher in April 2008 than a year earlier. Food makes up 46.7 percent of the total Consumer Price Index (CPI) basket and contributed three-quarters to the total annual increase in the CPI, which came to 25 percent in April 2008.[101] As in other South Asian countries, non-

[100] This Annex is partially based on a note prepared by a World Bank team consisting of Kirthisri Wijeweera (SASEP), Terrence Abeysekera (SASDA), Susrutha Goonasekera (SASSP), Mohamed Ihsan Ajwad (SASSH), and Claus Astrup (SASEP).

[101] DCS does not publish data for individual sub-components of the food price index, but price data for certain commodities—notably rice—are available from other sources as discussed below.

food price inflation in Sri Lanka used to be higher than food price inflation. However, after mid-2006 this situation reversed and food price inflation substantially exceeded non-food price inflation (Figure A6.1).

FIGURE A6. 1 FOOD AND NON-FOOD PRICE INFLATION IN SRI LANKA, 2004-08



Source: Department of Census and Statistics.

The increase in food prices had a particularly severe impact on households who were poor prior to the price increases. According to the 2006-07 Household Income and Expenditure Survey (HIES) just over 15 percent of the population lived below the poverty line in 2006, compared to nearly 23 percent in 2001. A poverty assessment carried out by Bank staff based on the 2001-02 HIES data shows that a large share of the population is clustered around the poverty line, implying that relatively small changes in per capita consumption can lead to relatively large changes in poverty rates. Simulations based on the same HIES[102] indicate that a 10 percent decline in per capita consumption would lead to a 6 percentage point increase in the poverty headcount ratio. According to the 2006-07 HIES, the average poor person consumes about 1,696 kilo calories (kcal) per day, significantly below the recommended norm of 2,030 kcal. The urban poor are among those with the highest calorie deficits, consuming about 1,316 kcal per day, while the rural poor and the poor in the estate sector consume about 1,686 and 1,984 kcal respectively. The Demographic and Health Survey held in 2000 estimated that 29 percent of all children are underweight and 14 percent are stunted.

[102] Summary statistics from the 2006-07 HIES published by the Department of Census and Statistics suggest that inequality has not changed much since 2001-02, implying that the vulnerabilities to income/consumption shocks that were observed in 2001-02 are continuing.

Malnutrition is highly correlated with household welfare, with children from the poorest households being 2.8 times more likely to be underweight than children from the richest households. Maternal undernutrition, too, is high, at 23 percent.

The food price crisis has likely reversed some of Sri Lanka's earlier poverty reduction achievements. As in other South Asian countries, the average share of food in total household expenditure in Sri Lanka is likely to have substantially increased during the period of the food crisis. To accommodate additional food expenditures, households would have had to compromise on other expenditures—including on clothing, healthcare, transport, and education. Poor households in rural areas and the estate sectors were probably most affected. A rapid impact survey conducted by WFP in the North and the East of Sri Lanka indicated that 62 percent of households reacted by purchasing less preferred foods, 68 percent started buying food on credit, and 41 percent sold household assets. The same WFP survey indicated that 80 percent of all households reduced their meal size, 61 percent reduced the number of meals consumed per day, and 30 percent of households would occasionally go an entire day without a meal. To the extent that these coping strategies would have an irreversible impact on nutrition and health, they may entrench intergenerational poverty transfer.

Safety net programs exist in Sri Lanka but they are limited in scope. In Sri Lanka about 2 million households receive cash transfers under two different government safety net programs. The main program is the *Samurdhi* program which provides benefits (cash and food stamps) to qualifying households that are identified through community-based targeting. The program provides benefits to about 1.7 million households and has a budget of about Rs. 9.2 billion (US$90 million) per year. The *Samurdhi* program has been criticized for its targeting performance: even though it covers 41 percent of the population, it excludes 40 percent of the households in the poorest expenditure quintile.

The second significant safety net program is the *ping padi* program implemented by the Provincial Social Service Ministry under the policy umbrella of the Ministry of Social Services and Social Welfare. This program provides income transfers and social services to the most disadvantaged and vulnerable groups, including the elderly, widowed, and disabled poor people. The benefits of this program have not been revised since 1988 and are much smaller than the benefits granted under the *Samurdhi* program, amounting to only between Rs. 100 and Rs. 300 (US$1-3) per person per month depending on the number of dependants in the household. The program reaches about 630,000 people and the annual fiscal costs amount to about US$15 million. Around 250,000 people receive benefits exclusively from the *ping padi* program while 380,000 people receive the *ping padi* benefits in addition to other social

assistance programs (including *Samurdhi*). The *ping padi* program is better targeted than the *Samurdhi* program. Public resources allocated to safety nets have decreased in recent years, from almost 1.6 percent of GDP in 2001 to 1.1 percent of GDP in 2004 and to only 0.3 percent of GDP in 2008.

International rice prices influence the domestic rice price in Sri Lanka. In early April 2008, the average wholesale price for a kilo of Samba rice[103] peaked at Rs. 83 compared to Rs. 38 per kilo a year earlier—an increase of 140 percent. The price hike mostly reflected international price trends, but it may have been exacerbated by the fact that the country's import volumes were significantly higher during November 2007-February 2008—exactly at the time when international prices escalated dramatically. Domestic production declined in 2007 compared to 2006, and combined with enhanced uncertainties about available supply from international markets, this led to some "precautionary" buying of rice in early 2008 and to upward pressure on domestic prices. A continuation of the fertilizer subsidy cushioned farmers from the hike in international fertilizer prices—albeit at a significant fiscal cost. Based on numerical evidence from other South Asian countries it is likely that also in Sri Lanka the majority of households (including large numbers of rural households) are net rice buyers, and therefore suffered welfare decreases during the food crisis.

The domestic rice price in Sri Lanka typically follows and exceeds the international price but during the food crisis this trend was broken. Despite similarities in trends, the domestic rice price has traditionally exceeded the international price by a substantial margin (on average by 48 percent since 1990) even though the wedge has been reduced in recent years (figure A6.2). The wedge between the domestic and international price of rice protects the domestic rice market and is implemented mainly through import tariffs which average about 35 percent.[104] However, during the peak of the food crisis (March-September 2008) domestic rice prices in Sri Lanka were kept significantly below international prices, mainly as a result of government price controls (figure A6.2). On April 13, 2008, the government capped the retail price of Samba rice at Rs. 70 per kilo, about 30 percent below the market price prevailing at the time. In defending the decision to impose a price cap, the government argued the need to protect consumers, noting that there was a strong speculative element in domestic prices while accusing millers and wholesalers of collusion. Earlier (in October 2007) the government had already

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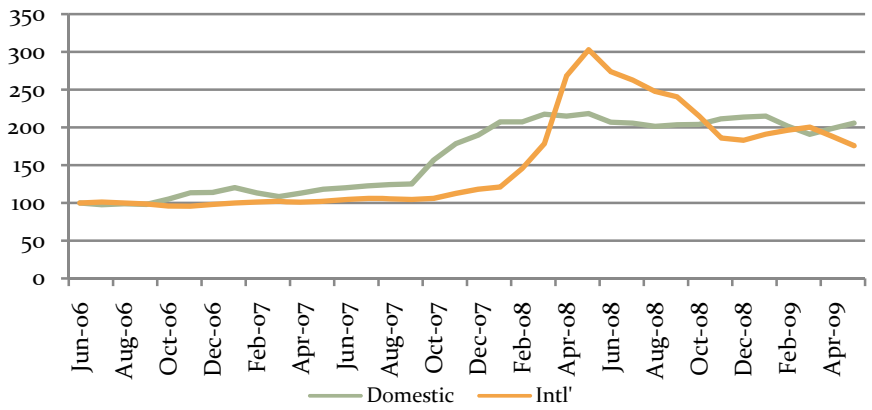
[103] Price data for rice concerns the higher quality short grain Samba rice, as opposed to the lower quality long grain Nadu rice.

[104] Import taxes have also been used intermittently to stabilize domestic prices and as such are subject to frequent changes. The protection of the domestic rice market has reduced the incentive for farmers to produce rice for export, and even though Sri Lanka has never imposed a ban on rice exports, the country does not actually export rice.

abolished the import duty on rice, at an estimated fiscal cost of 0.3 percent of GDP. Domestic rice prices started to exceed international prices again early in 2009.

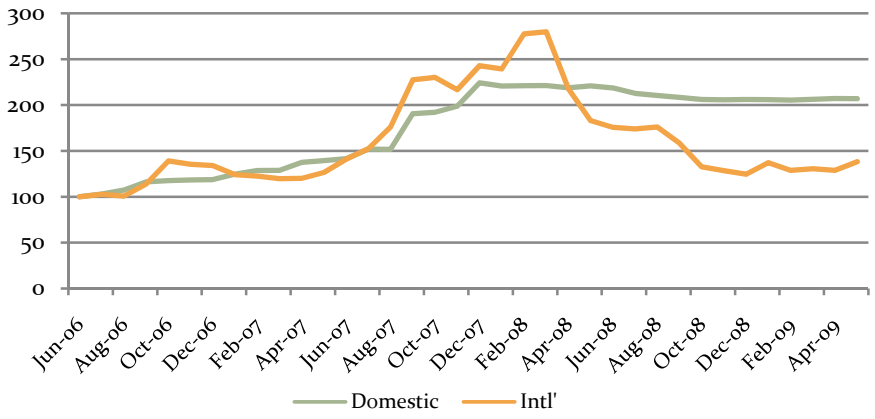
FIGURE A6. 2 RICE PRICE INDICES IN SRI LANKA



Source: Own calculations based on data from Department of Censsus and Statistics.

Wheat price increases also contributed substantially to food price inflation. Even though Sri Lanka does not produce wheat, the latter has become an important food staple in both rural and urban areas. Wheat and wheat products accounted for 15 percent of total dietary energy supply in 2003-05. On average during 2004-08, per capita consumption (as food) of wheat and wheat products was 52 kg/year, equivalent to about 25 to 30 percent of total cereal consumption. Since all wheat is imported, the domestic price of wheat was allowed to increase in line with the international price during the initial phase of the food crisis in 2007. However, as the world market price continued increasing in 2008, domestic prices were stabilized through price controls. After the international wheat price collapsed in the second quarter of 2008, domestic prices were allowed only a modest decrease and were kept at levels substantially above the world market price (figure A6.3).

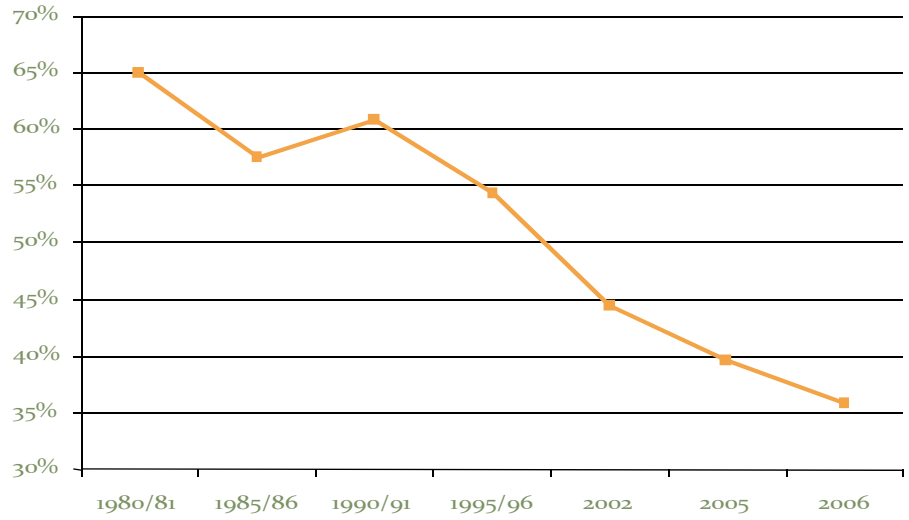
FIGURE A6. 3 WHEAT PRICE INDICES IN SRI LANKA



Source: Own calculations based on data of Department of Census and Statistics.

The share of food in total consumption has declined steadily. In 2006-07, food took 35.8 percent of the average household's total expenditure, down from 60.9 percent in 1990 (figure A6.4). But as in other South Asian countries, food accounts for a much larger share of total expenditure among the poor than among the more affluent. For the two poorest deciles, the food expenditure ratio is about 60 percent, and for about half the population in Sri Lanka food takes more than 50 percent of total spending. This makes the poor particularly vulnerable to food price inflation.

FIGURE A6. 4 AVERAGE SHARE OF FOOD IN TOTAL HOUSEHOLD EXPENDITURE



Source: Department of Census and Statistics.

The composition of food spending has changed significantly over time. The average share of rice in total household expenditure declined from 31.5 percent in 1981 to 12.8 percent in 2006. During the same period the expenditure shares of milk and fish increased: fish accounted for 8.1 percent of consumption expenditure in 1981 but had increased to 12.8 percent by 2006, while the share of spending on milk rose even more sharply, from 3.3 percent in 1981 to 9.5 percent in 2006. Most changes in the composition of household expenditure can be attributed to changes in the relative prices of various food items, given only limited changes in the quantities consumed. For example, annual per capita rice consumption has only declined modestly from 114 kg in 1981 to about 105 kg in 2006. Similarly, annual per capita consumption of fish has also remained relatively stable, at 13.5 kg in 2006 compared to 12 kg in 1981. Table A6.2 shows aggregate consumption levels of major food items based on the two most recent household expenditure surveys.

TABLE A6. 2 AGGREGATE NATIONAL CONSUMPTION OF KEY FOOD ITEMS ('000 MT)

Food Item	Variety	2001-02	2006-07
Rice	Samba	414.2	408.9
	Nadu	663.7	656.3
	Red Rice (*Kekulu)*	721.8	1020.9

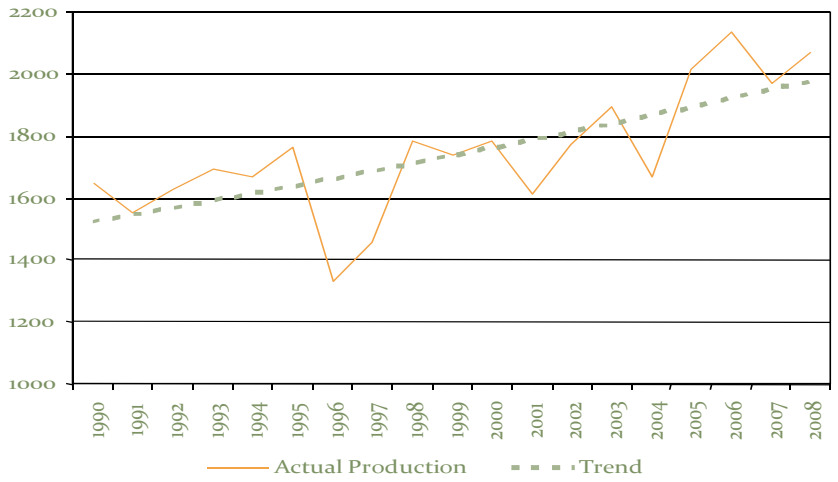
Food Item	Variety	2001-02	2006-07
Vegetables		458.5	476.6
Condiments		182.4	308.5
Milk Products	Fresh Milk (Mill liters)	20.1	22.1
	Powdered Milk	65.9	85.0
	Infant Milk	5.7	6.0
Fish Products	Fresh Fish	159.6	197.0
	Tin Fish (salmon)	13.3	11.9
	Dried Fish	74.1	77.6

Source: Department of Census and Statistics, Household Income and Expenditure Surveys 2001-02 and 2006-07.

Rice production shows an increasing trend. Rice production has increased steadily during the last two decades but with occasional drops (figure A6.5). The drops experienced in 1996, 2001, 2004, and 2007 were primarily due to adverse weather. In 2007, the decrease in output was also partly due to intensification of military operations in the Eastern part of the country (which accounts for more than one quarter of the country's total rice production). The land area cultivated in the Eastern Province during the *maha* and *yala* seasons[105] dropped by 35 percent and 18 percent, respectively, in 2007. This led to corresponding production decreases of respectively 7.7 percent and 4 percent. Heavy rains during the 2007 *yala* harvest season also played a role and damaged the crop in several paddy growing districts. But in 2008 rice production recovered: the 2008 *maha* paddy harvest was 2.1 million MT—a 5 percent increase over 2007 and about 6 percent higher than the average trend value (figure A6.5). The recovery was mainly due to favorable rainfall during the North-Eastern Monsoon period and occurred despite excessive rainfall and flooding in the Eastern Province. But increased farm gate prices also played an important role and led farmers to sow 6.3 percent more area than in 2007 during the *maha* season.

[105] The *maha* (major rainy season) harvest in the spring contributes 60-70 percent of total annual rice production, while the *yala* (minor rainy season) harvest in the fall accounts for the remaining 30-40 percent.

FIGURE A6. 5 PADDY PRODUCTION DURING THE *MAHA* SEASON (MILLION MT)



Source: World Bank staff calculations.

Past growth in rice production has been driven by yield increases. Rice production increased by an average of 1.2 percent per year over the period 1990-2008, by virtue of an annual increase in yield of 1.4 percent and a small decline of 0.2 percent per year in area harvested (table A6.3). Since 2000, rice productivity has increased at more than twice the rate of the previous decade (1.9 percent per year as opposed to 0.7 percent per year from 1990-99). The increase is explained by increased mechanization of paddy production and by the gradual introduction of higher yielding varieties that are better adapted to the country's diverse agro-climatic conditions.

TABLE A6.3 GROWTH IN RICE PRODUCTION, AREA, AND PRODUCTIVITY

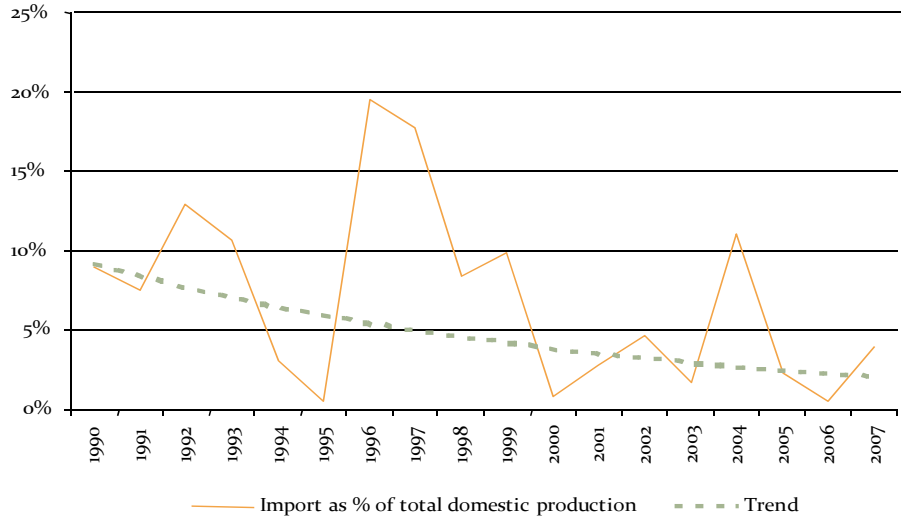
	Average annual change in production (%)		
	Maha	**Yala**	**Total**
1990-2008	1.3	1.6	1.2
1990-1999	0.6	2.7	1.4
2000-2008	1.9	1.0	1.3
	Average annual change in harvested area (%)		
	Maha	Yala	Total
1990-2008	0.5	-0.4	-0.2
1990-1999	0.4	1.0	0.6
2000-2008	0.8	-1.0	-0.5
	Average annual change in productivity (%)		
	Maha	Yala	Total
1990-2008	0.8	2.0	1.4
1990-1999	0.1	1.7	0.7
2000-2008	1.0	2.0	1.9

Source: Central Bank of Sri Lanka and World Bank staff calculations..

Sri Lanka is almost self-sufficient in rice. Historically, imported rice has accounted for less than 10 percent of total supply (figure A6.6) and Sri Lanka seems to be moving closer to self-sufficiency. Since the year 2000, imported

rice has accounted for less than 5 percent of total domestic supply on average.[106]

FIGURE A6. 6 SHARE OF IMPORTS IN TOTAL RICE SUPPLY

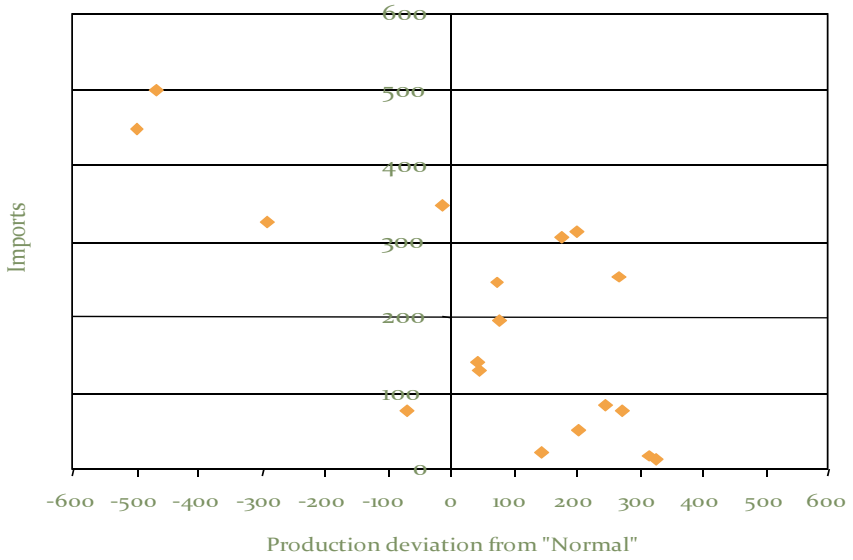


Source: Based on Central Bank data.

Imports of rice serve as a buffer against domestic production variation but do not usually cover the full shortfall in supply. Rice import levels vary significantly from year to year in response to changes in domestic production. That is, imports serve as a buffer against poor harvests, resulting in a significant negative correlation between "excess" domestic production—defined as the difference between actual and trend production—and import volumes (figure A6.7). On average, imports cover only about 50 percent of the domestic production shortfall.

[106] The exception was 2004 when due to a poor harvest imports made up almost 8 percent of total supply.

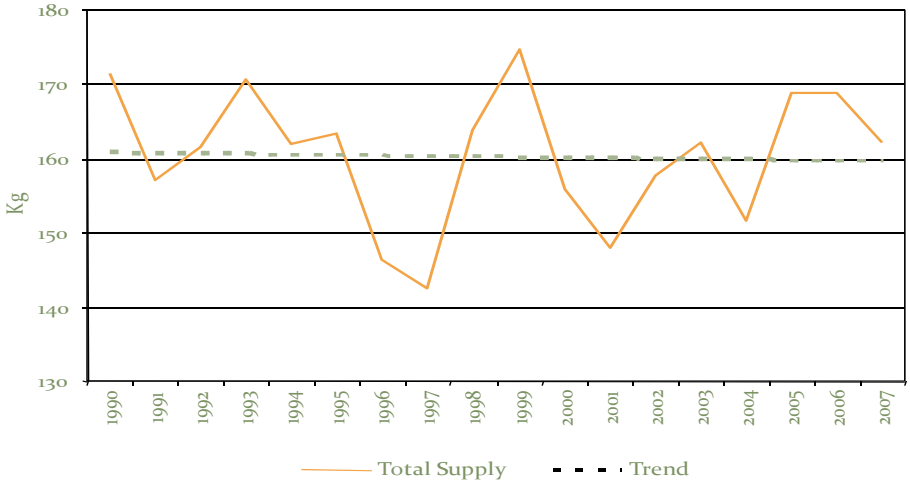
FIGURE A6. 7 RICE IMPORTS AND DEVIATIONS OF DOMESTIC PRODUCTION LEVELS FROM TREND



Source: World Bank staff calculations.

Per capita supply of paddy has remained relatively stable during the last two decades. Total available paddy—i.e. domestic production plus imports—amounted to 162 kg per capita in 2007, which was slightly above the long-term average of 160 kg per capita (figure A6.8). Subtracting allocations for rice seed and processing wastage, which historically amount to about 9 percent, and converting the paddy into rice-equivalents (using a rice/paddy conversion ratio rice of 1:1.47) suggests that in 2007 the total available rice per capita was about 105 kg.

FIGURE A6. 8 PER CAPITA PADDY SUPPLY (KG/YEAR)



Source: World Bank staff calculations.

Appendix 7: Availability of Agricultural Price Data for South Asian Countries

FAO is the most reliable and comprehensive source of agricultural price data. Time series data for many countries regarding the overall food price index are available at <http://www.fao.org/worldfoodsituation/ FoodPricesIndex/en/>. FAO's Giews (Global Information and Early Warning System) database[107] contains domestic price data for wheat and rice. International prices of agricultural commodities that are substantially traded in international markets can be found at <http://www.fao.org/es/esc/prices/PricesServlet.jsp?lang=en>. FAO for its price data depends on the statistical agencies (national and international) and/or ministerial departments that collect and publish such data.

While most South Asian countries manage to keep domestic price information relatively current for the major grains (especially wheat and rice which are the major staple foods throughout South Asia) this is not the case for other food subgroups and individual food commodity items. In other words, for food commodities other than rice and wheat, data regarding domestic price developments typically become available only with a considerable time lag. One reason for the superior availability of domestic price data for rice and wheat is that domestic rice and/or wheat markets in most South Asian countries are subject to substantial government intervention for which up-to-date data availability is a must. But with the exception of India, which has an advanced system of very detailed retail price data accessible online (<http://dacnet.nic.in/rpms/>), in most South Asian countries official nationally representative price data for commodities other than wheat and rice are not (yet) available for 2008 and beyond. Another (perhaps surprising) exception is Afghanistan where the agriculture ministry in cooperation with FAO and the European Commission publishes a monthly bulletin with detailed agricultural prices by region and makes it accessible through the web. On the other hand, Afghanistan's central statistical office does not publish any price data other than the CPI. In Pakistan, the Federal Bureau of Statistics publishes up-to-date price statistics for some agricultural commodities that form part of the so-called sensitive price index (SPI). But for other commodities there is a three to four year time lag. In Sri Lanka, producer

[107] The Giews database is a national food price data and analysis tool which was developed as part of the FAO Initiative on Soaring Food Prices to assist in the monitoring and analysis of domestic food price trends in developing countries.

prices at the national level are available only until 2005 and while retail price data go up to 2009, they are collected exclusively in capital city markets and therefore not nationally representative. In Nepal the Central Bureau of Statistics publishes price indices by major region (latest data are for 2006-07) but does not publish individual food commodity prices. The World Food Program collects food prices on a regular basis in different regions but these are not necessarily statistically representative. For most countries, once national price data become available they can be accessed (though with a time lag) through a FAO database called FAOSTAT. FAOSTAT currently contains data only until 2007. Table A7.1 provides an overview of the availability of price data for crops other than wheat and rice by individual country.

TABLE A7. 1 PRICE DATA FOR CROPS OTHER THAN WHEAT AND RICE

Country	Latest agricultural price data availability	Source
Afghanistan	2009	http://www.mail.gov.af/m/english/English.htm
Bangladesh	2005-06	Ministry of Agriculture, Statistics Division (http://www.moa.gov.bd/statistics/statistics.htm)
India	2009	Directorate of Economics and Statistics, Ministry of Agriculture (http://dacnet.nic.in/rpms/)
Nepal	-	Central Bureau of Statistics (http://www.cbs.gov.np/)
Pakistan	2006-07	Federal Bureau of Statistics (http://www.statpak.gov.pk/)
Sri Lanka	2005	Department of Census and Statistics (http://www.statistics.gov.lk/)