FOOD PRICE STABILISATION AND FOOD SECURITY: INTERNATIONAL EXPERIENCE

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The importance of food commodities to consumers and farmers leads most countries to attempt to influence the levels and stability of food prices. The specific policies adopted and the degree of price stabilisation actually achieved vary considerably across countries, however. This paper reviews the experience of four countries (China, India, Bangladesh and Madagascar) that have implemented explicit price stabilisation and food security policies. Several policy lessons emerge from the analysis, including the potential savings to be made through reliance on international trade rather than buffer stocks; the likelihood of efficiency gains from relying more heavily on market mechanisms; the need to maintain transparency of policies; and the high cost of untargeted public distribution programs.

INTRODUCTION

Because of the importance of food commodities to both consumers and farmers, especially those with low incomes, most countries attempt to influence the levels and stability of food prices. Interests of consumers and producers clash, however, often facing government policy makers with the ‘food policy dilemma’ about whether to pursue high prices for producers or low prices for consumers, compounded by concerns about the cost of government subsidies and about efficiency losses arising from government intervention (Timmer, Falcon and Pearson 1983). Moreover, governments often attempt to meet multiple objectives (target price levels for producers and consumers; price stability; availability of grain for subsidised distribution programs; maintenance of minimum stock levels; and so on) with an insufficient number of policy instruments (such as procurement and selling prices; levels of government imports). Ultimately, this results in major gaps between stated objectives, policy measures undertaken and actual achievements.

In practice, most countries have followed one of two broad strategies, focusing either on market price stabilisation through untargeted open market purchases and sales of grain, as in Indonesia during the 1970s and 1980s, or on the supply of public sector grain in limited quantities and at low prices through ration shops,

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as in India. Although price stabilisation may be the nominal objective of the ration shop strategy, the more accurately stated objective is income redistribution in favour of the poor, by way of a permanent lowering of prices to eligible consumers of rationed grains. Market price stabilisation is evidently a less important objective of this strategy, since quantities sold are typically determined independently of the amount needed to achieve a particular target level of open market prices. While this amount may vary substantially from year to year, the quantities of grain needed for public distribution systems are generally predictable, except for emergency relief operations. In contrast, under the first strategy (interventions in the open market), levels of procurement or sales from stocks depend on the amount of market withdrawals or injections needed to maintain market prices at target levels.

Countries have also differed widely in the degree of reliance on market mechanisms to implement either pure price stabilisation or rationed quantity systems. At one extreme is complete reliance on market mechanisms for procurement (tenders) and distribution (open market sales at auction). At the other extreme is forced procurement and rationed sales at official prices. As will be shown below, the evidence of international experience (as well as economic theory) suggests that market mechanisms are generally more efficient over time in achieving price stabilisation objectives.

This paper examines the experience of four countries (China, India, Bangladesh and Madagascar) that have price stabilisation and food security policies, and draws lessons for such policies in other countries, including Indonesia. China has undergone dramatic changes in policy from a command and control economy in the 1960s to a continuously changing, more market-oriented system with vestiges of government controls in food markets in various regions and sectors. India retains a vast public distribution system involving large-scale domestic procurement, substantial control over international trade, huge stocks, and rationed, but now targeted, sales. Bangladesh, with a system similar to that of India in the 1970s and 1980s, has liberalised domestic and international trade, though retaining a scaled-down version of India’s public distribution system that relies mainly on food-for-work and direct distribution to poor households, instead of sales through ration shops. Madagascar eliminated almost all direct government interventions in food markets as part of economic liberalisation measures undertaken in the 1980s, and has since relied largely on private sector rice imports to stabilise market prices of rice, its major staple. The country’s more recent experience is also of interest, although unfortunately for the wrong reasons. Following a domestic shortfall and an exchange rate depreciation, Madagascar reverted to a combination of interventionist policies in 2004 that exacerbated the problem rather than ameliorating it, sharply increasing the domestic price of both domestic and imported rice. The last section of the paper synthesises broad lessons from these country experiences.

1 Other common alternative means of subsidising household consumption are direct cash transfers and food stamp programs; the latter entitle holders to purchase a range of private market commodities through private shops, which are then reimbursed by the government.
China, the world’s most populous country, has relied mainly on its own production of wheat and rice for its supply of major staples, with relatively small roles for international trade. From the 1950s until the early 1990s there was almost no private grain trade in China, but reforms since that time have resulted in a mixed system with a greater role for private trade. Sales of grain through ration shops were essentially eliminated in the 1990s. Steps to phase out domestic grain procurement were taken in 2002. But government interventions to stabilise domestic market prices have continued, and the government still controls most external trade, and probably retains large stocks.

China has an official policy of self-sufficiency in food, particularly grain (Chern and Yu 2003: 186). Production of both rice and wheat increased very rapidly during the 1960s, with annual output of the two grains doubling from 51.8 to 104.6 million tonnes between 1961 and 1970. Production growth rates of the two crops have slowed considerably over time, however, falling to only 1.10% p.a. in the 1990s and 0.75% p.a. from 2001 through 2005 (table 1). Nonetheless, China reduced the average share of net imports (mostly wheat imports, with smaller volumes of rice exports) in total availability (that is, total available

<table>
<thead>
<tr>
<th></th>
<th>Wheat</th>
<th>Rice</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Production (million tonnes p.a.)</td>
<td>Growth Rate (% p.a.)</td>
<td>Net Imports (million tonnes p.a.)</td>
</tr>
<tr>
<td>1961–70</td>
<td>23.3</td>
<td>8.05</td>
<td>5.20</td>
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<td>1971–80</td>
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<td>1981–90</td>
<td>83.4</td>
<td>4.14</td>
<td>12.22</td>
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<td>106.3</td>
<td>1.23</td>
<td>7.07</td>
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<td>2001–05</td>
<td>91.9</td>
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<td>58.6</td>
<td>6.74</td>
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<td>1981–90</td>
<td>115.6</td>
<td>1.86</td>
</tr>
<tr>
<td></td>
<td>1991–2000</td>
<td>127.4</td>
<td>0.99</td>
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<tr>
<td></td>
<td>2001–05</td>
<td>117.6</td>
<td>0.68</td>
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<td>Rice</td>
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<td>7.11</td>
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<td>132.4</td>
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<td>1.10</td>
</tr>
<tr>
<td></td>
<td>2001–05</td>
<td>209.6</td>
<td>0.75</td>
</tr>
</tbody>
</table>

a 2001–04 average.
b 2001–03 average.

Source: Calculated from Food and Agriculture Organization (FAO) data.
supplies) from 5.8% in the 1960s to 2.9% in the 1990s. From 2001 to 2005 China was on average a small net exporter of rice and wheat (equivalent to 0.6% of net availability).

These gains have been achieved through dissemination of improved technology, high fertiliser use, and production quotas that have heavily influenced the allocation of land across crops. Wheat production has increased faster than rice, from only 14.3 million tonnes in 1961 to an annual average of 91.9 million tonnes from 2001 through 2005, though rice production remains almost 30% greater than wheat production (table 1). Indica rice, traditionally the dominant rice in southern China, accounts for about 60% of rice production. Japonica rice, traditionally grown in the northern provinces, has expanded rapidly and accounted for about 30% of rice production in 2005 (compared to only about 10% in 1980). The remainder of China’s rice includes various types of glutinous and indigenous varieties.

**Government market interventions and price stabilisation**

Under the ‘unified grain procurement and sale system’ established in December 1953, state grain agencies were designated as the sole buyers and sellers of grain. Procurement prices and sales quotas for collective farms were administratively set. Initially, this system involved complete government control of grain markets: area and output targets for each crop were set by the central government, and there were compulsory quotas at fixed procurement prices and provisions for output in excess of the quota to be sold for about 30% more than the quota price. International trade was monopolised by state agencies; private trade was allowed for only a few commodities and was limited to the county level (Sicular 1988). Urban households were issued grain coupons permitting purchases of grain up to the rationed amount at a fixed price. Grain-deficit agricultural households, food processors and restaurants were also issued coupons. This distribution and sales system, which covered rice and wheat flour, coarse grains and edible oil, remained in place until the early 1990s, with minor modifications to per capita ration sizes and to government selling prices to various consumers (Zhou and Wan 2006).

On the production side, major reforms were undertaken beginning in 1978 with the introduction of the ‘household responsibility system’. This gave individual households use rights to land and control over production decisions, though communes still retained ownership of land. Procurement prices were also increased and plan targets were applied to fewer crops, though the government retained complete control of markets for cereals, cotton and edible oils. These reforms contributed to growth in agricultural production (6.6% per year on average) and output per hectare (6.1% per year on average) between 1979 and 1984 (Chen, Wang and Davis 1999; Gulati, Fan and Dalabi 2005).

In the late 1970s and early 1980s, large increases in the procurement prices of grains combined with no increase in selling prices led to rapid rises in government subsidies, from 0.3% of GDP in 1978 to 3.1% in 1983. These large subsidies continued until May 1991, when the government finally increased the grain selling prices. With little difference between the coupon sales price and the open market price, and given the lower quality of grain in government shops, sales in the state-operated channels had become minimal by mid-1993.
Trade policy and government-induced price instability

During the 1990s China’s government maintained tight control over international trade, administratively deciding levels of grain trade (generally net exports of rice and maize and net imports of wheat). These decisions were made well in advance of the beginning of the calendar year in which trade was to occur, but there was apparently no procedure for policy adjustments as new information on the size of harvests became available. Although contracts for the entire year’s trade arguably gave China more bargaining power and a more favourable price, the lack of responsiveness to market signals both within and outside the country led to unnecessarily high price instability.

In spite of a reported record harvest of total grain, rice prices rose throughout calendar year 1993, in part due to excessive rice exports (contracts for which had been arranged before the price increases). The immediate policy response was to reverse earlier domestic market liberalisation by imposing new restrictions on private trade. The central government re-imposed direct controls: grain rationing and coupons, which had been abolished in 1992/93, reappeared in some areas, and mandatory procurement targets were increased.

Inflexibility in modifying government administrative decisions on external trade levels contributed to price instability in the following year as well. In calendar 1994, in spite of rising prices, China reduced its net imports of grain rather than increasing them. Ultimately, total net production of rice and wheat in 1994 was 5.7 million tonnes less than average net production in 1990–92. Government imports were also lower, by 4.0 million tonnes, than in this earlier period. As a result, per capita net availability of rice and wheat fell by 8%, from 182 to 168 kilograms. In subsequent years, net imports were sharply increased, even though production levels had more than recovered; this probably contributed to stock build-ups and steep declines in market prices (Lohmar 2002; Johnson 2003; FAO data).

To stabilise markets the government imposed price ceilings on grain transactions in the open market, re-introduced coupons, and gave local governments primary responsibility for achieving food self-sufficiency at the provincial level (Zhou and Wan 2006). The sharp rise in market prices in 1994 also led China to increase procurement prices and set minimum grain production and reserve levels for provincial governments. Production of wheat, rice and maize rose by 53 million tonnes from 1994/95 to 1996/97 (USDA 2001).

A combination of higher procurement prices and increased sales of grain through government shops at subsidised prices helped stabilise markets in 1995, but at a large fiscal cost. Subsidies rose rapidly, from $2.3 billion in 1994 to $6.8 billion in 1998, as procurement volumes increased (Zhou and Wan 2006). Moreover, since sales of grain through government shops declined as price differentials between official selling prices and market prices narrowed, government stocks rose rapidly.

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2 The possibility that actual rice production was less than estimated may also help explain the rice price increase.

3 These calculations of net availability do not include changes in public stocks, on which no data are available.

4 Since that time a social security system based on cash transfers, begun in 1993, has largely replaced the ration sales system.
From export subsidies to WTO membership

From 1999 to 2001 the government’s policy shifted again towards reducing its large stocks, in part through export subsidies (USDA 2001). Domestic market prices were allowed to fall, lowering incentives for production; as a result, wheat output declined sharply from 1997 to 2003, and there was a significant shift in area cultivated towards high-value horticultural crops and cotton (Lohmar 2004). In spite of the price decline, domestic prices were not far below international prices, however. Nonetheless, export subsidies to dispose of excessive public stocks were large—equivalent to $6.6 billion (0.5% of GDP) in 2003.6

With accession to the WTO in 2001, China agreed to some liberalisation of its wheat import trade regime. Before WTO accession China’s state-owned trading enterprises (STEs) had a monopoly on international trade in wheat under a quota system administered by the country’s State Council. In place of this non-transparent quota system, China adopted a tariff-rate quota (TRQ) system that allows a limited amount of wheat to be imported with a low tariff (for example, 9.6 million tonnes at a 1% tariff in 2004), with any wheat imports above this quota subject to a prohibitively high tariff (65% in 2004). China also agreed to allocate 10% of the wheat quota to non-STEs, and to allow STEs to re-allocate any portion of their quota unused by September to non-STEs for wheat imports by the end of the calendar year. These provisions were designed to encourage the STEs to operate more like commercial enterprises (Lohmar 2004).

China has also continued reforms in the domestic marketing of grains by abandoning the foodgrain price support system of domestic procurement, except in major producing regions in the northeast. A three-year plan to phase out all state procurement was adopted in 2002 (Gulati, Fan and Dalafi 2005). In place of price supports, direct payments to grain farmers in 13 major producing provinces were introduced in 2004. Under this system, payments are made on a per unit of land basis, with the unit subsidy varying by crop and province; for example, the subsidy on summer-sown (high-quality) rice in Hubei province was $27 per hectare (about $3.12 per tonne), while the subsidy on wheat in Shanxi province was only two-thirds of this amount. Total subsidies on rice, wheat and corn, as reported by China’s finance ministry, were RMB 11.6 billion ($1.4 billion, or about $18 per hectare), equal to less than 2% of the value of grain production (Gale, Lohmar and Tuan 2005).

Nonetheless, regulations introduced in 1995 as part of the ‘Governors’ Responsibility System’ (which gave explicit responsibility to local governments to achieve policy targets) still stipulate that government departments have a responsibility to ensure a balance between grain supply and demand, and that the government can intervene when prices are rising rapidly. Moreover, former government grain bureau procurement stations that have been sold to their managers are the key

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5 Wheat output prices were on average 10% less than world prices; early (first season) indica rice prices were 12% above international border prices, while late (second season) indica rice prices were 17% below (Fang and Beigin 2003).

6 Little information on the size of stock and stock management is released, however. Zhou and Wan (2006: 16) report that public stocks of grain are in excess of 100 million tonnes. The United States Department of Agriculture (USDA) estimated wheat stocks alone at 42.4 million tonnes in July 2004, and an expected 31.4 million tonnes in June 2005 (Lohmar 2004).
players in grain marketing, and retain close ties to the government (Gale, Lohmar and Tuan 2005). China continues to intervene to support farm prices as well. In the first nine months of 2006 the government purchased 41 million tonnes of wheat and 4 million tonnes of indica rice as part of a minimum grain price policy to protect farmers’ interests.7

INDIA: PRICE STABILISATION THROUGH PUBLIC STOCKS AND FOOD DISTRIBUTION
Like China, India has followed a food self-sufficiency strategy since the 1960s and, since the mid-1970s, domestic supplies of rice and wheat have come almost entirely from domestic production. India’s government intervenes heavily in domestic food markets and operates the largest public food distribution system in the world, covering 600 million consumers entitled to rationed quantities at subsidised prices. Market liberalisation in the 1990s has increased the role of the private sector in domestic and international trade, but the government still procures 20–25% of wheat and rice production annually. Price stability is maintained through adjustments in procurement, distribution and stock levels, rather than through open market sales.

Food aid was a major contributor to total food availability in India from the mid-1950s to the late 1960s, but a desire to avoid the uncertainties and political conditions tied to food aid flows led the country to adopt a food self-sufficiency policy in the mid-1960s. Public investments in irrigation, agricultural research and extension and subsidies to fertiliser and agricultural credit led to a rapid spread in green revolution technology. The government intervened heavily in rice and wheat markets by restricting private sector purchases, storage and grain movements, while providing support to producers (particularly in key producing states) through procurement at official minimum support prices. Together these agricultural technology and price policies succeeded in rapidly raising production of rice and wheat, enabling the country to boost grain availability and reduce reliance on food aid and commercial imports to insignificant shares of total net availability (table 2). By the mid-1990s, excess availability of food (as reflected in rising public stocks) had replaced food supply shortfalls as a major food policy issue. This new situation called into question the wisdom of continuing large subsidies on agricultural inputs, particularly for wheat and rice production.

The public distribution system
In the mid-1960s India faced uncertain food aid flows that depended on donor political considerations. This experience was instrumental in creating the political will to support policies aimed at increasing domestic production and achieving national food self-sufficiency through investments in irrigation, agricultural research and extension. Having successfully increased domestic production of rice and wheat, by the mid-1970s India was able to rely mainly on drawdown of accumulated stocks to address production shortfalls, coupled with self-targeting emergency relief programs (mainly food-for-work). This was the case even following

the 1987 ‘drought of the century’, which contributed to grain production declines relative to 1985/86 of 5.4 million tonnes in 1986/87 and 7.7 million tonnes in 1987/88 (3.9% and 5.6%, respectively).

India has stabilised the prices of rice and wheat through the operation of ration shops that provide fixed quantities of grain to eligible recipients at official prices. The public distribution system (PDS) is the cornerstone of the country’s safety net arrangements, covering about 600 million people at a cost of Rs 300 billion ($7 billion) per year in recent years. In the 1960s, food aid was a major source of grain for the PDS. Since the mid-1970s, however, the vast majority of the grain distributed through the PDS has derived from domestic procurement of rice and wheat at minimum support prices that are equal to or above open market prices. These procurement prices are determined in accordance with estimated costs of production for farmers. In the past, most procurement took place in only a few states, where the government had invested heavily in irrigation and where relatively large farms produced sizable market surpluses. Until markets were gradually liberalised, beginning in the 1990s, private sector grain trade across state boundaries was generally prohibited; international trade is still controlled by the government through licensing requirements. In recent years, the government has sold excess food stocks (mainly rice, but also some wheat) to private traders for export.

### TABLE 2 India: Cereal Production, Trade and Food Aid

<table>
<thead>
<tr>
<th></th>
<th>Average Quantity (million tonnes)</th>
<th>Trend Growth (% p.a.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>60.9</td>
<td>113.2</td>
</tr>
<tr>
<td>Rice</td>
<td>29.6</td>
<td>50.6</td>
</tr>
<tr>
<td>Wheat</td>
<td>9.5</td>
<td>33.9</td>
</tr>
<tr>
<td>Coarse cereals</td>
<td>21.7</td>
<td>28.7</td>
</tr>
<tr>
<td>Exports</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Imports</td>
<td>3.7</td>
<td>2.1</td>
</tr>
<tr>
<td>Food aidb</td>
<td>n.a.</td>
<td>0.7</td>
</tr>
<tr>
<td>Net availability</td>
<td>56.7</td>
<td>100.5</td>
</tr>
<tr>
<td>Net availability/personc</td>
<td>136.6</td>
<td>149.9</td>
</tr>
<tr>
<td>Imports/net availability</td>
<td>2.1%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

*a* Logarithmic trend for 1952–67 not calculated because exports were zero in some years.

*b* The food aid figures in the 1968–90 and 1991–2004 columns are 1970–90 and 1991–2002 averages, respectively; data for 1951–67 food aid are not available, but most imports of cereals in 1951–67 were food aid.

*c* Includes changes in public stock and 12.5% deduction from production for feed, seed and wastage.


*Source: Indian Economic Survey,* various issues; World Food Programme (WFP), International Food Aid Information System (INTERFAIS), <http://www.wfp.org/interfais/>; del Ninno, Dorosh and Subbarao (2007).
India’s stock build-up in the 1990s

Political pressures to raise minimum support prices rapidly—and then procure the high volumes of rice and wheat offered for sale at these prices—had a major impact on policy in the early 1990s. Procurement levels of rice and wheat increased sharply, from 22.0 million tonnes in 1990/91 (13% of foodgrain production) to 37.4 million tonnes in 2001/02 (18% of foodgrain production). Because procurement is highly concentrated in only a few states (Punjab, Haryana and Uttar Pradesh for wheat, and Punjab, Haryana and Andhra Pradesh for rice), most of the benefits of these policies accrued to farmers in these states (World Bank 2004).

Stock levels rose rapidly along with procurement levels, since volumes of grain distribution did not increase. Government stocks increased from 11.3 million tonnes in 1990 to 58.0 million tonnes in January 2002 (figure 1), far in excess of the stock norm (target minimum level) of 18.8 million tonnes. Consequently, there was a significant increase in the subsidy on buffer stocks as a proportion of total food subsidies, from 16% in the early 1990s to 42% in 2001/02. Apart from their financial implications, these mounting buffer stocks (of both rice and wheat) became a source of embarrassment to the government in the wake of reports of deaths due to hunger in some states. Food Corporation of India (FCI) stocks were subsequently reduced to 21.7 million tonnes in January 2005, in large part through subsidised exports of 31 million tonnes of rice and wheat from 2000/01 through 2003/04 (del Ninno, Dorosh and Subbarao 2007).

Part of the reason for slow growth in public distribution of grain throughout most of the 1990s was an effort to keep fiscal costs down by reducing the
coverage and per unit subsidies of the PDS. Until 1995, subsidised food sales were untargeted, with all consumers entitled to a rationed amount at the official price. Reforms in 1995 introduced targeting, with a lower sales price for households with incomes below the poverty line (BPL). Households with incomes above the poverty line (APL) paid higher prices, initially equal to the full cost of the grain to the FCI. Thereafter, ration entitlements and prices were periodically adjusted in accordance with market conditions and public stock management strategies. BPL allocations were gradually increased from 10 kg to 35 kg per family per month between March 2000 and April 2002, as part of a policy to reduce stocks. The selling price of APL grain was also reduced, to 70% of the economic cost to the FCI.

India has numerous other safety net programs, including several that are supported by food stocks; they include the Sampoor Grameen Rozgar Yojana (SGRY) employment program implemented by state governments,8 midday meal programs; nutrition programs; food-for-work programs; and a destitute feeding program known as Antyodaya.9 Yet in spite of the size of the PDS and the wide array of other safety net programs, the system still does not completely address the food needs of the poor. An estimated 200–300 million people—20–30% of the population—still consume inadequate amounts of calories (del Ninno, Dorosh and Subbarao 2007).

BANGLADESH: PRICE STABILISATION IN A LIBERALISED FOOD ECONOMY

The Bangladesh food economy is similar to that of Indonesia, each having a large population (139 and 218 million, respectively), a dominant role for rice in grain production and consumption, and multiple rice crops that spread major rice harvests throughout the year and help limit intra-annual price fluctuations. Until the early 1990s the food policy of Bangladesh closely resembled that of India, with government control of international trade and large-scale domestic procurement to help supply a public foodgrain distribution system. Since the early 1990s, however, Bangladesh has liberalised its domestic and international trade, while retaining a more limited public foodgrain distribution system. As a result, private sector imports have played a major role in price stabilisation, particularly following major domestic production shortfalls such as occurred after the severe floods in 1998.

Like India, Bangladesh raised domestic production and reduced the role of food aid in domestic food supplies (table 3), but with a more market-oriented approach that has involved lower fiscal costs of government procurement. Expanded irrigation (particularly private tubewells after restrictions on imported pumps were relaxed in the late 1980s) and increased use of fertiliser and improved seeds enabled the country to reach its rice and wheat production targets by 2000. In contrast with India, however, stability in food supplies was achieved mainly through

8 The SGRY replaced two other employment programs, namely the Employment Assurance Scheme and the Jawahar Village Development Program (Jawahar Gram Samridhi Yojana).

9 Radhakrishna, Rao and Subbarao (2004) summarise the results of a number of studies identifying deficiencies in the implementation of various work fare programs in India.
food aid from the mid-1970s to the early 1990s and, since then, via private sector imports.

Food safety nets
Bangladesh’s foodgrain price stabilisation and food security policies were very similar to those of India until the early 1990s (both systems having their origins in British colonial India). As in India, domestic procurement and government buffer stocks were used both for price stabilisation and as the basis of a public foodgrain distribution system (PFDS). However, in Bangladesh tighter budget constraints limited the extent of government procurement and distribution. Procurement decisions have been driven largely by quantity targets for public distribution and stocks, and the procurement price is not meant to function as a floor price. Moreover, market liberalisation has been far deeper in Bangladesh than in India.

Foodgrain for the PFDS is procured through domestic purchases at a fixed price, through international commercial tenders or through food aid.10 In contrast with India before its mid-1990s reforms—when state governments or the Food Corporation of India operated through monopoly procurement and levies on rice millers—domestic procurement in Bangladesh consists of voluntary sales by producers and millers.11 As production gains have led to greater volumes of marketed foodgrain (rising from about 3 million tonnes in the 1970s to 14 million tonnes in 2000), the share of government distribution in total marketed foodgrain has declined, from 15% in the 1970s to only 5% in 2000.

10 Local tenders have also been used in recent years, particularly when fixed-price procurement has failed to meet government targets.
11 All domestic procurement has been voluntary since the 1980s.

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### TABLE 3  Bangladesh: Cereal Production and Availability

<table>
<thead>
<tr>
<th></th>
<th>Average Quantity ('000 tonnes)</th>
<th>Trend Growth (% p.a.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>16,103 20,172 26,559</td>
<td>2.48 3.02 2.71</td>
</tr>
<tr>
<td>Rice</td>
<td>15,011 18,772 25,156</td>
<td>2.63 3.04 2.77</td>
</tr>
<tr>
<td>Wheat</td>
<td>1,092 1,400 1,403</td>
<td>0.15 2.50 1.84</td>
</tr>
<tr>
<td>Net imports</td>
<td>3,060 3,007 2,916</td>
<td>0.28 0.49 0.24</td>
</tr>
<tr>
<td>Food aid</td>
<td>1,222 929 367</td>
<td>2.19 −3.91 −19.89</td>
</tr>
<tr>
<td>Net availabilitya</td>
<td>17,553 21,162 26,820</td>
<td>2.16 2.49 1.70</td>
</tr>
<tr>
<td>Net availability/person</td>
<td>176.6 176.0 198.8</td>
<td>−0.02 0.78 0.19</td>
</tr>
<tr>
<td>Imports/net availability</td>
<td>17.3% 14.2% 10.8%</td>
<td>−0.43 0.93 6.20</td>
</tr>
</tbody>
</table>

a Includes a 10% deduction from production for feed, seed and wastage, but does not include changes in government stocks.

Source: del Ninno, Dorosh and Subbarao (2007); Food Planning and Monitoring Unit (FPMU), Bangladesh Ministry of Food and Disaster Management.
Reforms in 1991/92 and 1992/93 closed the Rural Rationing and Statutory Rationing channels (the rationed sales channels in rural and urban areas, respectively), in an effort to improve the targeting of subsidised foodgrain distribution and to reduce fiscal costs (Ahmed, Haggblade and Chowdhury 2000). As a result, both the percentage and the total amount of foodgrain distributed through targeted and relief channels increased in the mid- to late 1990s, averaging 1.17 million tonnes per year from 1995/96 to 1997/98, or 73% of the 1.60 million tonne total annual average distribution during these years, as compared with 838,000 tonnes—37% of annual average distribution—from 1989/90 to 1991/92 (Dorosh, del Ninno and Shahabuddin 2004).

Private sector imports following production shortfalls
Before the rice and wheat import trade was liberalised in the early 1990s, Bangladesh attempted to stabilise food supplies and prices through a combination of food aid, public sector imports and operation of public buffer stocks through the PFDS. Following severe flooding in 1998, however, private sector rice imports, made possible by earlier trade liberalisation and investments in infrastructure and market development, effectively stabilised market supplies and prices.

In mid-1998, major floods spread across much of Bangladesh and rice prices rose to import parity levels (the export price of rice in the exporting country plus transport and normal marketing costs), inducing huge inflows of rice imported by hundreds of small traders (figure 2). Private sector rice imports—totalling 2.5 million tonnes from July 1998 through April 1999, according to official estimates—were 6.1 times larger than government rice distribution. During the 1998 calendar year alone, private sector imports (mainly from India) reached 2.3 million tonnes. Had the government of Bangladesh imported this grain itself, the average additional cost of the imported rice delivered to local distribution points would have been approximately $50–100 million, as a consequence of its weak cost minimisation capability relative to private sector operators. And, if the government had subsidised this rice by selling it at the open market sale price used for very limited government sales in urban centres, the total fiscal cost would have been $160–210 million (del Ninno, Dorosh and Smith 2003).

The liberalised trade policy also helped the government to achieve price stabilisation without maintaining large stocks. In 1988/89, before the liberalisation, a major flood had caused an 18.1% reduction (relative to trend) in the monsoon season rice harvest. Public stocks averaged 1.167 million tonnes from August to November of 1988 (10.9 kg per person), and these stocks, combined with public sector imports, enabled the government to use public distribution channels to stabilise markets and reach flood-affected households. By contrast, in August–November 1998, following liberalisation, average public stocks were only half the per capita levels of 10 years earlier (5.5 kg per person). On this occasion private sector imports, rather than public distribution, provided the main source of additional market supplies to compensate for the 2.04 million tonne crop loss (del Ninno et al. 2001).

Other factors were also important in enabling Bangladesh to stabilise food supplies. The large expansion in the winter season (boro) rice and wheat harvests

12 For an analysis of political economy issues related to the food subsidy reforms, see Chowdhury and Haggblade (2000).
over more than two decades greatly shortened the length of time between major
domestic grain harvests. This helped reduce the seasonality of production and
thus stabilise total supplies and prices—particularly following periodic poor
monsoon season (*aman*) rice harvests resulting from unusually long-lasting
floods (Ahmed, Haggblade and Chowdhury 2000). Moreover, large-scale import
flows would not have been possible without encouragement of private domestic markets
through investment in market infrastructure (particularly roads and bridges) and
the adoption of pro-market policies (including no limits on maintaining private
stocks, and no restrictions on grain movement or access to foreign exchange—the
latter a major constraint in the famine years of the early 1970s), and without the
ready availability of grain in world markets (del Ninno et al. 2001).

Bangladesh has also enhanced household food security by quickly scaling
up existing safety net programs after major shocks; for example, following the
1998 flood the government provided aid to flood-affected households through
cash transfers under the Gratuitous Relief (GR) program, and in-kind transfers
to poor women under the Vulnerable Group Feeding (VGF) program (del Ninno
et al. 2001). In the initial flood period, immediate relief through the GR program
went mainly to seriously flood-exposed households. VGF transfers started later
and were targeted more towards the poor than towards flood-exposed house-
holds: survey data indicate that nearly 40% of the poorest one-fifth of households
received grain transfers, compared to 17.2% and 11.2% in the top two quintiles
of the per capita expenditure distribution. In all, total direct transfers (mainly

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**FIGURE 2 Bangladesh: Rice Imports and Prices**

*(monthly data)*

The import parity price is based on the Bongaon (West Bengal) price through November 1997, and
the Delhi wholesale price thereafter. Tk = Taka, Bangladesh’s currency unit.

*Source:* Dorosh (2001); Food Planning and Monitoring Unit (FPMU), Bangladesh Ministry of Food and
Disaster Management.
through the VGF program) added an estimated 20–25 calories per person per
day to the consumption of recipients (del Ninno, Dorosh and Smith 2003). Rice price stabilisation achieved through private sector imports provided even
greater benefits, however. The estimated 21% increase in rice prices that would have occurred in the absence of the private sector rice trade would have reduced the calorie consumption of the 60 million poor individuals in Bangladesh by an estimated 44–109 calories per person per day. Counteracting this impact would, in turn, have required a six- to twelve-fold expansion of the VGF program (del Ninno, Dorosh and Smith 2003).

MADAGASCAR
Madagascar is a poor island nation of 18 million people with a gross national per capita income of only $290 per year in 2005. Production of rice, its major staple, increased from 1.9 million tonnes in 1970 to 3.0 million tonnes in 2004, a trend growth rate of only 1.1% per year. In contrast to the rapid growth rates in much of Asia, the area cultivated with rice in Madagascar increased by an average of only 0.6% per year, and yields by only 0.5% per year, in the same period. With population growth of almost 3% per year during this time, however, annual per capita production fell from 237 kg to 179 kg. Rice markets were liberalised in the late 1980s (albeit retaining a moderately high tariff), and since then the country has relied on private sector imports to supplement national production. Over the period 1995 to 2003, private sector imports averaged about 5% of total net availability each year, helping to stabilise prices of local rice at price levels of imported rice in the October–March period before the major rice harvest in April–May (figure 3). However, following a production shortfall in early 2004, which coincided with a rise in world prices and a sharp depreciation of the currency, the government began again to intervene heavily in the import and domestic rice trade, destroying incentives for private traders and exacerbating price instability.

The 2004 Madagascar rice price crisis
The major objectives of government rice policy during the crisis period in mid-
2004 were to avoid a rice shortage and to reduce and stabilise the domestic price of rice for consumers. The slow pace of private commercial imports at this time led to concern that the private sector might not supply Madagascar with sufficient imported rice, suggesting the need for a change in government policy. Unfortunately, however, subsequent government interventions in rice markets served to exacerbate rather than ameliorate the effects of these shocks on the domestic rice market.

At the time of the crisis, Madagascar still imposed an import tariff equal to 45% of the cost and freight value of rice imports. Concern about fiscal and balance of payments implications dissuaded the government from reducing import tariffs in order to increase rice imports and lower domestic prices. Instead, it announced that it would float tenders for commercial imports of rice, but left open the possibility that tariffs on these imports might be waived or rebated. Since tariffs on regular private sector commercial imports remained, the possibility of competing government imports at reduced tariff rates discouraged the private sector import trade. Moreover, the government announced an official sales price of Fmg 3,500 per kilogram, a price below the tariff-inclusive import parity price. This was a
further signal to private importers that importing probably would not be profitable. Since the government did not have sufficient rice to meet all demand at this official price, government sales had to be rationed, and a parallel market at a price above import parity levels had to be developed. Government policy—and in particular its lack of transparency, the harassment of importers (including detaining ships with imported rice), uncertainty about tariff levels and enforcement, and an official selling price that made private sector imports paying full tariffs unprofitable—ultimately made the situation worse than if there had been no intervention. Total rice imports (both government and private sector) in 2004 were only 151,000 tonnes, compared with 254,000 tonnes in 2003, and market prices rose above import parity levels. Moreover, the better policy option—reducing the import tariff—would have benefited net consumers of rice, with only minimal effects on government revenues, since the impact of the reduced tariff rate would have been partially offset by an increase in rice imports (Minten and Dorosh 2006).

LESIONS FROM INTERNATIONAL EXPERIENCE IN PRICE STABILISATION

International experience in price stabilisation (including that of the four case study countries as summarised in table 4) varies widely, reflecting vast differences in policy objectives, fiscal and other constraints, and government willingness to use market mechanisms. Stated policy objectives often involve a mix of both producer and consumer interests. In many cases, however, there are insufficient instruments or resources to achieve objectives that relate to the level and

FIGURE 3 Madagascar: Rice Imports and Prices

a Fmg = Franc Malagache (Malagasy franc), Madagascar’s currency unit. 
Source: Minten and Dorosh (2006).
### TABLE 4 Summary of Price Stabilisation Policies by Country

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>India</th>
<th>Bangladesh</th>
<th>Madagascar</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History of stabilisation policy</strong></td>
<td>State-controlled production and marketing with administered prices until gradual liberalisation began in late 1980s</td>
<td>Public Distribution System begun in 1960s with large-scale para-statal procurement, rationed sales and public stocks</td>
<td>Public Foodgrain Distribution System with large food aid inflows, government procurement and distribution programs</td>
<td>Substantial state intervention in early 1980s, with major fiscal deficits from subsidised sales of rice to urban groups</td>
</tr>
<tr>
<td><strong>Recent policy</strong></td>
<td>Instruments: Controls on external trade, government stocks; limited procurement and sales</td>
<td>Large public stocks; domestic procurement at fixed prices; sales through ration shops</td>
<td>Liberalised private trade; small public stocks; minimal local procurement; targeted distribution programs</td>
<td>Minimal government stocks and interventions in markets (exception: 2004 rice crisis)</td>
</tr>
<tr>
<td></td>
<td>Role of para-statal agencies: Maintain central stocks; control external trade; domestic procurement and distribution</td>
<td>Food Corporation of India holds national stocks; large-scale public sector procurement, sales</td>
<td>Maintain national security stocks; channel food aid and procured grain through targeted programs</td>
<td>Since liberalisation, only a small security stock; some subsidised sales in 2004</td>
</tr>
<tr>
<td></td>
<td>Link with international markets: Government-controlled external trade</td>
<td>Private export trade partially liberalised in mid-1990s</td>
<td>Trade liberalised in early 1990s; government imports and food aid did not prevent private imports</td>
<td>Private trade liberalised, though government tenders and policy uncertainty in 2004 inhibited private trade</td>
</tr>
<tr>
<td></td>
<td>Implications for price stabilisation at producer and consumer levels: Government export policies increased price instability</td>
<td>High level of price stability for producers and consumers</td>
<td>Private trade a major stabilising force following production shortfalls</td>
<td>Substantial price stability through private imports except in 2004</td>
</tr>
<tr>
<td></td>
<td>Welfare implications (efficiency gains, etc.): Liberalisation brought welfare gains to producers, but higher prices to urban consumers</td>
<td>Ration shops provided subsidies to consumers at substantial fiscal cost</td>
<td>Private imports prevented price spikes following production shortfalls, benefiting consumers</td>
<td>Policy uncertainty in 2004 contributed to high prices for consumers with little gain to producers</td>
</tr>
</tbody>
</table>
stability of prices, the volume of food transfers to the poor, and the level of stocks. Nonetheless, several broad lessons may be highlighted. They concern potential savings to be made through reliance on international trade rather than buffer stocks for price stabilisation; efficiency gains from a shift to market orientation (encompassing both the liberalisation of international trade and the use of private sector firms rather than public sector institutions); the need to promote competitive and efficient trade; and the high cost of untargeted public distribution programs.

Buffer stocks and international trade

Analysis of the costs of procurement in China using prices from 1997 through 2004 indicates that on average the costs of maintaining buffer stocks of rice and wheat to stabilise inter-annual prices are higher than procurement costs in domestic (rice) or international (wheat) markets. Holding wheat in storage for one year adds about $33 per tonne to the cost of imported wheat. Thus, only in years when international wheat prices rose by more than this amount (equivalent to 25% of the average price of US Gulf wheat in this period) would procuring the previous year and storing wheat have been more financially efficient than simply purchasing wheat in the current year. However, in the 1997–2004 period, the largest annual price increase (between 2001 and 2002) was only $21 per tonne. Because the average annual price change in international markets was near zero, the average estimated savings from current-year market purchases as compared with maintaining a buffer stock were equal to the average saving in storage and interest costs ($33 per tonne), which is equivalent to 17% of the average procurement cost of wheat in a buffer stock.

Similarly, the total estimated storage and interest cost of holding domestically procured rice in a buffer stock for one year averaged RMB 378 per tonne, equivalent to about 21% of the average wholesale domestic price of rice in Dalian (a major rice-producing area) of RMB 1,769 per tonne. In only one year (2004) in the 1997–2004 period did domestic rice prices rise by more than 21%, however. Average estimated savings from making open-market purchases of rice in the current year rather than holding a buffer stock were RMB 371 per tonne, equivalent to 15% of the average procurement cost of rice in the buffer stock.

Most governments choose to maintain some buffer stocks as a hedge against major disruptions in international markets, temporary closure of ports and transport networks, or exceptionally high international prices coinciding with domestic shortfalls over an extended period of time. As illustrated by the China example, however, maintaining a large buffer stock relative to normal consumption or trade levels for price stabilisation purposes, as opposed to a small stock that serves as a

13 The following comparisons of storage costs with procurement costs are broadly similar for other countries.

14 The total estimated storage and interest cost of holding internationally procured wheat in a buffer stock for one year is $39 per tonne, $33 per tonne more than short-term storage of imports ($6 per tonne) (World Bank 2006).
short-term working stock in case of emergencies, is far more costly than reliance on international trade for imports.\textsuperscript{15}

**Efficiency gains from international trade liberalisation and shifting to market orientation**

Economic theory suggests that trade liberalisation combined with the promotion of competitive markets is a more efficient mechanism than public buffer stocks for stabilising prices. The reasons for this include greatly reduced storage and handling costs, and the impact of the profit incentive on the timeliness of information flows and decision making. The experience of Bangladesh in promoting private sector import trade to bolster domestic supplies and stabilise rice prices at import parity levels illustrates the benefits of trade liberalisation in promoting food security. In particular, the response of the private rice import trade to market signals (that is, price differentials between local and international prices) was much more rapid than the response of the government or international donors.\textsuperscript{16} Moreover, these private imports involved no cost to the government (other than a possible small reduction in potential import tariff revenues, and total import tariffs on rice were less than 5\% in this period).

For price stabilisation through international trade to be a feasible option, international price levels must not be excessively volatile.\textsuperscript{17} If the import parity price becomes very high, international trade may not be profitable for private traders, or a domestic price increase up to import parity levels may be deemed unacceptable to the government.\textsuperscript{18} With the expansion of international trade volumes and the number of countries participating in the trade, however, international prices of grain are becoming increasingly stable over time, so this would not appear to be a serious problem nowadays.\textsuperscript{19}

\textsuperscript{15} Multiple harvests spread throughout the year also contribute to reduced risk of production shortfalls and increased price stability, since weather-related production shocks that reduce production in one season have smaller impacts on annual production (and may even be offset by increased production in another season). Seasonal price spreads related to the cost of storage are also reduced when the time between major harvests is reduced.

\textsuperscript{16} The slow response of China’s government import policies to changes in market conditions in the mid-1990s also contrasts sharply with the response of the private sector rice trade in Bangladesh.

\textsuperscript{17} In principle, export parity can provide a price floor for domestic grain markets, just as import parity provides a price ceiling. Establishing marketing channels for exports can be costly, however, particularly if a country’s exports are irregular. Policies of potential trading partners may also inhibit exports; for example, although price margins suggested that exports of rice from Bangladesh to India would have been profitable in several months in mid-2000, no trade took place because of import restrictions in India (Dorosh, del Ninno and Shahabuddin 2004).

\textsuperscript{18} Adequate infrastructure is thus essential to reduce marketing costs so that the import parity price in various parts of the country is not excessively high, as it is in Ethiopia, for example (Byerlee, Jayne and Myers 2006).

\textsuperscript{19} In reality, the greater threat to stability of import parity prices is posed by instability of nominal exchange rates, such as Indonesia and other Asian countries experienced during the Asian financial crisis of the late 1990s. This experience illustrated that without effective
Promoting competitive and efficient trade

Price incentives are necessary but not sufficient conditions for international trade, however. Equally important is transparency of government policy regarding public stocks, sales prices and commercial imports. Madagascar’s experience in the rice crisis of 2004 showed that uncertainty about import tariffs, the quantity of government imports and the ultimate government selling prices for these imports increased risks and led to a sharp decline in private sector trade. Likewise, uncertainty about government commercial imports and food aid flows inhibits private commercial imports in Zambia and elsewhere in sub-Saharan Africa (del Ninno, Dorosh and Subbarao 2007). In contrast, the Bangladesh government took deliberate steps to inform private traders of its policies on government imports, and to signal its active support for private sector trade by eliminating all rice import tariffs following major production shortfalls in 1998 (Dorosh et al. 2004).

Other measures can also be taken to promote competitive and efficient private sector trade. Removal or simplification of import licensing requirements and other administrative procedures reduces opportunities for bureaucratic extortion by government officials, and lowers transactions costs for traders. Maintaining a level playing field between government and the private sector, as well as among private traders (including international traders), encourages competition and promotes efficiency.20

The high costs of public food distribution programs

Much of the international experience with public distribution systems (especially with untargeted programs) has been disappointing. Public distribution schemes involving subsidised sales of grain through ration shops have entailed extremely high costs in China and India, though reduction in the number of beneficiaries through selective targeting has helped to reduce these costs. Distribution of low-quality commodities that are less preferred by non-poor households can also help reduce costs. All public distribution food programs, however, must solve the problem of potentially large leakages (diversion or theft of food) that may occur when official prices are significantly below market prices, as documented through household surveys in Pakistan and Bangladesh in the late 1980s and Mozambique in the early 1990s (Alderman and Garcia 1993; Ahmed, Haggblade and Chowdury 2000; Alderman, Sahn and Arulpragasam 1991). Operating a public food distribution system also necessitates maintenance of working stocks of grain, which may entail substantial losses and deterioration in quality in storage (as in India and China since the mid-1990s). The costs of storage and distribution of grain are macroeconomic management to provide some measure of stability in nominal exchange rates, it is not possible to stabilise nominal prices of imports without major fiscal losses.

20 Governments are often concerned that private traders restrict supply and manipulate market prices of imported food. Analysis of changes in domestic prices and in margins between domestic and international prices provides some indication of the competitiveness of trade. Where private import trade has been liberalised, monitoring of letters of credit issued and en-cashed can give an indication of the number of importers, the average size of contracts, the levels of negotiated prices and the total volume of imports expected in coming months, all of which are further indicators of the competitiveness of trade and the extent to which private sector imports can be expected to stabilise markets (Dorosh 2001).
typically greater than the administrative costs of cash transfer programs such as have been implemented successfully in Mexico and Sri Lanka (Skoufias, Davis and de la Vega 2001; Pinstrup-Andersen 1985).

TOWARDS AN OPTIMAL STRATEGY

The international experience with price stabilisation and food security in developing countries suggests that the optimal strategy is likely to involve market-based instruments for price stabilisation combined with targeted safety nets (Byerlee, Jayne and Myers 2006). Such an approach would avoid the efficiency losses caused by reliance on government management of buffer stocks, international trade and food distribution, and instead use market-based instruments such as procurement by tender and open market sales to influence prices and manage minimal government security stocks. Among the countries discussed in this paper, Bangladesh has the policies that come closest to this approach, though even in this case, the efficiency of price stabilisation and food security efforts could be enhanced through greater reliance on targeted cash transfers instead of in-kind distribution. Futures contracts could also be used as insurance against extreme price spikes in international grain markets.

The most appropriate strategy for applying these broad policy outlines in any individual country, however, depends on its specific circumstances, including the size and seasonal distribution of domestic food production; market infrastructure and market development; the composition of food demand; the extent and depth of poverty at the household level; budget constraints; and political aversion to food price fluctuations. Given these parameters, the benefits and fiscal costs of policy options should be carefully weighed against alternative uses of funds (for example, spending on poverty and development programs). Finally, price stabilisation and food security policies should be part of an integrated package of social protection measures that may include various other instruments (such as public works, cash transfers and credit programs) that address the needs of poor and vulnerable households.

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Food price stabilisation and food security: international experience


