

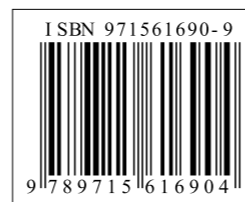
#### About the Paper

This Special Report was prepared by a team from the Economics and Research Department. Food prices have increased sharply since mid-2007 and accelerated alarmingly in early 2008. Rice and wheat prices have spiked at levels not seen in over three decades. This threatens to exacerbate poverty in developing Asia by reducing the real incomes of the already poor, while pushing many others below the poverty line. The report proposes appropriate policy responses to the challenge of food price inflation in order to avoid the reversal of the gains in poverty reduction in the region.

#### About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two thirds of the world's poor. Nearly 1.7 billion people in the region live on \$2 or less a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance. In 2007, it approved \$10.1 billion of loans, \$673 million of grant projects, and technical assistance amounting to \$243 million.







SPECIAL REPORT

# **Food Prices and Inflation in Developing Asia: Is Poverty Reduction Coming to an End?**

Economics and Research Department

April 2008

This special report was prepared by a team led by William E. James. Other authors include Shikha Jha, Lea Sumulong, Hyun H. Son, Rana Hasan, Muhammad Ehsan Khan, Guntur Sugiyarto, and Fan Zhai. Research assistance was provided by Juan Paolo Hernando, Pilipinas F. Quising, Anneli Lagman-Martin, Maria Rowena M. Cham, J. Salcedo Cain, Rhoda A. Magsombol-Miranda, and Eric Suan.

Asian Development Bank

Asian Development Bank  
6 ADB Avenue, Mandaluyong City  
1550 Metro Manila, Philippines  
[www.adb.org/economics](http://www.adb.org/economics)

©2008 by Asian Development Bank  
April 2008  
ISSN 1655-5252

The views expressed in this paper  
are those of the author(s) and do  
not necessarily reflect the views or  
policies of the Asian Development  
Bank.

# CONTENTS

Abstract	v
I. Introduction	1
II. Explaining the Underlying Causes of High Food Prices	5
A. Structural and Cyclical Factors	5
B. Demand and Supply Factors	6
C. Domestic and World Markets	7
III. Macroeconomic Effects of High and Rising Food Prices	8
A. Analysis of Food Price Shocks	8
B. Fiscal Impacts on Food and Fertilizer Subsidies from Rising Food Prices	11
IV. Impact of Rising Food Prices on Households: Poverty and Distribution Analysis	13
V. Medium-Term Supply Response and Poverty Impacts	18
A. Effects on the People's Republic of China	19
B. Effects on Indonesia	20
VI. Policy Responses for Long-Term Food Security	21
VII. Policy Responses: Safety Net Programs for Food Security and Policies to Mitigate Rising Food Prices	30
References	36

## TABLES, BOXES, FIGURES

Table 1	Food Weights in CPI	5
Table 2	Changes in GDP Growth Under Fixed and Flexible Interest Rate Regimes	11
Table 3	Share of Food Expenditures to Total Expenditures	13
Table 4	Impact of Price Increases on Poverty	15
Table 5	Impact of Price Increases on Inequality	16
Table 6	Compensation Required for the Poor from Food Price Increases	17
Table 7	Policy Responses in Developing Member Countries	31
Box 1	Enhancing Long-Term Food Security in India	24
Box 2	Public Sector Investments in the Agriculture Sector	26
Box 3	Food Price Increases and Responses: Toward Inclusive Growth	34
Box Table 2.1	Public Sector Spending on Agriculture in Select Countries	26
Box Table 2.2	Potential Returns from Investments in the Irrigation Sector in Pakistan	27
Box Figure 1.1	Trends in India's Wheat and Rice Trade	24
Box Figure 1.2	Yield Gaps in Rice and Wheat	24
Box Figure 1.3	Import Dependence in Indian Agriculture	25
Box Figure 3.1	Inclusive Growth through Improvements in the Agriculture Sector	35

Figure 1	5 Percent Broken Milled White Rice, Thailand	1
Figure 2	No. 1 Hard Red Winter Wheat, FOB Gulf of Mexico	2
Figure 3	Breakdown of World Rice Supply	3
Figure 4	Major Rice Exporters for 2007	3
Figure 5	Breakdown of World Wheat Supply	3
Figure 6	Major Wheat Exporters, 2007	4
Figure 7	Food Price Index of Net Rice/Wheat Exporters	4
Figure 8	Food Price Index of Net Rice/Wheat Importers	4
Figure 9	World Year-end Stock of Selected Grains	5
Figure 10	Changes in Inflation Rates	9
Figure 11	Changes in Private Consumption Growth	9
Figure 12	Changes in Fixed Investment Growth	10
Figure 13	Changes in GDP Growth	10
Figure 14	India: Fiscal Cost of Increase in Procurement Prices of Wheat and Rice	12
Figure 15	Philippines: Fiscal Cost of 50% Increase in Rice Import Price	12
Figure 16	Relationship between Private Credit and Fertilizer Use	12
Figure 17	Share of Rice Expenditure to Total Expenditure	14
Figure 18	Percentage Reduction in Average Standard of Living when Food Prices Increase by 10%	16
Figure 19	PRC Gains in Terms of Trade	19
Figure 20	Food Production Expansion	19
Figure 21	Percentage Change in Household Income and Overall Price	20
Figure 22	Percentage Change in Output	21
Figure 23	Rice and Wheat Yields for Top 10 Global Producers	22

# ACRONYMS

ADB	Asian Development Bank
CGE	computable general equilibrium model
CPI	consumer price index
GDP	gross domestic product
HCR	head count ratio
HKG	Hong Kong, China
IND	India
INO	Indonesia
KOR	Republic of Korea
MAL	Malaysia
PHI	Philippines
PRC	People's Republic of China
SIN	Singapore
TAP	Taipei, China
THA	Thailand
US	United States



## **ABSTRACT**

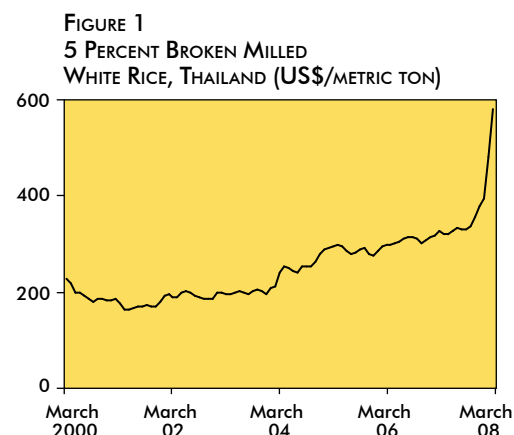
The recent spike in global food prices and the short-sighted policy responses that accentuate volatility in prices threaten to push large numbers of people back below the poverty line—including many millions in developing Asia. Structural forces augmented by adverse cyclical events have put food prices on an upward trajectory that will not end soon. Unless trade is kept open and relative prices are allowed to reflect market scarcity, severe consequences will emerge. In the immediate future, carefully targeted assistance to the poor will be essential—both in terms of food and inputs necessary to increase food production in the coming crop season. A reevaluation of investment priorities and feasibility of agricultural projects must be undertaken in light of these price developments, accompanied by stronger efforts to boost agricultural productivity growth in order to mitigate any longer-term rise in food prices.



## I. INTRODUCTION

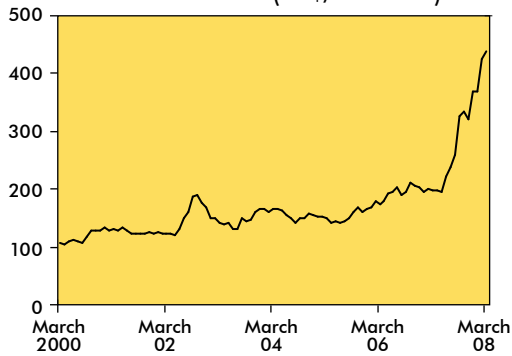
For decades, food prices had been declining in real terms, allowing millions of people around the globe to escape from the trap of poverty. This long-term trend took place despite rapid income and population growth, as agricultural productivity rose steadily. However, productivity gains began to stagnate in the face of continuing growth in demand, bringing about a reversal of this long-term trend. Rising food prices contributed to an acceleration of inflation across the Asia and Pacific region during 2007, and in 2008 the further rise in food prices has reached alarming proportions. The rise in food prices is worrisome precisely because food price inflation is the most regressive of all taxes—it hurts the poor the most. This paper addresses the dimensions of the so-called “food crisis” in developing Asia, including the relationship of rising international prices of staple foods to domestic food prices; the impact of dramatically higher prices on growth, inflation, fiscal balances, as well as poverty and inequality; and the policy choices and responses to elicit a supply response and, in the longer run, realize sustainable productivity gains in agriculture that will mitigate the current crisis. First, recent trends in global food prices and their implications for food prices in developing Asia are examined. Section II explains the reasons behind the recent surge in food prices, while Section III provides a scenario analysis of macroeconomic impacts of food prices on inflation and growth in 2008 and 2009, and explores the fiscal consequences of measures aimed at sheltering consumers from the full brunt of the price increases. Section IV presents an assessment of how the rise in food inflation will affect the incidence and severity of poverty and inequality prior to any supply response (the pure price effect). Section V analyzes the supply response as prices rise and farmers respond, using a computable general equilibrium model. Section VI identifies medium-term and long-term prospects for investment and productivity growth in agriculture that are essential if developing Asia is to manage the problem, so that the hard won reductions in poverty incidence in the region are not reversed. Section VII reviews policy responses across the region and concludes with the key messages of the paper.

International prices of the two key staple cereals produced and consumed by Asians, rice and wheat, have spiked in recent months. Rice prices (Figure 1) have been rising steadily but incrementally until late 2007—by which time they were roughly double the levels of 2002. In the fourth quarter of 2007 and in the first quarter of 2008, the rate of increase of international rice prices sharply accelerated, fueling inflation and stoking fears of a 21<sup>st</sup> century food crisis in the region. Wheat—the second most important item in the food consumption



Source: IMF, *Primary Commodity Prices*, available: <http://www.imf.org/external/np/res/commod/index.asp>, downloaded 14 April 2008.

**FIGURE 2**  
**NO. 1 HARD RED WINTER WHEAT,**  
**FOB GULF OF MEXICO (US\$/METRIC TON)**

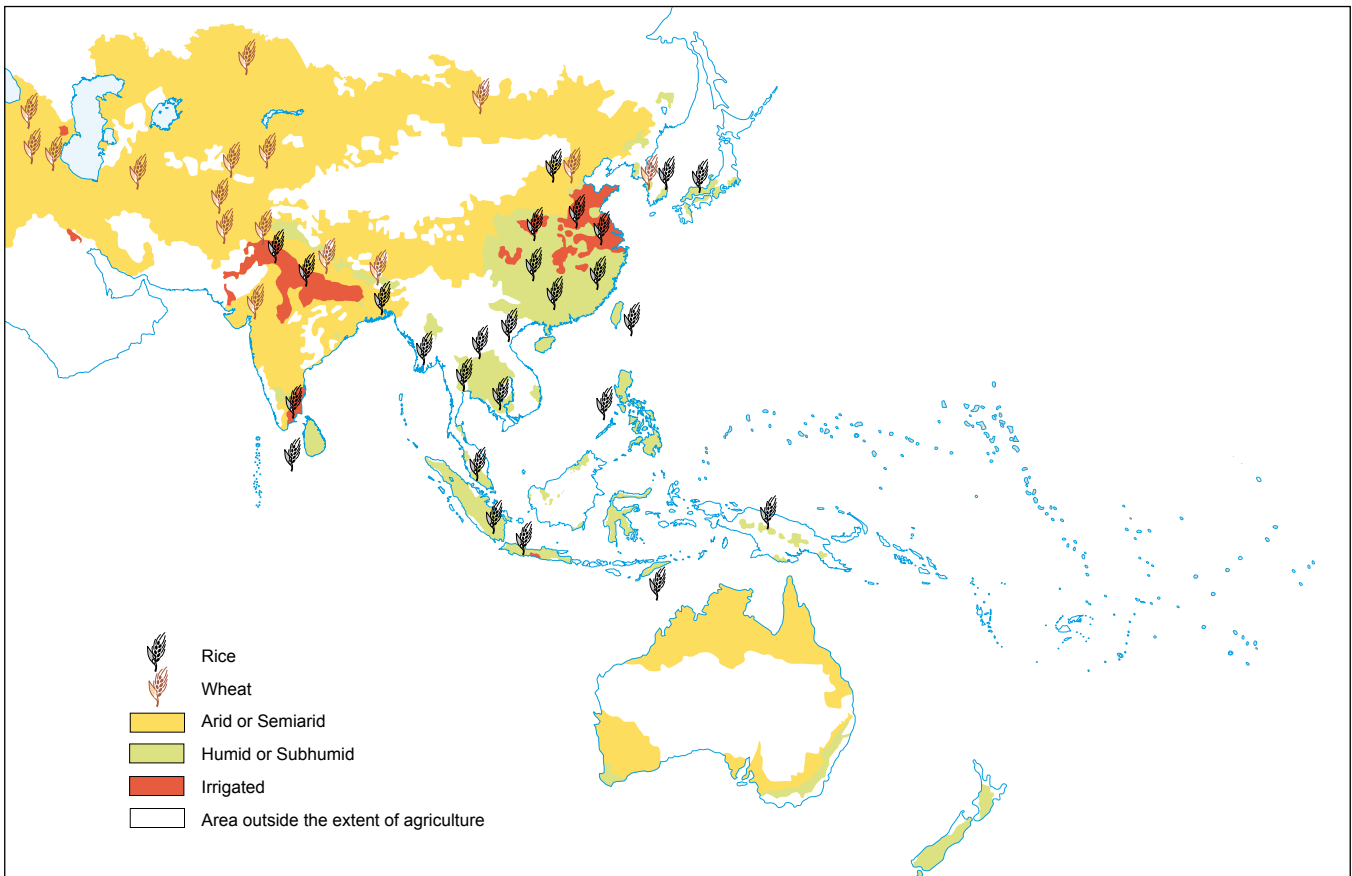


Source: IMF, Primary Commodity Prices, available: <http://www.imf.org/external/np/res/commod/index.asp>, downloaded 14 April 2008.

basket in Asia—has also had a spike in international prices albeit not as pronounced as in the case of rice (Figure 2). Since rice is the basic staple for over 2 billion Asians and wheat for an additional billion, there is concern that unless the problem is managed well, there could be social tension and unrest on the horizon.

The geography of producing and consuming regions in Asia is such that there is a basic divide between north and west (wheat) versus south and east (rice), with the most populous and densely cultivated areas devoted to rice (see Map 1). And while wheat production is more evenly distributed around the globe, rice is overwhelmingly (over 90%) produced and consumed in monsoon Asia. As a consequence, the capacity to export surplus production over domestic consumption is far more concentrated in a few countries, and international trade in rice is very limited relative to production and consumption (Figures 3 and 4) compared to wheat (Figures 5 and 6). This makes international rice prices subject to higher volatility than international wheat prices.

**MAP 1**  
**AGRICULTURAL MAP OF ASIA: RICE AND WHEAT AREAS**



Sources: Adapted from World Bank, World Development Report 2008 (World Bank 2008b, Map 2.1); Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>, downloaded 24 April 2008.

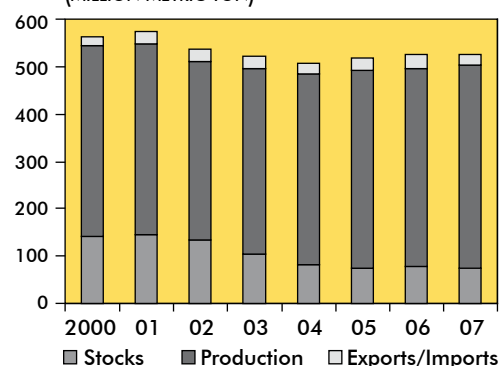
In general, international markets in rice are shallow and subject to heavy regulation and protection compared with those for wheat. The sensitivity of rice prices to slight changes in international supply and demand compounds the difficulty of managing the problem of high rice prices relative to that of high wheat prices.

In addition to rapid increases in cereal prices in the region, other food items are also experiencing high prices including vegetable oils, soybeans, meat products, and fish. Across developing Asia, rising food prices are pushing up inflation. There is a clear and present danger that rising food prices will push large numbers of households back below the poverty line in developing Asia.

In the first months of 2008, food price inflation has hit double digits in Bangladesh; People's Republic of China (PRC); Hong Kong, China; Indonesia; Pakistan; and Viet Nam. Food price inflation is also rising in India, Malaysia, Philippines, Singapore, and Thailand. And although no 2008 figures are yet available for Sri Lanka, there is little doubt that food prices are also rising at double digits there as well. Wheat-dependent countries in Central and West Asia are also experiencing double-digit rates of food inflation (ADB 2008).

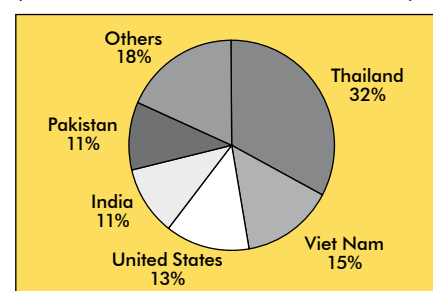
The problem is not confined to importing countries, as net exporters are also experiencing food price inflation. In fact, the rising inflation pressure has been more intense in net exporting countries (compare Figure 7 and Figure 8). The indices understate the true amount of food inflation pressures as governments have introduced numerous policy measures to suppress prices.

**FIGURE 3**  
BREAKDOWN OF WORLD RICE SUPPLY  
(MILLION METRIC TON)



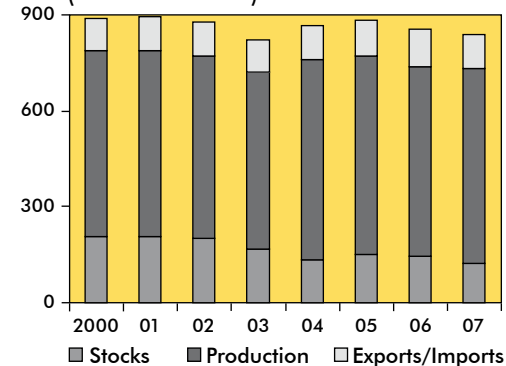
Note: For World, accounting identity dictates exports=imports; however world exports and imports have a 6% discrepancy due to grain in transit, reporting discrepancies, and trade to countries outside the USDA database.  
Source: Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>, downloaded 16 April 2008.

**FIGURE 4**  
MAJOR RICE EXPORTERS, 2007  
(AS A PERCENT OF TOTAL WORLD RICE EXPORTS)



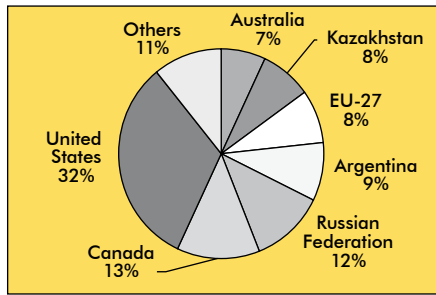
Source: Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>, downloaded 16 April 2008.

**FIGURE 5**  
BREAKDOWN OF WORLD WHEAT SUPPLY  
(MILLION METRIC TON)



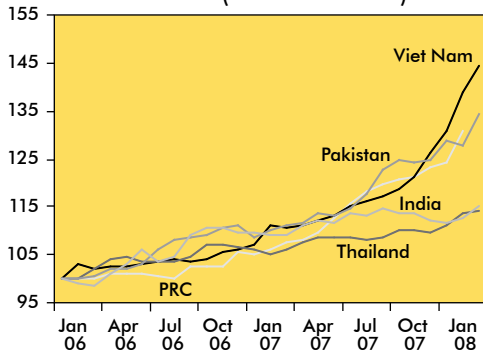
Note: For World, accounting identity dictates exports=imports; however world exports and imports have a 6% discrepancy due to grain in transit, reporting discrepancies, and trade to countries outside the USDA database.  
Source: Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>, downloaded 16 April 2008.

**FIGURE 6**  
**MAJOR WHEAT EXPORTERS FOR 2007**  
 (AS A PERCENT OF TOTAL WORLD WHEAT EXPORTS)



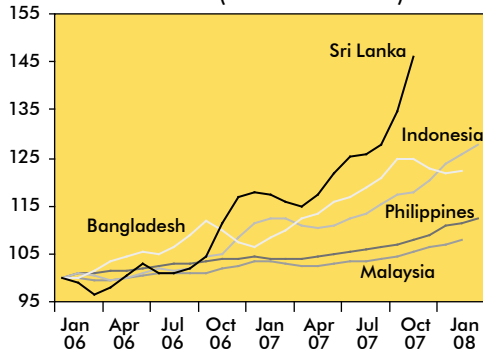
Source: Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>, downloaded 16 April 2008.

**FIGURE 7**  
**FOOD PRICE INDEX OF NET RICE/**  
**WHEAT EXPORTERS (JAN 2006 = 100)**



Note: Based on exports and imports for 2007. Sources: CEIC Data Company Ltd.; Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>; The Institute of International Finance database; all downloaded 17 April 2008.

**FIGURE 8**  
**FOOD PRICE INDEX OF NET RICE/**  
**WHEAT IMPORTERS (JAN 2006 = 100)**



Note: Based on exports and imports for 2007. Sources: CEIC Data Company Ltd.; Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>; The Institute of International Finance database; all downloaded 17 April 2008.

It can readily be seen that the general index of domestic food prices in developing Asia (Figures 7 and 8), while on an upward trend, is not anywhere near as pronounced as the rise in international rice and wheat prices (Figures 1 and 2). The first reason is that cereal grains imports make up a fairly small percentage of consumption and production in most developing Asian countries with significant agricultural sectors. Rice and wheat also constitute roughly a quarter of the weights in food used to construct the consumer price index (CPI). Furthermore, international prices are denominated in United States (US) dollars, and most regional currencies have appreciated somewhat against the dollar over the last year or so. Finally, governments have intervened to cushion consumers from the sharp rise in staple food prices through various measures. Still, the sharp acceleration of food prices in recent months is evident in the figures.

The explosion in food prices across the region is a threat to macroeconomic stability through inflation, the rising fiscal cost of food subsidies, and the possible exchange rate depreciation in food-importing countries. The rate of inflation measured by the CPI in 2007 accelerated in developing Asia to 4.3%, up from 3.3% in 2006, and currently is forecast to surge further in 2008 to 4.8% (ADB 2008). The fiscal burden of food subsidies will mount in 2008 given the sharp rise in food prices that is occurring across the region. Already, some rice-importing countries are experiencing weakening currencies against the US dollar, which threatens to push inflation rates even higher in 2008.

Food prices carry considerable weight in consumer expenditure baskets (see Table 1) used to construct the CPI in developing Asia, and there is a strong correlation between food price inflation and general CPI inflation (ADB 2008).

TABLE 1  
FOOD WEIGHTS IN CPI

ECONOMY	SHARE (%)	ECONOMY	SHARE (%)
China, People's Rep. of	33.20	Malaysia	30.00
Hong Kong, China	26.94	Philippines	46.58
India	57.00	Singapore	23.38
Indonesia	42.30	Taipei, China	25.00
Korea, Rep. of	14.00	Thailand	32.71

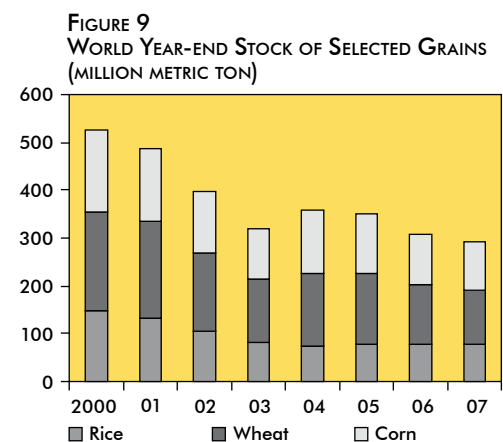
Sources: National statistics offices; ADB resident missions.

## II. EXPLAINING THE UNDERLYING CAUSES OF HIGH FOOD PRICES

Prices of close substitutes for rice are rising sharply as well: wheat, maize, and soybeans are all at record highs. Three sets of factors must be taken into account in order to explain what is happening to food prices in developing Asia. First is the distinction between structural and cyclical factors; second is the distinction between supply and demand; and third is the relationship between international and domestic markets.

### A. STRUCTURAL AND CYCLICAL FACTORS

Structural factors are fundamental in explaining what has happened to international rice and food grain prices in recent years. Falling global stocks of rice and other cereals (Figure 9) are indicative of the fact that production growth has fallen below consumption growth for several years. Rice and wheat stocks have ebbed and now are about 200 million metric tons, compared with 350 million metric tons in 2000, a decline of about 43% (USDA 2008). The current steep increases in the price at which rice is traded in international markets reflect not only shortfalls in production relative to current consumption but also reflect the attempt to rebuild stocks themselves, putting even greater upward pressure on demand relative to supply. As was illustrated above, international rice markets are extremely thin as a result of asymmetry between the large numbers of consuming countries as opposed to those few countries that produce exportable surpluses.



Source: Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>, downloaded 16 April 2008.

Another structural factor is the rising scarcity of oil driven by the stagnation of supplies from the Organization of the Petroleum Exporting Countries (OPEC) and decline in production in non-OPEC economies. Even in the face of the G-3 slowdown and the expected cyclical slowdown in world growth in 2008, oil prices have continued to surge to new highs. The close relationship between oil and food prices, i.e., of food prices following oil prices, has been amply documented (ADB 2008).

Cyclical factors as well have been unkind in influencing price trends. Adverse weather including the drought-related harvest failure of wheat in Australia in 2007 and the flooding in South Asia have harmed production as did outbreaks of brown planthopper infestation in Viet Nam. Recent financial market turmoil has also exerted a cyclical effect as investors turn to commodities with high expected rates of return in contrast to poor returns from equities, bonds, and money market instruments.

## **B. DEMAND AND SUPPLY FACTORS**

The most important demand factors in the rise in food prices in recent years are long-term in nature and can also be thought of as supporting the view that structural rather than cyclical factors are predominant. Among these demand-side factors are growing world population and strong income growth in emerging economies around the globe. The latter factor is associated with dietary change toward higher-quality food such as meat and dairy products. Production of meat and dairy products requires large amounts of grain in the form of livestock feed. In order to produce a single kilogram of beef, it may take as much as 7 kilograms of grain, hence as caloric intake shifts to more protein, more and more grain is demanded for the same amount of calories for human consumption. Another important structural demand factor is the competing use of food grain to produce ethanol as a substitute for oil. Biofuel demand is rising and is leading to diversion of grain, soybeans, sugar, and vegetable oil from use as food or feed. On the supply side, urbanization and competing demand for land for commercial as opposed to agricultural purposes is an important factor, as is the increasing scarcity of fresh water for agriculture. Cropping patterns away from food to biofuels may also reduce the available supply of land devoted to food. Neglect of investment in agricultural technology, infrastructure, and extension programs is also to blame for the tepid growth in the supply of rice (IRRI 2008).



Pricing policies may have played a role by discouraging farmers from increasing marketed supplies. Also, poor and marginal farmers may not have the means to respond and may also be hurt if they are net buyers rather than net sellers of food. The rise in costs of inputs related to record-high fuel prices and rising costs of power for irrigation pumps also are factors. Inadequate post harvest milling and storage facilities entail losses as does poor infrastructure and bureaucratic indifference.

### C. DOMESTIC AND WORLD MARKETS

Government short-term responses have made matters worse by attempting to paper over relative price changes and shield consumers through beggar-thy-neighbor policies of restricting exports and using administrative measures in an attempt to control prices. In order to shield consumers, taxes and import duties on imported grains are being reduced in net importing countries—temporarily. Price subsidies are also widely applied throughout the region for staple foods such as rice and for suppression of food prices.

The burden of general rice and wheat price subsidies will become much heavier as a result of the spike in prices in 2008. In the Philippines, the leading importer of rice in the world in 2007, the fiscal cost of subsidized rice in 2008 is estimated to be P32.8 billion with a purchase price of P29.4/kg<sup>1</sup> versus a selling price of P17.25/kg. Indonesia has budgeted in 2008 an increase in food subsidies of Rp19.8 trillion from Rp7.2 trillion—an increase of \$1.4 billion or 3% of all government expenditure.

It is not possible to untangle all the causes of rising prices without conducting a more detailed statistical analysis or decomposition of price movements. However, it appears from the discussion of these three sets of factors above that structural factors are swamping cyclical factors, as price spikes have occurred in the context of slowing world growth. The International Monetary Fund in its *World Economic Outlook 2008* (IMF 2008) has cut its forecast for world growth drastically in 2008 from 4.1% down to 3.7%. In spite of this slowdown, prices have been accelerating, indicating that it would be unwise to be complacent, and that higher food prices are not merely a short-term phenomenon that markets will automatically correct. This has strong implications for macroeconomic stability, poverty incidence and inequality, and for corrective measures over time.

---

<sup>1</sup> Based on March 2008 contracts (see *Philippine Daily Inquirer* 2008).

### **III. MACROECONOMIC EFFECTS OF HIGH AND RISING FOOD PRICES**

#### **A. ANALYSIS OF FOOD PRICE SHOCKS**

Food prices have been rising since 2007, but in the first three months of 2008, the rate of increase has accelerated. The World Bank's food price index climbed 57.5% in the first quarter of 2008 relative to the corresponding figure a year ago. Some grain prices have increased by much more—wheat prices are up by over 100%—during the same period. At the same time, energy prices have also been on an upswing, with the World Bank's oil price index growing by 66.5% in the first quarter of 2008. These global developments are likely to cascade to developing Asian economies' growth and inflation prospects.

To trace the impacts of escalating food and energy prices on developing Asia, the Oxford Economics global model is applied. Note that the results shown in this section do not represent projections, but should be taken as mere indications of how regional economies could respond to a food and fuel price shock. Two scenarios are analyzed to simulate the effects. In the first scenario, it is assumed that the 57.5% increase in world food prices in the first quarter of 2008 is maintained through the fourth quarter of the year. In the second scenario, the 66.5% growth in world oil prices is added on top of the 57.5% world food price increase. The rise in oil prices is critical in analyzing food price increases since fertilizer prices, which are highly dependent on petroleum and natural gas prices, move in tandem with energy prices. In 2009, the growth in food and oil prices is assumed to revert to the baseline rates in the Oxford Economics model. But as food and fuel prices continue to rise, these economic responses could well be underestimates.

Expectedly, global food price increases translate to higher prices in developing Asia, particularly since food carries a large weight in the CPI of many of the region's economies (see Table 1). The result from the first scenario is for regional inflation rate to rise by 1.65 percentage points in 2008, with individual country consumer prices climbing by at least 0.53 percentage point (Figure 10). Singapore's consumer prices swell by 3.15 percentage points, since in the absence of a domestic agriculture sector, the economy is completely reliant on the global food market. Significant increases in inflation rates are likewise observed in PRC, Malaysia, and Philippines.

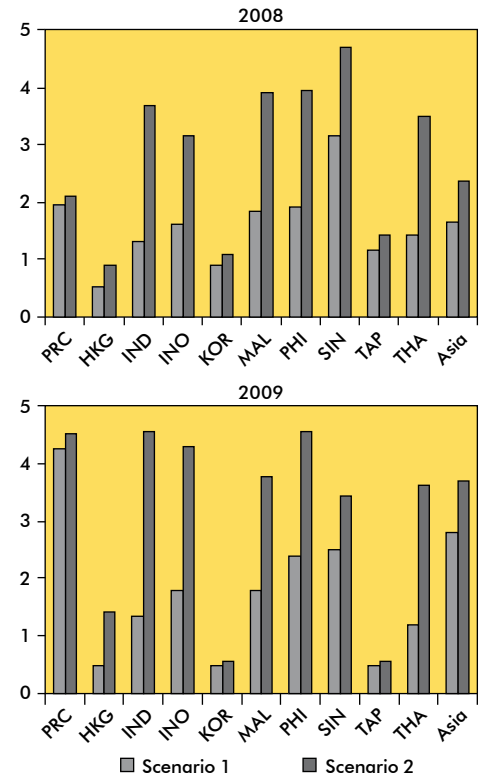
In the second scenario, the impacts are much more pronounced, with regional inflation rising by 2.37 percentage points in 2008. However, the results are further magnified in the second year under both scenarios, since the model takes time to adjust to the exogenous food and oil price shocks. With food and oil accounting for a large share of consumer price indexes in the region, and with a majority of countries being net food and oil importers, the consequent rise in developing Asia's prices is not surprising.

With domestic prices rising, private consumption takes a plunge (Figure 11). In Singapore, where consumer prices increase by the largest rate, the steepest fall in private consumption growth is registered. Indonesia; Korea; Malaysia; Philippines; and Taipei, China all suffer drops in private consumption growth in excess of 1 percentage point in 2008 under the first scenario. Overall, growth in private consumption in developing Asia is set to fall by 0.94 percentage point in the first year. With oil prices also rising under scenario 2, private consumption is crimped even more, falling by 1.36 percentage points in 2008. Higher inflation rates in 2009 shrink private consumption further.

As prices increase, the model allows governments to raise interest rates to prevent inflation from spiraling uncontrollably. Given the extent of consumer price rises in the region, the model sees interest rates climbing by 0.87 percentage point in 2008 under scenario 1. Higher interest rates result in sluggish fixed investment, with regional growth estimated to slow by 0.92 percentage point in year 1 (Figure 12). Large falls in fixed investment are recorded for India, Indonesia, and Philippines, where the drop is about 2 percentage points. Under scenario 2, larger interest rate increases are required to rein in inflationary pressures. This results in even slower fixed investment growth across the developing Asian region. Still higher inflation rates in 2009 elicit larger interest rate increases. The model estimates interest rates in developing Asia to go up by 1.88 percentage points in the first scenario, and 2.79 in the second. Fixed investment growth thus diminishes further.

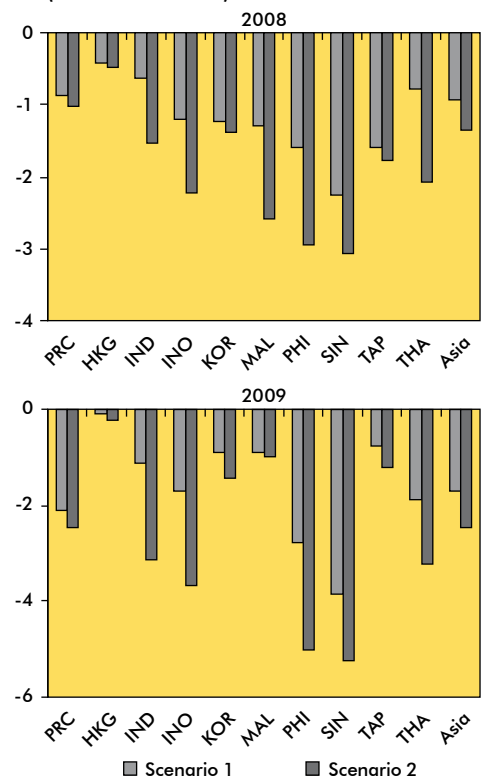
With consumption and investment demand squeezed by rising inflation and interest rates, gross domestic product (GDP) growth in developing Asia is estimated to decline by 1.05 percentage points in 2008 under the first scenario (Figure 13). PRC, Indonesia, Philippines, and Singapore all experience falls in GDP growth in excess of 1 percentage point in the first year. Despite being a food exporter, higher domestic prices slash the PRC's growth by a substantial amount. In scenario 2, regional GDP growth sinks by 1.41 percentage points. Among the 10 developing Asian economies in the model, only the Philippines experiences a further reduction in GDP growth of more

**FIGURE 10**  
CHANGES IN INFLATION RATES  
(PERCENTAGE POINTS)



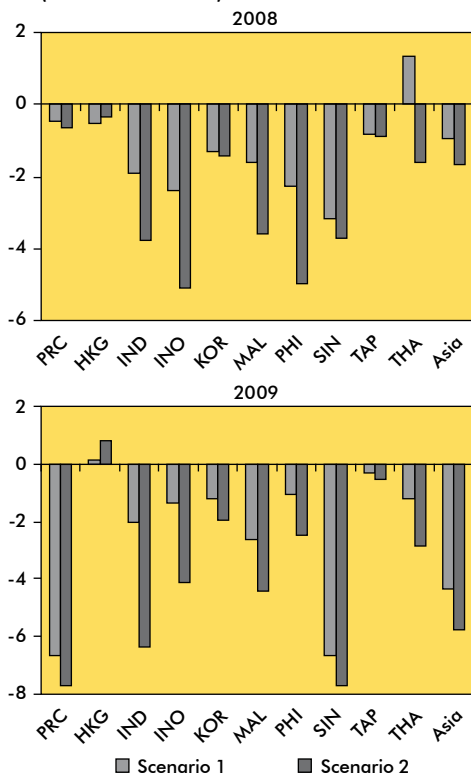
Source: Oxford Economics simulations.

**FIGURE 11**  
CHANGES IN PRIVATE CONSUMPTION GROWTH  
(PERCENTAGE POINTS)



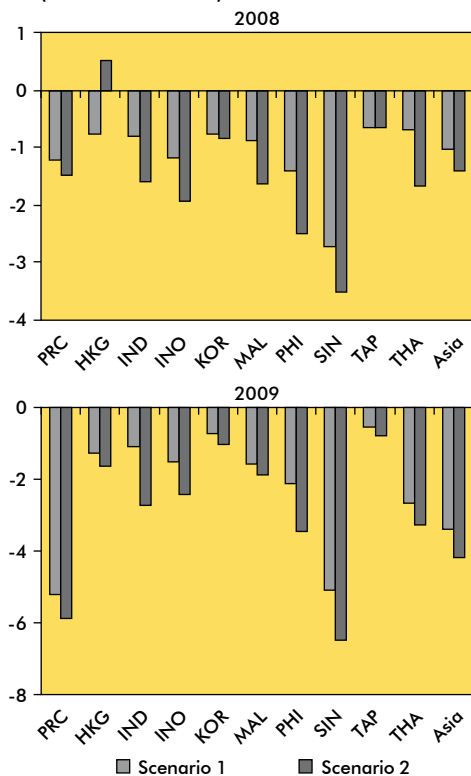
Source: Oxford Economics simulations.

**FIGURE 12**  
CHANGES IN FIXED INVESTMENT GROWTH  
(PERCENTAGE POINTS)



Source: Oxford Economics simulations.

**FIGURE 13**  
CHANGES IN GDP GROWTH  
(PERCENTAGE POINTS)



than 1 percentage point between scenario 1 and scenario 2. This is perhaps reflective of the Philippines' greater reliance on imported food and oil. Conversely, the limited impact for Hong Kong, China may be due to its dependence on the PRC, which is a large supplier of both its food and oil.

In 2009, GDP growth in developing Asia is estimated to fall by 3.39 percentage points under scenario 1, and 4.15 percentage points in scenario 2. This is because developing Asia copes not only with slower growth within the region, but also with slower global growth under both scenarios. In addition to falling regional domestic demand, sluggish global growth significantly reduces demand for the region's exports, particularly since developing Asia remains heavily reliant on industrial countries' demand.

In the short run, governments may opt to keep interest rates on hold to moderate the negative impact of rising prices on domestic demand. Table 2 shows a comparison of changes in GDP growth rates under fixed and flexible interest rate regimes in the region. Keeping interest rates at baseline levels eases the impact on fixed investment growth, and eventually on overall GDP growth. In 2009, the decline in GDP growth rates under fixed interest rates is about half those arising from flexible interest rates.

However, fixing interest rates may be acceptable only in the short run, when rising inflation is caused by cyclical factors. Countries may also permit their exchange rates to appreciate in the face of imported inflation. But Section II clearly shows that the current increase in global food prices is driven both by structural and cyclical factors. Keeping interest and exchange rates steady amid inflationary pressures caused by structural factors imposes the danger of inflation becoming ingrained in the economy. This may bring down productivity growth and undermine the economy's ability to maintain its long-term sustainable growth path. In short, inflation needs to be nipped in the bud to limit its impact on long-term growth. Allowing currencies to appreciate combined with monetary policy tightening are desirable tools in addressing this issue. While Table 2 shows that economic growth will suffer in the short run, it is the price the economy must pay in order to return to its long-term high growth path. In the interim, governments may undertake targeted subsidy programs to alleviate the impact of rising inflation on the poor.

TABLE 2

CHANGES IN GDP GROWTH UNDER FIXED AND FLEXIBLE INTEREST RATE REGIMES (PERCENTAGE POINTS)

ECONOMY	2008				2009			
	FLEXIBLE INTEREST RATES		FIXED INTEREST RATES		FLEXIBLE INTEREST RATES		FIXED INTEREST RATES	
	SCENARIO 1	SCENARIO 2	SCENARIO 1	SCENARIO 2	SCENARIO 1	SCENARIO 2	SCENARIO 1	SCENARIO 2
	1	2	1	2	1	2	1	2
China, People's Rep. of	-1.20	-1.47	-1.01	-1.23	-5.18	-5.86	-2.46	-2.78
Hong Kong, China	-0.77	0.50	-0.46	0.86	-1.25	-1.65	-1.36	-1.57
India	-0.81	-1.61	-0.67	-1.21	-1.11	-2.70	-0.88	-1.52
Indonesia	-1.19	-1.94	-0.69	-0.87	-1.50	-2.42	-1.14	-1.14
Korea, Rep. of	-0.77	-0.83	-0.28	-0.28	-0.71	-1.01	-0.26	-0.27
Malaysia	-0.89	-1.63	-0.61	-1.04	-1.57	-1.88	-1.43	-1.42
Philippines	-1.40	-2.49	-0.84	-1.36	-2.15	-3.48	-1.31	-1.50
Singapore	-2.74	-3.52	-2.55	-3.22	-5.11	-6.49	-4.72	-5.81
Taipei, China	-0.66	-0.65	-0.06	0.04	-0.56	-0.77	0.24	0.40
Thailand	-0.69	-1.67	-0.51	-1.02	-2.66	-3.26	-2.31	-2.23
Developing Asia	-1.05	-1.41	-0.78	-0.99	-3.39	-4.15	-1.75	-2.03

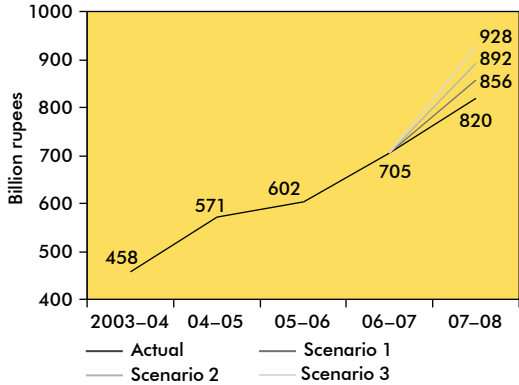
Source: Oxford Economics simulations.

## B. FISCAL IMPACTS ON FOOD AND FERTILIZER SUBSIDIES FROM RISING FOOD PRICES

The previous subsection explored the potential macroeconomic impacts of a global food price rise for Asian economies. To protect the poor from such shocks, governments in many developing countries run food-based safety net programs by importing or procuring food grains from farmers at specified prices to sell at subsidized prices to consumers. A related policy ostensibly protects farmers through fertilizer subsidies. These subsidies contribute to the budgetary costs of the governments. Rising global food and oil prices are directly adding to these food subsidies in food-importing countries. Governments in other countries are under pressure to increase procurement prices to give farmers the right price signals and to generate a larger supply response. The budgetary impacts of these changes are illustrated using costs of food and fertilizer subsidies in India and the Philippines.

For India, food subsidy is calculated as the difference between the cost of rice and wheat procurement and distribution, and the other incidental administrative and operational costs on one hand, and returns from subsidized sale for the Targeted Public Distribution System and the *Antyodaya Anna Yojana* on the other. The government procures about 20–30% of production. The fertilizer subsidy is added to the food subsidy to analyze the fiscal implications of rising food prices.

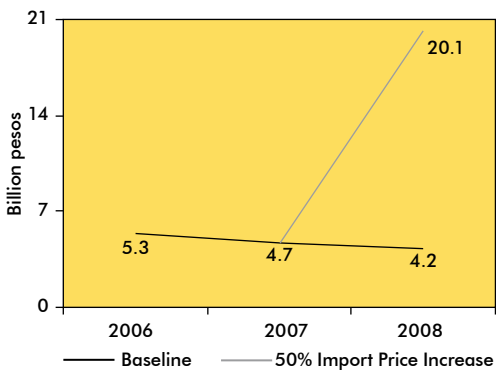
**FIGURE 14**  
INDIA: FISCAL COST OF INCREASE  
IN PROCUREMENT PRICES OF WHEAT AND RICE



Sources: Staff estimates. For baseline data: Ministry of Finance, Government of India (2008).

In the Philippines, the supply for subsidized rice distribution to consumers comes from two sources, domestic procurement and imports. Only 0.5% of local rice production is procured, at a fixed price. The difference between the costs of local procurement and imports, administrative and other operating costs, and revenue from subsidized sales equals the food subsidy. The fertilizer subsidy is added to this to get the total fiscal cost to the government.

**FIGURE 15**  
PHILIPPINES: FISCAL COST OF 50% INCREASE  
IN RICE IMPORT PRICE

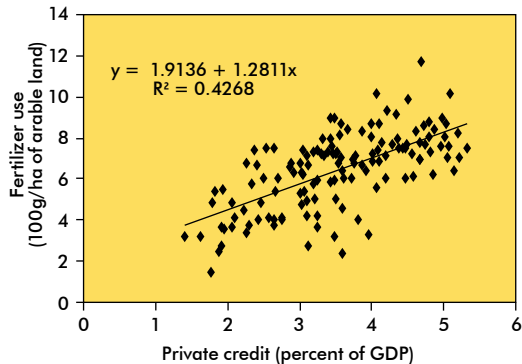


Sources: Bureau of Agricultural Statistics, available: <http://www.bas.gov.ph>; National Food Authority, available: <http://www.nfa.gov.ph>; Datastream, all downloaded 21 April 2008; staff estimates.

Three scenarios are analyzed for India, namely, 10%, 20%, and 30% increases in the procurement prices of rice and wheat (Figure 14). The estimates show that the increases in the budgetary cost from higher procurement prices in India would be of the order of 4%, 9%, and 13%, respectively, for the three scenarios.

For the Philippines, since most of the subsidized rice is imported, to obtain the fiscal impact on subsidies from rising food prices, a price shock of 50% is applied on the 2008 import price. The procurement price for local rice is assumed fixed. The results are presented in Figure 15. A 50% higher rice import price leads to a 329% increase in total subsidy cost, because of the Philippines's heavy reliance on imported rice and the much larger share of food in the total food plus fertilizer subsidy—98% compared to 67% in India.

**FIGURE 16**  
RELATIONSHIP BETWEEN PRIVATE CREDIT  
AND FERTILIZER USE



Notes: Variables are averages from 2002 and 2005 and converted to logarithms; y is fertilizer use; x is private credit.  
Sources: World Bank, World Development Indicators online, downloaded 24 April 2008; Claessens and Feijen (2007); staff estimates.

Artificially setting prices for procurement is distortionary. It is possible to run food-based safety-net programs without distorting prices. Procurement at market prices would give the right signals to farmers. Fiscal costs could be reduced through reform measures such as removing inefficiencies in the functioning of the distribution systems and allowing competition in the market for fertilizer. In India, only about 60% of the fertilizer subsidy reaches the farmers (Government of India 2004). As Figure 16 shows, instead of subsidizing fertilizer, making credit available to farmers can increase the use of fertilizer. This will in turn increase agricultural productivity and incomes. But these reforms would not diminish the need for continuing and strengthening safety nets for the poor, who are hit significantly more from the immediate impact of a food price rise than those above the poverty line. This issue is elaborated upon in Section IV.

## IV. IMPACT OF RISING FOOD PRICES ON HOUSEHOLDS: POVERTY AND DISTRIBUTION ANALYSIS

The effects of rising food prices will differ across households. There will be some households that may benefit from higher prices; there may be households that are adversely affected. Rising food prices may lead to income gains for net producers who are in rural areas. The food price increase should contribute to higher incomes for these net surplus producers. However, to the extent that net surplus producers tend to be the relatively well-off, rising food prices may be expected to adversely affect even the rural poor. Certainly the urban poor, who are food consumers and unlikely to be food producers, can be expected to suffer the most from rising food prices.

In this context, it is important to examine how different groups will be affected by rising food prices. It is also important to investigate what would be the net impact of food price increases on poverty. Concerns over high prices are mounting because inflation eats into real incomes and expenditures and can undermine the gains from poverty reduction and human development that developing countries have achieved over the last decade or so.

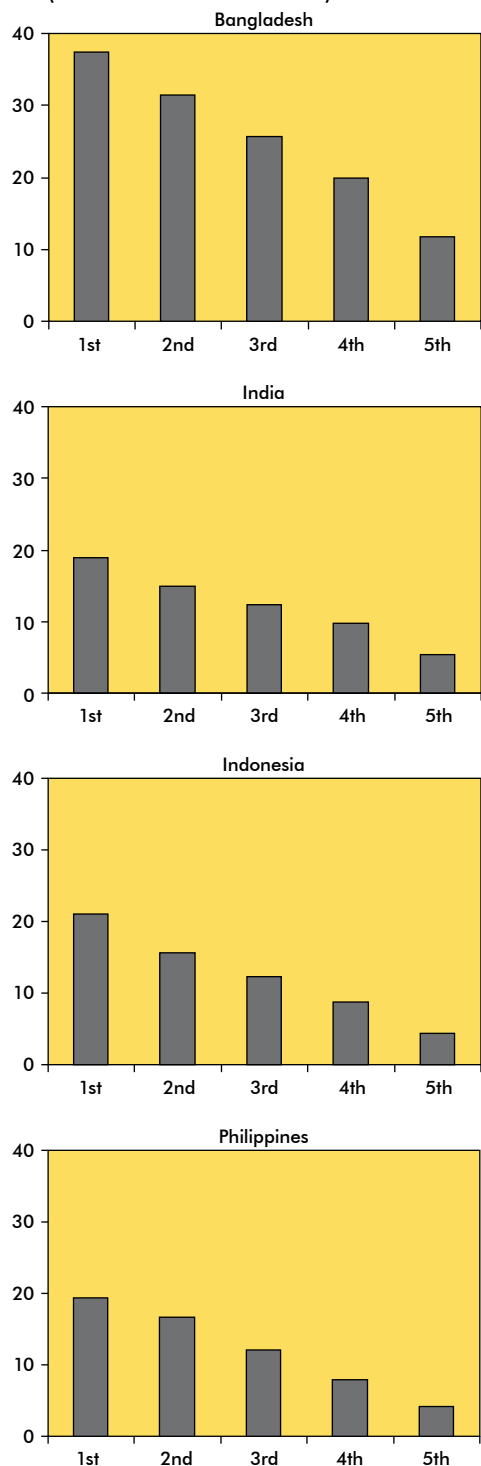
In order to gain a sense of the varying impact of increases in food prices on different subgroups of the population, food expenditure shares by income quintile are examined (Table 3). The average share of food in total expenditure is inversely related to income across quintile groups, as seen from recent household expenditure survey data from Bangladesh, India, Indonesia, and Philippines.<sup>2</sup> It is perfectly clear that poorer population subgroups spend a larger share of their total

**TABLE 3**  
SHARE OF FOOD EXPENDITURES TO TOTAL EXPENDITURES (PERCENT)

QUINTILE	BANGLADESH	INDIA	INDONESIA	PHILIPPINES
1st	69.3	62.0	63.3	64.6
2nd	66.9	59.4	58.1	59.2
3rd	63.2	56.2	54.1	54.1
4th	58.7	50.8	49.0	47.7
5th	45.2	36.4	37.9	36.4

<sup>2</sup> The quintiles are based on households' total expenditures expressed in per capita terms. Quintile one represents the 20% of the population with the lowest per capita expenditures and so on.

**FIGURE 17**  
**SHARE OF RICE EXPENDITURE TO TOTAL EXPENDITURE**  
**(PERCENTAGE SHARE BY QUINTILE)**



Source: Staff estimates using unit-level data from household expenditure surveys.

expenditures on food than richer ones. In each of the four countries, a clear majority of the expenditure of the poorest 20% is on food. In contrast, the share of food in total expenditures tends to be around 25 percentage points less for the richest 20%. As a result, the poorer population subgroups are more vulnerable to rising food prices.

To the extent that some households produce (and consume) their own food, they will tend to be relatively shielded from increases in food prices. In fact, those with a marketable surplus may even benefit. Nevertheless, the household expenditure survey data used here suggest that for all quintile groups in all four countries, a majority of food consumption is purchased. In the case of rice, for example, typically an average of around 70% or more of total rice expenditures is purchased in any given quintile group in rural areas. A smaller percentage is purchased for some quintile groups in rural Bangladesh (a little less than 60%). However, this is for the top two quintiles.

As it turns out, the fact that the increase in food prices has been driven to a large extent by increases in the price of rice has a special significance for the poverty and distributional impacts of the recent increase in food prices in Asia. This is because of the large share of rice in expenditures—not just food expenditures but total expenditures—in Asian economies, especially among their poor. Figure 17 describes the average share of rice in total expenditures across quintile groups for the four countries considered in Table 3. As can be clearly seen, while rice can easily account for roughly 20–35% of total expenditure for the bottom quintile across countries, it can account for as little as 5–10% of total expenditure for the top quintile.

The implication is obvious. The sharp rise in the price of rice, and food more generally, across Asian countries can be expected to wreak havoc among lower-income groups. In particular, it can be expected to increase the misery of those who are already living below the poverty line, and can be expected to drive others into poverty.

We now turn to an in-depth analysis of this issue. Using household data, the impacts of higher food prices on poverty and inequality are analyzed. Two countries are selected: the Philippines, a middle-income country, and Pakistan, a low-income country.<sup>3</sup> To assess these impacts, three different scenarios are adopted, where the increase in food prices is 10%, 20%, and 30%. It should be noted that the simulation results

3 The analysis uses country-specific poverty lines.



presented in this Section IV are pure price effects assuming that per capita expenditure remains constant.<sup>4</sup>

Table 4 shows that an increase in food prices in the Philippines by 10%, 20%, and 30% risks creating an additional 2.72 million, 5.65 million, and 8.85 million poor people, respectively. The impact of rising food prices will be even greater in Pakistan. A 10% increase in food prices will result in an additional 7.05 million poor people. In case of a 20% and 30% increase, the increment in the number of poor people would be 14.67 million and 21.96 million, respectively.

**TABLE 4**  
**IMPACT OF PRICE INCREASES ON POVERTY**

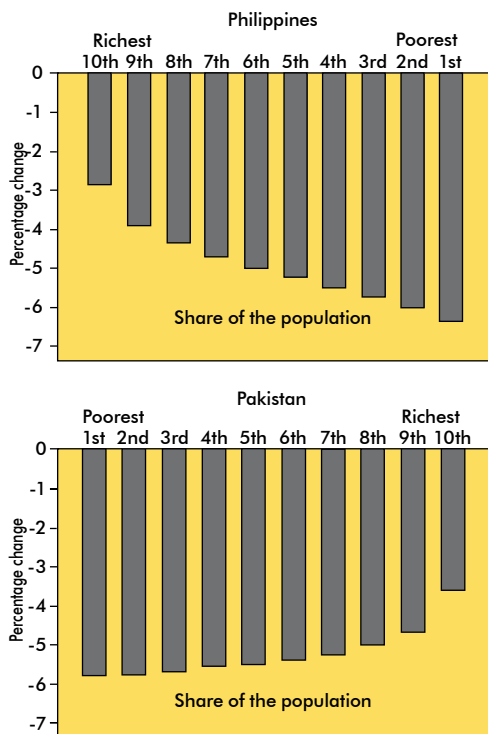
	<b>CHANGE IN NUMBER OF POOR (IN MILLIONS)</b>		
	<b>WITH INCREASE IN FOOD PRICES BY:</b>		
	<b>10%</b>	<b>20%</b>	<b>30%</b>
Philippines	2.72	5.65	8.85
Pakistan	7.05	14.67	21.96

Note: To estimate the number of additional poor, national poverty lines were used. Results from using national poverty lines are different from those based on the \$1/day poverty line. When using the national poverty line, changes in the head count ratio (HCR) are highly sensitive to changes in the poverty line. Sensitivity analysis for Pakistan shows that as the national poverty line is lowered by 20%, the percentage of poor drops from 25.7% to 12.8%, while the number of poor drops from 33.35 million to 16.63 million. However, using a lower poverty line such as \$1/day will result in a much lower number of people falling below the poverty line due to price increases. As the national poverty line is around the mode of the expenditure distribution, the change in the HCR is highly sensitive to changes in the national poverty line. On the other hand, using the \$1/day poverty line makes the change in the HCR less sensitive since the poverty line is almost at the bottom end of the distribution. The HCR based on the \$1/day poverty line is about 14% for Pakistan. Note that these estimates are concerned only with the price effect on consumers (i.e., they do not take into account the impact of price changes on the producers). Producer prices can be very different from consumer prices. Traders buy grains from farmers at much lower prices than those consumers actually pay. To take account of producer prices, the households with a surplus of grains need to be identified, and their poverty status determined.

Sources: Staff estimates.

<sup>4</sup> The fact that some households' consumption is on account of home production is not empirically important for this exercise. As noted earlier, in the case of rice, for example, a large majority of rural people depend on purchased rice. Indeed, a separate simulation based on a different methodology carried out using Indian household expenditure survey data for the rural sector revealed the poverty impact of a 10% increase in the price of rice to be hardly unchanged if an adjustment was made for the fact that some households consumed rice from home production. This result can be expected to be reinforced even further if good quality data were available on food consumption expenditures separated in terms of whether the expenditures are purchased or based on home production.

**FIGURE 18**  
**PERCENTAGE REDUCTION IN AVERAGE STANDARD OF LIVING WHEN FOOD PRICES INCREASE BY 10%**



Source: Staff estimates.

The larger poverty impact of the food price increase in Pakistan relative to that in the Philippines can be explained by the difference in the share of food in total expenditure. The average Pakistani spends about 50% of his/her total expenditure on food. For the average Filipino, food expenditure is about 40% of his/her total expenditure. From this observation it can be said that the poorer the country, the greater will be the share of food in total expenditure (see Table 3).

Table 5 presents the impact of food price increases on inequality. The Gini index, which is the most widely used measure of inequality, is used in this analysis. The impact on inequality is similar for the two countries: an increase in food prices tends to intensify income inequality. The results show that an increase in food prices by 10% will increase the Gini index by 0.55 percentage point for the Philippines and by 0.39 percentage point for Pakistan. As expected, the impact on inequality becomes much sharper with rising food prices. Because of the food price increases for the first quarter of 2008 (7.19% for the Philippines and 18.31% for Pakistan) inequality worsens by 0.39 percentage point for the Philippines and 0.71 percentage point for Pakistan.

The possible impact of food price increases on distribution can be also seen from the percentage reduction in the average standard of living of different income groups (Figure 18).<sup>5</sup> The estimates suggest that if food prices go up by 10%, the average standard of living of the people in the Philippines and Pakistan will decline by 4.16% and 4.84%, respectively. But rising food prices affect people at varying income levels differently. Higher prices put upward pressure on the cost of living and thus lower the overall standard of living. As Figure 18 suggests, the food price increase reduces the average standard of living of the poorest 10% of the population more than that of the richest 10% of the population in both countries. It can be observed that the percentage reduction in the average standard of living declines monotonically with higher level of per capita household income. This

<sup>5</sup> In this section, the average standard of living is measured by per capita real expenditure.

**TABLE 5**  
**IMPACT OF PRICE INCREASES ON INEQUALITY**

	CHANGE IN GINI (PERCENTAGE POINTS)		
	WITH INCREASE IN FOOD PRICES BY:		
	10%	20%	30%
Philippines	0.55	1.10	1.65
Pakistan	0.39	0.78	1.16

Sources: Staff estimates.

supports the earlier finding in Table 5 that higher food prices will lead to more unequal distribution of income or expenditure because food takes a greater share in total expenditure for poorer individuals, particularly for the poorest. Hence, safety measures are required for the poorest of the poor to be able to mitigate the negative impact of rising food prices on them.

In addition, the paper estimated how much would be required to help cushion the poor consumers from the negative effect of high food prices. To be consistent with the earlier scenarios used in poverty and distribution analyses, three scenarios were simulated for food price increases in the Philippines and Pakistan. These results do not take into account increases in people's incomes, i.e., nominal expenditures of households are assumed to remain the same even with changes in prices.

The years 2003 and 2006 for the Philippines, and 2004–2005 for Pakistan are used as base years (Table 6). Price increases are relevant only for base years. In 2006, there were 22.73 million poor people in the Philippines. If food prices had increased by 10% and people's nominal expenditure had not changed, then the number of poor would have increased to 25.45 million people. Thus, a 10% increase in food prices would have forced 2.72 million more people to fall

**TABLE 6**  
**COMPENSATION REQUIRED FOR THE POOR FROM FOOD PRICE INCREASES**

	PHILIPPINES		PAKISTAN
	2003	2006	2004–05
Number of poor before price increase (million)	20.66	22.73	33.35
<b>SCENARIO 1: 10% FOOD PRICE INCREASE</b>			
Number of poor after price increase (million)	23.12	25.45	40.40
Compensation to poor (million PhP/Rs)	10025.35	13906.92	14587.94
	(0.23% of GDP)	(0.23% of GDP)	(0.22% of GDP)
Compensation to poor* (million PhP/Rs)	11673.54	16159.80	18537.61
	(0.27% of GDP)	(0.27% of GDP)	(0.29% of GDP)
<b>SCENARIO 2: 20% FOOD PRICE INCREASE</b>			
Number of poor after price increase (million)	25.77	28.38	48.02
Compensation to poor (million PhP/Rs)	20050.70	27813.83	29175.89
	(0.47% of GDP)	(0.46% of GDP)	(0.45% of GDP)
Compensation to poor* (million PhP/Rs)	27053.38	37346.07	46239.12
	(0.63% of GDP)	(0.62% of GDP)	(0.71% of GDP)
<b>SCENARIO 3: 30% FOOD PRICE INCREASE</b>			
Number of poor after price increase (million)	28.66	31.58	55.31
Compensation to poor (million PhP/Rs)	30076.05	41720.75	43763.83
	(0.70% of GDP)	(0.69% of GDP)	(0.67% of GDP)
Compensation to poor* (million PhP/Rs)	47108.89	64810.61	83203.69
	(1.09% of GDP)	(1.07% of GDP)	(1.28% of GDP)

\* Indicates the estimates with the old and new poor after the price increases. Note that the compensation estimates are yearly figures.

Source: Staff estimates.

below the poverty line. Changes (increases) in prices reduce people's real expenditure and thus increase the number of poor. Suppose the government provides compensation to every poor person to offset his/her loss in real expenditure resulting from the price increase. This compensation is calculated for two possible scenarios. (Total amount of compensation will depend on which base year is used.) The first scenario is to compensate only those who were poor before the price change. In other words, the government gives compensation to only 22.73 million people who were poor before the price increase. This compensation is estimated to be equal to P13,906.92 million, which is equivalent to 0.23% of GDP at 2006 current prices. Since the price increases have pushed into poverty an additional 2.72 million people who were not poor before the price increase, it would cost the government a total of P16,159.80 million in compensation (i.e., 0.27% of GDP at 2006 current prices). Results for Pakistan are also estimated (Table 6).

## **V. MEDIUM-TERM SUPPLY RESPONSE AND POVERTY IMPACTS**

Thus far the paper has examined the impact of an exogenous shock in terms of higher world food prices at two separate levels. In Section III, a macroeconomic aggregate demand-driven model was used to trace the effects of the exogenous shock on key macroeconomic variables over the short term, i.e., the next two years. Following from this analysis, Section IV examined the pure price effect of the exogenous shock in the very short term, i.e., less than a year, on the incidence of poverty and inequality that focused on household expenditures. In both Sections III and IV, supply responses from agriculture to the exogenous shock are not taken into account.

This section explicitly allows for supply responses from agriculture. The higher world food prices that will turn the terms of trade in favor of the food sector will, over time, lead to a reallocation of factors of production from other sectors to food, which would elicit a supply response. In this section, the stock of factors of production and technology are kept fixed. (These assumptions are relaxed in the next Section VI, which focuses on issues pertaining to long-term intertemporal responses from agriculture.)

Over the medium term, persistent food price increases will induce supply-side responses as resources are reallocated across sectors in

response to changes in relative returns. This response will moderate the initial impacts of shocks coming from external food price increases. To examine the medium-term adjustments induced by international food price increases and their related poverty impacts, computable general equilibrium (CGE) models are employed for the PRC and Indonesian economies.<sup>6</sup> The PRC is a net exporter while Indonesia is a net importer of food. The price effect is simulated by doubling international food prices.

The models assume a standard, fully competitive, and full-employment economy, featuring multisectors and many households, capturing the economywide and general equilibrium effects, i.e., both price and quantity impacts. As the models move from the benchmark equilibrium to a new equilibrium in the simulation analysis, they factor in all direct, indirect, and multiplier effects stemming from price, substitution, and supply responses in the economies. The results therefore represent the impacts in the medium term and beyond.

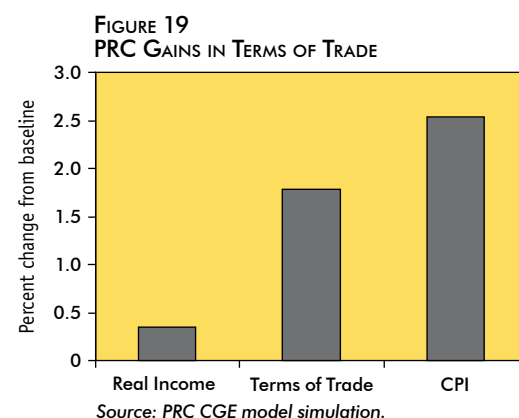
Households in the PRC model are stratified into rural households by agriculture-specialized (more than 95% of household income from farming) and diversified (all other). Urban households are divided into three strata: transfer-specialized, labor-specialized, and diversified. Within each stratum, the households are disaggregated into 20 vingtiles, each containing 5% of the stratum population, from poorest to richest based on per capita income.

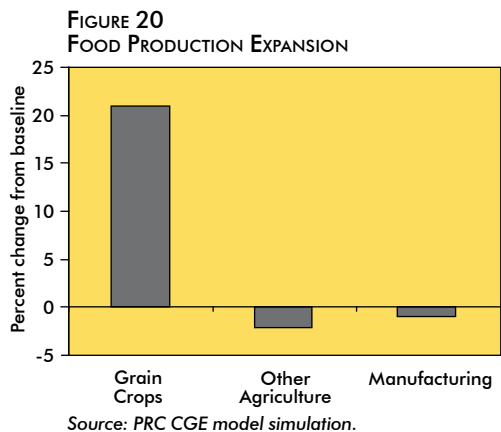
On the other hand, households in the Indonesian model are grouped into 10 categories based on a combination of sector, participation in the labor market, and job status. Moreover, the model is linked with a complete household data set to trace the relationships through which changes in food prices affect the economy and then household welfare. By doing so, there will be impacts at the sector, factor, and household levels. These impacts include changes in household poverty indices.

## A. EFFECTS ON THE PEOPLE'S REPUBLIC OF CHINA

The simulation results shown in Figure 19 suggest that the PRC as a whole would gain from the rising international grain prices. As a net food exporter, PRC's terms of trade improves slightly in

<sup>6</sup> More detailed descriptions about the Indonesian CGE model can be found in Sugiyarto (2007), while the PRC model can be found in Hertel and Zhai (2006).



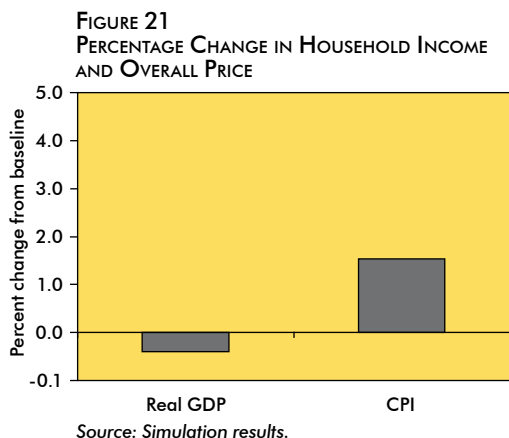


the wake of the world grain prices hike. This leads to gains in real income, which rises by 0.3% of GDP. Rising import prices of grains are passed along to consumers, with CPI increasing by 2.5% relative to the world price of nongrain goods.

Rising grain prices improve the incentives of farmers to increase inputs in food production. Figure 20 shows that as a result, the output of the grain sector expands by 20% following the rise of international food prices. Other agricultural sectors experience slight output contraction because their resources are diverted to grain production.

The aggregate welfare gains from improved terms of trade are not distributed evenly across households. The detailed household results show that rural households benefit from the improved agricultural terms of trade, but urban households would experience losses in real income because of higher food expenditure. Urban households at lower income levels lose more owing to their larger proportion of food consumption in total expenditure. The largest welfare gains are associated with agriculture-specialized rural households. The progressive effects of food price inflation on urban households result in an increase in the urban Gini, which rises slightly from 0.2587 in the model's base year to 0.2629. The national Gini declines by 0.02 because of the income increase of rural households. The Gini coefficient within rural areas also declines slightly. Using \$1/day poverty lines and adjusting them to the change in CPI, the simulation indicates that rural households in the PRC enjoy a significant reduction in the incidence of poverty.

## B. EFFECTS ON INDONESIA



The doubling of international food prices brings about a 3.7% surge in import prices and a 1.4% rise in domestic production cost in the Indonesian economy. Consumer prices increase by 1.5%, resulting in a 0.4% fall in economywide consumption, which leads to an import decline of 1.5%. The real exchange rate appreciates by 0.3%, resulting in a loss of competitiveness of Indonesian products in the world market. As Indonesia is a net importer of food crops (including cereals), producers there respond by reallocating their outputs toward the domestic market, causing a 0.02% increase in domestic sales following a 0.7% decline in exports. Overall, as shown in Figure 21, real GDP falls by 0.4%.

The food crops subsector expands by 3.1%, while other agriculture subsectors contract from 1.98% (livestock) to 3.57% (fisheries). The

manufacturing sector output declines due to contractions in food processing and in textile and wood industries, together with more expensive intermediate inputs and overall lower demand as a result of price increases. On the other hand, the service sector expands as more output is allocated for domestic sale (Figure 22).

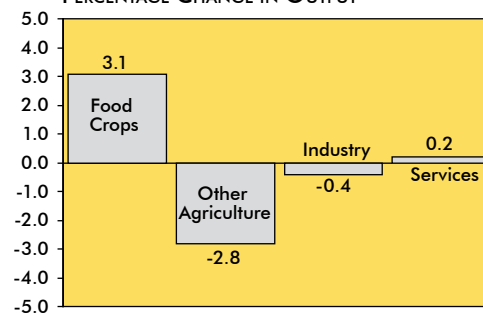
The simulation also shows the impact on poverty. Total poverty measures show opposite movements, with the national head count ratio (HCR) increasing by a 0.03 percentage point as both poverty gap and poverty severity indices drop by a 0.01 percentage point each. However, by analyzing different household groups instead of national averages, a clearer pattern emerges, with the worst hit households being urban low-income, rural low-income, and landless farmers. Those that benefit are households of medium and large farmers (i.e., those with more than 1 hectare of land). The HCRs of urban low-income, rural low-income, and landless farmers increase by a 0.35–0.52 percentage point, while the HCRs of medium and large farmers decrease by 1.1 and 1.4 percentage points, respectively. The small farmers (<0.5 hectare of land) are slightly worse off. In general, urban households are hit harder from higher food prices than rural households.

Once supply responses are allowed, the doubling in international food prices will lead to both winners and losers in economies, with the winners being concentrated among farmers with marketed surpluses in food crops. Among the losers are urban and nonfood crop-producing rural areas, where both the incidence and severity of poverty increase. In the rural areas producing food crops, improved access to inputs for small farmers could alleviate the loss from buying higher-priced food, as production increases would have a compensatory effect. These issues are taken up in the next section.

## VI. POLICY RESPONSES FOR LONG-TERM FOOD SECURITY

In the short to medium run, the importance of safety nets to secure food for the needy is demonstrated from the scenarios in Sections IV and V. But subsidies on a continuing basis are not sustainable. Instead, enhancing access to financial services for the poor and undernourished can help to reduce hunger. An analysis of 50 countries between 1980 and 2003 shows that a 1% increase in private credit to GDP would reduce the prevalence of undernourishment by

FIGURE 22  
PERCENTAGE CHANGE IN OUTPUT

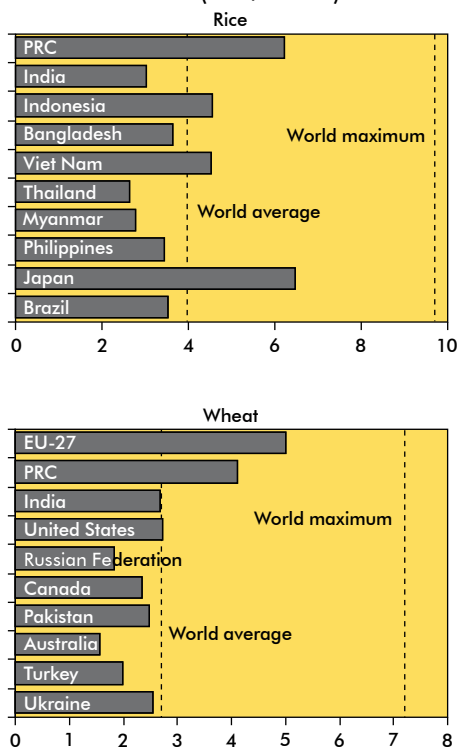


0.22–2.45% (Claessens and Feijen 2006). By comparison, a 1% increase in GDP per capita would reduce the prevalence of undernourishment by about 0.85%. The ratio of private credit to GDP in low-income countries, for example, is about 16%, well below the 88% level in high-income countries. Because financial sector development can play a significant role in reducing not only income poverty but also undernourishment, it can contribute substantially to attaining the first Millennium Development Goal: to halve income poverty and hunger from their 1990 levels by 2015.

The impacts of higher food prices will be moderated as supply responds to prices over the medium term of say, 6 months to 2 years, as shown in the analysis in Section V. To facilitate this response, much neglected agricultural sector reforms need to be put in place to promote the use of modern technology, new seed varieties, and better financial systems. Box 1 presents estimates of the latent potential and measures for raising food yields in India. Such potential across developing Asia can likewise be tapped through agricultural reforms and better farming practices. These steps will increase production within the medium term with minimal effort even without an expansion in cultivated land, and help keep down the pressure on food prices.

In the long run, the notion of food security should move beyond a relatively static focus on food availability and access to one of higher productivity. As the majority of the poor in developing Asia live in rural areas and depend on agriculture, higher agricultural growth will provide food security by increasing supply, reducing prices, and raising incomes of poorer farm households. But yields of food crops in most of Asia remain low in comparison with other major producing countries (Figure 23). Low yields can be attributed to (i) poor crop management skills of farmers, (ii) use of cheaper seeds, (iii) lack of agriculture infrastructure and postharvest technologies to ensure high recovery of harvested grain, (iv) limited research and the gap between available research and practical applications, and (v) inadequate funding for research and development. The highest-yield countries are New Zealand for wheat and Egypt for rice. Our estimates show that if the yields in major producing countries that are below the world average (as in Figure 23) could be increased at least to the world average, global production of wheat would rise by about 17%, and rice by 23%.

FIGURE 23  
RICE AND WHEAT YIELDS FOR TOP 10  
GLOBAL PRODUCERS (TONS/HECTARE)



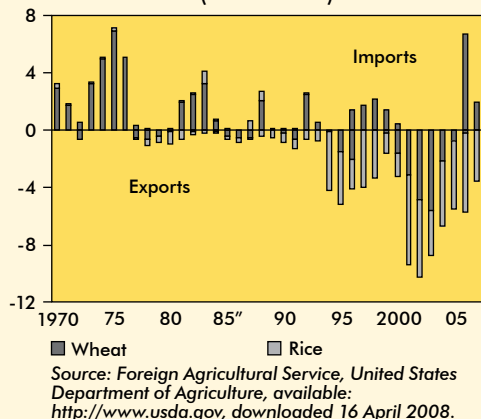
Note: Economies ordered by average production in 2000-07, with the PRC and EU-27 as top producer for rice and wheat, respectively. Yields refer to average in 2000-07.  
Source: Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>, downloaded 17 April 2008.



An expansion of the technology frontier through agricultural research and development to improve yields has become increasingly important, especially under difficult farming conditions such as in mountainous and arid regions. This will need to be supplemented with measures to counter the adverse impacts from decreasing soil quality and falling water tables. Setting an appropriate tariff policy will promote efficient use of water and power for sustainable resource use. In the wake of climate change and stress on water resources, recent research is focusing on making rice more resistant to heat stress and growing it with less water. New wheat varieties developed for dry land farming seem to be promising. The public sector can play a key role in “crowding in” private investments into agriculture. Partnership with the private sector is necessary to supplement limited public resources. Box 2 presents an approach to augment the returns to public investment in agriculture.

Farmers will face complex adjustments as they make the transition to new farming systems and technologies. Instead of distortionary price supports, what they will need to make the right choices and to realize profits from the evolving global trading system, are accurate information on market conditions including prices, domestic and external demand, and trading costs; access to new seeds, modern technology, and credit; and infrastructure facilities.

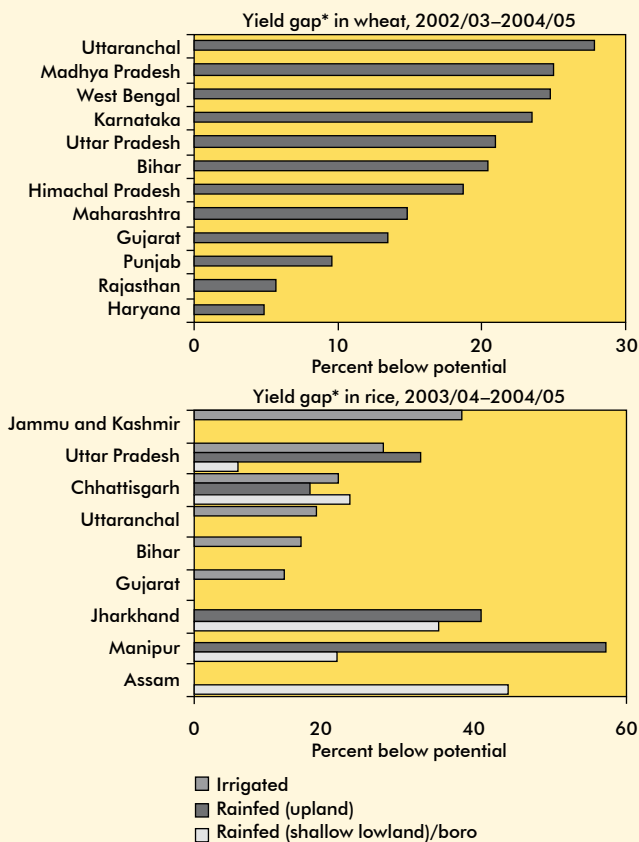
**BOX FIGURE 1.1**  
TRENDS IN INDIA'S WHEAT  
AND RICE TRADE (MILLION TONS)



## BOX 1: ENHANCING LONG-TERM FOOD SECURITY IN INDIA

As a result of both domestic and international factors, food prices in India have been rising faster than the general rate of inflation. The food surplus situation of a few years ago arose, largely owing to artificially hiked prices through the support price policy and input subsidies, gave the impression that availability is not as much of a problem as is providing economic access to the poor. But the availability of cereals has since been declining, driven mainly by market forces. Record surpluses of rice and wheat that occurred during 1998–2002 turned into deficits by 2006 as per capita food grain output fell to the 1970s' level and imports increased (Box Figure 1.1), although India remained a net exporter in 2007.

**BOX FIGURE 1.2**  
YIELD GAPS IN RICE AND WHEAT



Yields of key food crops across states have reached a plateau. Although about 90% of wheat areas and 75% of rice areas are planted with high-yielding varieties, average yields in major states are much lower than yield levels achieved in experiment stations (Box Figure 1.2).

It is projected that food grains demand in India would grow at 2–2.5% per annum during the 2007–2012 Five-Year Plan period, by the end of which import demand may exceed 20 million tons if the stagnation in cereal yield growth continues. Also, India has emerged as the largest importer of edible oils, with more than 40% of its domestic demand met through imports. Increasing demand and slower growth in domestic output can increase dependence on imports. Although, as seen in Box Figure 1.3, import dependence at present is minimal for cereals, this could change in the future. Food imports to sustain domestic consumption may not suffice in the changing global food scenario.

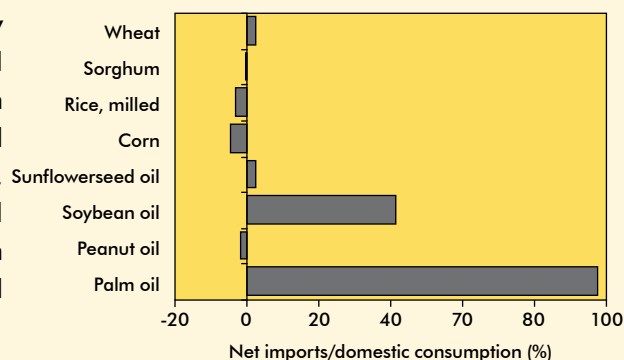
What are the options for India at this juncture of rising world prices and increasing domestic demands? Should it turn toward self-sufficiency or import dependence? Or should it establish itself as a major world player in the global food market? Does it have the capacity to become a key exporter and seize the opportunity brought about by external factors?

India first needs to set right the domestic agricultural policies. Agricultural input and output subsidies have not only been unproductive, financially unsustainable, and environmentally damaging; they have also accentuated inequality among rural Indian states (Fan, Gulati, and Thorat 2007). Resources can instead be diverted to investments for enhancing agricultural growth. A combination of lower subsidies on fertilizer, irrigation, power, and credit; higher investments in agricultural research and development and rural infrastructure; and institutional reform are a must to sustain agricultural growth in the long term and to reduce poverty.

India can indeed leapfrog into an era of high productivity in the medium term of 2–3 years. If all the states (as in Box Figure 1.2) successfully tapped their yield potential, they would produce an additional 13 million tons of wheat and 19 million tons of rice, equivalent to 19% and 20% of their current production.

Simple measures such as adoption of improved cultivation practices, balanced and timely application of fertilizer and other inputs, and improving farmers' access to modern technology can significantly bridge the gap between potential and actual yields, especially in Eastern India, which is endowed with adequate water resources and fertile soil. However, even with improved production prospects, complete reliance on domestic production may not be desirable if more cost-efficient sources of supply are available externally. Indeed, exploiting the available opportunities can firmly place India once again on the map of major world food exporters.

**BOX FIGURE 1.3**  
IMPORT DEPENDENCE IN INDIAN AGRICULTURE,  
2007



Source: Foreign Agricultural Service, United States Department of Agriculture, available: <http://www.usda.gov>, downloaded 24 April 2008.

## BOX 2: PUBLIC SECTOR INVESTMENTS IN THE AGRICULTURE SECTOR

In a majority of Asian countries, gaps between actual yield levels and theoretical yield levels given the existing levels of technology are wide for both rice and wheat. However, efforts to narrow these gaps appear to have been faltering, and levels of public sector spending in the agriculture sector in a number of countries in Asia have been on the decline since the late 1990s. Box Table 2.1 compares public sector spending in the agriculture sector in some of the major Asian rice-producing countries, and shows that the spending levels during 2000–2004 were lower in all these countries than in the prior three decades. In part, this decline could be attributed to low returns to investments in the agriculture sector resulting from low prices of the main agricultural commodities during the period.

BOX TABLE 2.1

PUBLIC SECTOR SPENDING ON AGRICULTURE IN SELECT COUNTRIES (PERCENT OF TOTAL PUBLIC SECTOR SPENDING)

COUNTRY	1975	1980	1985	1990	1993	1998	2000-04
PRC	12.1	12.2	7.7	10.0	9.5	10.7	6.5
Indonesia	9.8	9.6	6.8	7.6	6.6	7.2	5.9
Philippines	9.0	5.3	5.7	6.0	7.3	6.0	3.7
Thailand	5.9	8.1	11.7	10.4	10.4	7.5	7.3

Sources: Indonesia: *Strategic Vision for Agriculture and Rural Development* (ADB 2006); Philippines: *Agriculture Public Expenditure Review* (World Bank 2007).

However, with the recent rises in world prices for major food commodities such as wheat, rice, maize, and oilseeds, investments in the agriculture sector have become more attractive. This is despite the fact that the prices for major inputs such as seed and fertilizers, and costs of cultivation and irrigation have also risen sharply. A case in point is the irrigation sector in Pakistan. In 2002, an ADB technical assistance project assisted in the formulation of a medium-term investment plan that compared and prioritized a number of potential projects, some of which were assessed to be economically not viable (Government of Pakistan 2002). A reevaluation of economic viability of some of these projects in 2007–2008 suggests that many of these projects will be economically viable if the high level of prices were to prevail (Box Table 2.2).

**BOX TABLE 2.2**  
**POTENTIAL RETURNS FROM INVESTMENTS IN THE IRRIGATION SECTOR IN PAKISTAN**

PROJECT	2002 ASSESSMENT <sup>a</sup>		2008 ASSESSMENT <sup>b</sup>	
	ECONOMIC INTERNAL RATE OF RETURN (%)	ECONOMIC NET PRESENT VALUE (AT 12% DISCOUNT RATE)	ECONOMIC INTERNAL RATE OF RETURN (%)	ECONOMIC NET PRESENT VALUE (AT 12% DISCOUNT RATE)
Sehwan Barage Project	10.1	-5,245.7	13.2	4,853.9
CRBC 1st Lift Irrigation Project	10.3	-2,650.4	14.1	5,002.3
Pat Feeder Extension Project	6.9	-760.4	9.7	-595.5
Jalalpur Canal Project	11.4	-151.9	15.5	1,058.6
North West Canal Project	9.7	-991.4	15.6	2,816.9
Shakargarh Canal Project	9.9	-1,282.4	14.7	2,398.8

Sources: <sup>a</sup> Medium Term Investment Plan prepared under the PAK-Water Resources Sector Strategy Study (Government of Pakistan 2002).

<sup>b</sup> Staff estimates based on the models prepared for the Medium Term Investment Plan under the PAK-Water Resources Sector Strategy Study (Government of Pakistan 2002).

However, the higher returns to investments in these and other investments in the sector can only be realized if farmers have easy and ready access to inputs, information, and markets, and if they have the right incentives. This will require concerted efforts from governments in improving the “5 Is”, namely; (i) infrastructure, (ii) input availability, (iii) institutions, (iv) information, and (v) incentives.

**(i) Infrastructure.** Low levels of investments in the sector have led to poor upkeep and maintenance of existing agricultural structures and facilities, and insufficient development of new structures and facilities. In particular, investments are needed to ensure efficient and reliable irrigation water supplies and connectivity to markets.

(a) Investments in irrigation systems will improve efficiencies and reliability of irrigation water supplies, which will in turn raise crop productivities, expand irrigated areas, and reduce the incidence of crop failures. The priority should be to improve the efficiency and reliability of existing irrigation systems rather than to develop new systems. Most countries in Asia are either already water-stressed or are nearing such a point, and there may not be much scope for development of new irrigation systems. Having said that, even if there is scope for harvesting previously uncommitted water resources for irrigation, the development of new systems is a lesser priority, since in most cases, areas with prime agricultural potential are already being irrigated, and investments to irrigate new areas with marginal agricultural potential will generate lower returns.

(b) Improvements in connectivity to the markets will help in lowering production and marketing costs, reducing wastage of inputs and produce, and improving returns to agriculture. Therefore, investments in rehabilitation, maintenance, and development of existing and new farm-to-market roads need to be a priority area for public sector intervention.

**(ii) Input Availability.** Although the availability of inputs has improved in most Asian countries, further improvements are needed to ensure that farmers have easy, reliable, and affordable access to seed, fertilizers, pesticides, and credit. Moreover, the rapid hikes in the prices of key inputs such as fertilizers, pesticides, and fuel have created additional hurdles for farmers. For example, higher prices of fertilizers have doubled or tripled the operating capital requirements for both the input suppliers as well as the farmers. Unless these rises are accompanied by affordable and timely access to credit, the input suppliers and farmers may scale down operations instead of expand these to benefit from higher prices for their produce, and may underinvest in the sector.

**(iii) Institutions.** In most Asian countries, the two areas that were perhaps most affected by the decline in public sector spending were agricultural research and development and agricultural extension services, which led to a slowdown in both the development and dissemination of new technologies (e.g., improved crop varieties), and technical know-how (e.g., improved crop management). In the Philippines for example, the ratio of expenditure on agriculture research over total government expenditure had gone down from 0.2% in 2000 to 0.07% in 2005. The same is the case for Indonesia. From 0.06% in 2000, the ratio had gone down

to 0.02% in 2005. Potential returns from investments in the sector will require that these are also accompanied by revival and/or improvements in support services, as without these, farmers may continue to grow crop varieties with low potential and to operate using traditional and inefficient practices.

**(iv) Information.** Although there has been great progress on the information technology front, farmers have largely been left out. The timely flow of market information is still lacking, which makes it difficult for farmers to adjust their production decisions to respond to changing market conditions.

**(v) Incentives.** Investments in the four areas discussed above may still not generate the envisaged returns unless these are accompanied by completion of the reform agenda in the areas of pricing policies and trade policies. Since the mid-1990s to the late 1990s, most Asian countries have initiated reforms aimed at removing distortions arising from interventionist price and trade policies; however, progress has been mixed and most countries have faltered on the reforms. As a result, farmers in most Asian countries still make their production decisions based on distorted prices and are unable to benefit from the higher prices in international markets for their produce—although in some cases they are exposed to rapidly rising prices of inputs such as fertilizers and fuel. A case in point are fertilizer prices in Pakistan, which have shot up in the past 18 months, even as the prices of wheat and rice have not risen proportionately to their rise in international markets. Unless the distortions are corrected and divergence between economic and financial returns narrowed, farmers will continue to operate in a suboptimal manner and countries will not be able to realize the full benefits from investments in the sector.

The challenge to governments in developing Asia is to attain a proper balance between immediate responses to protect vulnerable groups and the poor, and short-term and rapid efforts to ensure that inputs and credit are available to support a supply response over the coming crop cycles. Only then can a smooth transition be made to medium- and long-term efforts to increase supply by making agricultural land and labor more productive. Attaining this balance will require a long-term vision that avoids sacrificing incentives for a farm-supply response and that stifles domestic and international trade. The present situation holds out hope for moving the agricultural reform agenda forward internationally, as the rationale for farm support in the industrialized countries is undercut by the existence of high farm prices in the foreseeable future.

## **VII. POLICY RESPONSES: SAFETY NET PROGRAMS FOR FOOD SECURITY AND POLICIES TO MITIGATE RISING FOOD PRICES**

The short-term policy responses for developing Asia are provided in Table 7. The types of policy responses vary according to whether countries are net importers or net exporters. The former involves reducing import restrictions and tariffs, while the latter involves adopting increased taxes and restrictions on exports. In this regard, it is significant that one of the leading net exporters (Thailand) has liberalized imports of rice and has eschewed export restrictions. This is an important factor in helping to ensure that countries with shortfalls will have access to supplies. Safety net programs and policies to mitigate the rise in food prices through subsidies, using stocks to stabilize prices, and providing assistance to farmers to meet rising input costs are widespread. Food assistance programs have been in place for some time in Asia although their impact has been mixed—sometimes helping consumers, other times weakening incentives for producers—with distributional consequences. The adoption of some policies is consistent with objectives such as assisting vulnerable households, preserving incentives for farmers, not imposing costs beyond national borders, good governance, etc. However, clearly some responses such as imposing price controls, trade restrictions, and increasing general subsidies are inconsistent with the objectives and tend to cause more harm than good. There is also a contradictory element in policy responses as countries hope to reduce price volatility rather than increase it, yet take measures that encourage consumption, discourage production, and stifle the deepening of international markets and the smooth development of trade.



TABLE 7 POLICY RESPONSES IN DEVELOPING MEMBER COUNTRIES

REGION / DMC	REDUCE IMPORT DUTIES	INCREASE SUPPLY USING RESERVES	BUILD RESERVES/ STOCKPILES	INCREASE IMPORTS/ RELAX RESTRICTIONS	RAISE EXPORT DUTIES	EXPORT RESTRICTIONS	PRICE CONTROLS/ CONSUMER SUBSIDIES	MINIMUM SUPPORT PRICES	MINIMUM EXPORT PRICES	ASSISTANCE/ SUBSIDY TO FARMERS	PROMOTE SELF-SUFFICIENCY	ACTIONS AGAINST/ APPEALS TO PROFITEERS	CASH TRANSFER	FOOD RATION/ STAMP
<b>EAST ASIA</b>														
Cambodia		✓	✓			✓	✓					✓		
PRC	✓	✓			✓	✓	✓	✓		✓	✓	✓		
Indonesia	✓	✓		✓		✓	✓							✓
Korea	✓	✓					✓				✓			
Malaysia			✓				✓				✓			
Mongolia	✓			✓										
Myanmar											✓			
Philippines			✓	✓			✓	✓		✓	✓	✓		✓
Singapore			✓										✓	
Taipei, China	✓													
Thailand		✓	✓	✓			✓					✓		
Viet Nam			✓	✓		✓			✓					
<b>CENTRAL ASIA</b>														
Kazakhstan						✓	✓							
Kyrgyz Rep							✓							
Tajikistan	✓													
<b>SOUTH ASIA</b>														
Afghanistan	✓						✓	✓						
Bangladesh		✓	✓	✓			✓	✓		✓	✓			✓
India	✓		✓	✓	✓	✓	✓		✓			✓		✓
Nepal				✓										
Pakistan			✓		✓	✓		✓						
Sri Lanka	✓		✓	✓								✓		
<b>PACIFIC</b>														
Fiji											✓			✓
FSM											✓			
PNG											✓			
Samoa							✓							
Solomon Islands	✓													
Tonga							✓							

Major rice exporter

Major wheat exporter

Note: Pakistan is a major exporter of both rice and wheat.

Sources: Adapted and expanded from World Bank (2008a); various news articles.

What can/should governments do? Short-run, medium-run, and long-run measures were examined above. First, shifting from costly general subsidies to targeted safety net programs such as cash transfers or food stamps, feeding programs for school children, and food-for-work programs can be used in the short run, as can release of stocks to stabilize prices. Closing the yield gap in Asia between low-productivity areas and high-productivity areas in rice and wheat production by making input supplies more reliable and providing credit at market interest rates; freeing up trade; and avoiding protectionism are responses that can work over the course of one year. Medium-term responses such as improving institutional capacities and governance structures in Asia's rice economy, and investing in improved postharvest facilities are a second route to a sustainable outcome. Finally, long-term investment in education in rural areas, agricultural technology, and infrastructure can elicit productivity gains and alleviate the trend of higher rice prices and food prices in general.

The short-, medium-, and long-run responses to the rise in food prices described in this paper are imperative if developing Asia is to stay on the path of ensuring inclusive growth (Ali and Zhuang 2007). Inclusive growth, in turn, will directly address the challenges resulting from an increase in both the incidence and severity of poverty emanating from rising and high food prices. Box 3 distills the responses put forth in this paper as a means to contributing toward inclusive growth, in order to preserve developing Asia's progress in poverty reduction.

The recent spike in world and domestic food prices cannot be simply ignored—it is a wake-up call for developing Asia. Food price inflation is the most regressive tax imaginable, with poor and near-poor households the most vulnerable. The rise in prices to elevated levels not seen for more than 30 years is a result primarily of structural factors that are not going away in the near future. World food prices are on an upward trajectory and are quite volatile as a result of the thin volume of international trade relative to total production and consumption, coupled with the low level of stocks of staple grains. Governments

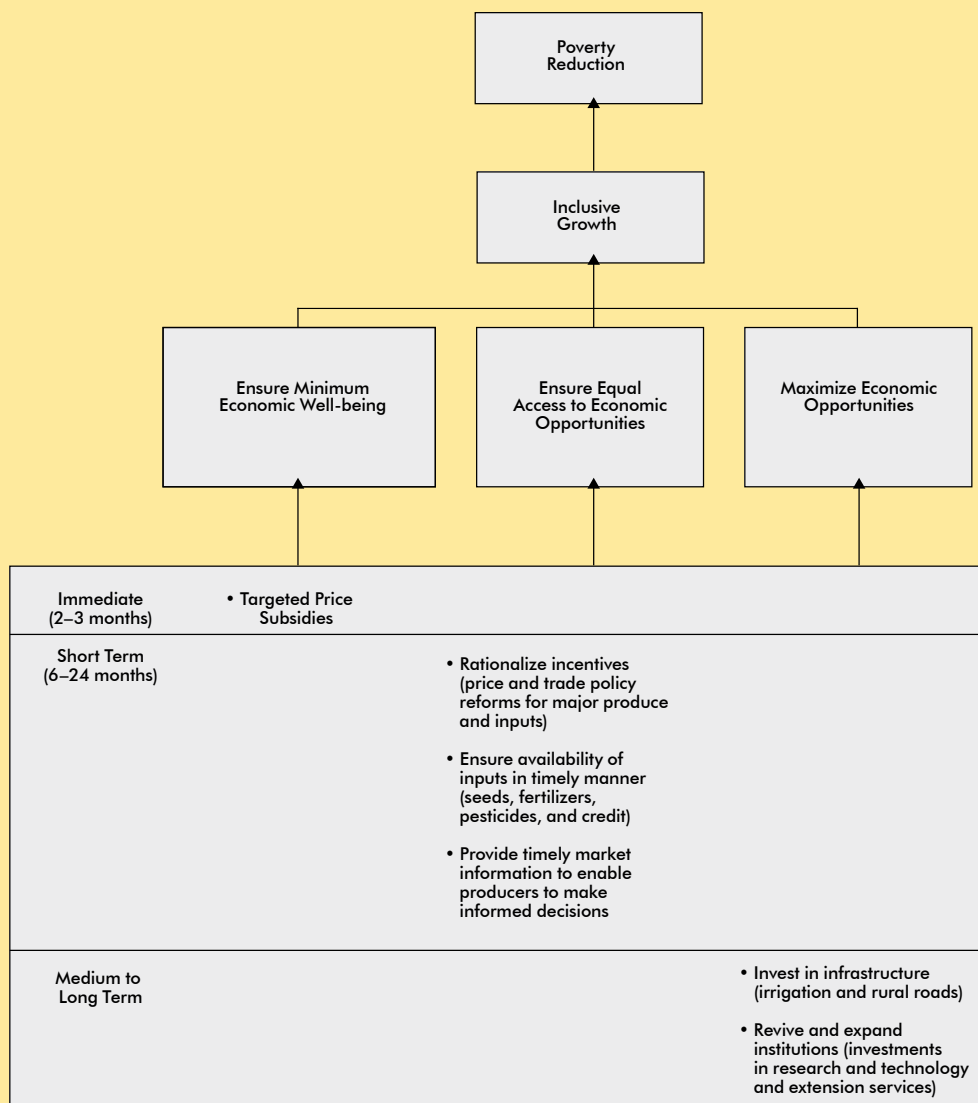
must act to keep trade open and to avoid costly interventions that drive trade underground. Export restrictions should not be resorted to, rather, relative price changes should be allowed, to send the right signals to farmers and consumers alike. Domestic markets should likewise be unrestricted, and administrative controls over prices and resource allocation should be avoided so that markets can become more efficient. The extremely poor, including the new poor, must be provided well-targeted assistance over the next 3–12 months in the form of purchasing power—cash transfers, food-for-work, feeding programs, and food stamps—to alleviate the pure price effect. The governments of developing Asia must work to ensure that small and marginal farmers have equal access to credit, fertilizer, improved seeds, pesticides, electricity, and water. Market access should be provided to farmers across the region and in the global marketplace to allow a maximum supply response and to provide order and reduce uncertainty. Over the long haul, improvements in land and labor productivity in agriculture will be essential in rice, wheat, and edible oils. This can only be attained through long-term investments and technological advances that have been identified in Section VI above. These include a rejuvenation of research and development and education that enable farmers to take advantage of technologies. Land use must also be made sustainable; this will entail better practices in protecting watersheds and forests. The economic viability of farm activities and investments must be the determining factor in what is produced domestically and what is imported.

Rising food prices could bring an end to poverty reduction in Asia—the greatest reductions in poverty in mankind’s history. This paper has provided a road map for Asia’s continued progress in poverty reduction in the face of rising food prices. Looking to the future, the question is: Can Asia transform the challenge of sustained high prices for food into a new opportunity and scale new heights? How this is addressed will determine whether or not poverty can continue to monotonically decrease as it has over the past decades. There are other challenges to be sure, but there are no others that are so immediate and pressing.

### BOX 3: FOOD PRICE INCREASES AND RESPONSES: TOWARD INCLUSIVE GROWTH

Faced with the challenge of rising food prices and the need to improve production of major commodities, governments will need to have an action plan that addresses the range of issues from the immediate to the long term. In the **immediate term** (prior to any supply response in output), governments will need to focus on protecting the poor from high and rising food prices, which can be accomplished through programs targeted at the poor to provide them access to food commodities through cash transfers, food-for-work, or food stamp programs. Through targeted support to the poor rather than general price subsidies, governments will be able to ensure better coverage as well as free up resources for addressing the needs in the “5 Is”. Provision of targeted support will also help minimize the adverse impacts on the poor of rising food prices, and will enable the governments to address the distortions in the incentives in the **short term**. The right incentives accompanied by dependable, affordable, and timely access to inputs and credit at market interest rates will enable farmers to invest in improved and appropriate levels of input usage (improved seed, fertilizers, pesticides, and irrigation), which will then lead to an expansion in production levels and will stabilize and keep prices from spiraling up. However, the supply response, while significant, will be limited under the current levels of technology options and inputs available at the farm-gate level. In the **medium to long term**, governments will need to further build on the gains in supply by addressing the inadequacies in infrastructure and ineffectiveness of institutions, and by promoting research and development of new technologies. In addition, provision of more equitable access to education will expand capacities for future farmers to take advantage of advances in technology.

**BOX FIGURE 3.1**  
INCLUSIVE GROWTH THROUGH IMPROVEMENTS IN THE AGRICULTURE SECTOR



Improvements in these areas will contribute to a more inclusive growth path where the poor’s minimum economic well-being will be ensured and protected (Box Figure 3.1). In the immediate term, targeted food programs and subsidies in the form of food stamps, cash transfers, feeding programs in schools, and food-for-work for the poor will constitute social protection and safety nets. In the short term, initiatives to correct incentives and improve access to inputs will help remove inequalities in access to economic opportunities. In the longer term, improvements in research and development, in extension services, and in relevant infrastructure will help improve the opportunity for producers to expand production and returns.

## REFERENCES

- Ali, I., and J. Zhuang. 2007. Inclusive Growth toward a Prosperous Asia: Policy Implications. ERD Working Paper 97, Economics and Research Department, Asian Development Bank, Manila.
- Asian Development Bank. 2006. *Indonesia: Strategic Vision for Agriculture and Rural Development*. Asian Development Bank, Manila.
- . 2008. *Asian Development Outlook 2008*. Asian Development Bank, Manila.
- Claessens, S., and E. Feijen. 2006. Finance and Hunger: Empirical Evidence of the Agricultural Productivity Channel. Policy Research Working Paper 4080, World Bank, Washington, DC.
- . 2007. "From Credit to Crops." *Finance and Development* 44(1, March): Available: <http://www.imf.org/external/pubs/ft/fandd/2007/03/claessen.htm>.
- Fan, S., A. Gulati, and S. Thorat. 2007. Investment, Subsidies, and Pro-Poor Growth in Rural India. Discussion Paper 00716, International Food Policy Research Institute, Washington, DC.
- Government of India. 2004. "Central Government Subsidies in India." Report prepared with the assistance of the National Institute of Public Finance and Policy. Available: <http://finmin.nic.in/downloads/reports/cgsi-2004.pdf>.

- Government of Pakistan. 2002. *Pakistan Water Sector Strategy – Medium Term Investment Plan*. Prepared under the Water Resources Sector Strategy Study. Ministry of Water and Power, Islamabad.
- Hertel, T., and F. Zhai. 2006. “Labor Market Distortions, Rural-urban Inequality and the Opening of China’s Economy.” *Economic Modelling* 23(1):76–109.
- IMF. 2008. *World Economic Outlook 2008*. International Monetary Fund, Washington, DC.
- IRRI. 2008. *The Rice Crisis: What Needs to be Done?* International Rice Research Institute, Los Banos. Available: <http://www.irri.org>.
- Philippine Daily Inquirer*. 2008. “Rice Shortage may Cost the Philippines P60B, Says Escudero.” Available: <http://newsinfo.inquirer.net/breakingnews/nation/view/20080327-126672/Rice-shortage-may-cost-the-Philippines-P60B-says-Escudero>.
- Sugiyarto, G., ed. 2007. *Poverty Impact Analysis: Selected Tools and Applications*. Asian Development Bank, Manila.
- USDA. 2008. *Production, Supply and Distribution*. US Department of Agriculture. Available: <http://www.fas.usda.gov/psdonline>.
- World Bank. 2007. Philippines: Agriculture Public Expenditure Review. Technical Working Paper, Manila.
- . 2008a. “Country Policies and Programs to Address Rising Food Prices.” Available: <http://siteresources.worldbank.org>.
- . 2008b. *World Development Report 2008*. Available: <http://www.usda.gov>.