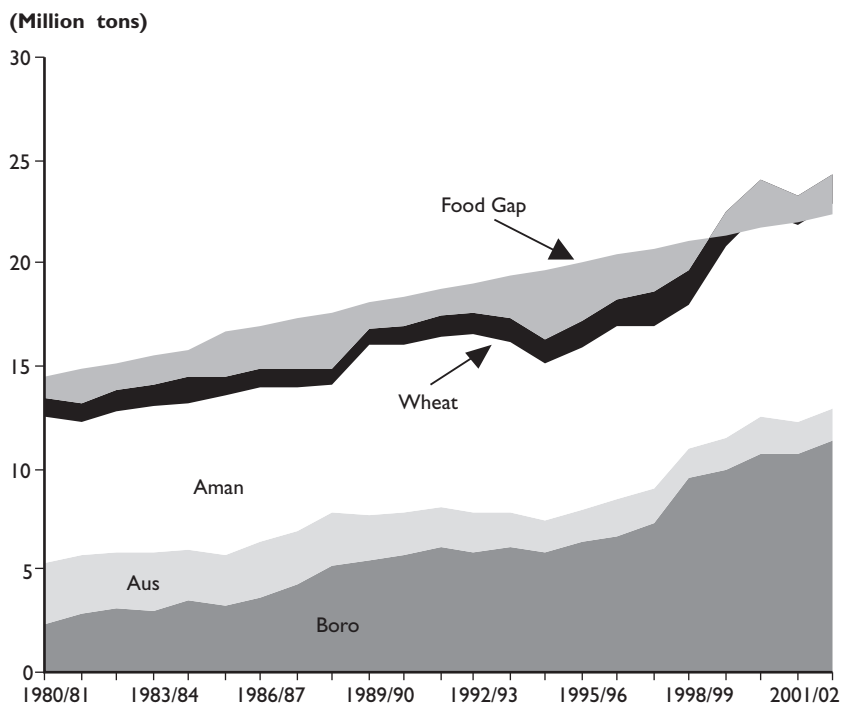


## 2 THE 1998 FLOODS AND BEYOND

**Figure I.1 The foodgrain gap in Bangladesh, 1980/81–2002/03**



Sources: MOF/FPMU n.d.; BBS n.d.

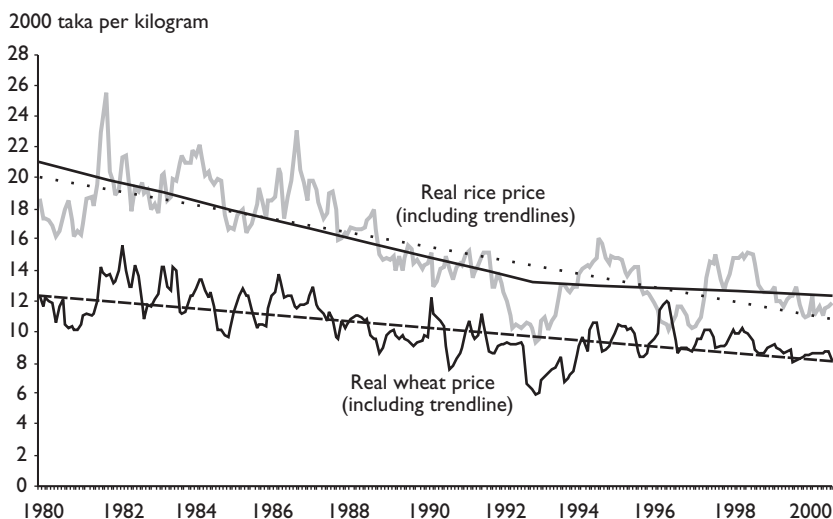
Note: Production data indicate net production.

Yet food security has not been achieved. Domestic foodgrain production remains susceptible to floods and droughts, perpetuating the threat of major production shortfalls and inadequate foodgrain availability. Moreover, increases in foodgrain production have not been accompanied by significant increases in *availability* of other foods, half of the population of Bangladesh lacks the income and other resources to enable adequate *access* to food, and problems of malnutrition and insufficient *utilization* of food remain widespread.<sup>2</sup> Nearly

<sup>2</sup> These three aspects of food security (availability, access, and utilization and/or nutrition) are commonly used by the World Food Programme and others (WFP 2001).

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**Figure 2.1 Bangladesh national average real wholesale prices of rice and wheat, 1980–2000**



Source: Calculated by authors from MOF/FPMU n.d.

Note: Prices are deflated using the nonfood Dhaka middle-income cost of living index and, after June 1998, the national Consumer Price Index.

## THE PRIVATE- AND PUBLIC-SECTOR ROLES IN FOODGRAIN MARKETS

### The Public Foodgrain Distribution System

Though its size relative to the private market has diminished, public-sector foodgrain distribution in Bangladesh plays an important role in domestic procurement of rice and wheat, management of food aid inflows, public-sector-targeted distribution, and maintenance of emergency foodgrain stocks. The PFDS has five major objectives outlined below (MOF 1998).

1. Make foodgrains available to poor households that would not otherwise be able to acquire enough food.
2. Stabilize prices by distributing foodgrains in urban and rural areas, thus preventing excessive foodgrain price increases.
3. Support foodgrain prices and maintain incentives for domestic production through a system of domestic procurement of marketable surplus.

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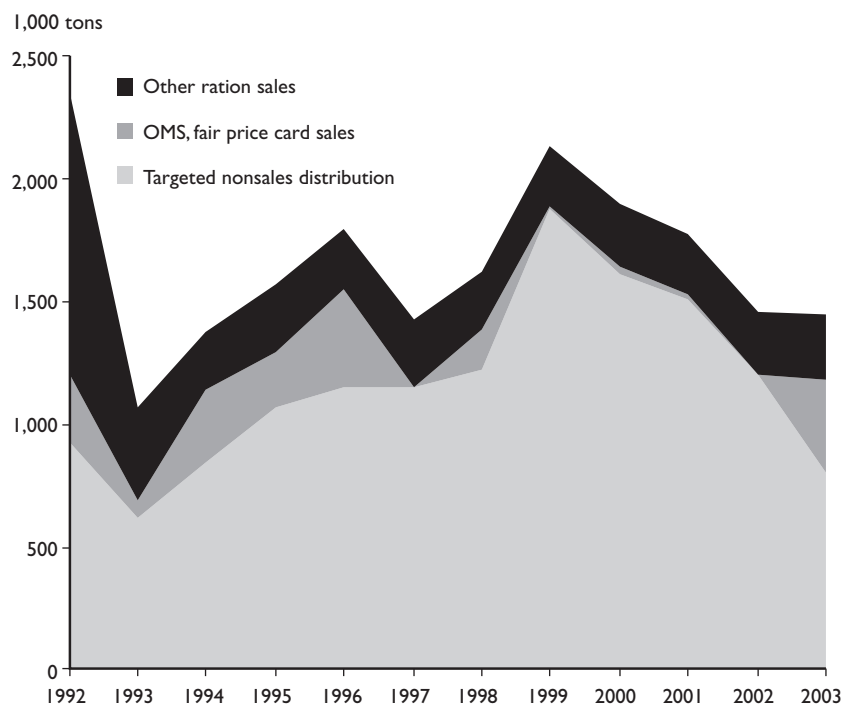
**OVERVIEW OF THE BANGLADESH FOODGRAIN ECONOMY 25**


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tion during these three years (Figure 2.2).<sup>15</sup> Distribution increased by about 0.5 million tons in 1998/99 to over 2.1 million tons because of the 1998 flood, but declined to only 1.4 million tons in 2001/02 and 2002/03 (Table 2.6).

By the late 1990s, the Essential Priorities channel (mainly sales to military personnel) constituted the main sales channel, accounting for about three-

**Figure 2.2 Targeted and nontargeted foodgrain distribution, 1992–2003**

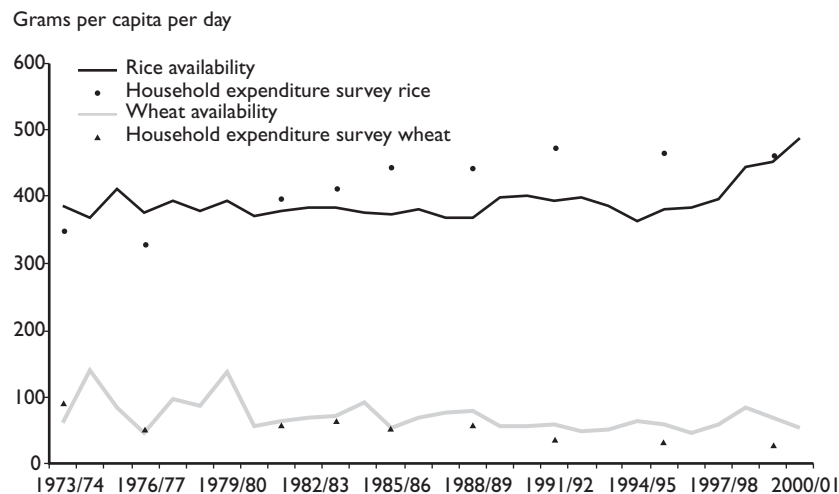


Source: MOF/FPMU n.d.

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<sup>15</sup>Note that the share of public distribution targeted to the poor was used by United States Agency for International Development (USAID)/Dhaka as a measure of food policy market orientation.

**Figure 2.3 Per capita consumption of rice and wheat, household expenditure survey and net availability estimates, 1973/74–2000/01**



Sources: Ahmed 2000; MOF/FPMU n.d.; Dorosh 2000; BBS 1998, 2000.

production and/or imports, and overestimates of losses and other end uses.<sup>27</sup> Mitchell (1998) suggests that the sampling frame used for crop cuttings gives insufficient weight to irrigated land that normally has higher yields, so that average rice yields are underestimated.<sup>28</sup> In principle, unrecorded cross-border trade could also account for more domestic supply, but in most years, this trade is likely to have been small, given a lack of price incentives for significant rice movement.<sup>29</sup>

Estimates of rice consumption in the 1999/2000 household survey, however, closely match net rice availability. Production and trade data suggest that

<sup>27</sup> With an increase in incomes over time, it is possible that wastage of rice by households has also increased.

<sup>28</sup> The irrigation census of 1996 shows irrigated area to be 56 percent of rice area, but BBS shows it to be only about 30 percent (Mitchell and Islam 1998). However, it is possible that differences in definitions or measurement errors account for some of this discrepancy.

<sup>29</sup> See Chapter 3 and Rahman et al. (1994).

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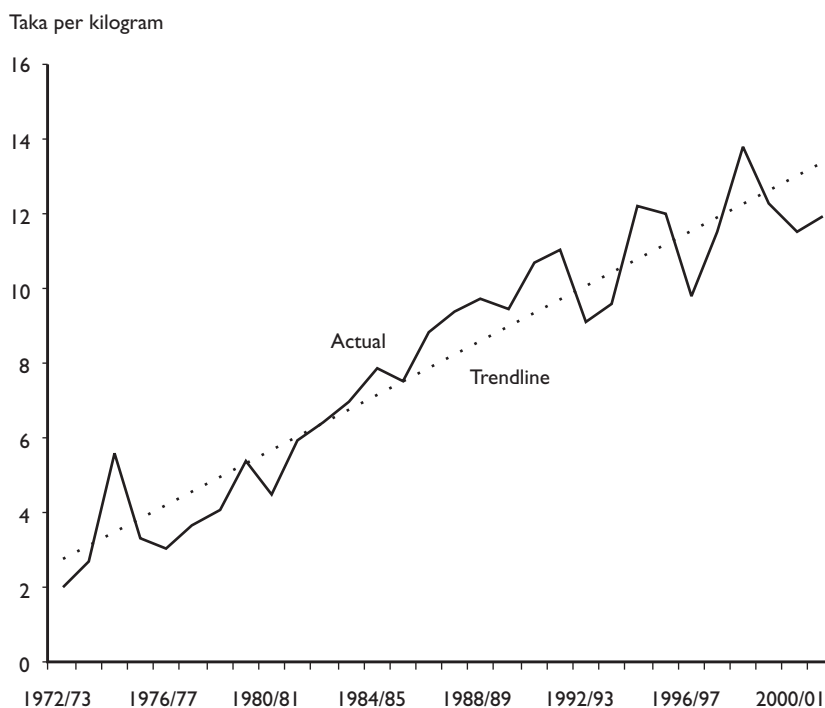
**PRICE STABILIZATION AND FOOD STOCK POLICY 57**


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ing average were quite large during the 1970s (between 2.8 and 44.7 percent) and became much smaller during the 1980s (between 0.1 and 14.4 percent) and the 1990s (between 1.7 and 11.7 percent).

Moreover, deviations of actual prices from the moving average greater than 5 percent occurred in 6 of 7 years during the 1970s, in only 5 of 10 years during the 1980s, and in 7 of 10 years during the 1990s. The patterns remain the same if we consider the deviation of actual prices from the linear trend. Thus, by several measures, annual rice prices displayed a greater degree of stability in the 1980s than in the 1970s, but fluctuations in rice prices again increased in the 1990s.

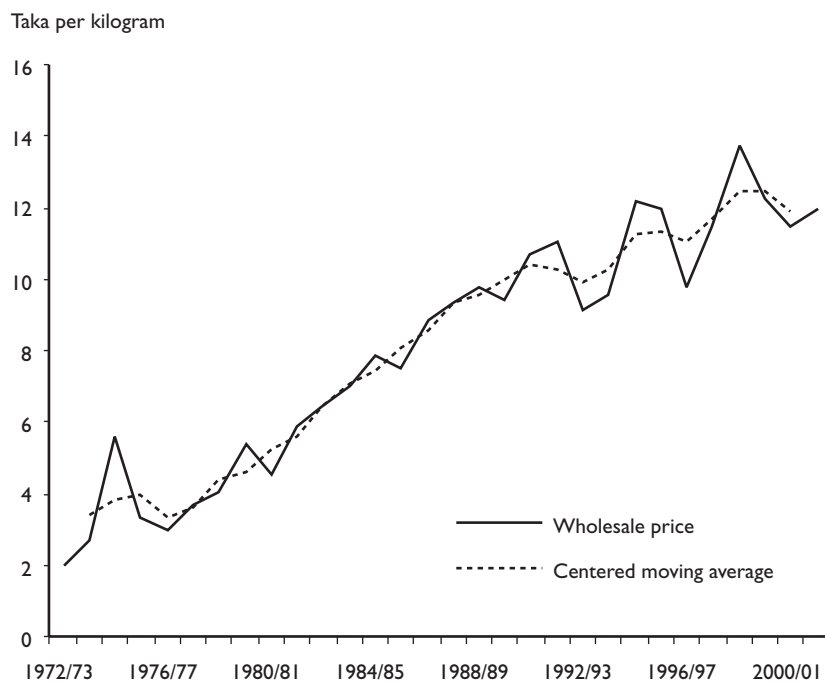
**Figure 3.1 Fluctuations in annual wholesale prices of coarse rice, 1972/73–2001/02**



Sources: Dorosh and Shahabuddin 2002; MOA/DAM n.d.

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**Figure 3.2 Fluctuations in the annual wholesale price of coarse rice, 1972/73–2001/02**



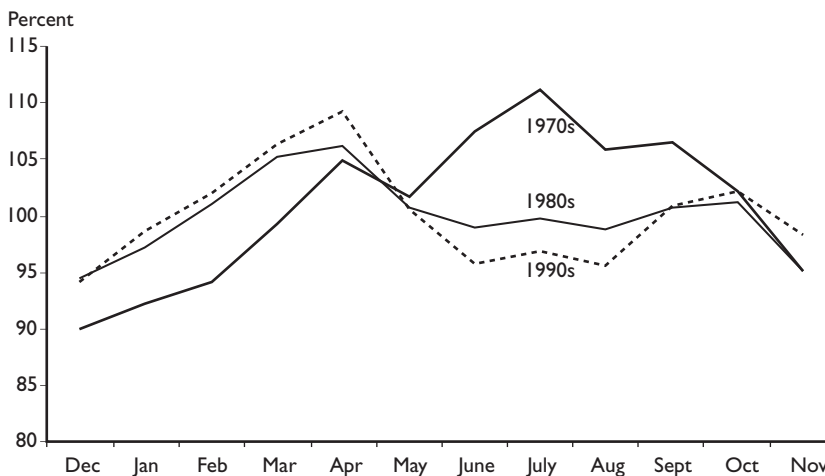
Sources: Dorosh and Shahabuddin 2002; MOA/DAM n.d.

### Fluctuations in Monthly Prices in Bangladesh

Table 3.2 shows the extent of fluctuations in monthly prices for the 1970s, 1980s, and 1990s. Two indicators are presented. The first is the simple range—the difference between the lowest and highest monthly price indexes. For each year, the January price is chosen as the base, and is set equal to 100. The second indicator is the coefficient of variation, defined as the standard deviation of the monthly prices in a year, divided by the average price.

In terms of the first indicator (the range between the highest and lowest monthly prices), monthly price fluctuations exceeded 30 percent in 6 of 8

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**Figure 3.3 Seasonality in coarse rice prices in Bangladesh**

Sources: Dorosh and Shahabuddin 2002; MOA/DAM n.d.

Notes: This figure uses a 12-month lagged moving average. 1970s data are for 1976/77–1978/79. 1990s data are for 1989/90–2001/02.

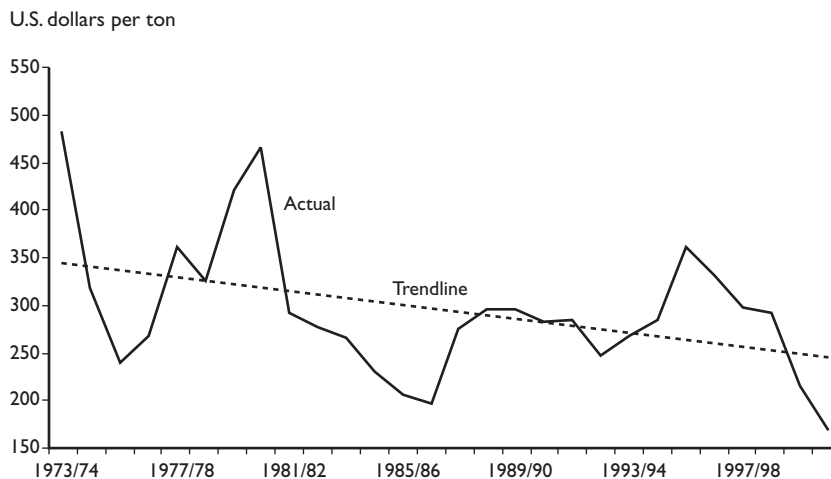
in relatively stable prices from May to October. As a result, the ratio of peak to trough was reduced.

Note that the decline in the magnitude of seasonal price fluctuations is not as steep when comparing the pre- and post-rice import trade liberalization periods: 1.106 in 1993/94–2001/02 compared with 1.129 in the preceding decade (1983/84–1992/93). The major reason for this smaller decline is that seasonal price fluctuations were especially large in the early 1980s; there was little change in price seasonalizing from the mid-1980s on. In particular, this data shows that the magnitude of seasonal price fluctuations did not change significantly following trade liberalization.

#### Fluctuations in Annual Rice Prices in International Markets

As with domestic rice prices, fluctuations in annual world prices of rice (ex-Bangkok, C&F Chittagong, 15 percent broken) have been measured both in reference to the previous year's price (nominal fluctuations) as well as to a moving average (Table 3.4 and Figure 3.4). Fluctuation in nominal prices ranged from 10.0 to 34.7 percent during the 1970s, from 0.0 to 39.1 percent during the

## 64 THE 1998 FLOODS AND BEYOND

**Figure 3.4 Fluctuations in international rice prices, 1973/74–2000/01**

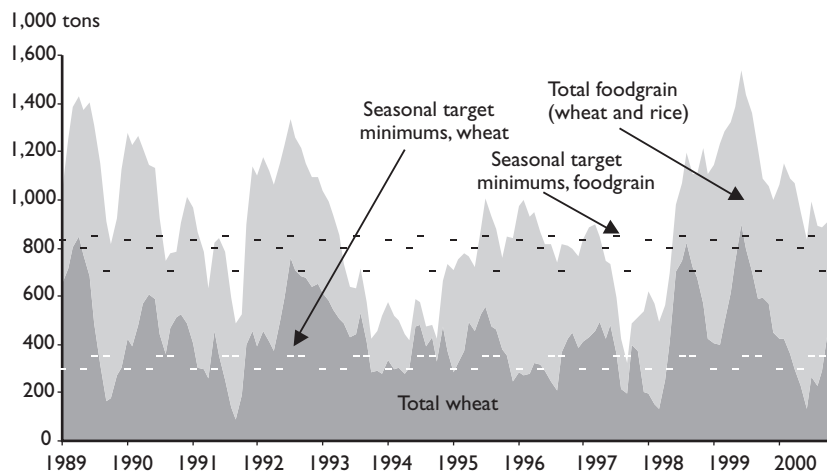
Sources: Dorosh and Shahabuddin 2002; MOA/DAM n.d.

Deviations from the moving average indicate that fluctuations in prices, which were rather small during the 1970s (4.3 and 13.5 percent) became larger during the 1980s (0.5 and 18.5 percent), but retracted again during the 1990s (0 and 11 percent). Moreover, deviations of actual prices from the moving average of greater than 10 percent occurred in three of six years during the 1970s, in 3 of 10 years during the 1980s, and in only 1 of 10 years during the 1990s. Thus in terms of number of years with large deviations (for both year-to-year fluctuations and deviations from the moving average trend), annual world prices of rice displayed a progressively greater degree of stability over the last three decades.<sup>6</sup>

Table 3.5 presents a comparison of price variability of Bangladesh wholesale prices, Indian prices, and Thai prices for the late 1970s, the 1980s, and the 1990s. Variation in annual prices is measured using the coefficient of variation in each period (that is, the standard deviation of prices divided by the mean

<sup>6</sup> This conclusion remains valid when Thai 5 percent broken parboiled rice prices are used.



**Figure 3.6 Net closing stocks of wheat in Bangladesh, 1990–2001**

Sources: Dorosh and Farid 2003; MOF/FPMU n.d.

1989/90 and 1990/91 averaged 1.137 million tons,<sup>12</sup> equal to 6.66 and 5.38 times the monthly average distribution in those years (Table 3.9).

Major reforms in the PFDS took place in the early 1990s with the elimination of major rationing channels (Statutory Rationing and Rural Rationing) and greater emphasis on targeted distribution. Total distribution was reduced to an average of only 1.53 million tons from 1993/94 through 1996/97. Stock levels were reduced as well, with average annual stocks ranging from 573,000 to 950,000 tons over this period.

Total foodgrain stocks increased rapidly after the 1998 floods, however, to an annual average of 1.348 million tons in 1999/2000 and 951,000 tons in 2000/01. This large PFDS stock build-up occurred mainly because of delayed import arrivals and relatively high levels of domestic procurement in response to falling market prices immediately after harvest of consecutive bumper crops (in boro 1999, aman 1999/2000, boro 2000, and aman 2000/01). Domestic rice procurement from the bumper boro harvest in 1999

<sup>12</sup> Unless otherwise noted, all foodgrain stock figures in this report indicate net stocks (that is, gross stocks less a deduction for foodgrain in transit). In 2000/01, 15,000 tons of rice and 88,000 tons of wheat were considered to be "in transit."

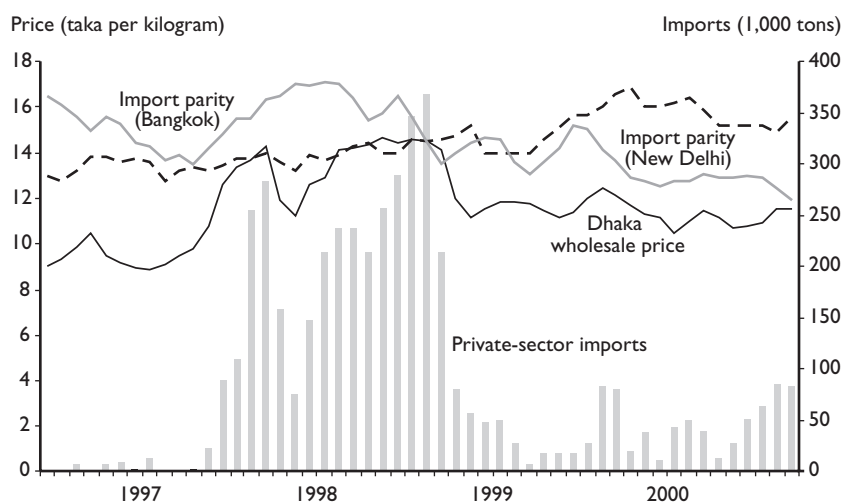
## 116 THE 1998 FLOODS AND BEYOND

parity prices. As a result, 1.127 million tons (an average of 66,000 tons per month) were imported by the private sector, in addition to 704,000 tons imported by the government.

Rice flows between the two countries nearly came to a halt in 1996 and 1997, however, as favorable weather and stable input supplies helped boost rice production and drop domestic market prices below import parity levels (Figure 4.1). But following another poor aman rice harvest in Bangladesh in November-December 1997, rice prices rose sharply, and less than two months after the start of the aman harvest, they again reached import parity levels. Given the price incentives for imports and the large gap between domestic supply and demand, 917,000 tons of rice were imported by the private sector through official channels from December 1997 to May 1998.

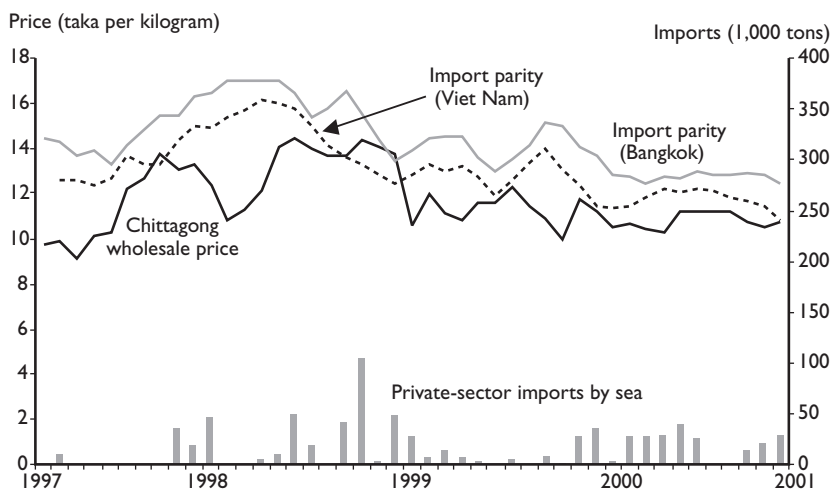
A good boro rice harvest in May 1998 brought a sharp decline in rice imports from India as prices dropped below import parity. But from July through September, floods in Bangladesh caused extensive damage to the aus and aman rice crops. As the Government of Bangladesh continued its policy

**Figure 4.1 Rice prices and quantity of private rice imports in Bangladesh, 1997–2001**



Sources: MOF/FPMU n.d.; CMIE various years; Dorosh 2001.

**Figure 4.2 Rice prices and quantity of private rice imported through sea ports in Bangladesh, 1997–2001**



Sources: MOF/FPMU n.d.; CMIE various years.

markets, but the effect on national markets was minimal since total imports through land ports for 2000/01 (including low-quality, coarse, medium, and fine rice) were only about 300,000 tons, about 1.5 percent of total rice supply.

Several measures to stop the import of low-quality rice have been proposed, including credit restrictions on importers or banning rice imports altogether. However, such measures risk long-term disincentives on the private-sector rice trade, a source of supply that greatly added to national food security in 1998 and 1999. Increases in tariff rates, announced at least one month in advance (so as to not affect contracts in process), would be preferable to quantitative or credit restrictions in terms of avoiding long-term disincentives on private trade.

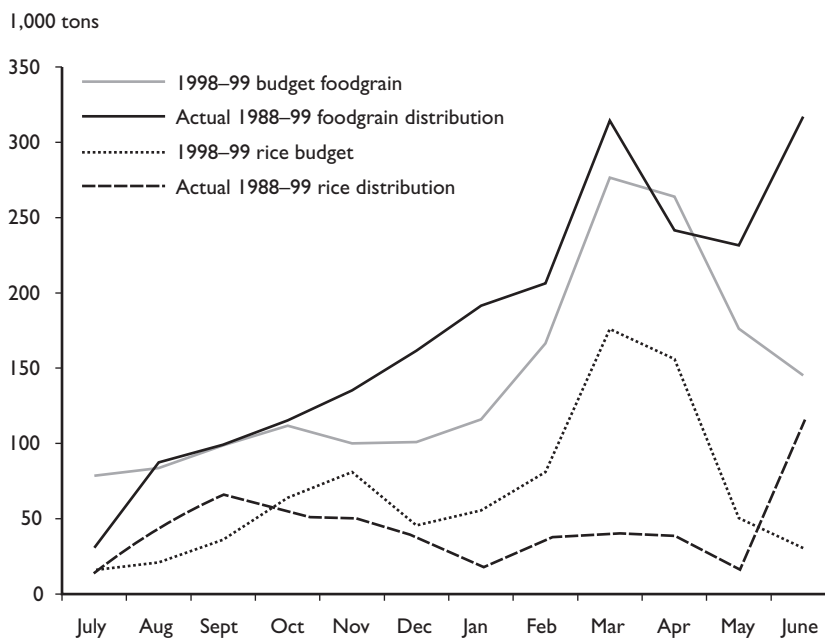
## IMPLICATIONS FOR BANGLADESH FOOD POLICY

Several key aspects of private-sector imports from India enabled India to make a large contribution to national food security in Bangladesh in 1998 and 1999. First, India's good harvests and ample rice stocks made large-scale exports not

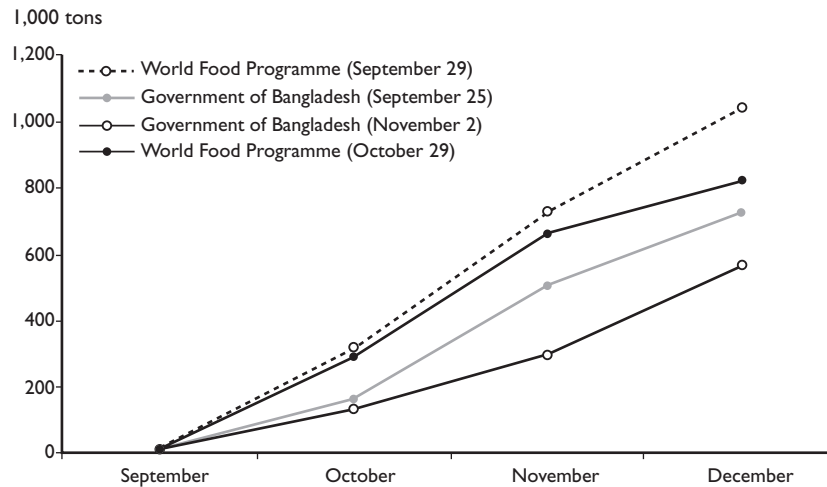
## 168 THE 1998 FLOODS AND BEYOND

Altogether, planned offtake for 1998/99 was increased from 1.718 million tons to 2.279 million tons. Through December, however, limited government wheat stocks, uncertainties about rice supplies after the aman harvest, and financial constraints limited total distribution to 630,000 tons, only 26,000 tons more than in the pre-flood government distribution for this period (Figure 6.1). Rice distribution was greater than originally planned only in August and September, mainly because of VGF distribution. Thereafter, it was significantly less than planned, especially in March and April, as originally budgeted OMS did not take place. The story for wheat was exactly the opposite. Actual wheat distribution was below initial plans in August and September and exceeded initial plans every month thereafter. Largely, additional food-

**Figure 6.1 Budgeted and actual public distribution of rice and total foodgrains, 1998/99**



Sources: del Ninno et al. 2001; MOF/FPMU n.d.

**Figure 7.1 Projected and actual food aid arrivals**

Source: IFPRI/FMRSP 1999.

were many hardships, particularly for the poor. However, no mass migration to urban centers occurred. Famine conditions did not develop. A quarter-century of adjustments toward a more rational policy mix, free political expression, a more liberal trade regime, and flexible and effective disaster response and mitigation certainly laid the foundation for this success story. However, as this chapter shows, the early and unwavering support of the international community, particularly on the food front, was an important factor in assuring the population that, if worst came to worst, sizeable resources from the outside would support the government's policies and disaster response structures.

The autumn 1998 events show that the "psychology of famine" is very much present in the nation's mind. It might take mastery of several more large floods before one can completely rely on market forces and national disaster response capacities. A central point of this section is that psychology and "irrational" expectations do matter in the context of massive and widespread disaster—particularly when the memory of previous famines is still very much present.

It is important to interpret the international community's involvement not only as a means for enlarging immediate availability of actual food and medical supplies, but also as a stabilizing instrument in the maintenance of

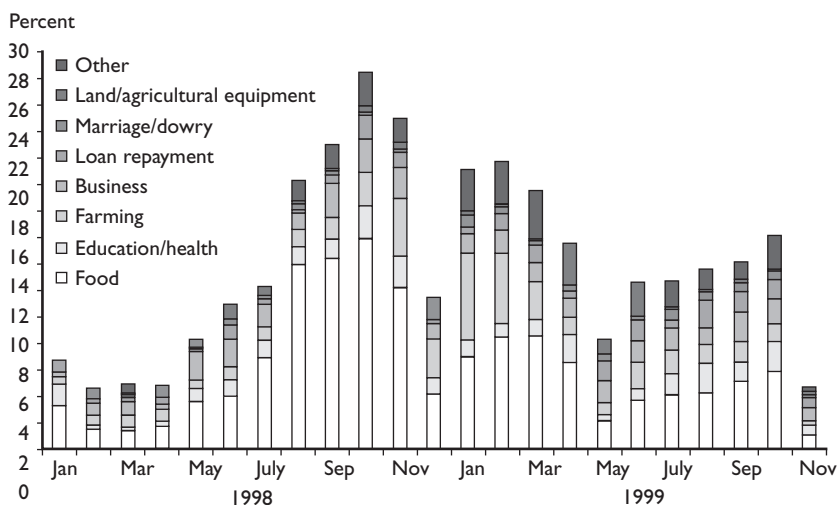
## 226 THE 1998 FLOODS AND BEYOND

the months immediately following the flood, and of these more than half borrowed money for food (Figure 8.1). Table 8.13 shows that during the crucial months of the flood, between July and October 1998, 60.6 percent of households in the bottom 40 percent category exposed to the flood borrowed money amounting to 3,534 taka, whereas 54.6 percent of households not exposed to the flood borrowed money amounting to 2,438 taka.

Table 8.13 also shows that over time, irrespective of expenditure category, households exposed to the flood were more likely to borrow money than had they not been exposed to the floods. Moreover, poor households had to continue to borrow money after the flood (69.5 percent between January and June 1999) compared with households in the top 20 percentile, who were less likely to borrow but borrowed in larger amounts when they did.

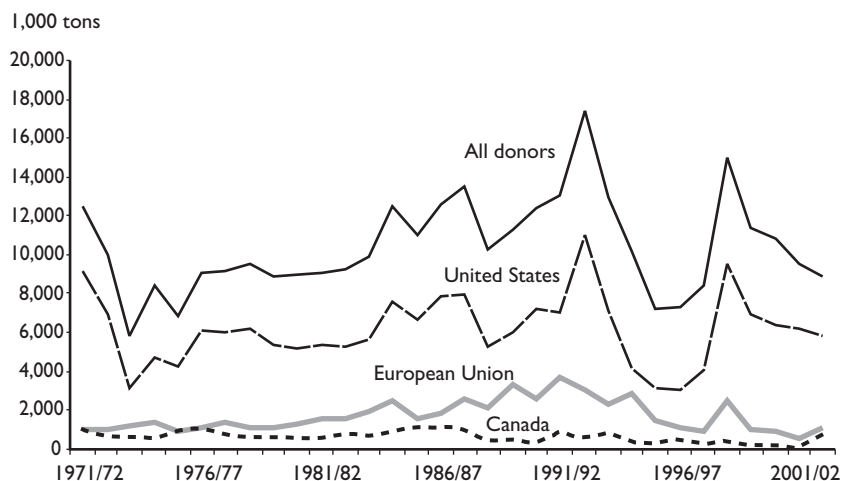
In terms of loan sources, Table 8.14 indicates that households borrowed mostly from non-institutional sources such as friends and neighbors rather than from NGOs and banks. During the flood period (July–October 1998), the majority of loans received (over 86 percent) were from non-institutional sources. Among them, neighbors provided 50 percent of the

**Figure 8.1** Percent of households taking a loan, by month and reason, January 1998–November 1999



Source: IFPRI/FMRSP 1998/99.

**Figure 9.1 Food aid: Canada, European Union, United States, and all donors, 1971/72–2001/02**



Sources: FAO 2001; WFP 2003.

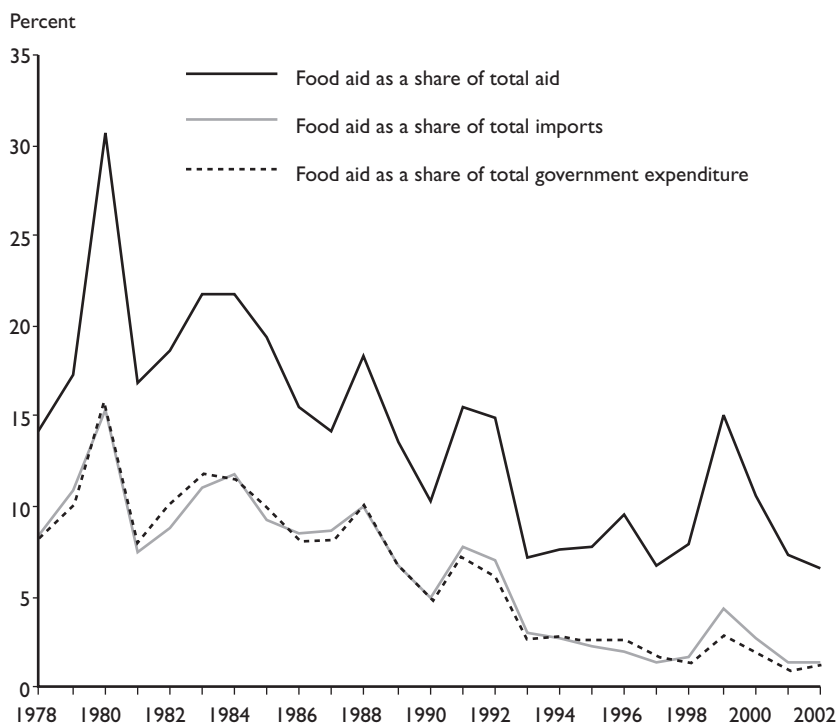
increased to 15 million tons in 1998/99 and was still 11 million tons in 1999/2000, with the U.S. contributing about 60 percent of the total in these two years, similar to its average over the past two decades (Table 9.1).

Donors of food aid can be grouped into several broad categories. First, the agricultural exporters—Australia, Canada, the European Union, and the United States—became food aid providers as a way of utilizing surpluses for a mixture of developmental, humanitarian, foreign policy, and domestic agricultural policy and trade objectives.<sup>7</sup> Other donors that are not major agricultural exporters have historically seen themselves as providing finance for food as part of the international commitment to humanitarian relief and developmental assistance under the Food Aid Committee<sup>8</sup> or to multilateral programs and the work of voluntary agencies. Historically, the latter group

<sup>7</sup> Diven (2001) provides econometric evidence that the volume of U.S. food aid from 1954 to 1991 was driven mainly by producer interests in the U.S. (levels of stocks and exports) and not by production shortfalls in developing countries.

<sup>8</sup> The Food Aid Committee (FAC) consists of all the donor members of the 1999 Food Aid Convention.

**Figure 9.2 Food aid as a share of total aid, imports, and total government expenditure, 1978–2002**



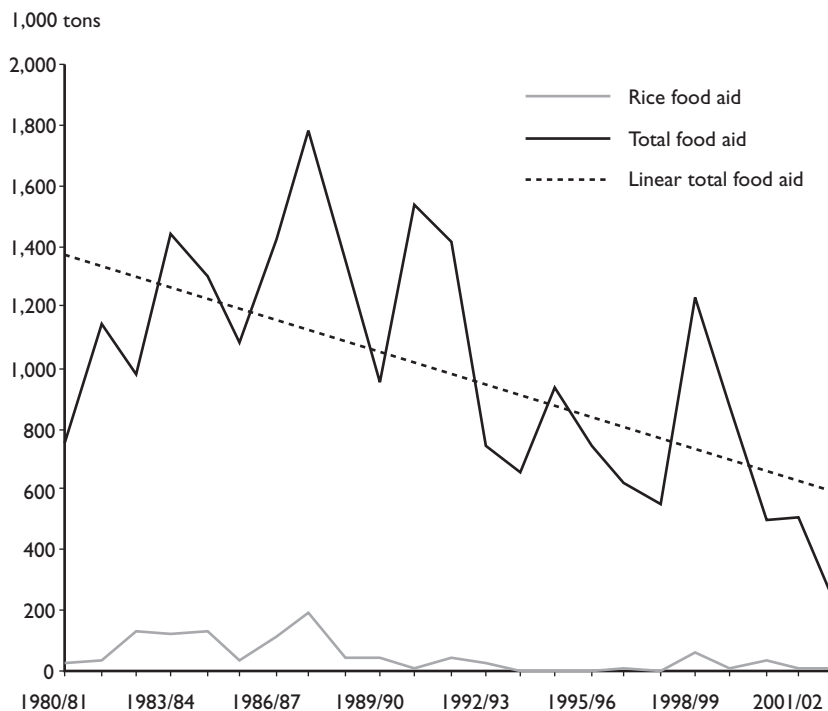
Sources: Calculated by authors from MOF/FPMU n.d., BBS n.d., and IMF 2003.

mented by Cooperative for Assistance and Relief Everywhere, Inc. (CARE) started using cash as its focus shifted from earthwork to create structures on roads, including culverts to facilitate safe flow of water.

As donors gradually withdrew direct support for so-called local initiative FFV programs from the late 1980s, the Government of Bangladesh began to provide its own resources to fund various programs. By the late 1990s, average annual food aid inflows were only about 600,000 tons (a decline of about 800,000 tons from the late 1980s), and food aid accounted for only about one-third of total PFDS distribution of about 1.8 million tons per year



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**Figure 9.3 Food aid to Bangladesh, 1980/81–2002/03**

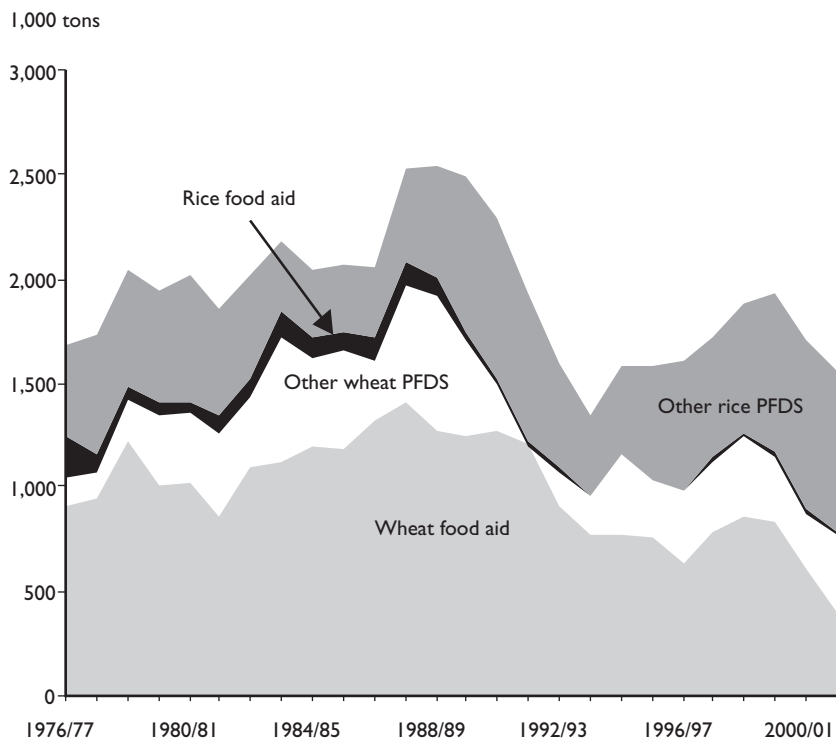
Source: MOF/FPMU n.d.

(Table 9.5 and Figure 9.4).<sup>13</sup> Distribution of grain from nonfood aid resources (Government of Bangladesh-own resources) rose to about 1.2 million tons per year, up by about 200,000 tons from the late 1980s.

The net result of the elimination of major nontargeted sales channels, initiation of the FFE program, and the decline in food aid was a smaller, better-targeted PFDS. The share of the public foodgrain distribution through programs targeted to the poor increased from 39.4 percent in 1992 to 84.7

<sup>13</sup>With the sharp decline in food aid in 2002/03, the share of food aid in public distribution fell to only 15 percent.

**Figure 9.4 Food aid and the Public Food Distribution System, 1976/77–2001/02 (1,000 tons)**



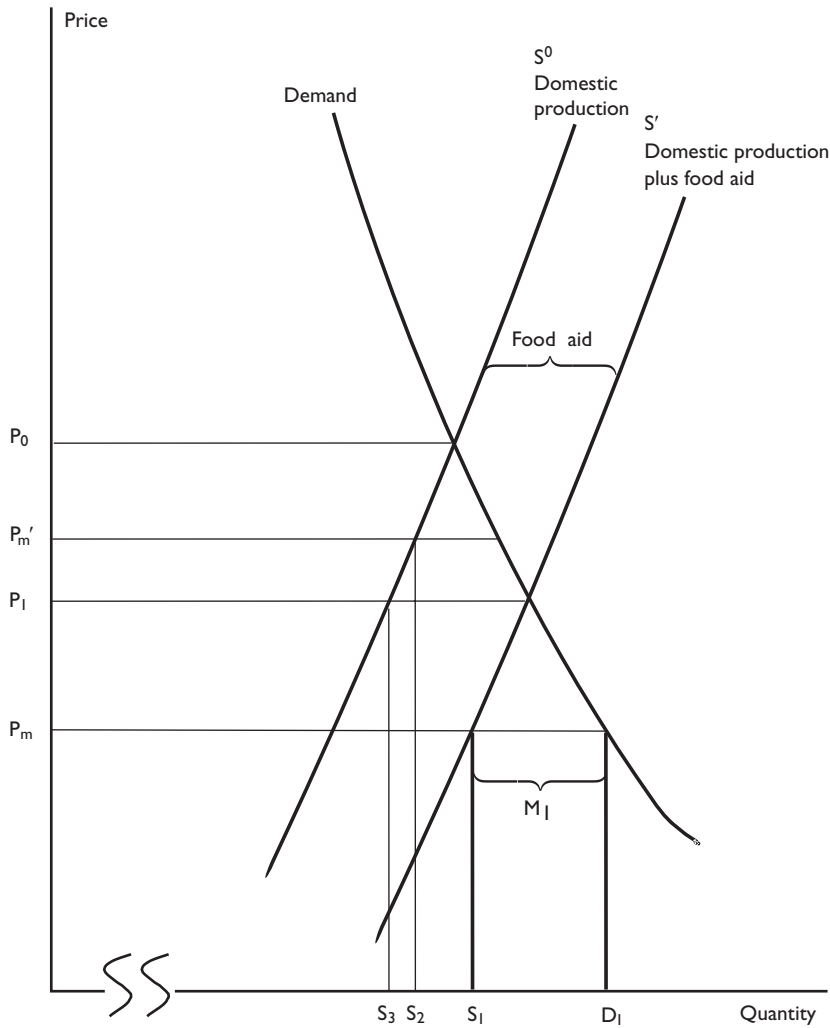
Source: MOF/FPMU n.d.

Notes: Data are three-year centered moving averages. Food aid includes grants only. PFDS indicates Public Food Distribution System.

## PRICE DISINCENTIVE EFFECTS OF FOOD AID IN BANGLADESH

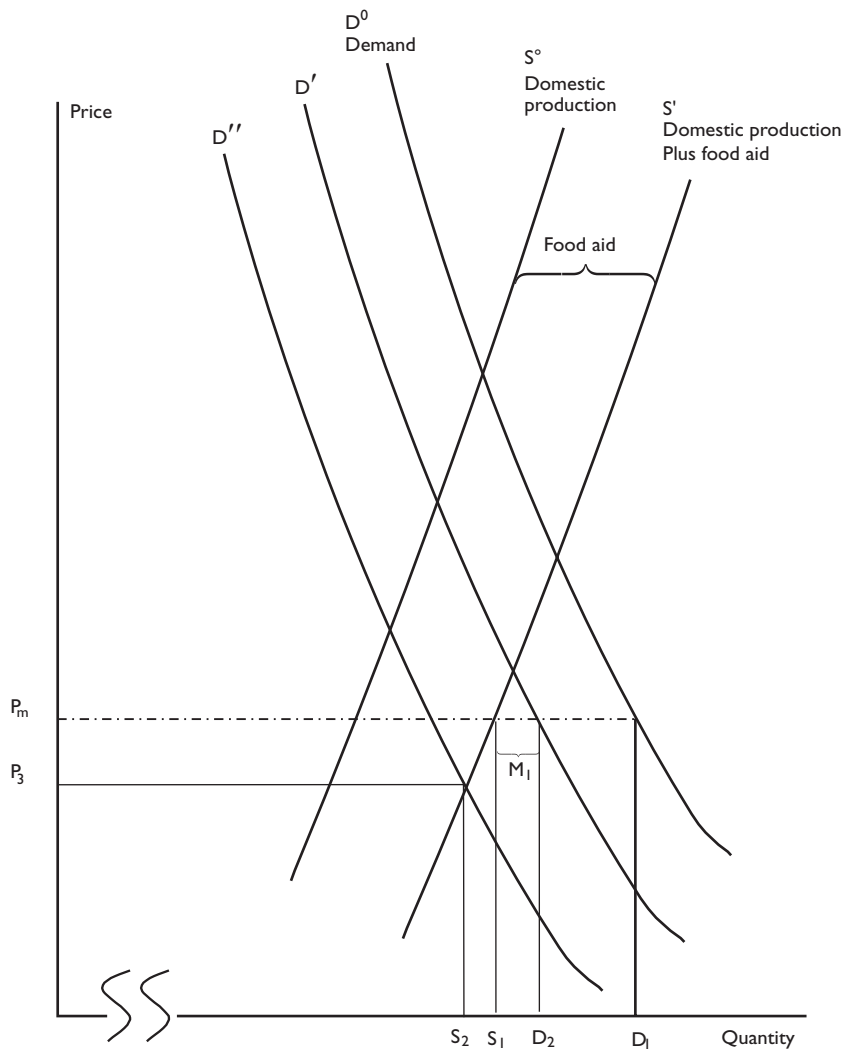
Since food aid ultimately increases market supply of wheat, it has the potential to lower domestic wheat prices and adversely affect incentives for domestic wheat production and incomes of wheat farmers. Whether food aid actually lowers market prices, however, depends on whether food aid is simply replac-

Figure 9.5 Disincentive effects of food aid



Source: Devised by authors.

**Figure 9.6** Impact of reduced demand on production, prices, and imports



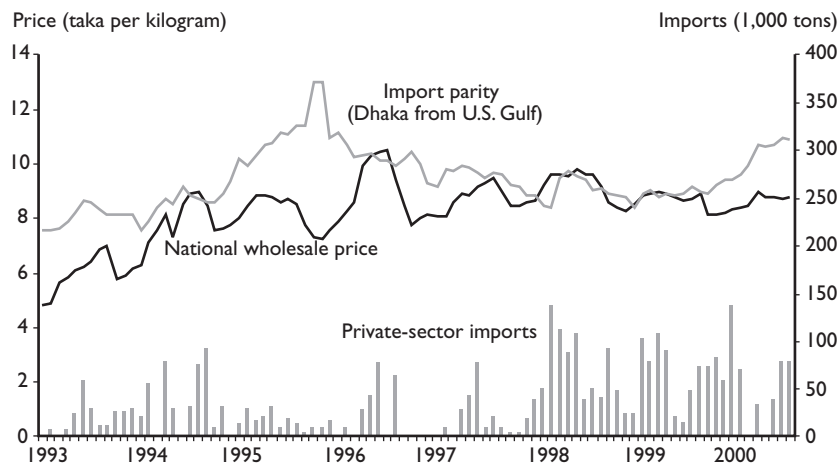
Source: Devised by authors.

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ers to changes in the wheat price, holding other factors constant. But other factors, which influence the shape and location of the domestic supply and demand curves for wheat, must also be taken into account. Domestic supply is determined not only by farmers' expected price of wheat during the growing season, but also by the expected prices of alternative crops, expected yields, available production technologies, weather, prices, and availability of inputs. Domestic demand is determined by the responsiveness of consumers to changes in the wheat price (reflected in the shape of the demand curve), as well as the prices of other goods (most importantly, rice), and the level and distribution of household incomes (both of which shift the demand curve to the right or left). Other factors also influence total demand, including demand for wheat as animal feed and the amount of wheat distributed through programs targeted to poor women and children.

The impacts of reductions in demand for wheat on domestic prices, production, and imports are shown in Figure 9.7. In years of a good rice harvest, demand for wheat in Bangladesh falls as consumers choose to consume more rice and less wheat. A shift in the demand curve from  $D^0$  to  $D'$  reduces total private-sector imports to  $M_2$ , but domestic prices remain equal to the import

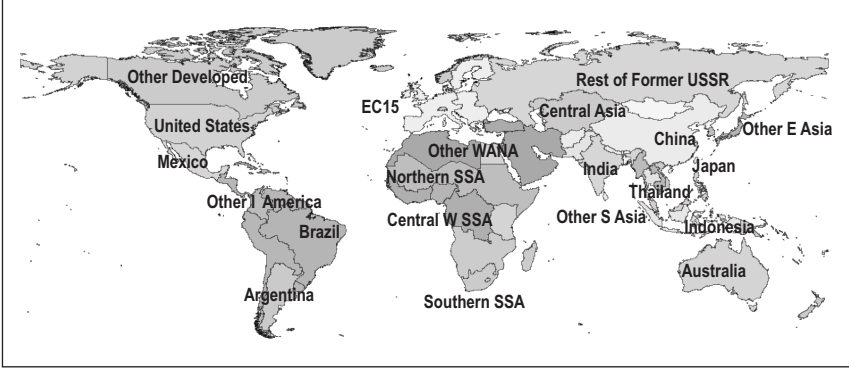
**Figure 9.7 Wheat prices and quantity of private imports in Bangladesh, 1993–2001**



Sources: MOF/FPMU n.d.; Dorosh 2000.

Figure A.2—IMPACT-WATER spatial elements

(a) Combined basins



Source : Authors' assessments.

(b) Major basins in China



Source : Authors' assessments based on HPDGJ (1989) and Qian (1991).

Figure A.2—Continued

## (c) Major basins in India



Source : Authors' assessments based on Revenga et al. (1998).

India, 14 basins in the United States (not pictured), and 33 “aggregated basins” in other countries or regions (See Box A.1). 1995 is treated as the base year, in which all demand and supply items are assessed and calibrated. Projections of water demand and supply are made for the 30 years from 1995 to 2025.

## WATER DEMAND

### Irrigation Water Demand

Irrigation water demand is assessed as crop water requirement based on hydrologic and agronomic characteristics. Net crop water demand (NCWD) in a basin in