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Input Prices, Subsidies and Farmers' Incentives[1]

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This Policy Brief discusses the role of input prices and subsidies in managing food price volatility. It outlines key factors to be considered by policy makers in the light of likely future volatility in food and oil prices. This brief was funded by the UK Department for International Development (DFID).

1. Introduction

Policy makers in Bangladesh, as in many other developing countries, face the challenge of trying to keep food prices low for consumers, especially poor people, while ensuring prices are high enough to give farmers the incentive to grow more food.

In the medium-to-long term this problem can be tackled by raising the productivity of farming (e.g., by breeding more efficient rice varieties, improving marketing systems), so that food can be produced more cheaply, benefiting both consumers and farmers (see Policy Brief No.0903). In the short term, Government can try to reduce farmers' costs of growing food (e.g., through irrigation and fertiliser subsidies or more efficient fertiliser and water management practices) and/or influence the price of food in the market (e.g., through domestic procurement, open market sales and/or food imports – see Policy Brief No. 0902).

Over the last 30 years, Bangladesh has experienced a "green" revolution' in rice production, with a tripling of production from approximately 10 million metric tonnes (hereafter tons) in the mid-1970s to almost 30 million tons in 2007/08. It was largely based on the cultivation of high-yielding varieties (HYVs) under irrigation with use of chemical fertilisers.

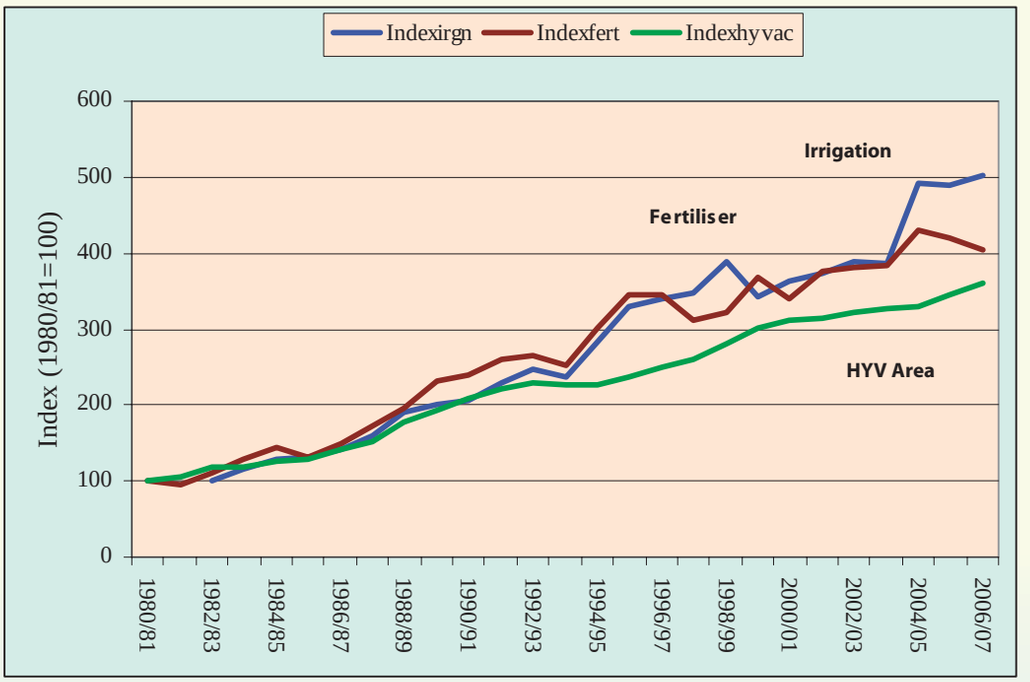
This "Green Revolution'' has enabled Bangladesh to increase food availability to meet the demands of a rapidly growing population. Bangladesh still imports some food grain, especially at times of disaster (e.g., floods, cyclones), but the country is largely self-sufficient.

In the early years, fertilisers and diesel/electricity (for irrigation pumps) were subsidised in order to encourage farmers to try the new technology. Later, they became a key policy instrument to incentivise farmers and encourage them to grow more rice.

The rate of growth in the use of HYVs, fertilisers and irrigation is shown in Figure1. Over time, the price of fertiliser relative to rice has been kept low, providing the economic incentive for farmers to produce rice.

[1]This Policy Brief was prepared for the National Conference on "Market Volatility, Vulnerability and Food Security: Strategic Issues and Policy Options" organised by the Bangladesh Institute of Development Studies (BIDS) and the UK Department for International Development (DFID) at Dhaka on April 9th, 2009. The views expressed in this paper are those of the authors and do not represent the official views of BIDS or DFID.

Figure 1: Expansion in HYV area, fertiliser consumption and mechanical irrigation



Note: The base year for area under mechanical irrigation is 1982/83.

2. Fertiliser Subsidies and Distribution

Fertiliser Subsidies

There are four main fertilisers used in Bangladesh - urea, triple super phosphate (TSP), muriate of potash (MP) and di-ammonium phosphate (DAP). Urea is produced in Bangladesh using natural gas (60-70 per cent) and imported (30-40 per cent); 15 per cent of TSP is produced in country, but most is imported, while all the MP and DAP used is imported (see Table 1).

Table 1: Annual fertiliser requirement (2007/08)

(MillionTons)

	Urea	T SP	MP	DAP	Total
Produced in Bangladesh	1.70	0.05	0	0	1.75
Imported	1.10	0.45	0.40	0.30	2.25
TOTAL	**2.80**	**0.50**	**0.40**	**0.30**	**4.00**

The Government subsidises fertiliser in a number of ways:

- domestically produced urea is subsidised twice: (a) the natural gas used to manufacture urea is sold to the five fertiliser factories at a subsidised rate; and (b) the ex-factory price fertiliser dealers pay is subsidised at a level lower than the cost of production;
- imported urea is subsidised to make the price the fertiliser dealer pays the same as that of domestically produced urea;
- imported TSP, MP and DAP receives a fixed subsidy which, for many years until late 2008, had been set at 15 per cent of the import cost.

The cost to government of subsidising imported fertiliser obviously varies with the international price (see Fig. 2).

There are a number of problems with the subsidy system:

- It has encouraged inefficiency in the domestic production of urea. Not all factories are equally efficient and the relatively inefficient ones receive comparatively higher subsidy. Thus the subsidy is

Figure 2: Nominal and relative price movements of fertiliser

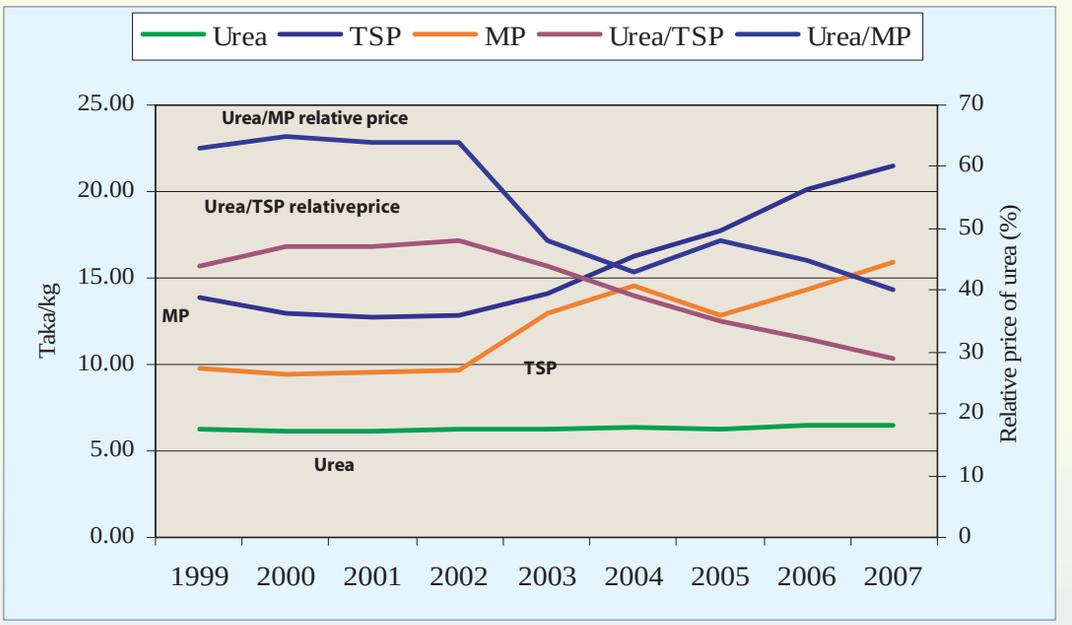
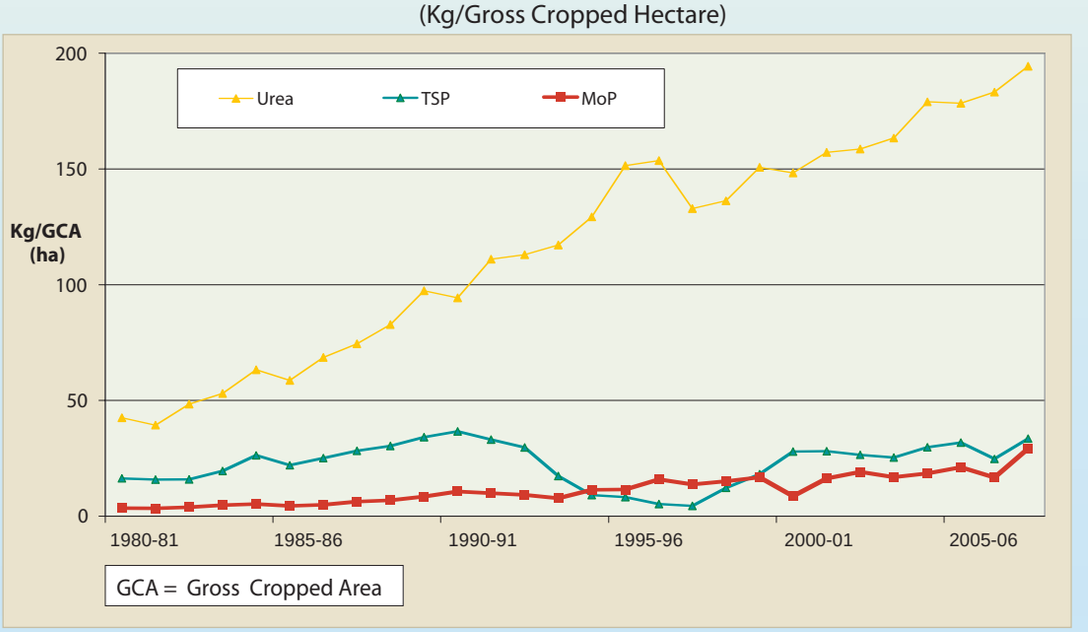


Figure 3:Trends in per hectare use of different fertilisers in Bangladesh: 1980/81 - 2006/07
(Kg/Gross Cropped Hectare)



more than absolutely necessary, leading to waste of resources and a high fiscal cost for Government.

- The relatively higher subsidies given to urea, compared to TSP and MP, in recent years has led to unbalanced fertiliser use by some farmers, which has probably depressed yields and may have adversely affected soil fertility. Figure 2 illustrates how relative fertiliser prices have changed since 1999 and Figure 3 shows the rapid increase in use of urea.

Fertiliser Distribution System

Until the late 1970s, fertiliser procurement and distribution was a public monopoly of the Bangladesh Agricultural Development Corporation (BADC). Because the system was

inefficient and was not able to cope with the increasing farmer demand for fertiliser, the Government introduced a series of reforms in the 1980s, resulting in a largely private sector and unsubsidised system by the early 1990s. However, the Government took over control and regulation of the fertiliser marketing system, following an unprecedented urea shortage in 1995 caused by (a) poor monitoring of fertiliser demand and availability, and (b) the export of domestically produced urea, despite high demand at home.

The current fertiliser marketing and distribution system is as follows:

- the Bangladesh Chemical Industries Corporation (BCIC) is responsible for domestic production of urea and TSP and import of urea, while the Bangladesh Fertiliser Association (BFA) and BADC imports non-urea fertiliser;
- fertiliser factories sell fertiliser to 4,800 upazila fertiliser dealers (10-15 per upazila), appointed by BCIC on the recommendation of the Government's Fertiliser Monitoring Committee;
- the fertiliser dealers, in turn, serve 14,000 block or union level sale representatives (sub-dealers) who sell to farmers at a rate fixed by farmers;
- farmers are given a certificate by Department of Agricultural Extension staff enabling them to buy fertiliser at the subsidised price in proportion to their fertiliser requirements.

Although there has been no repeat of the crisis of 1995, there are problems with the system:

- farmers frequently complain of fertiliser shortages (due to many factors, including weak forecasting of demand, problems in smooth import of fertiliser and rules that prohibit sale of fertiliser across upazila boundaries);
- the current system involves high management costs to sustain the policies and controls. A major problem is that local agricultural extension staff are preoccupied with managing and controlling fertiliser distribution at the union level and thus their primary responsibility of providing agricultural extension support to farmers is seriously hindered.

There is clearly scope to improve the current system.

3. What Happened in 2007 and 2008?

In 2007 and 2008, Bangladesh experienced unprecedented rises and sharp falls in the prices of oil, fertiliser and food. A striking feature of this volatility was that while prices took many months to build up to their peaks in mid-2008, the downturn was very rapid, with prices tumbling by the end of 2008 (see Figure 4 and Figure 5).

Figure 4: Price of Fertilisers in Bangladesh: 1984/85-2008/09

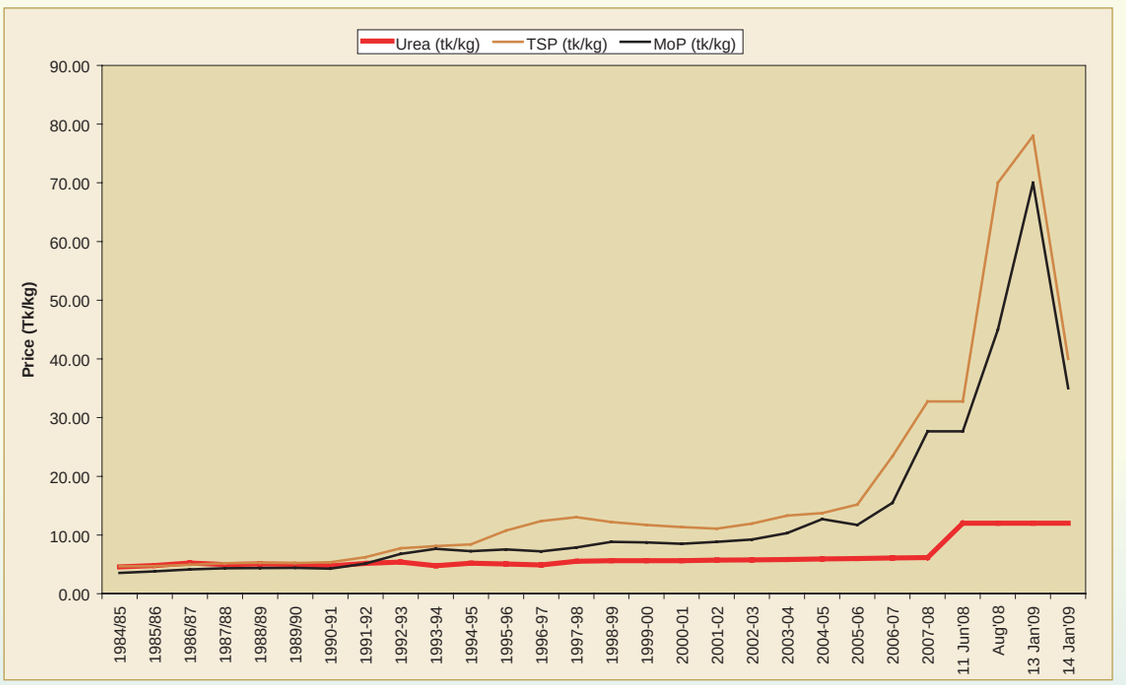
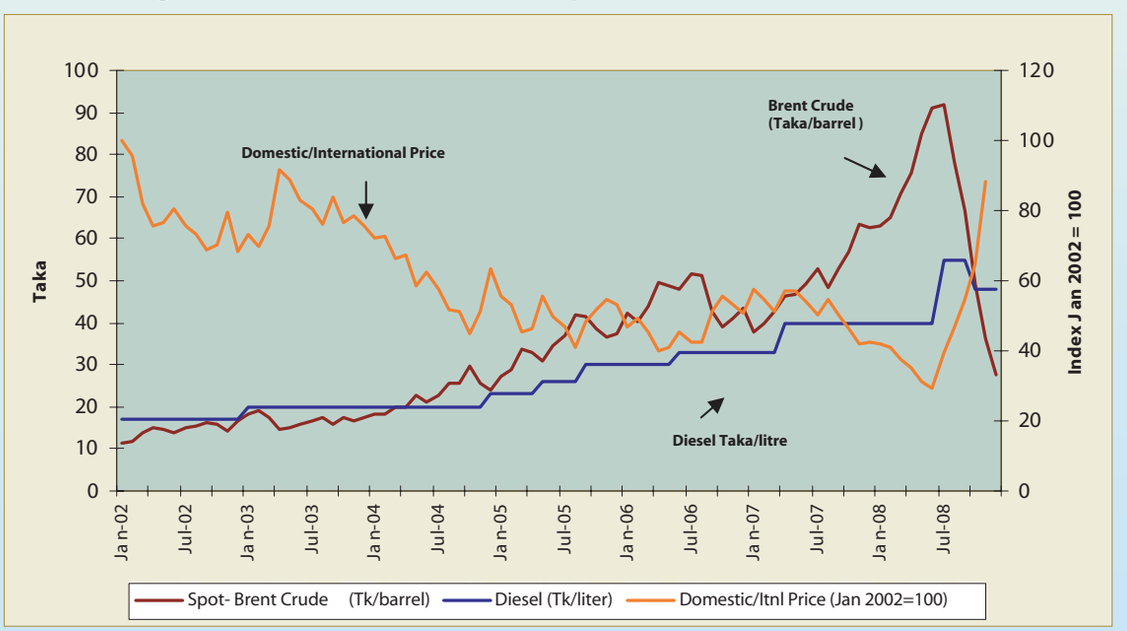


Figure 5: International and domestic prices of crude oil and diesel



Fertiliser

International fertiliser prices doubled between late 2006 and late 2007 and jumped again between October 2007 and March 2008. TSP and DAP prices rose from approximately $400/ton in October 2007 to almost $1,200/ton in the following March and urea rose from $350/ton in October to $750/ton in August 2008. Prices fell precipitously from August/September 2008 and by early 2009 were almost back at their 2006 levels.

Domestic prices of TSP and MP, which were not heavily subsidised by the Government, mirrored world prices, with a lag. TSP, for example, jumped from Tk24/kg in 2006/07 to Tk70/kg in August and Tk78/kg in December 2008 (see Fig.4). The administered price of urea, on the other hand, remained at Tk6/kg until June 2008 when the Government

increased it to Tk12/kg, though some farmers who could not access urea through official channels paid higher prices. During this period the Government paid a very high subsidy of up to $800/ton on imported urea to maintain a low urea price in the country.

The high prices of urea did not stop importers from bringing in supplies of urea, because they knew they would be compensated through subsidies. In 2007/08 the quantity of urea imported more than doubled and overall availability (domestic production plus imports) increased by 35 per cent.

The situation was different for non-urea fertilisers, which received a fixed government subsidy of 15 per cent. Because of the high international prices, importers were not sure that they would be able to sell what they could import. TSP and MP imports thus declined in 2007/08 causing a shortage in the market and rapid prices rises. The Caretaker Government made efforts to procure more non-urea fertiliser from international sources but supplies were limited. In early 2009, the new Government changed the system, fixing the dealer prices of non-urea fertilisers at almost half the prevailing market price to compensate importers who had imported earlier at high international prices, which they were unable to sell.

Diesel

International oil prices also shot up during 2007/08, peaked in July/August 2008 and then fell precipitously. Because of government subsidies, the domestic price of diesel was lower than the international price and "sticky" in that it was changed from time to time as the Government adjusted to the rising international price.

The response of the Government to rising diesel prices was to introduce a cash payment for marginal and small farmers who irrigated boro rice using diesel pumps. Taka 2.5 billion was distributed. Although there were some reports of leakage, the programme was reasonably effective. The price of diesel has fallen recently.

4. Operationalising Subsidies

The Government can choose to subsidise fertilisers in various ways. These include:

(a) *Targeting subsidies to farmers according to area cultivated.* This approach could reduce the risk of fertilisers being diverted to non-agricultural uses, but would require a survey each season of how much land each farmer is cultivating, which would be very costly.

(b) *Targeting subsidies to marginal and small farmers.* This approach would support those farmers who would find it most difficult to pay for fertiliser and adopt new technologies (e.g., hybrids). However, it would require a listing of farmers and a local system (using extension agents or Union Councils) to verify eligibility, which would also be costly. It would also

mean that larger farmers, who produce the surplus production in the country, would be disadvantaged and could result in higher food prices for consumers and poor people.

(c) *Providing subsidised fertiliser to all farmers.* This "universal" approach would make all farmers eligible to buy as much fertiliser as they need from registered dealers and sub-dealers. So long as the Government ensures that adequate supply is available in the market and quality is regulated, this would mean that farmers would be able to buy all the fertiliser they need to maximise their output and would thus make the biggest impact on farm incomes and food production in the country.

This system would require a listing of all farmers (though this would be less difficult than targeting specific groups of farmers (option (b), above). There could also be leakage if farmers buy more fertiliser than they need and sell it to industries.

Under this system, the subsidy could be paid through administered dealer prices, as is currently done, or as a cash payment to all farmers. The advantages and disadvantages of these two alternatives are given in Table 2.

(d) *Providing subsidised fertiliser to all.* This truly "universal" approach would allow anybody who wanted to buy fertiliser, for whatever purpose, to do so from dealers, sub-dealers or shops. So long as Government ensures that adequate supply is available in the market and quality is regulated, farmers and others would be able to buy all the fertiliser they require. This system would involve extra costs (in that industries and others would be able to buy subsidised fertiliser and use it for other purposes) but this would be offset by (a) not needing to pay to maintain a register of farmers and (b) releasing extension workers from managing fertiliser distribution and allowing them to focus on their extension work.

Table 2: Universal subsidies: alternative ways of delivery

Subsidy paid	
As cash payment to farmers	**Through administered dealer prices**
Advantages	
Progressive – MSF get higher subsidy per acre cultivated Flexibility – farmers can use for any input (increases allocative efficiency) Could be provided as combined payment for diesel and fertiliser	Easy to administer
Disadvantages	
Provides large farmers, who produce most of the marketed surplus, less incentive to increase production Possible diversion to non-agricultural uses by family Requires registration system (NIC or Union Council Certificate)	Possible diversion by dealers to non-agricultural sectors (e.g., industries) Need to closely monitor dealers to check charging correct prices to farmers Requires adjustment of subsidies each season to ensure allocative efficiency MSF access may be relatively restricted

Similar systems could be used for diesel subsidies, though there is the extra consideration of equity between farmers who use diesel and more highly subsidised electricity to power their pumps.

5. Key Policy Implications

The Government can seek to influence farmer incentives by subsidising agricultural inputs (fertiliser, diesel) or by procurement of food grain and Open Market Sales. In recent decades, both approaches have been used but a systematic evaluation of the effectiveness and cost to the Government of each approach has not been undertaken. It recommended that this should be done urgently so that Government can use its funds as effectively and efficiently as possible. This should include both the direct costs (e.g., of subsidies on inputs, food grain storage costs, etc.) and the opportunity costs of capital (tying Government funds up in food grain stores) and labour (using government staff to manage input subsidy schemes and food grain stores).

There are currently many shortcomings in the fertiliser procurement and distribution system. A comprehensive assessment of the current system needs to be undertaken, constraints identified and analysed, and policy and operational reforms implemented to contribute towards more efficient, equitable and farmer-responsive fertiliser marketing and distribution system in the country.

Note: This paper draws heavily on a World Bank paper drafted by Hans Jansen and Nihal Fernando (World Bank 2008).

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