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Promoting National and Household Food Security in Bangladesh:

The Evolving Roles of Public Stocks, Cereal Distribution and Private Trade

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About this working paper

This working paper is one of the products of a study conducted by DAI at the request of the European Commission as part of the advisory service ASiST managed by the unit in charge of rural development, food security and nutrition (C1) within the Directorate General for International Cooperation and Development (DEVCO).

The study has aimed at clarifying the potential role of food reserves in enhancing food and nutrition security in developing countries, and at making recommendations on how to use food reserves (in complement to other tools), taking into account the specificities on the context and the constraints of World Trade Organisation (WTO) disciplines.

The study was conducted based on i) an extensive review of the existing literature (both theoretical and empirical) and ii) 10 case studies analysing national or regional experiences in Africa, Asia and South America.

All the products of the study (including other working papers, a compilation of case study summaries, and a synthesis report) are available at: https://europa.eu/capacity4dev/hunger-foodsecurity-nutrition/discussions/how-can-food-reserves-best-enhance-food-and-nutrition-security-developing-countries.

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List of Abbreviations and Acronyms

BPL	Below Poverty Line
DEVCO	Directorate General for International Cooperation and Development
HYV	High yielding variety
Mt	Metric tonne
OMS	Open Market Sales
PFDS	Public Foodgrain Distribution System
WTO	World Trade Organisation

1. Introduction

Large-scale government interventions in cereal markets supported by public stocks have been a central part of food policy in the Indian sub-content since the days of British colonial India. Following the Great Bengal Famine of 1943, during which an estimated three million people died of hunger-related causes, the colonial government instituted a system of government sales and distribution of cereals designed to help ensure minimum food consumption for poor households (Sen, 1982). Public distribution systems continued in both India and united Pakistan following independence in 1947. The famine conditions in 1972-74 that followed the liberation war and Bangladesh independence in December 1971 strongly reinforced the perceived need for major public interventions to ensure food security (Haggblade et al., 2000).

Over the past five decades, this Public Foodgrain Distribution System (PFDS) has played a major role in addressing chronic food insecurity. The heart of the PFDS, at least in terms of the volume of cereals, has been annual distribution programmes involving in-kind transfers to poor households to reduce chronic under nutrition (such as food-for-work and food-for-education programmes). Open market sales from public cereal stocks have also been used, particularly in the 1970s and 1980s to prevent or mitigate price surges. Large-scale emergency relief operations have addressed food security needs following natural disasters, including the extraordinary floods that caused major production shortfalls in 1987, 1988 and 1998 (del Ninno, Dorosh and Islam, 2002). Domestic procurement of rice and wheat, generally at a fixed procurement price, has been part of government strategy to increase incentives for production through stable, remunerative prices for farmers.

Nonetheless, there have been major changes in the PFDS over time as donors have reduced food aid and the Bangladesh government has improved targeting of its distribution programmes. There has been an increased reliance on market mechanisms since major liberalisation in the early 1990s, though the spike in the price of rice in international and domestic markets in 2007 and 2008 led to pressures to reverse this trend. Increasing demand for and volume of higher quality rice in the last decade has muted the impact of interventions in the coarse rice market. Technical change in drying of paddy and an ongoing major expansion of government storage facilities promise further changes in the role of public stocks and distribution in the Bangladesh food system.

This paper is designed to provide a broad assessment of the impact of public cereal stocks and market interventions in Bangladesh over time, as well as highlight future policy options. Section two describes the structure and evolution of the PFDS in Bangladesh over three major periods: 1) an initial period of heavy government intervention in markets, substantial food aid and relatively high stocks in the 1970s and 1980s; 2) the transition to lower volumes of food aid and distribution, accompanied by a significant role for private imports, from the 1990s through 2006; and 3) the aftermath of the 2007-08 world price spike with increasing calls for larger public stocks and more intervention in domestic markets. Section three then discusses the current PFDS and factors influencing the levels, timing and composition (rice versus wheat) of stocks, procurement and distribution. Section four covers the response to major production shortfalls and price shocks, as well as estimates of the impacts of current PFDS interventions. Section five summarizes and suggests

implications for the current debate in Bangladesh on the role of large stocks and government interventions.

2. Structure and Evolution of the Public Foodgrain Distribution System (PFDS)[1]

2.1 1971/72-91/92: Chronic Cereal Deficits and Major Government Market Interventions

In the first few years after its independence in 1971,[2] Bangladesh was faced with massive food security problems. Poor weather, combined with an infrastructure greatly damaged by the war with West Pakistan, contributed to a sharp decline in the main monsoon season (*aman*) rice crop. Rice production fell sharply in 1971/72 and 1972/73, averaging 16.5% less than in 1969/79. Moreover, constrained by a severe shortage of foreign exchange and very high international prices, rice imports were severely limited. Availability of cereals fell to 155.2 kilograms/person (compared to 180.1 kilograms/person in 1969/70) resulting in the death of at least 30,000 people from famine-related causes, though unofficial reports put the figure as high as 100,000.[3]

The Bangladesh government, with support from international donors, responded with sharp increases in public investments in infrastructure, agricultural research and extension, as well as an expansion in public distribution supplied largely by food aid. Major gains were achieved in the 1980s and 1990s due largely to increased production of the winter season (*boro*) rice crop made possible by an expansion of shallow tubewell irrigation and increases in fertiliser use and planting of improved high yielding variety (HYV) seeds. Wheat production also increased from an average of 102,000 metric tonnes (Mt) in 1971/72 to 1.075 million Mt in 1980/81 (and ultimately reached a peak of 1.90 million Mt in 1999/2000).[4,5] Total rice and wheat production rose from 9.89 million Mt in 1971/72 to 24.91 million Mt in 1999/2000 enabling Bangladesh to eliminate its "food gap", defined as the difference between the amount of foodgrain required to meet the consumption target of 454 grams of foodgrain per person per day and net domestic production (Figure 1).

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1 For overviews of the history of the Bangladesh Public Foodgrain Distribution System programmes and market interventions, see Ahmed et al. (eds.) (2000) and Ali et al. (2008).

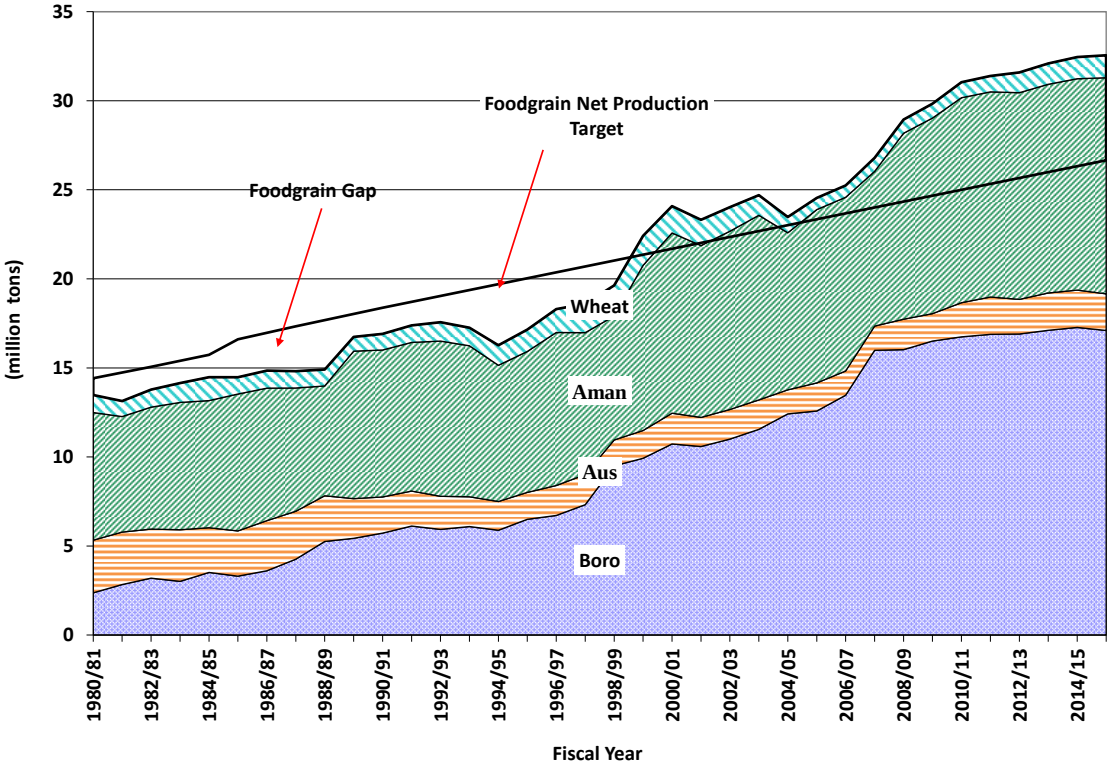
2 Bangladesh declared independence on 26 March 1971, but the ensuing war with (West) Pakistan lasted until 16 December 1971.

3 See del Ninno, Dorosh and Islam (2002), Alamgir (1980) and Sobhan (1979).

4 Over the nearly 30-year period, wheat area harvested rose seven-fold and wheat yields doubled.

5 Rice is the major food commodity in Bangladesh in terms of both production and consumption, accounting for 69.8% of the 2450 calories/person/day consumed in Bangladesh in 2013. Wheat is a relatively minor food commodity, accounting for 6.1% of calories in the same year. Per capita rice and wheat consumption in Bangladesh were 171.7 and 17.5 kgs/person/year, respectively (FAO Food Balance Sheet, 2014).

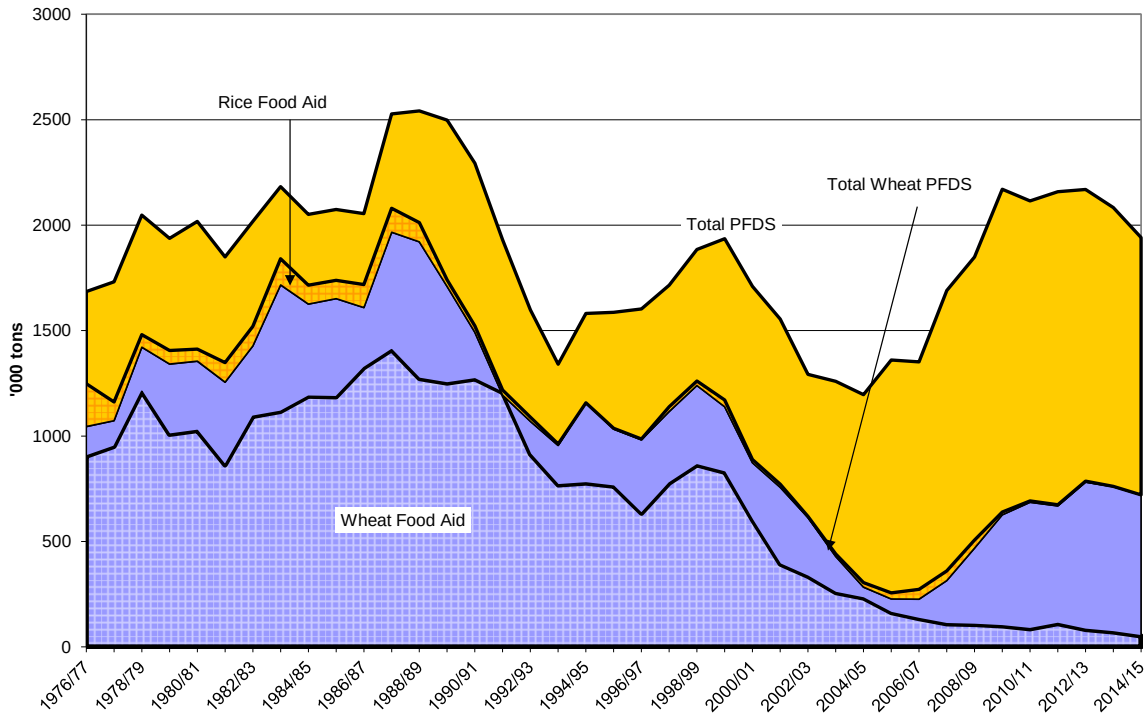
Figure 1 Bangladesh, Net Production and the Food Gap (1980/81 to 2014/15)



Source: Bangladesh Food Planning and Monitoring Unit (FPMU) data.

Distribution of food aid (almost exclusively in the form of wheat) through the PFDS was also a key component of government food security strategy. Food aid flows jumped from 502,000 Mt in 1969/70 (the year before independence) to 1.56 million Mt in 1972/73. From 1972/73 to 1991/92, food aid averaged 1.26 million Mt per year, supplying the grain for 60% of PFDS distribution during this period (Figure 2).

Figure 2 Food Aid and PFDS Distribution, 1976/77-2014/15 (3-year centred moving average)



Source: Calculated from Bangladesh Ministry of Food data.

The green revolution technology (fertiliser, improved seeds and irrigation) that spurred increased rice and wheat production directly benefits farmers who adopted the technology. Increased production also benefited consumers as real rice prices (i.e. rice prices adjusted for overall inflation) declined from the late 1970s to the early 1990s.

Public foodgrain stocks in the early 1970s were very low, reflecting low levels of distribution and very tight government budgets. Stocks averaged only 276,000 Mt (48,000 Mt of rice and 228,000 Mt of wheat) from 1972/73 through 1974/75 (Table 1). Thereafter, stocks were built up to an average of 865,000 Mt (374,000 Mt of rice and 491,000 Mt of wheat) from 1975/76 through 1991/92 as food aid and government domestic procurement increased (Figure 3). Given that total PFDS distribution changed little between these two periods, the ratio of stocks to distribution remained approximately constant at about 42%.

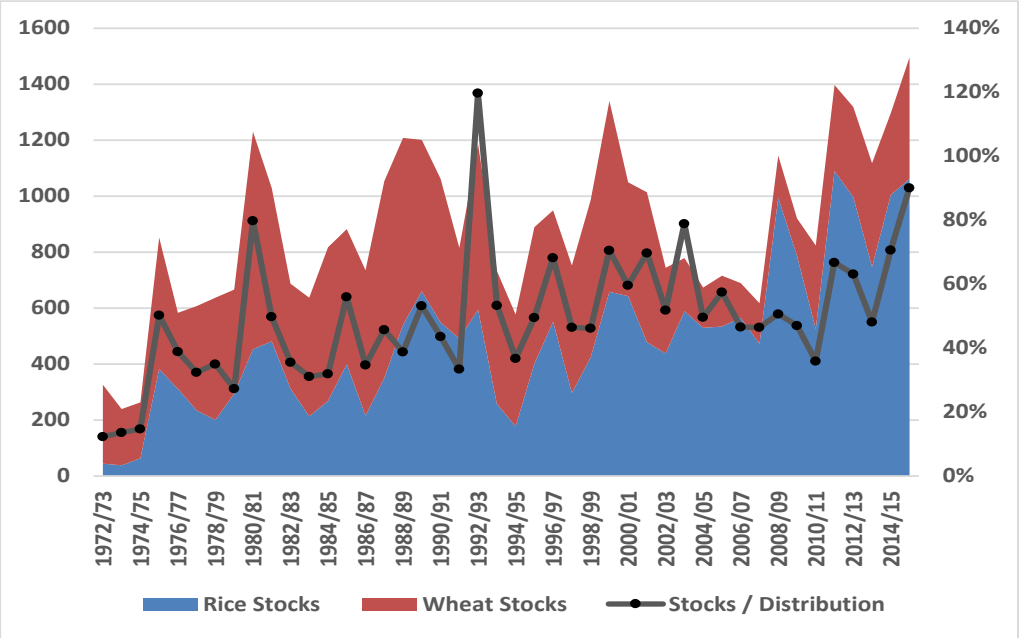
Table 1 Bangladesh Food Stocks and PFDS Distribution, 1972/73 to 2015/16

	Stocks ('000 Mt)			Distribution ('000 Mt)			Stocks/Distribution (%)		
Period	**Rice**	**Wheat**	**Total**	**Rice**	**Wheat**	**Total**	**Rice**	**Wheat**	**Total**
1972/73-74/75	48	228	276	n.a.	n.a.	2,067	n.a.	n.a.	41.1
1975/76-91/92	374	491	865	624	1,479	2,103	63.5	34.9	42.2
1992/93-07/08	475	380	856	740	749	1,489	69.4	56.0	59.4
2008/09-15/16	900	289	1,189	1,399	665	2,065	65.7	45.4	59.0

Notes: Stocks as a share of distribution is calculated for each year as the average of monthly stocks divided by total annual distribution

Sources: 1972/73 - 1988/89 Bangladesh Bureau of Statistics, Monthly Statistical Bulletin, various dates from Goletti et al. (1991, Table 4, p. 8); 1988/89 - 1995/96 from Dorosh, Shahabuddin and Farid (2004, p. 74); Bangladesh Ministry of Food, Food Planning and Monitoring Unit (FPMU).

Figure 3 Bangladesh: Public Rice and Wheat Stocks, 1996/97 – 2015/16



Source: Calculated from Bangladesh FPMU data.

2.2 1992/93-2006/07: Market Liberalisation, Reductions in Food Aid and Lower Public Stocks

Several major changes in policy in the early 1990s had far-reaching effects on the Bangladesh food system: liberalisation of private sector wheat and rice imports; elimination of major ration (sales) channels in the PFDS combined with a sharp reduction in domestic procurement; and donor decisions to reduce food aid, essentially linked to the success of Bangladesh in increasing cereal production.

Liberalisation of wheat and then rice imports in the early 1990s provided substantial stability to cereal prices. Despite increased wheat production, domestic demand for wheat far outpaced supply. From 1992/93 through 1999/2000, commercial wheat imports averaged 402,000 Mt per year, even

with large-scale food aid wheat inflows averaging 780,000 Mt per year in this period. Commercial wheat imports subsequently increased to an average of 1.510 million Mt per year from 2001/02 through 2007/08. In contrast, until 2003, when India began to subsidise exports, private sector rice imports were profitable only in years of relatively poor harvests, including following both the 1997 and 1998 *aman* (monsoon season) harvests (discussed in detail below).

While private sector imports of wheat increased, food aid flows declined in the 1990s, in part because the steady increase in total domestic production of rice and wheat eliminated the food gap – a major rationale for food aid imports. After the European Union phased out its food programme, food aid flows fell to only 242,000 Mt in 2002/03. However, unlike the years just after independence, growth in foreign exchange resources (from textile exports and workers' remittances) and government revenues (linked to overall economic growth) reduced the importance of food aid resources as a share of the value of imports and government expenditures to only 1.3 and 1.7%, respectively.[6]

The shift from rationed sales and open market operations to targeted cereal distribution brought about major gains in efficiency in terms of the benefits and costs of reaching poor households. Prior to these reforms, the Rural Rationing and the urban Statutory Rationing channels accounted for about one-fourth of total foodgrain distribution (which averaged 2.294 million Mt).[7] Total sales channels, including open market sales and other programmes, accounted for 63.5% of distribution, with relief and food-for-work channels accounting for the other 36.5% of distribution in these years (Dorosh, 2001).

Reforms in 1991/92 and 1992/93 closed the Rural Rationing and Statutory Rationing channels in an effort to improve the targeting of foodgrain distribution, as well as to reduce fiscal costs (Ahmed, Haggblade and Chowdhury, 2000).[8] As a result, both the percentage and total amount of foodgrain distributed through targeted and relief channels increased in the mid- to late-1990s, averaging 1.166 million Mt per year from 1995/96 to 1997/98, accounting for 72.8% of the 1.603 million Mt total annual average distribution during these three years.

By the early 2000's, the PFDS had shrunk to only 1.30 million Mt per year (average from 2002/03 to 2006/07) and stocks fell accordingly to an average of 720,000 Mt per year (531,000 Mt of rice and 189,000 Mt of wheat). For the 1992/93 to 2007/08 period as whole, however, average stocks were somewhat higher (856,000 Mt). Distribution for the period, however, was only about two-thirds that of the 1975/76 to 1991/92 period and stocks as a share of distribution rose to 59.6% (Table 1).

In spite of the reduced role of the PFDS, market prices of rice were low and very stable in the early 2000's because of private sector imports of relatively low quality Indian rice supplied directly or indirectly from India's own Public Distribution System (PDS) (Figure 4 and Figure 5).[9]

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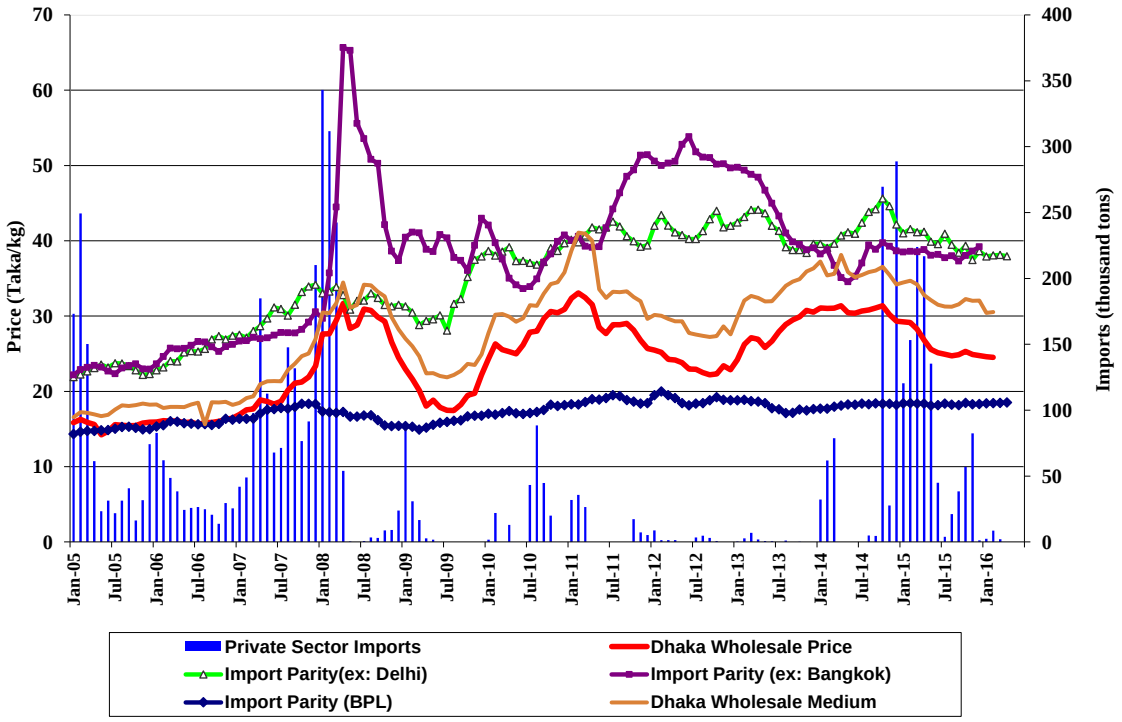
6 By comparison, food aid averaged 18.3 billion (2000) taka in real terms from 1980 to 1984, equal to 22.1% of total aid, 11.6% of government expenditures, and 10.9% of total imports (Dorosh, del Ninno and Islam, 2002).

7 Ration sales data are for 1988/89 - 1990/91.

8 For an analysis of political economy issues related to the food subsidy reforms, see Chowdhury and Haggblade (2000).

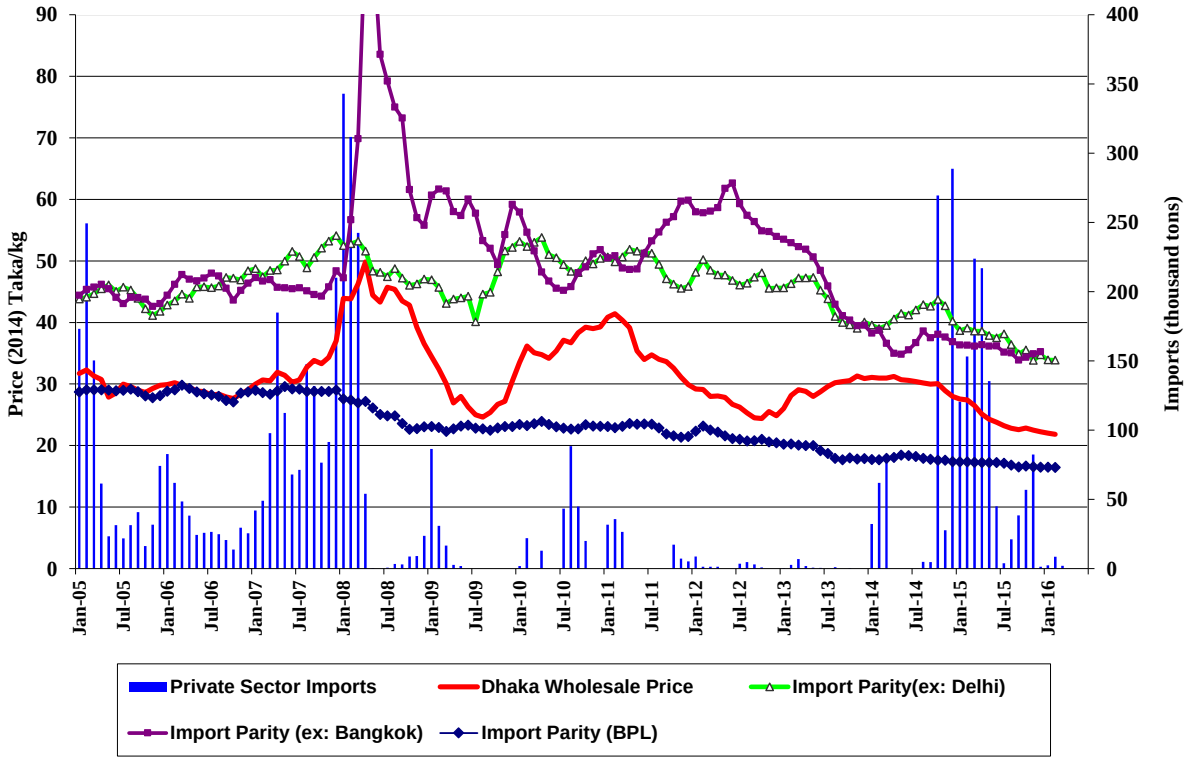
9 Econometric analysis by Dorosh and Rashid (2013) showed that Bangladesh wholesale rice prices were co-integrated with import parity prices of BPL (Below Poverty Line) rice from India from January 2002 through July 2007.

Figure 4 Bangladesh: Import Parity and Wholesale Rice Prices and Private Sector Rice Imports, 2005-16



Source: Calculated from Bangladesh Ministry of Food data.

Figure 5 Bangladesh: Real (2014) Import Parity and Wholesale Rice Prices and Private Sector Rice Imports, 2005 – 2016



Source: Calculated from Bangladesh Ministry of Food data.

2.3 2008/09 - present: Renewed Emphasis on Public Stocks After the World Price Shock

The period of relative stability of rice and wheat prices of the early 2000s ended with the 2007-08 world price shock. For Bangladesh, the most serious aspect of the crisis was the decision by the government of India to ban exports of ordinary (i.e. non-aromatic) rice in late 2007 because of their concerns about relatively poor wheat harvests (and relatively low domestic procurement) earlier in the year. Moreover, this export ban helped trigger a surge in prices and shortfalls in quantities in the international rice market. Ultimately, Bangladesh was able to negotiate a limited amount of imports from India, but not enough to prevent a surge in prices in Bangladesh as well.

In the aftermath of the 2007/08 price shock, the Government of Bangladesh again built up rice (and subsequently wheat) stocks. Public rice stocks, which averaged 531,000 Mt over the 2002/04 – 2006-07 period, increased rapidly to an average of 1.032 million Mt in the July 2008 to December 2009 period, mainly through increased domestic procurement (Table 2). Public wheat stocks also rose from 145,000 Mt in 2007/08 to 429,000 Mt in the July 2012 – February 2016 period, mainly sourced from public sector imports. Overall, public foodgrain stocks nearly tripled from 617,000 Mt in 2007/08 to 1.69 million in the July 2012 – February 2016 period.

Table 2 Bangladesh Cereal Rice Trade Regimes, Imports and Stocks, 1996/97 – 2015/16

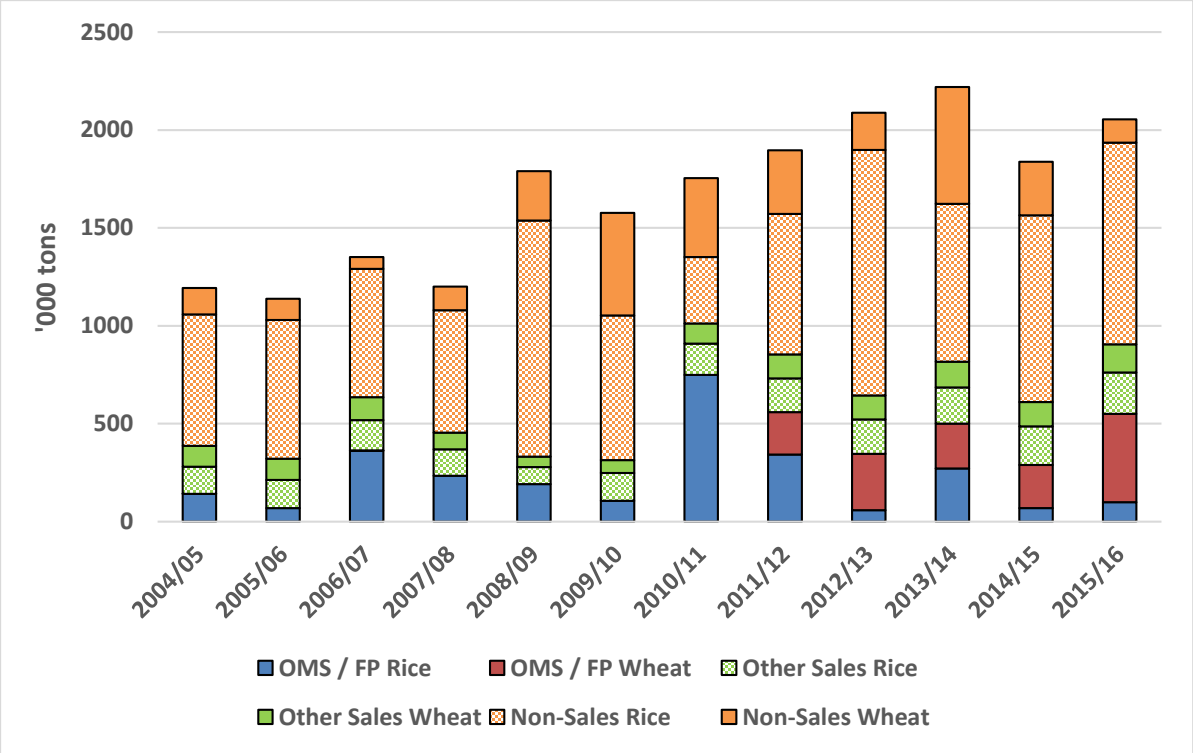
Period	Rice Import Trade Regime	Private Rice Imports	Public Wheat Imports	Public Rice Stocks	Public Wheat Stocks	Total Public Stocks
1996/97	Autarky	30	711	551	398	949
1997/98 - 98/99	Supply shocks; Private imports from India	1834	1154	360	509	869
1999/00 - 01/02	Autarky / minimal private imports	358	602	593	541	1134
2002/03 - 06/07	Private imports from India (BPL rice?)	948	256	531	189	720
2007/08	Autarky (World Rice Price Shock)	1681	177	472	145	617
July 2008 - Dec 2009	Autarky	125	403	1020	138	1159
Jan 2010 - June 2012	Autarky	148	852	745	274	1019
July 2012 - Feb 2016	Autarky	519	508	1258	429	1687

Source: Author and Bangladesh FPMU data.

Public distribution was also scaled up after the 2007/08 price surge. Total distribution averaged only 1.22 million Mt per year (1.01 million Mt of rice and 210,000 Mt of wheat) from 2004/05 through 2007/08. From 2009/10 through 2015/16 total public distribution averaged 2.065 million Mt per year, steadily rising to a peak in 2013/14 of 2.22 million Mt (1.26 million Mt of rice and 958,000 Mt

of wheat). Much of this increased distribution was through sales channels, including 1.04 million Mt through Open Market Sales (OMS) and Fair Price Cards in 2010/11 (Figure 6). Given the increases in both stocks and distribution, the average stocks/distribution ratio remained unchanged at 59%.

Figure 6 Bangladesh: Public Foodgrain Distribution Channels, 2004/05 – 2015/16



Source: Bangladesh Ministry of Food data.

The disruption of rice import supplies from India that occurred during the world price shock of 2007/08 re-invigorated a longstanding debate on the optimal size of public cereal stocks in Bangladesh. In the late 1970's, donors urged the Government of Bangladesh to hold more stocks; by the early 1990s, the opposite recommendation was made, i.e. to substantially lower stocks, in part because of lower procurement and distribution levels (Goletti, 2000). Another key factor, however, was the high rate of storage losses incurred. In the humid conditions of Bangladesh, rice stored in bags in warehouses absorbs moisture and deteriorates in quality from mold and insect attack. Stock rotation through a first in – first out stock management plan mitigated losses to some extent, but in years when procurement was unusually high relative to distribution, rice stocks accumulated rapidly and much of this grain stayed in warehouses for nine months or more, even though there is generally significant quality deterioration after six months in storage. This implies that to avoid excessive storage losses, rice stocks need to be replaced at least twice per year. Thus, for a minimum rice stock of one million Mt, distribution (including sales) must be at least two million Mt to maintain stock quality (Dorosh, Shahabuddin and Farid, 2004).[10]

Losses in rice quality are not included in the official government calculations of the costs of the PFDS in Bangladesh unless the rice is discarded (or sold as animal feed). Yet, these losses can be large in

[10] A new World Bank funded project launched in mid-2016 is designed to ease the storage constraints in Bangladesh through construction of new warehouse facilities and silos for rice. By increasing the length of time rice can be safely stored, these investments could enable Bangladesh to increase rice stocks by a factor of two or three without increasing rice distribution. Nonetheless, long periods of storage still imply high interest costs.

some years. Assuming a 15% deterioration in the market value of the 706,000 Mt of rice kept in storage for over seven months – essentially all of the rice distributed that year, estimated losses to recipients of Public Food Distribution System rice were 1.02 billion Taka (about 19 million US dollars) in 2000/01, equivalent to 11% of the total net outlays (net costs) of PFDS rice distribution and 13% of the estimated market value of PFDS rice distribution (see Dorosh and Farid, 2001 and Dorosh, Shahabuddin and Farid, 2004).[11]

In addition, not all grain reaches the intended beneficiaries. Estimates of leakages (diversions of grain) vary considerably across distribution channels and over time, ranging from more than 95% for the urban and rural rationing channels in the early 1990s (Ahmed, 2000). Subsequent reforms reduced leakages substantially -- to less than 20% for Food For Education in 2000 (Ahmed, del Ninno and Chowdhury, 2000) and only 6% in the Vulnerable Group Development (VGD) programme in 1998 (del Ninno, 2001).

3. PFDS Response to Emergencies: The 1998 Flood

Since the late 1980s, Bangladesh has faced two major food crises. The first occurred in 1998 when a major flood hit the country, causing a production shortfall in excess of two million Mt. The second, ten years later in 2008, resulted from an export ban on rice imposed by India that coincided with a sharp rise in world cereal prices. In both cases, the shocks led to a significant drawdown of stocks, increased imports and ultimately increased food distribution.

3.1 Policy Response to the 1998 Flood

In mid-1998, domestic rice prices rose along with floodwaters that ultimately covered two-thirds of the country. As domestic prices reached import parity levels, private sector rice imports flowed across the border from India, quickly adding to total market supplies (at no cost to the government). Continuing its policy of encouraging private sector imports, the Bangladesh government enabled the private sector to import substantial quantities of rice and keep the domestic market price from rising above import parity levels.[12] According to official Government of Bangladesh estimates, more than 200,000 Mt of rice per month were imported from August 1998 to March 1999, with private rice imports reaching 288,000 Mt in January and 345,000 Mt in February 1999.

In comparison with private sector rice imports, government interventions in the domestic rice market, constrained by low levels of stock, were small: only 399,000 Mt from July 1998 through April 1999. Private sector rice imports, equal to 2.42 million Mt in this period, were thus 6.1 times larger than government rice distribution.

If private sector imports were unavailable (or banned) from any source, then, with no change in government imports, total supply would have been 12.1% less (apart from private stock changes)

[11] In general, for the Bangladesh PFDS, storage losses for wheat, kept mainly in bulk in grain silos, are much lower, due to better handling and storage conditions.

[12] Earlier that year, following a production shortfall in late 1997, the Government of Bangladesh removed a 2% import surcharge on rice imports (signalling support for private sector rice imports) and simplified customs procedures to encourage rice imports. See Dorosh (2001).

and rice prices could have risen by 40 to 60%, to an average of between 18.7 Taka/kg and 21.3 Taka/kg.[13] Such an increase in the rice price level would likely have been unacceptable to the Government of Bangladesh and public sector imports would have been increased. But public sector imports of a magnitude equal to private sector flows would not have been feasible.

During the 1998 calendar year alone, private sector imports, mainly from India, reached 2.26 million Mt. Had the government of Bangladesh imported this grain itself, the average cost of the imported rice delivered to local delivery points would have been approximately 14.9-15.9 Taka/kg, 1.0 to 2.0 Taka/kg above the private sector import costs, due to additional marketing costs totalling 50 to 100 million dollars. And, if the government received a net price of 11.5 Taka/kg (equal to the Open Market Sales price of 12.0 Taka/kg less 0.5 Taka/kg OMS dealer's commission), the total unit subsidy would have been 3.4 to 4.4 Taka/kg, and the total fiscal cost would have been 160 to 210 million dollars (del Ninno, Dorosh and Smith, 2003).

Bangladesh had also experienced major production shortfalls at the time of the 1974 famine after the 1988 floods. In 1974, floods caused an 8.1% reduction in the aman rice harvest relative to trend (a 600,000 Mt reduction in rice production for the calendar year, equal to 5.0% of production in the previous calendar year). Rice prices rose by 58.2% between May-July 1974 and August-November 1974 (Table 3). Low public stocks (208,000 Mt, only 2.7 kilograms/person) and the inability to rapidly acquire more grain on the international market during the critical August-November period heavily constrained public distribution options and the government's ability to calm food markets.

[13] In the absence of private sector imports, domestic supply would have been 14.839 million tons, a 12.1% reduction in per capita supplies relative to the actual estimated levels. Assuming an elasticity of demand of –0.2 to –0.3, prices would need to rise by 12.1/0.3 (40%) to 12.1/0.2 (60%) to equilibrate market supply and demand. See del Ninno, Dorosh and Smith (2003).

Table 3 Bangladesh: Availability, Stocks and Market Prices in Major Flood Years

	1974/5	1984/5	1988/9	1998/9
Foodgrain production				
Aman (million Mt)	6.29	7.93	6.86	7.74
Below trend (%)	-8.5	-0.1	-18.1	-18.0
Total rice shortfall (calendar year, million Mt)	-0.61	-0.64	-0.24	-0.70
Per capita production (kg/person)				
Rice (calendar year)	149.1	144.9	136.6	138.8
Total foodgrain (calendar year)	150.3	157.4	146.6	153.1
Aus and aman share of production (%)	80.3%	73.3%	62.5%	47.0%
PFDS distribution (Aug-Nov)				
Total rice (thousand Mt)	43	201	231	216
Total wheat thousand Mt)	616	891	700	223
Foodgrain imports (July-June)				
Private rice imports (thousand Mt)	0	0	0	2,663
Public rice imports (thousand Mt)	267	695	61	393
Private wheat imports (thousand Mt)	0	0	0	805
Public wheat imports (thousand Mt)	2,030	1,898	2,075	1,603
Per capita availability (fiscal year)				
Rice (kgs/person)	133.3	137.0	134.1	162.3
Wheat (kgs/person)	21.8	33.3	29.2	30.5
Total (kgs/person)	155.0	170.3	163.3	192.8
National wholesale prices				
Rice: percent change [(a)]	58.2%	3.7%	7.0%	12.4%
Wheat: percent change [(a)]	61.2%	12.8%	15.0%	10.7%
Public foodgrain stocks (Average Aug-Nov)				
Rice (thousand Mt)	21	223	621	359
Wheat (thousand Mt)	187	413	546	310
Total (thousand Mt)	208	636	1167	669
Rice (kg/person)	0.3	2.3	5.8	2.8
Wheat (kg/person)	2.4	4.2	5.1	2.4
Total (kg/person)	2.7	6.5	10.9	5.3
Mid-year population (millions)	78.2	98.0	106.8	127.0

Note: [(a)] Percentage change from May-July average to August-November average.
Source: Adapted from del Ninno, Dorosh and Islam (2002).

The floods in 1988/89 led to an 18.1% reduction in the aman harvest relative to trend. Public stocks (which averaged 1.167 million Mt from August to November 1988) were nearly four times larger in per capita terms than in 1974 (2.7 and 10.9 kilograms/person in 1974 and 1988, respectively). Grain from these stocks combined with public sector imports enabled the government to use public distribution channels to stabilise markets and reach flood-affected households.

In 1998, average public stocks in August-November, (669,000 Mt, 5.5 kilograms/person) were only half the per capita levels of ten years earlier (though double those of 1974). Nonetheless, the large inflow of private sector imports more than compensated for relatively small increase in public distribution. For the nine-month period from July 1998 through April 1999, public distribution of rice was only 399,000 Mt; private sector imports (banned in 1974 and 1988) were 6.1 times larger (2.42 million Mt).

3.2 The 2007-08 World Price Shocks

Although Bangladesh did not experience a major production shortfall in 2007 or 2008, the 2007-08 world price shock had major adverse effects on Bangladesh consumers. In October 2007, as world prices of rice and other cereals rose, India cut off rice exports due to relatively low public wheat stocks (Dorosh, 2009; Headey and Fan, 2008; Slayton, 2009; Timmer, 2010). Average wholesale rice prices in Bangladesh rose by 45% in real terms between November 2007 and April 2008, even though India agreed to allow fixed quantities of rice exports to Bangladesh at a price higher than BPL prices. Ultimately, total rice imports by Bangladesh reached 1.7 million Mt in 2007/08.

Model simulations of the changes in net rice supply (production, imports and net market injections by the government) and consumption demand (as determined by real per capita income and population growth) account for only 9% of the actual 45% increase in real rice prices actually observed (November 2007 to April 2008, as compared to one year earlier), (Dorosh and Rashid, 2013). However, simulations of an increase in private stockholding of about 900,000 Mt (equivalent to about two weeks of consumption) result in a simulated real price increase approximating the historically observed increase.

These simulations suggest that private stock changes could have been a major factor in explaining the price increases of 2007-08. In the absence of an increase in private stockholding, a total of about 1 million Mt of net market injections (i.e. an extra 300,000 Mt of rice in addition to the approximately 700,000 Mt of net rice distribution in the period from November 2007 to April 2008) would have been sufficient to stabilise rice prices. These results suggest that ready availability of approximately 1 million Mt of rice through drawdown of public stocks or imports would enable Bangladesh to handle similar disruptions in the future, provided that private imports could supply an amount similar to that in 2008 (1.25 million Mt).

4. Conclusions and Future Directions

Bangladesh has enjoyed considerable success in increasing food security both in terms of availability of food and access to food. Rice production more than doubled from independence in 1971 to 1999/2000 when Bangladesh achieved its target levels of domestic cereal production (454 grams per

person per day). This increase in production has not only reduced the country's dependence on cereals, but has contributed to raising rural incomes and reducing the real price of rice from the early
1980s to the late 1990s that benefited all poor net consumers of rice. The trade liberalisation in the early 1990s that permitted private rice and wheat imports has also enhanced national food security as private sector imports have added to total cereal supply, especially after major domestic production shortfalls.

The Public Foodgrain Distribution System has also played an important role through targeted distribution that has increased access to food by poor households. Management of this system has involved complex policies related to choice of commodities (rice versus wheat), domestic versus international procurement, maintaining incentives for private sector imports, and managing public stocks. In the 1970s and 1980s, food aid and government imports channelled through the PFDS were major means of increasing the supply of food. During these years much of this food was distributed through rationed sales at subsidised prices, though food for work programmes were also significant. Large-scale domestic procurement at fixed prices during these years was designed to spur production. Following liberalisation of private imports of rice and wheat in the early 1990s that coincided with a shift from rationed sales to targeted distribution, the PFDS functioned mainly as a safety net. Private trade in rice stabilised prices and supplies following the 1998 flood, as well as during the early 2000s.

Since the 2007/08 world food price shock and temporary disruption of rice imports from India, government policy has shifted towards lesser reliance on international markets. Public cereal stocks have increased, along with domestic procurement and public distribution (including a return to rationed sales). There are also plans for investments in expanded grain storage and drying facilities that would enable storage of rice for longer periods without major quality deterioration. Nonetheless, private sector imports of rice and wheat continue on a large scale, side by side with government purchases and sales in the domestic market, and large public stocks.

Food security in Bangladesh has been greatly enhanced over the past two decades by policies that have allowed a major public foodgrain distribution to co-exist with private sector trade. Increasing the efficiency of the public distribution system while maintaining incentives for private sector trade can help ensure that food security continues to improve in the coming decades as well.

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