

Final Report

Issues in Food Prices Determination in Bangladesh

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February 2009

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Executive Summary

This report reviews a number of alternative explanations of the recent behavior of food prices in Bangladesh with particular focus on the rice market. The prices of key foods for Bangladesh particularly, rice and cooking oil increased rapidly after January 2007. This coincidentally was the time when the new Caretaker Government (CG) took power, but this is largely accidental, there is no evidence that the CG was responsible.

1. **Food prices** have increased steadily until mid 2007. At that time prices stabilized, jumped in one month in mid 2008 and have since been stable. Comparing prices with one year previously the rate of increase of prices has slowed since May 2008. The most representative rice price showed similar behavior. Soybean oil price increased more rapidly since mid 2006 but has started to decline since May 2008. Potato prices have been steady with marked seasonal variations. Rice is a key component of the Bangladesh diet taking 25% of the expenditures of the median rural household.
2. **Price formation:** Rice prices are established by a combination of the Indian parity price (Indian rupee prices * Taka/rupee exchange rate) and the domestic supply conditions. The dominant factor is the Indian parity price. The price expectations of all market participants lead to their sensing rice availability in the market and adjusting their stock holdings in response to tightness of supply. Although the preferred explanatory model melds the Indian parity price and domestic market conditions no statistical analysis of such approach was successful.

For other domestically produced agricultural commodities the rice price at the farm is important as it determines the value of land rentals. However, when imports are a significant share of the market then the international price is the main determinant of the Bangladesh whole sale price.

3. **What happened?** The domestic rice price in late 2007 jumped due to the world price increases, India's decision not to export rice, and the concerns generated by the Bangladesh Government's actions. These factors caused a panic leading, for everyone able to afford it, increased rice holdings. This froze the rice market driving up prices. The high prices increased farm gate prices and induced production of a large crop in response. Prices began to decline as stocks were released, the new boro crop fed into the market and confidence returned that there was enough rice. There was always sufficient rice within Bangladesh. It was fear that there was not enough that drove up the rice price. This panic reaction to the rice price was unique in Bangladesh history; during previous serious floods (1987 and 1998) there was muted behavior of a price spike but the connection with Indian market was never broken.
4. **What will happen?** Rice prices should continue to decline as the high priced paddy passes through the market. The 2008 aman crop was purchased at lower farm gate prices and is slowly driving down retail prices. The lower farm gate prices will probably reduce production in 2009 and 2010. Prices may rise in 2010 in response to a smaller crop. It remains uncertain if the Indian parity price will continue to be the major determinant of the rice prices.
5. **Macro economic impact:** The macro economic impact analysis concluded that there were increases in output of rice and connected services of milling and trade of about

0.8%. On the demand side the increase in prices reduced real income and led to a decline of demand of about 1%. The conclusion is that the overall impact on GDP was very small. The impact on the balance of payments was also limited.

6. Other factors

- a. Cost increases were insufficient to explain the size of the price increases.
- b. There is no evidence of market collusion to change rice prices.
- c. Demand for rice was little changed over 2005 taking account of price changes, increased income, population shift, and the wheat price. There was no price pressure from the underlying consumption.
- d. There is no evidence of a change in import behavior in 2007 other than for palm oil.
- e. Speculation certainly takes place, but in individually small amounts. The total, however, is sufficient to cause market changes. No one has the market power to influence the rice price. Only changes in the Taka/rupee exchange rate will influence the price directly.
- f. The analysis of the data indicates that the nominal rice stock at the lowest point in the production-use cycle has been increasing over the past few years suggesting that there is no pressure on prices from the domestic stock position. There are also definite problems with the quality of the data particularly on the rice production and loss estimates.

- 7. Recommendations:** A number of recommendations are made that would improve the management of rice prices. The key concepts revolved around improvements of markets and building a large stockpile of paddy and rice. The existence of a larger stock pile maintained at the level of 4-5 million metric tons of rice (except in emergencies) would convince people that the government could keep the prices down and would moderate speculative demands. Included are recommendation to increase the volume and quality of commodity storage, develop financial instruments to improve the rice trade and finance of farmers, and to improve data on the rice economy.

1. Recent food price behavior in Bangladesh

Bangladesh has experienced a return to a high inflation rate in the past few years. The decade of the 1980s was characterized by an average inflation rate of 10%, the 1990s by a rate of 5%. The price increases continued at 5% per annum until 2003 and then accelerated to 8% over the past five years.

The money supply [M2] grew faster in the first four years of the current decade than subsequently despite a lower inflation rate in the first half. This suggests that there was limited aggregate demand pressure on the economy. The food price increases are unlikely to be caused by excess aggregate demand. Another explanation must be sought.

This section examines the recent behavior of food prices in Bangladesh and then examines briefly the role of food in the Bangladesh diet. First, we examine the retail prices for a variety of foods, describing what happened to food prices in recent months. Second we examine international and domestic prices for a group of foods. Finally the consumption expenditures of the typical (median) rural household are examined.

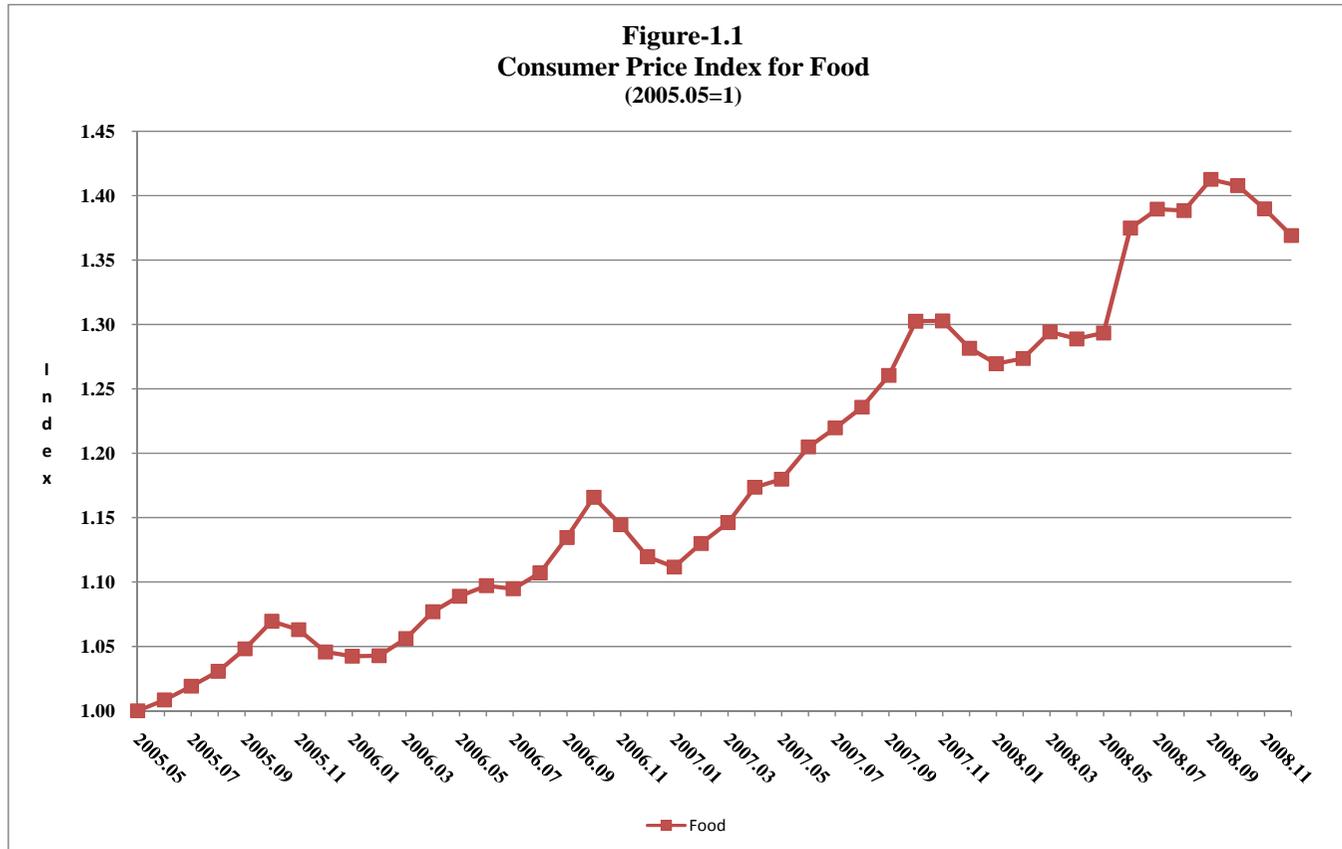
Figure 1.1 plots the consumer food price index monthly from mid 2005 to September 2008. The price index averages the prices of food consumed by Bangladeshis. Over this period food prices increased about 40%. In Figure 1.2 the percent changes are plotted month to month and for one month compared to the same month one year before.

The food price index was flat from September, 2007 until May, 2008 and then jumped sharply in June, 2008. Over the past few months the food price index has varied but no clear trend is evident. The past 14 months are characterized by no food price inflation other than one large upward step in June 2008!

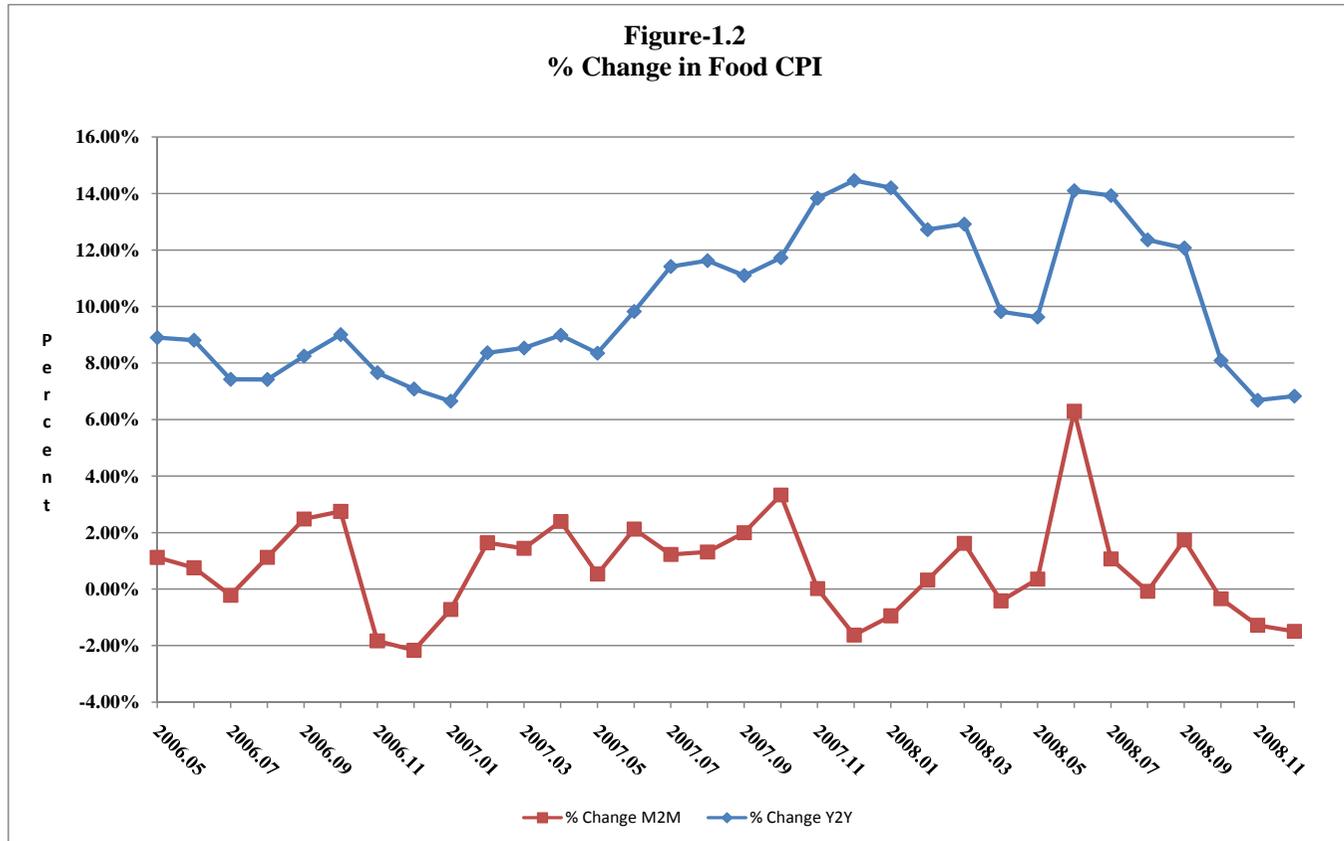
The month to month increases shown in Figure 1.2 show negative or low percent increases from September, 2007 except for one large increase in June, 2008.

The year to year (by month i.e June, 2008 over June, 2007) price increase shows a steady rise in food prices from January, 2007 until January, 2008; then a fluctuation from 14%-10%-14% followed by a steady decline in the rate of food price increase. Over the past 3½ years the annual rate of food price increase has averaged 9.6%. The first half of this period showed the same rate of increase as the second half. Thus while popular opinion perceives a more rapid rate of food price increase in the second half of this period, in fact the growth of food prices as measured by the CPI has been steady over the entire period.

Turning next to specific food prices, the retail prices of three varieties of rice and thirteen other food products were examined. Three of these are plotted here and thirteen others presented in Annex 1. The nominal retail price is plotted along with the “real” price. The real price for the non-rice products is the nominal price divided by the CPI. This represents the price of the food product relative to the general level of consumer prices. The CPI has been rebased to the first observation [May, 2005] of the graph forcing the nominal and real price to be equal at the initial observation.



2005.09 means 9th month of 2005



2005.09 means 9th month of 2005

Figure 1.3 presents the price of boro, effectively coarse rice, the most common form of rice consumed in Bangladesh. For rice the “real” price relative to other consumer goods is calculated by deflating with the non-rice component of the CPI.¹ The nominal price of rice rose steadily from the beginning of 2007, jumped sharply in early 2008 and then remained relatively stable during 2008, rising slowly. The real price was roughly stable until September, 2007, jumped sharply in one month by 50% and then stabilized. For almost one year the “real” rice price has been stable relative to non-rice consumer goods. This suggests that the recent increase in the market (nominal) price reflects adjustment of the price to the general inflation level.

The next commodity reviewed is soybean oil; the nominal and real price are presented in Figure 1.4. Soybean oil is imported and dominates the domestic cooking oil market. The nominal retail price of soybean oil began to increase in the last quarter of calendar 2006, six months before the increase of the rice price began and increased steadily, peaking in June 2008 and then started to decline. The “real” price followed a similar path. During 2007 and 2008 the nominal soybean oil price has doubled; the relative or real price rose by 60%. However, since January, 2008 this “real” price has been stable. Just as for the rice price, in 2008 the price seems to be adjusting to the general inflation level.

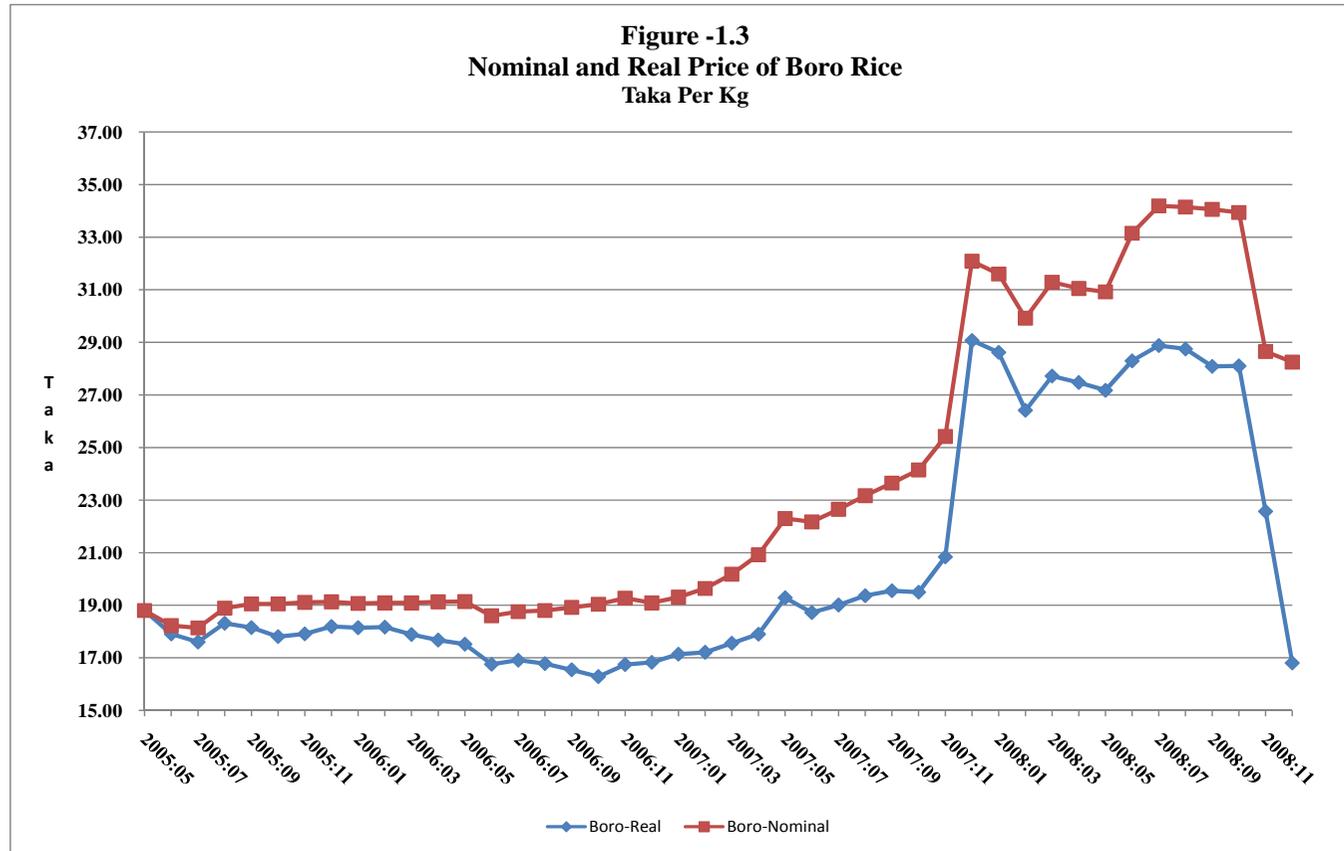
Figure 1.5 presents price data for potatoes. The nominal price is erratic, trending upward with seasonal effects in 2006 and 2007. A very good harvest in 2008 has kept the price low. The real price of potato is flatter but still with significant fluctuations.

Potatoes are a domestic product with no connection to an international market. Price increases are driven by general inflation and the supply conditions. There is no apparent trend in the relative price apart from the seasonal fluctuations.

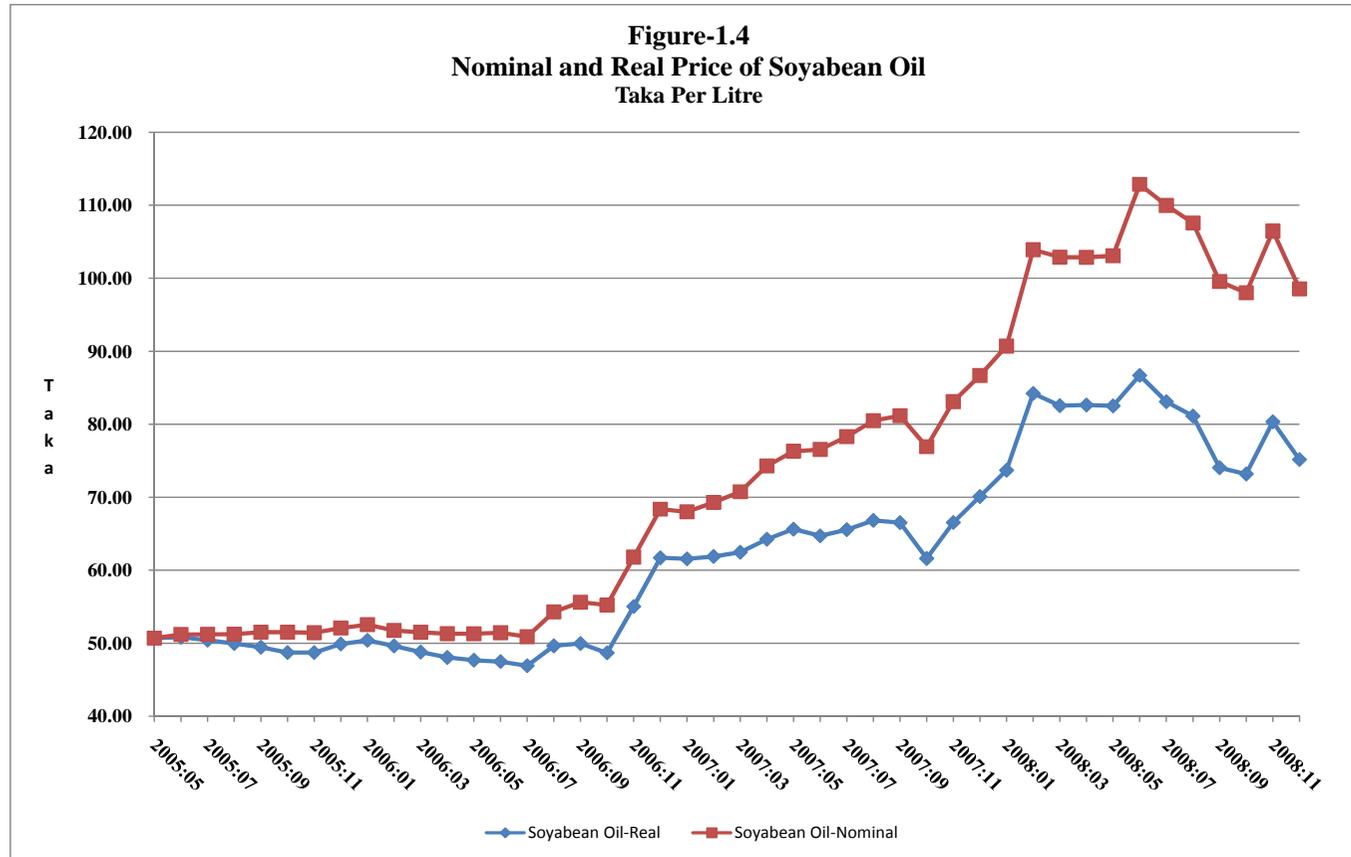
In Annex 1 graphs presenting the nominal and real (relative) prices for two other types of rice, wheat (atta flour), masur dal, sugar, fish, beef, mutton, fowl, hen eggs, duck eggs, milk and onions are given. There are a variety of price behaviors observed.

1. The two other varieties of rice show a somewhat different path than the coarse rice (boro). The nominal price increases are steadier than for coarse rice. One variety shows the price flattening during 2008 after a large jump in November, 2007; pajam rice shows a jump and then a continuing price increase. Wheat (atta) follows a path closer to that of coarse rice.
2. The sugar price peaked in March, 2006 and has subsequently fallen steadily. There are a number of special factors influencing sugar prices. In particular, prior to 2007 there was an attempt to refine and package sugar based on imported materials. During the past two years policy shifted to allow direct imports of refined sugar, lowering the domestic price.
3. The prices of beef and mutton rose steadily over the 2005-2008 period. These increases are linked to feed price increases and to higher income levels increasing demand. In real terms the prices stopped increasing over the past year.

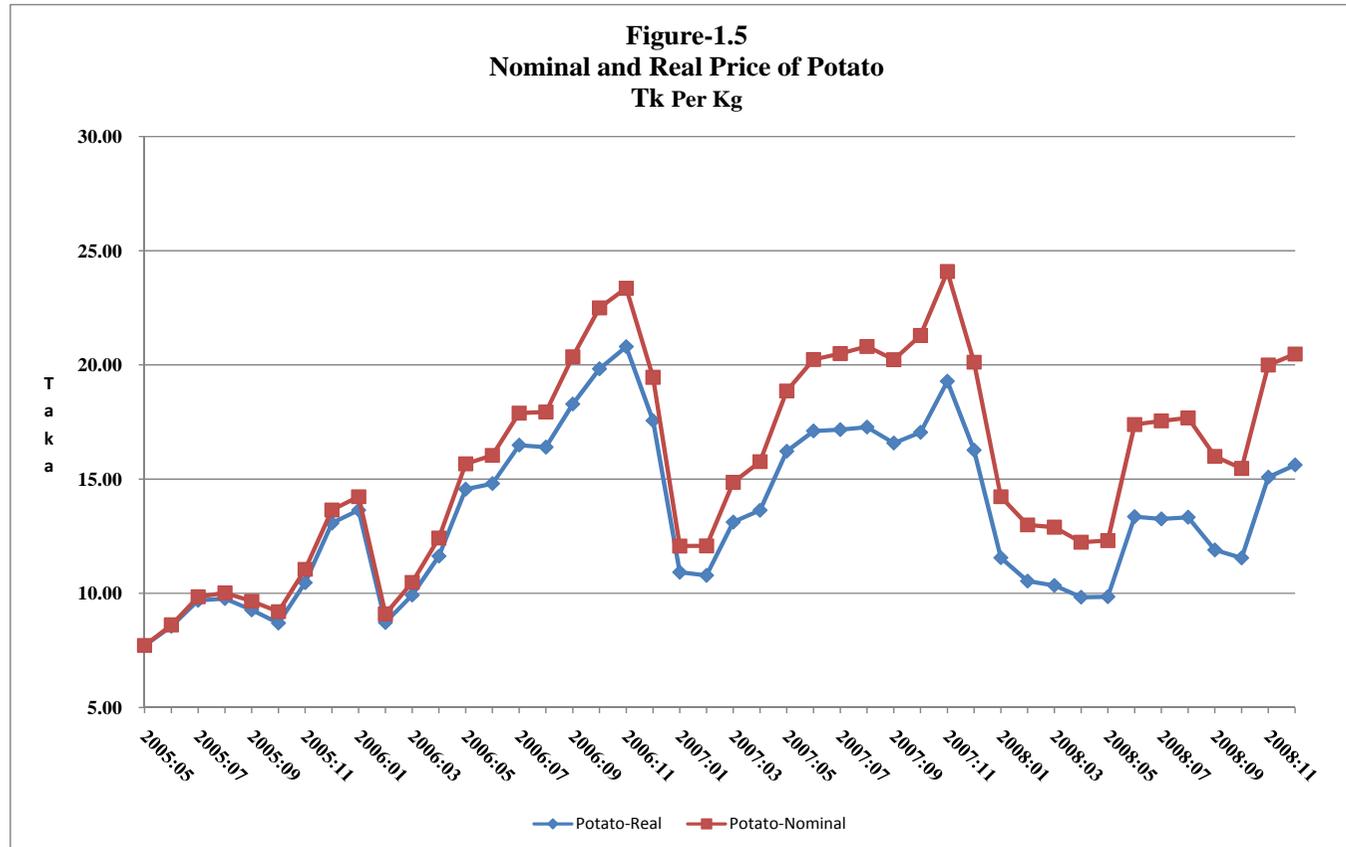
¹ Rice is such a large part of the Bangladesh diet that the CPI is strongly influenced by the rice price. For other food products the weight in the CPI is low so the “real” price can be determined relative to the CPI.



2005.09 means 9th month of 2005



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4. Fowl and egg prices rose sharply in May, 2008 but have since stabilized. Again demand is strong, feed prices have increased while bird flu has reduced both supply and demand.
5. Onion prices have fluctuated but the nominal price has been stable. The masur price in contrast grew steadily, accelerating in 2008. Both prices are partially influenced by import prices and partially by domestic production. The import price is more influential with domestic production price adjusting to import prices.

These various behaviors of onion, eggs, beef, and mutton prices reflect a variety of supply and demand conditions. One expects prices to rise as a consequence of the general inflation. Inflation increases the production cost of all products as wages and other costs increase. The rising price of rice drives up the land rent for other cultivated products, leading to higher prices. In the 2003-2006 period strong economic growth increased demand for mutton, beef, chicken, and fish; supply could not respond rapidly enough to maintain the price.

The international prices for four key commodities for Bangladesh are presented in Table 1 for the period from the past quarter of 2005 to the fourth quarter of 2008.

Table-1
Commodity Prices

Quarter	US \$/MT			
	IFS Price			
	Rice	Soyabean oil	Sugar	Wheat
2005.1	292	464	9	167
2005.2	294	510	9	162
2005.3	283	516	10	158
2005.4	282	493	12	168
2006.1	293	499	17	153
2006.2	302	542	17	169
2006.3	313	561	14	170
2006.4	307	604	12	192
2007.1	319	660	11	209
2007.2	323	751	9	220
2007.3	331	823	10	241
2007.4	357	965	10	341
2008.1	516	1,257	13	411
2008.2	953	1,346	12	347
2008.3	753	1,193	14	318
2008.4	579	739	12	228

Source: IMF, International Financial Statistics, various issues

Examining these series indicates that the price of three items: rice, soyabean oil and wheat have increased sharply up to the second quarter of 2008. Since the second quarter of 2008, these commodity prices have begin to decline.

Figure 1.6 presents data on traded rice prices.

This figure includes the world price as measured by Thailand's rice export price (labeled IFS, the data source),² the import price as measured from the central bank's L/C settlement data,³ and the Bangladesh wholesale price for coarse rice. The Bangladesh wholesale price is adjusted to dollar terms. The three reported prices follow the same path showing an increase beginning in 2007.1 until 2008.1. After 2008.1 the Bangladesh import and wholesale prices are constant. The world price continued to increase. In the second half of 2008 the world rice price fell sharply. The Bangladesh wholesale price is consistently higher than the import price as one would expect. The world price did not increase rapidly until 2008.1. The Bangladesh import price has risen partly due to the Indian exchange rate changes; the Rupee revalued with respect to the Taka during 2006 and 2007 increasing the Bangladesh wsp; the rupee devalued during 2008 but by that period Indian influence on the Bangladesh market was sharply reduced. Rice imports are largely from India and the prices reflect such exchange rate changes. As Bangladesh imports lower quality rice (parboiled) than the Thai rice for which the international price is reported, the import price is always lower than the world price.

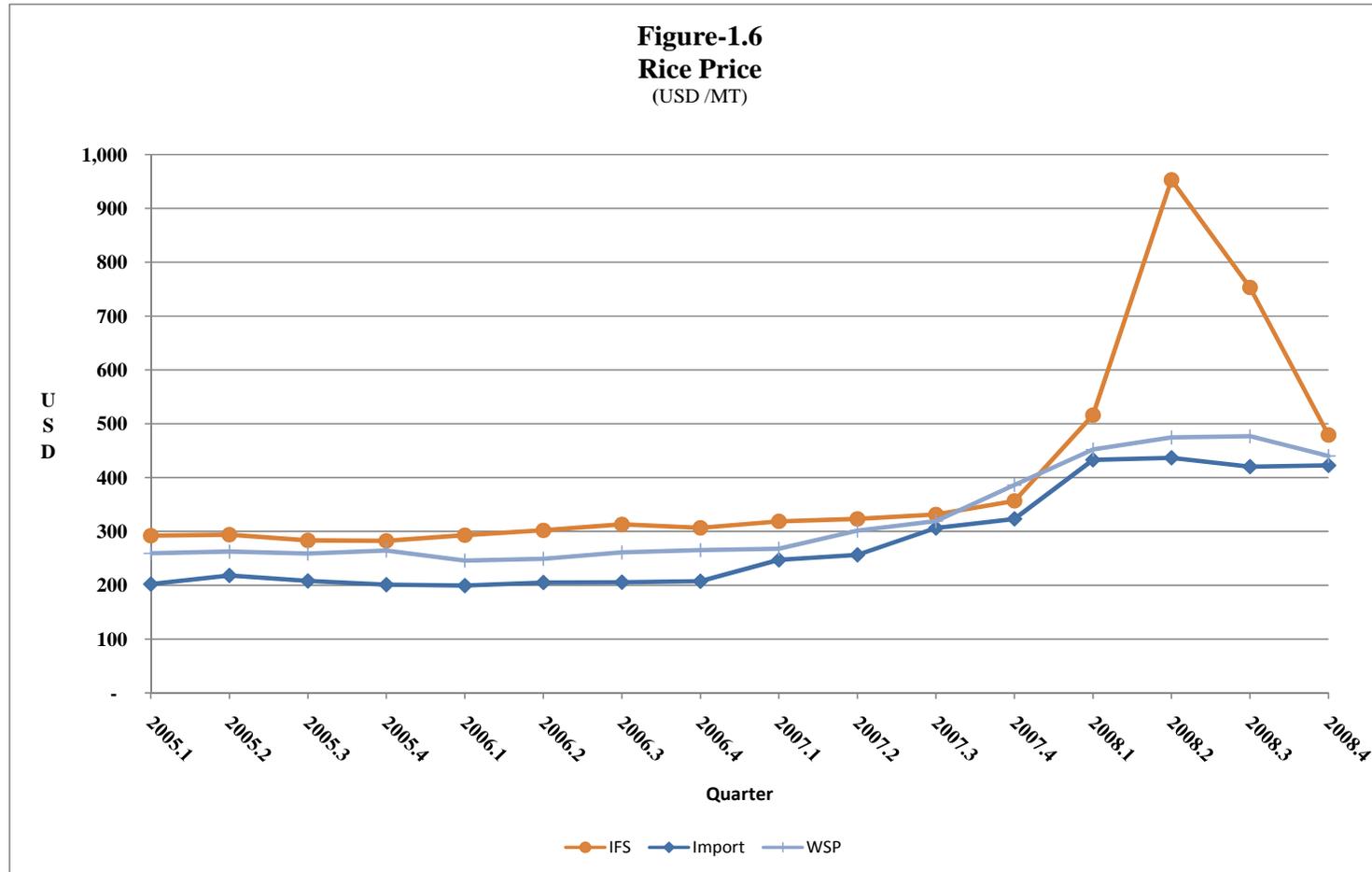
In Figure 1.7 all three rice prices are indexed to 100 in the first quarter of 2005; one can see more clearly how these prices move with respect to each other. The import price rises the most rapidly, followed by the wholesale price which did not keep pace and finally the world price which lagged until 2008. The prices move more or less together and are stable until the start of 2007. Then all prices moves up sharply with increases from 60% to 100%. Seen this way the Bangladesh import price has increased the most until 2008.2 when the world price overtook the import and domestic price. By the first half of 2008 the prices have become disconnected.

Figure 1.8 presents similar indexed data for soybean oil. Here the price increase started earlier than for rice and has been even more dramatic. The world price increased more rapidly than the import price or the domestic price. The index of the latter two prices moves more or less together. It is clear that the Bangladesh price is tracking the world price. Of course one expects the Bangladesh import price and the wsp to be close. All prices have declined together in the second half of 2008.

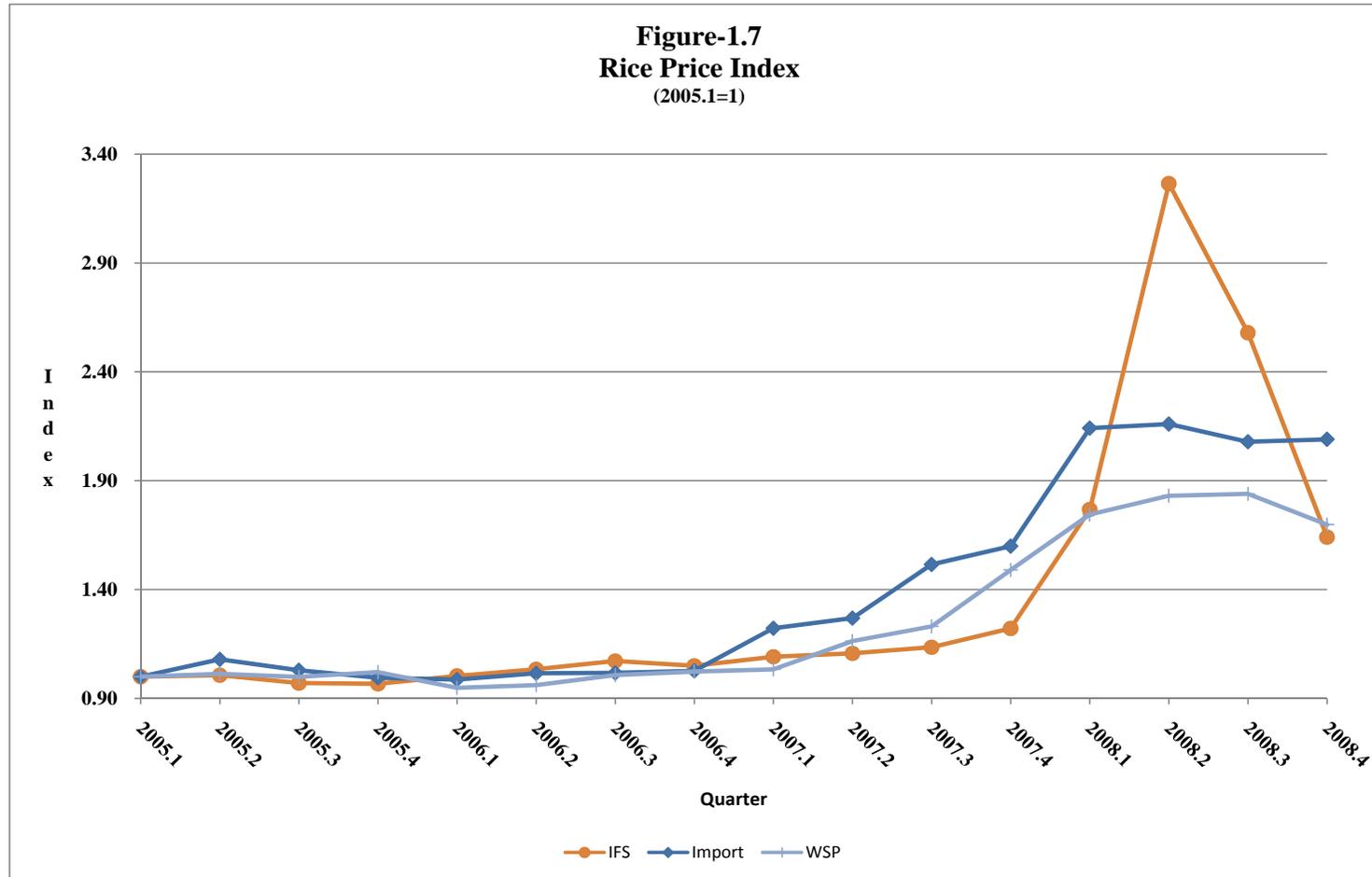
It is important in the Bangladesh context to understand the role of food and the composition of food expenditures in households.

² IFS data is taken from various issues of International Financial Statistics, IMF and from the associated website.

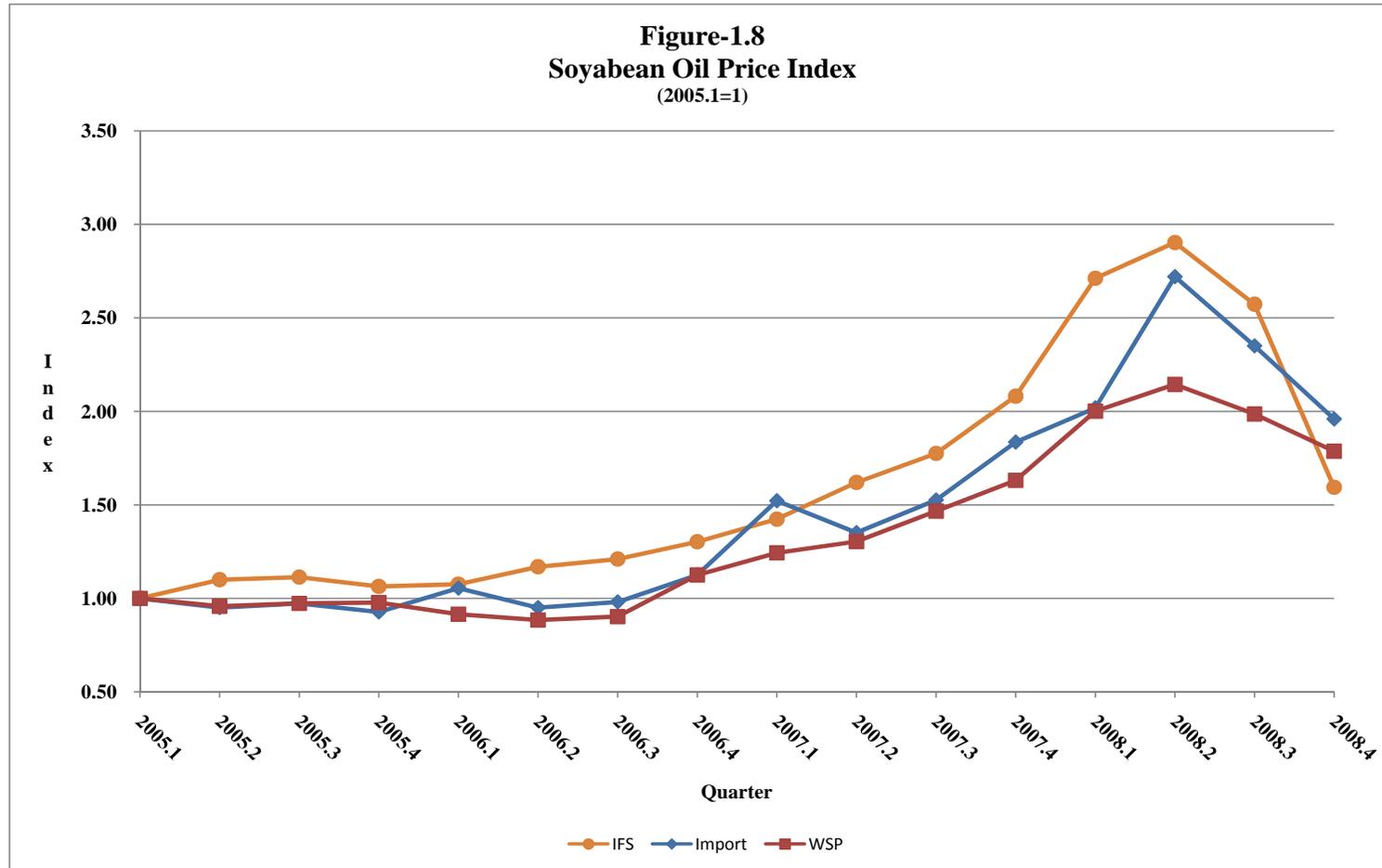
³ Bangladesh Bank supplies the value in US dollars of import L/Cs that have been paid (settled) and the volume for each commodity reviewed.



2005.1 means 1st quarter of 2005



2005.1 means 1st quarter of 2005



2005.1 means 1st quarter of 2005

Table 2 reports the expenditure pattern of the median income rural household (Household Income and Expenditure Survey 2005). [Rural households covered in the HIES 2005 are ranked by income. The middle 20% are used to compute Table 2 using a weighted average of the approximately one thousand households.] This Table indicates how the typical rural household spends its income. First, note that in 2005 the median rural household expenditure was Taka 4600/month. The average income for this category of households was less indicating the median rural household is receiving unrecorded assistance, going deeper into debt or selling assets. This expenditure level is about Taka 1,000/month person; certainly less than \$1/day per person. The median rural family is below the poverty line by the \$1/day criteria. For this median rural household 62% of household expenditures are for food. Of total expenditures 25% are for rice; almost 40% of the food expenditures are for rice. The second most important food consumed is fish that takes 7% of total expenditures. Cooking oil takes 2.5% of total expenditures. The dominance of rice in the diet of the median rural household is evident. There is no more dramatic story of why the rice price matters so much in Bangladesh. The price of rice is the central economic concern of the typical rural household. It influences both consumption and income.

Households will adjust their consumption behavior to maintain the volume of rice consumed, sacrificing other items. The volume of rice consumed is only slightly related to income. [See Annex 5 of this report.] As rice prices increase households will reduce other food expenditures as well as non-food expenditures. An increase of the rice price by 50% would imply a reduction of other consumption by 17%.

Table 2
Monthly Household Expenditure: Rural
Middle Income Group

Item	Quantity (Kg)	Expenditure (Tk)	Expenditure (%)
Food Item			
1. Rice	69.78	1,162.10	25.29%
2. Ata	1.27	20.30	0.44%
3. Pulses	1.84	68.25	1.49%
4. Fish	5.80	324.49	7.06%
5. Meat	1.68	155.85	3.39%
6. Potato	9.21	68.52	1.49%
7. Vegetable	23.23	177.43	3.86%
8. Milk (Ltr)	3.45	61.81	1.35%
9. Powder Milk	0.02	5.35	0.12%
10. Cooking Oil	2.01	113.88	2.48%
11. Fruits	4.77	75.24	1.64%
12. Sugar	1.05	36.62	0.80%
13. Condiments	7.61	217.98	4.74%
14. Beatle Leaf	1.23	80.49	1.75%
15. Other Food	-	300.47	6.54%
Sub-Total		2,868.78	62.44%
Non-Food Item			
1. Kerosene		46.46	1.01%
2. Transport		126.17	2.75%
3. Clothes		260.06	5.66%
4. Bed & bed related		21.18	0.46%
5. House rent		320.28	6.97%
6. Medical		138.52	3.01%
7. Education		127.98	2.79%
8. Insurance premium		41.20	0.90%
9. Others		643.78	14.01%
Sub-Total		1725.63	37.56%
Total		4594.41	100.00%

Source: Household Income and Expenditure Survey, 2005

2. Price Determination

This section discusses the factors behind price determination of various food products in Bangladesh. Fundamental to price determination is the operation of supply and demand. This is explained in this section in the Bangladesh environment. The analysis focuses on rice but other products are briefly discussed. Three formulations of the rice price determination are discussed. The linkage between rice prices and other domestic food is briefly reviewed. Next the price formation process for imported goods is discussed. Finally, products that are only produced domestically are briefly reviewed. Production and consumption of rice is the key issue in availability and security of food. The emphasis here is on the total economy and not just low income households. Low income households will spend substantial amounts of their income on rice; this demand is quite price inelastic. Consumption of other items will be reduced to insure the rice requirements can be met.

In the first section it was noted that aggregate demand does not appear to be the driving force of the food price inflation. What then has caused the food price behavior? Of course any initial cost push driven price increase will induce other prices to increase. There will be an inertia in the inflation as prices increase throughout the economy. The international food prices have declined and domestic agricultural production has been robust. Hence it appears that any current food price increases are incorporating the general non-food inflation.

Rice price formation

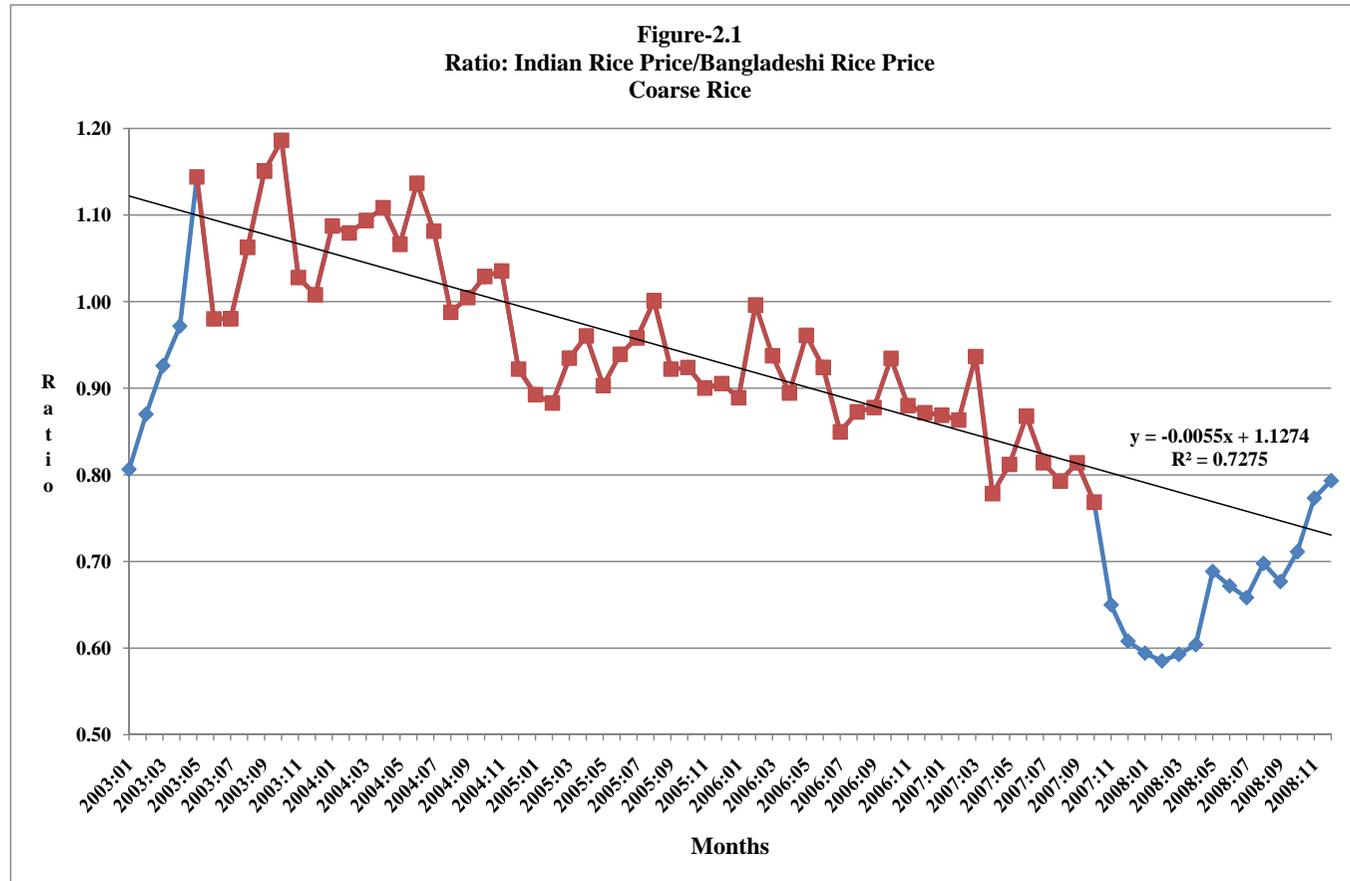
How is the Bangladesh rice price determined? Three theories are reviewed. Analysis of the rice market is rarely presented in a clear analytical way. Instead shopping lists of factors influencing the price are presented. The theories are:

- (a) Price determined by the Indian rice price.
- (b) Price determined by domestic supply and demand with imports exogenous to the system.
- (c) Simultaneous determination of price and imports.

The first and third work when there is access to the Indian rice market. When there are limited or restricted imports then the second theory must hold.

1. The first and most generally accepted theory bases the determination of the rice price it on the Indian rice price expressed in Taka. (What is called the parity price in this report) The Indian parity price and the Bangladesh wholesale price are expected to move together. The mechanism for the interaction of the price is discussed below. In this theory the domestic price is determined by the Indian parity price; supply and demand follow from the domestic prices. Imports are the difference between demand and supply.

What actually happens? Figure 2.1 plots the ratio of the two prices for coarse rice over the past 6 years. According to the theory that the Indian parity price determines the Bangladesh price one expect the ratio to be constant and below one. The ratio should be less than one as there are costs in transporting and marketing the rice into Bangladesh. The relationship is quite close up to the end of 2007 but the ratio is not constant and declines steadily over the period from the beginning of 2003 until September, 2007. At that time the domestic rice price rises sharply with respect to the Indian parity price, following the Indian Government cutting off access to their rice market.



A careful statistical analysis confirms that the downward slope of the ratio, while very small, is statistically significantly different from zero.¹ Clearly the linkage was strong until September, 2007. For the next year the Bangladesh price stayed higher than the parity price. By the end of 2008 the price seems to return to its past relationship with the parity price. However, no conclusions can be drawn from two observations. The next few months will reveal if the domestic price has again linked to the Indian parity price.

If the early half of the price ratios is used to determine the slope of the ratio line it turns out to be identical to slope of the second half of the observations. The relationship appear stable over the five years.

Figure 2.2 plots the two prices.

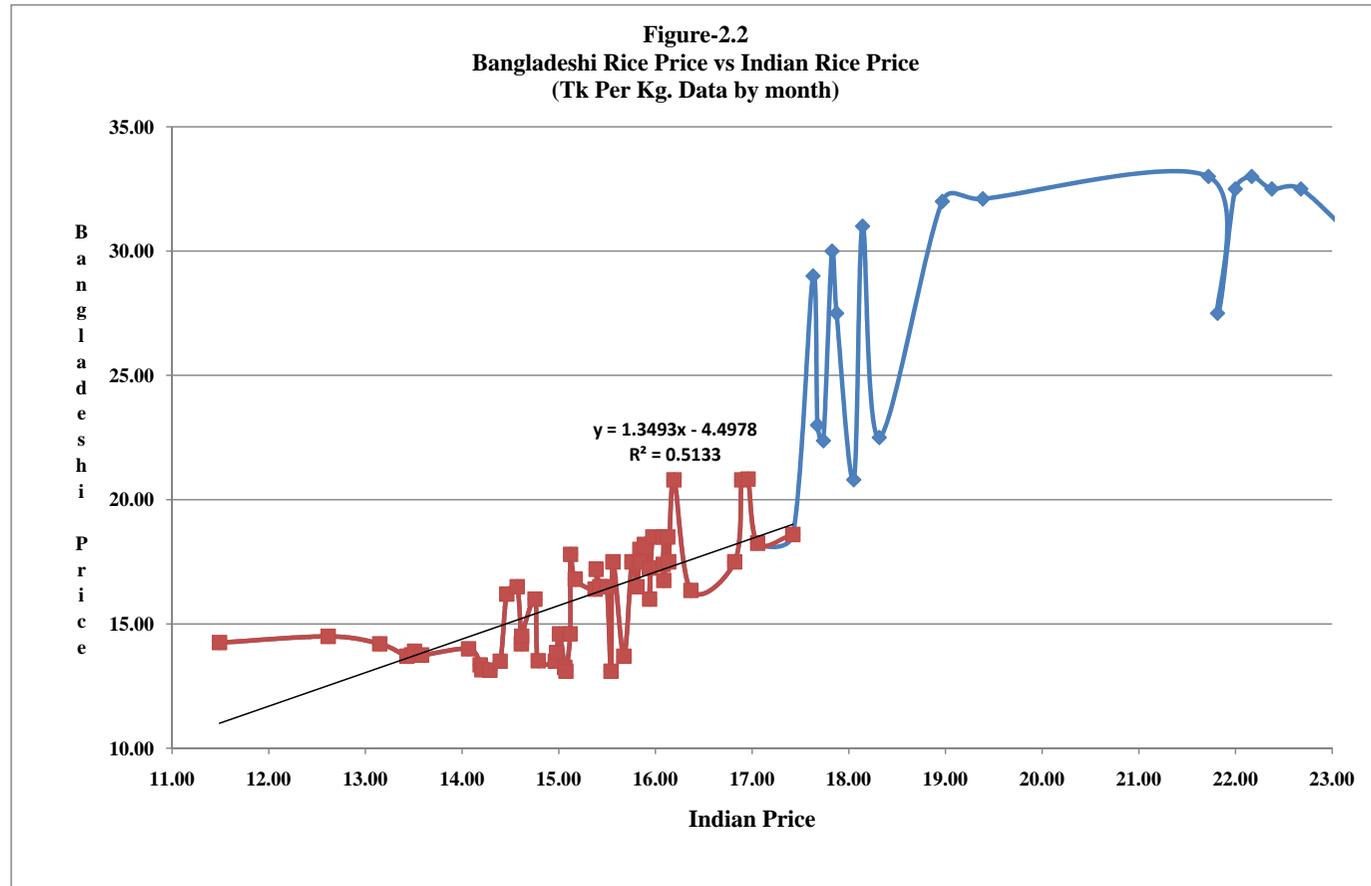
According to the theory the prices should fall on a 45° line. However, statistical estimates of the slope are higher, in the range 1.4 to 1.7. This is of course another way of expressing that the Bangladesh prices are systematically higher than the parity price. The recent observations are grouped on the right side of the Figure. Clearly the relationship of the Indian parity price and the Bangladesh wsp has obviously changed.

Returning to the theory that the parity price determines the Bangladesh price note that the parity price changes from either a change in the Indian rice wholesale price or a change in the Rupee/Taka exchange rate. The Indian exchange rate revalued with respect to the Taka in 2006 and 2007, reversing this direction in 2008. During 2006 and 2007 this raised the Bangladesh rice price (in Taka); in 2008 the exchange rate should tend to lower the wsp. However, by the end of 2007 the Indian and Bangladesh rice markets were largely disconnected due to the imposition of export bans by India.

Focusing on the period before this disconnection, why does the Indian parity price control the Bangladesh rice price? In this analysis of the market the assumption is that if there is a price difference across the border then rice will flow from the area of low price to the area of high price. Without border restrictions the flow of rice would respond immediately to any price difference, as it does within Bangladesh. The adjustment would serve to keep the two prices closely connected. The Indian rice market is well integrated over all of India so the Indian price is not really influenced by the Bangladesh price as the Indian market is much larger. But it is reasonable to expect the Bangladesh rice price will respond to changes in the Indian parity price. Any sustained difference should lead to product flows to take advantage of the price difference. In principle the flow could be either way, but historically the flow is from India to Bangladesh as the higher price has usually been in Bangladesh.

There are costs involved in moving the rice from markets in West Bengal to markets along the border in Bangladesh. Hence a difference in price will be maintained, roughly the magnitude of this movement cost. These transport costs and other fees may separate the price by a maximum of 10% although this difference may vary with changes in these charges. The legal trade may also be influenced by regulations and taxes imposed by either India or Bangladesh. But the underlying idea is that the prices should more together even if not equal.

¹ At better than 1% level.



In addition to legal trade there is always the prospect of smuggling. It is little appreciated how large a volume the smugglers can move both using trucks passing across the border and by head carry. An amount of 250-300,000 mt/year could be moved by head carry if the rice price difference is sufficient. Smuggling by truck is certainly feasible. Coal is good example. [Estimates of actual coal imports are 4-5 million mt of which only 10-15% are officially recorded.] Hence movement of one million mt into Bangladesh through smuggling is feasible. Use of trucks works by bringing in say three truck loads legally, but actually sending ten truck loads. Customs may be persuaded to look the other way as happens for coal. The Indian border is very porous and impossible to control. When the Indian Government banned rice exports, smuggling could continue. As the Indian rupee depreciated in 2008 the volume of smuggling would increase moderating the Bangladesh rice price.² Because rice can move in either direction the Indian parity price will determine the Bangladesh price even when there is plenty of rice in Bangladesh.

In brief the first explanation of the level of the rice price in Bangladesh is that it is determined largely by the Indian price and the Taka/Rupee exchange rate with rice moving to the higher price market. As demand is inelastic the prices will adjust quite rapidly. A large price difference cannot be sustained as movements legal or illegal will reduce the price difference. Adjustment does not need to wait for a new crop but can draw on stockpiles.

However, when one examines Figure 2.1 and Figure 2.2 it is clear that the Bangladesh price has been rising relative to the Indian parity price. This weakened influence of the Indian parity price may arise from: (1) Reduced importance of Indian rice availability for the Bangladesh market. (2) Rising cost of smuggling due to tighter border controls and higher costs in the hundi market. (3) Increased transport costs and toll collections. There is no compelling evidence on these possibilities. During 2006 and 2007 rising fuel cost increased transport costs. Toll collections inside Bangladesh increased sharply during the period of 2001-2006. The hundi market may have become more expensive due to the increased international banking controls over currency flows. All of these points are suggestive of a higher Bangladesh price relative to the Indian parity price. The Indian parity price theory works quite well up to September, 2007. At that time the markets decoupled.

2. Domestic factors dominate rice price formation: The second view of price formation focuses on the domestic supply and demand for rice. A model of purely domestic determined rice price is difficult to estimate statistically as adequate consumption data is not available on an annual basis and production data has serious deficiencies. A straightforward quantitative supply and demand analysis is not feasible.

In this theory rice imports are considered as under Government control (licenses, Government procurement) with price response of private flows very limited. This view assumes the border is reasonably well controlled so that large rice volumes cannot be smuggled. The domestic price is then determined by the supply [domestic production plus imports] and demand for rice. With two large crops per year there will be sufficient time for price responsiveness to bring the market to equilibrium.

² A cheaper rupee decreases the price of the Indian import.

In this view of the market the Indian parity price should not necessarily be correlated with the Bangladesh price. Of course it is highly correlated up to September, 2007. Further price variations should be inversely correlated with the crop size but this is not observed. In the boro crop 2008 when the farm gate price of paddy was 50% above the previous year the high price induced higher production. Despite these deficiencies common sense suggests the limited volume of rice imports compared to domestic production should result in domestic supply and demand being dominant forces.

3. A synthesis: The third theory of rice price formation joins the first two together. The rice price is determined by both the rice availability from domestic production and the Indian parity price. The Indian parity price influences the market but the domestic conditions are also important in setting the price. Imports are partly regulated and are partly responsive to price. It is wrong to ignore the influence of the Indian parity price, but it is equally incorrect to ignore important factors operating in the domestic market. As previously observed rice imports are a declining share of the total rice supply and demand. Hence it may be argued that the Indian price has diminishing influence over the domestic price.

This approach is particularly useful if one considers price formation month by month. There are two influences over the rice price: The supply of rice within Bangladesh and the Indian parity price. The farmers plant and grow rice based on the expected price they will receive; these expectations in turn are based on the prices in the market and recent harvest prices. Thus additions to rice stockpiles in a given month are shaped by rice prices several months before.

The demand for rice in a given month comprises the amount that people want to eat and the desired changes in the rice stock holdings. Changes in holdings of rice may arise from all manner of considerations that will be further considered below. The Indian parity price is known to market participants. Stockpiles are widely distributed among households, traders, millers and farmers. Demand for increased stock will arise when there are expectations of higher prices in the near future. Each market participant will increase demand for stocks when he believes the price is going to rise; and similarly reduce holdings when prices are expected to decline. Informing these expectations the key considerations are:

- (1) Expectations about the rice crop size. It is evident from the extensive newspaper coverage and discussion how important this is. There is constant attention by the public to the magnitude of the rice crop. The passionate response of public opinion to a bumper rice crop exceeds winning a test match in cricket.
- (2) Belief about stock holdings of others. There is in the market a sense of the amount of rice available; different market participants form these views from price changes, perception of market tightness, rumors etc. The public “feels” the market through regular transactions and discussion.
- (3) The Government’s actions and announcements. These influence public perceptions largely in ways opposite to what Government intends. The Government leaders and officials discussing rice shortages, price worries, etc. generate concern and lead people to believe there is a shortage of rice.

In this formulation the parity price is only one, but a very important one, of a number of factors influencing the price of rice.

In addition to the farmer supply the market is served by imports arising from past and future decisions to import. Import supply is particularly sensitive to the Indian parity price. This parity price provides the importer an immediate comparison price with domestic prices and will lead to a decision to import when the Indian parity price is below the domestic price. However, imports by Government are less price responsive and depend instead on an assessment of availability.

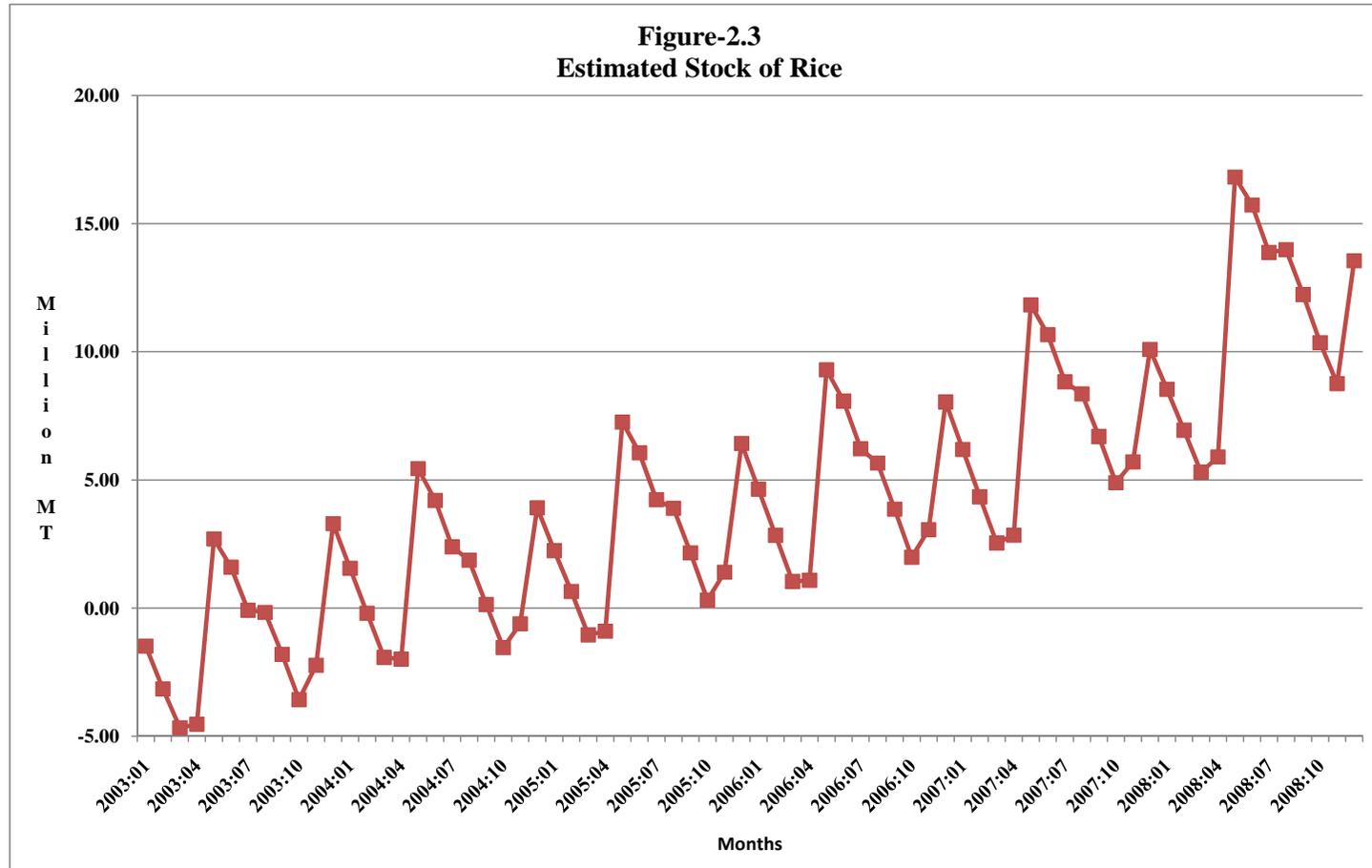
This synthesis of the factors shaping the rice price Bangladesh rice market is more convincing than either of the pure models: Both domestic production and the Indian parity price play a role in formation of domestic prices. The rice price is established continuously. The short run demand for rice is dependent both on consumption needs (relatively invariant) and on desired changes in stocks. The short term supply is determined by import decisions made during the past several months, new crop production coming onto the market, and of course the stock change decision by holders of rice and paddy. In this description of pricing the domestic stockpile of rice and the parity price combine to shape the short run supply and demand. The rice stockpiles while unknown, convey to the market through the vast web of transactions a sense of plenty or shortage.

Imports of rice and changing volumes of stocks both adjust to determine the price and to shape the flows of rice in the domestic market among producers, traders, millers and consumers. The stockpile of rice is being drawn down and as it declines the market becomes aware of the growing shortage. The stocks are continuously being distributed through the rice traders, consumers, millers, and farmers. Increased demands by some parties based on higher expected prices will raise prices.

Figure 2.3 presents the estimated stockpile of rice month by month. This figure suggests that there has been a growing rice stockpile in recent years. The estimated stockpile is the change in the rice stocks since 2004 allowing for production, imports, and consumption. The stockpile is the combination of both private sector and government holdings of rice. What is given in the Figure is the level of stocks assuming the consumption demands are met. [Details are given in Annex 2]

The synthesis theory for establishing the rice price uses the value of the rice stockpile as an explanatory variable – the higher the stockpile the lower the price; along with the Indian parity price – the higher the parity price the higher the Bangladesh price. Combined these factors provide a plausible explanation of the determination of the rice price in Bangladesh over the past several years.

Attempts to achieve an acceptable statistical explanation combining the two factors have not been successful. The steady increase in the stockpile suggests the price should tend to fall with respect to the parity price. But Figure 2.1 and 2.2 indicate the opposite. Nevertheless the qualitative description and the month to month behavior give the synthesis theory more acceptability. Statistical fits can be obtained but these provide the wrong sign for the stockpile variable. Details are in Annex 7.



Source: Author's calculation. The stock includes paddy (in rice equivalents). The stock becomes negative as the starting level is unknown.

The rice economy in Bangladesh is highly competitive. There is no market power resting with any participant. The significance of this for holding rice stocks is discussed in the next section. The improvements in transport, the large number of market participants and the ease of entry for millers and traders combine to make the market competitive.

One of the consequences of this synthesis theory is that the Bangladesh rice harvest has some effect on the rice price, but it is quite limited. The Indian parity price of rice exerts tremendous power over the domestic market so that the impact of a good harvest has only limited impact on price; a poor harvest equally has little impact. Historically it was understood that India acted as a supplier of last resort; not only through government transactions but through the private sector, including smuggling. This supplier provided some confidence rice would be available at prices near the parity price.

The conclusion is the rice price is normally determined by a combination of the perception of the stock level in Bangladesh and the Indian parity price, with the parity price as the dominant consideration. Since the end of 2007 the situation has changed and the price is much less influenced by the parity price and more by the availability of rice in Bangladesh. At the beginning of 2009 the basis of rice price formation is in transition. This transition is linked to the degree of access to the Indian market. The uncertainty in the minds of the market participants as to assured availability may continue to decouple the two markets. The shaping of the price since September, 2007 is covered in the following section.

Price formation for imported food commodities. Several food items are discussed to examine the range of behavior typical of food prices when imports compete with local production.

First, note that any produced agricultural item has three types of costs:

1. Labor costs which are either market determined or adjusted within the household.
2. Cost of purchased inputs such as fertilizer, seeds, pesticides, credit, irrigation services etc.
3. Land rent.

For a farmer selecting crops to cultivate, the land rent is determined by the rent earned in the best alternative crop. Given its predominance in agriculture, the land rent earned when rice is grown is the critical consideration in determining the cost of production of other crops. If the rice price is high then land rents – inputed or market – will be high driving up the cost of other crops. In this way changes in rice prices impact other food prices.

In the case of cooking oil, an important consumption item in the Bangladesh diet, most of the oil is imported (predominantly soybean and palm oil) but a significant amount is made from domestically produced mustard seed. The market price is controlled by the import price and domestic production adjusts to this price; if the land rent implied by this price is too low the farmer will prefer other crops, domestic production of mustard will decline and imports of soybean will increase. But the price of cooking oil does not change.

The domestic price of soybean oil is determined by the import price plus any taxes imposed by Government plus the mark-ups by importers and retailers. The importers typically process and package the crude soybean oil. The ability of the importer to earn above normal competitive profits depends on his ability to maintain market power, limiting competition.

The level of competitiveness in the international market for soybean oil is very high but there are complexities: Access by Bangladesh importers entering the market to reputable international suppliers may be limited by access to credit, market knowledge, experience in working in the international market and ready access to retailers within Bangladesh. There are often exclusive agreements between international companies and local importers which reduce competition. This limits the response of the market to sharp price increases and above normal profits can be obtained.

However, such market power is readily eaten away by competition, it may take a year to do so. The supply response has been greater with non-branded cooking oils than with branded ones. The importers with links to important traders and suppliers are able to protect their brand position to some extent. But new importers will eventually identify suppliers and force prices lower. Market power of traditional importers is temporary. Bangladesh consumers are relatively brand insensitive so eventually competition will erode above normal profits.

Annex 7 presents data on other imported items. The link of Indian masur to the Bangladesh wholesale price is relatively tight although the Bangladesh price rises with respect to the Indian parity price. Pulse import prices and the wholesale price have a relatively stable relationship. Wheat import price has tended to increase over the atta retail price. These commodity prices behave as one would expect. The price is established by the international parity price and prices for domestic production. To compete with the imported commodity the land rent determined by the sales price minus other costs must be greater than the land rent earned from growing rice.

Domestic products

Many products are domestically priced without competition from any imports or any export possibility. Pricing will be at cost plus reasonable profits, where the land rent is determined from alternative crops, particularly rice. The value of the land rent derived from rice cultivation is the key link between international prices and domestic product pricing.

Potato for example is available in the market with a selling price determined by supply conditions – the cost of potatoes purchased from farmers plus storage, marketing, and transport costs. Marketing costs for perishable agricultural products must make allowance for substantial spoilage. The cost of potatoes increases over time if they have been stored. On the other hand quality deteriorates with age. The supply and demand conditions emerging from these factors mean the potato prices rise for several months due to increasing costs and falling demand (for constant quality) breaking in December when the new harvest appears.

The past year 2008/2009 has been very unusual in that the seasonal changes in prices were muted. This seems to be a consequence of a very large crop.

Each product with a price determined from domestic factors has special considerations such as those noted above for potatoes. The link to international prices is indirect but always present.

3. What happened?

In this section the reasons for the price increases in food in 2007 and 2008 are reviewed and an integrated account presented of what happened. The sharp increases in food prices began late in 2007. Prices rose sharply both internationally and domestically; then a sharp decline began in the middle of 2008 that is still underway.

The previous section discussed the factors that have influenced the price formation of rice and other agricultural products under normal conditions. The major influence on the Bangladesh domestic rice price has been the Indian parity price. During 2006 and 2007 the steady revaluation of the Indian rupee drove up the parity price, raising Bangladesh rice prices. While Indian inflation contributed marginally to this increase, the major factor was the exchange rate movement. In 2008 this exchange rate movement reversed itself but Indian restrictions on rice exports make the point moot, as access to the Indian rice market was sharply curtailed.

Domestic production was slightly reduced from natural disasters in 2007. These disasters events contributed to public concerns about the food situation. The press usually contributes to these concerns by exaggerated estimates of losses. During 2007 a number of things developed: The world rice price shot up. The sources of this increase appear to lie with higher wheat prices partly arising from Australian drought and rising demands from those Asian economies undergoing rapid economic growth. Modern communication technologies throughout Bangladesh insured that knowledge of the rising world grain prices was widely available. With rising domestic prices many Asian exporting countries choose to block further rice exports; for Bangladesh the decision of India to suspend imports and the increases in prices reportedly demanded by the India Government for agreed exports were particularly critical. Whatever the reality the public perception was clear there was a shortage of rice.

The depreciation of the Taka with respect to the Indian rupee drove up rice prices during 2007; the Government began to make statements that there was sufficient rice, to procure more imported rice, and also to organize expanded safety net programs to provide rice to poor people at lower prices. There were widespread reports of hoarding and of syndicates of business persons being responsible for rising food prices. The cumulative impact of these types of accusations and claims help convince the public that there was indeed a shortage of rice. The increasing difficulties in obtaining rice from India, the mounting concerns being expressed by Government and the inability of Government to deliver the promises that were being made with respect to price stability all resulted in the public growing apprehension as to the availability of rice. Claims of having control of prices were shown to be wrong over and over. All of these factors together effectively triggered widespread belief in the public that there was a shortage of rice and that rice prices were going to continue increasing. Although the Bangladesh market has no direct linkage to the world rice price, psychologically rising world prices created widespread concerns that such increases were coming to Bangladesh.

There is great sensitivity to the threat of famine and food shortages in Bangladesh. When the society comes to believe that such a threat is imminent it leads to everyone taking action to increase the stock of rice or paddy being held. This takes place at all levels—on farms, by traders, by millers, and by households. The rice and paddy markets freeze up. The immediate result is an increase of the rice price. Even though there is sufficient rice available in the country the fear that there is not and as everyone else is increasing their

holdings of rice each individual decides that this is the right course of action. This is of course simply another expression of Sen's explanation of the presence of famine in the midst of plenty. The increases in holdings of stocks are not just by businessmen and traders but take place throughout the society. Those who have the resources to buy and hold rice or paddy do so. Those who hold inventory are reluctant to sell and will do so only at higher prices. In effect the population comes to believe that there is a rice shortage and that prices are rising and then acts defensively in such a way as to bring about exactly this outcome. This we emphasize takes place even though there is no rice shortage.

Such a phenomenon has been seen before. During several recent years prices tended to rise during serious flood periods based on expectations that there would be a shortage of rice. These stock building periods were short lived and price increases were modest. Access to the Indian market was always available and Government moved rapidly to import grain. The 2007-2008 panic took place in the face of perceived non-availability of rice on world markets and rapid increases in reference prices for rice traded in world markets. Government intervention only made things worse.

In reviewing these triggers that led to the freezing up of the rice market particular attention should focus on the Government's efforts to blame the business community, syndicates, millers, etc of using their alleged market power to withhold rice from the market and drive up prices. These ideas about market collusion and restriction of supply are not supported by any evidence. However, by making such accusations the authorities create concern and worry in the general public who react to the claims of business manipulation by increasing their rice holdings bringing about the very thing that Government is trying to prevent.

Once the rice price was driven up it immediately resulted in higher prices for paddy at the farm level. The analysis of the value chain for paddy and rice indicates that the farmers took almost 90% of the value of the retail sales; the competitive linkages of millers and traders made their normal mark-ups. The resulting high paddy price led to a major effort by farmers to grow more rice. More area was planted and increased labor inputs were applied to improve agronomic practices. The result was a large increase in the boro crop. As this crop began feeding into the wholesale and retail markets the public became convinced that for the moment the rice position was satisfactory and that there was sufficient available to meet the needs of the public. This eased the holding of rice stocks.

Following the strong paddy crop and its sale at a good price to the millers and traders, more rice is filtering onto the retail market. Of course the retail price remains high since the paddy was purchased at a high price; paddy is fed through the mills into the market as it is needed. However, the availability of plentiful credit reduces the pressure on the traders to sell. Gradually, however, rice prices begin to decline and more and more rice is released into the retail market. Traders cannot reduce the price too much without incurring ruinous losses given the high prices that they paid to farmers. As one approaches the next crop, maintaining rice stocks becomes unprofitable and these are released to the market quickly.

Expectations of high paddy prices continued on into the aman crop and a good crop has been produced. However, the prices for paddy are falling; the decline as of early 2008 is of the order of 35%. This will convert into lower rice prices in retail markets. The result of the falling paddy and rice prices is that the 2009 boro crop will be smaller than expected as labor and land inputs will be reduced due to the lower price. In brief, the rice price will decline due to the improved supply and the attempts to reduce above normal inventories.

In studying the behavior of the rice market the underlying forces of supply and demand remain paramount. But the short run decisions by many households and traders with respect to paddy and rice holdings are influenced by expectations of rice availability and future price of rice. Even though the nation is essentially self-sufficient in grain, the expectation effects can, as observed in the past year, drive up the price as the market freezes up and less rice is supplied to markets or equivalently household demands rise to protect against future price increases.

During these changes in prices and stock holding there are likely to be some changes in costs. Some of these relate to labor: higher food prices will lead to higher wages for day labor and such factor prices tend to be sticky. That is these factor prices do not decline, they add permanently to the production costs. Production costs also involve irrigation and fertilizer. The irrigation cost is linked to the diesel price and that fluctuates to some extent with the price setting by the Government. Fertilizer is also a partially controlled price and the cost to the farmer fluctuates from year to year. In both cases active black markets lead to higher prices, product contamination, and uncertainty as to availability. However, the end cost to the farmer are unlikely to be reduced. The underlying cost increases facing the farmers will raise total production costs putting a slowly rising floor under the price of paddy. Future rice prices, compared to 2008 should decline significantly, but the underlying cost increases will prevent a return to pre-crisis levels.

Future developments in the rice markets will be shaped by two factors: the supply of rice from Bangladesh farmers and by the public's view of the rice position of the country. The link to the Indian market will eventually return bringing the Indian parity price back as an important factor.

When the public suspects there is not enough rice then prices will rise rapidly as the market freezes and there are widespread attempts to increase stocks reducing the supply of rice to the market or consumers remove unusually large amounts of rice from the market to private consumption stocks. If there is a large shortfall in supply there will be a consequent increase in rice prices. The conclusions to be drawn from the experience of the past year are:

1. Policy should continue to support increased rice production. However, at present production is able to meet the requirements of the nation and the import requirements are quite small. The tendency will be to produce too much rice, not too little.
2. It is vital to maintain public confidence that there is enough rice available. When confidence breaks there is little that Government can do; the rice price will increase sharply.

It is this second lesson that should shape public policy in the future. The implications are discussed in detail in the section on recommendations.

4. What will happen?

The events of the past eighteen months characterized by very high food prices in Bangladesh have had a dramatic impact on public attitudes. But the behavior of the public and of farmers is determined by their perception of their interests. This section looks forward to what is likely to happen during the next eighteen months from January, 2009 through two boro crops and one aman crop. As this is written at the beginning of 2009 the aman crop has proven very substantial. Farmers responded to the high price of paddy cultivating a large area and using as much fertilizer as could be obtained. Favorable weather conditions assisted with what is a good harvest. However, the price of paddy has fallen sharply, probably by as much as 35%.

The decline in the paddy price is a signal to the markets that the rice price is going to decline further and so stocks are being unloaded. This change in expectations has been slowly developing but will accelerate during the first three months of calendar 2009. The coarse rice price will probably fall to the range of 18-20 Taka/kg.

The decline in the paddy and rice prices will have a substantial impact on the size of the 2009 boro crop. The area planted will be somewhat reduced from the 2008 crop as the lower expected price will end the efforts of last year to plant every available bit of paddy land. The yield that can be expected from the 2009 boro crop will be lower. The lower expected paddy price will reduce use of inputs and extraordinary efforts of the farmer to raise yields. There are already two signals of this: Fertilizer is widely available due to reduced demand. Recent reduction in non-urea fertilizer prices will increase use but the real concern of farmers is the expected lower paddy price. Hybrid seed sales are lower than for the previous boro season. These adjustments—using lower quality seed and reducing fertilizer applications are exactly what one would expect from the farmers at a period of weakening paddy prices.

Despite this the 2009 boro crop is likely to remain satisfactory if somewhat below the 2008 level. The third good crop in succession will drive down the paddy price even further, probably below 10 Taka/kg. This price signal will influence the next two crops [aman 2009 and boro 2010]. Area planted will decline and use of inputs and improved seeds will decline. One should expect lower production of rice from all of these effects. By the end of 2010 there is likely to be an increase of the rice price again in response to the lowered production. However, if access to the Indian rice market is restored the Indian parity price will again have a strong influence the Bangladesh price. The behavior of the Rupee/dollar rates is impossible to predict with any confidence. However continued depreciation is more likely than the reverse. This suggests the parity price will tend to be low.

The world rice situation may go through a similar cycle—a strong production response to the price increase of 2008 followed by a decline in price perhaps sufficient to result in a shortage and higher prices by the middle of 2010. There are many factors that might underlie such a cycle of international prices. However the 2010 increase in world prices may combine with reduced production in Bangladesh to contribute to considerable pressure on domestic rice prices after the boro harvest in 2010. That is the most likely time when there may again be major upward pressure on the rice price.

There are several consequences of such developments:

1. Urban population will find that their real income improves in 2009; industrial wages in real terms will rise due to lower food prices. Pressures to raise wages may moderate.
2. Farmers will find that their incomes from agriculture have declined.
3. Landless households in rural areas will find that their real incomes have risen due to the lower food prices. However, daily wages are likely to decline with the lower prices.

It is difficult to foresee what might happen further out in the future. Demand for rice will only increase slowly and there should be no difficulty in meeting that requirement through domestic production. Rice demand may well peak during the next five years. That is the maximum amount of rice Bangladesh will ever need will be reached. However there will be continual downward pressure on farmer's income with weak prices for rice. The review of rice demand and the likely changes in the future suggest that with rising income and increased urbanization the pressure from the demand side will ease. The dangers of such a situation are:

1. The provision of grain will always be subject to the risk of panic as in 2008 with a sharp rise in prices causing grave harm to the poor.
2. Natural disaster could cause a major shortfall in grain availability and run the risk of panic in public expectations. Uncertain access to the Indian rice market increases this panic potential.
3. Intervention by Government to control prices or regulate rice markets will contribute to poor market functioning, encourage widespread unnecessary accumulation of stockpiles, and convey the message that there is a rice shortage. It is impossible for Government to control prices at a level well below what the market would establish. Such an effort creates gains for middlemen who will buy at the low official price and resell at a higher price, likely to be higher than the price the market would establish.

5. Macro-economic analysis

The Bangladesh economy has experienced a steady inflation over the past three years. Food prices peaked in 2008 and have started to decline.

The sources of this inflation have been the subject of considerable discussion. One position is that the inflation has been triggered by external factors. The second position focuses on the growth of the money supply and the excess aggregate demand that it generates as the causative factor. The argument over these alternatives suffers from weak data, from coverage gaps in understanding the functioning of the economy, and in some participants taking strategic positions for purposes other than seeking objective understanding. The first four sections have focused on food prices, the forces that have caused their dramatic behavior over the past two years, and how these prices may evolve in the near future.

In one sense there is no difference between these two positions. Externally driven inflation links international prices to domestic prices. The key parameter is the exchange rate. Increased international prices can be offset by a revalued exchange rate, i.e. higher import prices in dollar terms can be reduced in Taka valuation by revaluing the exchange rate. To achieve a revaluation a restrictive monetary policy is needed to reduce aggregate demand and hence imports, strengthening the balance of payments, revaluing the currency and thus moderating imported inflation. Such a restrictive monetary policy will, in Bangladesh conditions, slow economic growth; the income effects to lower imports are typically greater than the price effects on exports and imports (revaluation increases imports and reduces exports). There is always some level of the money supply that will ease the externally driven inflation. The correct question is whether the economy should pay the price of a restrictive monetary policy to limit imported inflation.

The authorities in Bangladesh have not really confronted this issue, arguing that the inflation is exogenous, driven from abroad while monetary policy should focus on insuring sufficient investment to achieve rapid growth. The authorities have been unwilling over the past two years to confront the inflation – growth trade off. Policies aimed at inflation control have been oriented towards price controls, tinkering with custom duties, subsidies, open market sales of essential commodities, and moral suasion against businesses. The management of inflation in the economy is still highly politicized and has failed to come to terms with the central macro economic issue. In effect the inflation control policy is little better than the hope that the price increases will go away.

The substitution of market interventionist policies to control directly key prices for a restrictive monetary policy has failed. The interventionist policies are never backed up with sufficient resources to make a difference. Inflation has not been influenced by domestic policy or put more precisely monetary policy has not been restrictive enough to limit inflation driven by external price increases.

The inflationary process in Bangladesh has two potential triggers:

- (1) External prices (converted to Taka) rise and these are passed into the economy.
- (2) An increase in Government expenditures resulting in a larger deficit, greater money supply, increased demand for output leading to (a) Greater demand for labor leading to higher production costs and (b) Greater imports causing a depreciating currency and price increases.

A third possibility is less likely: monetary policy reducing interest rates leading to increased aggregate demand through greater investment. However in Bangladesh interest rates have little impact on investment levels; availability of funds may have some influence but this is unlikely to be a significant consideration in investment decisions. If there is a back log of projects not financed due to banks not having resources then an expansionary policy may provide funds to increase investment. These conditions have not held in Bangladesh during the past two years.

Once the inflationary triggers are activated the price increases will pass through the economy raising the general price level. These secondary cost push effects are discussed briefly in this section.

In this section the mechanisms triggering price increases are not covered, rather we focus on the macro-economic consequence of food price increases.

This approach is based on the conclusion that there is no evidence of excessive aggregate demand in the period 2007 and 2008. Indeed the level of aggregate demand in calendar 2007 and the first half of calendar 2008 was very low, expanding somewhat in the second half of 2008. Investment in the economy was very weak. Available data on imports of capital goods in real terms indicates a low level of demand, improving in the second half of calendar 2008. Imports of construction materials in real terms showed little change. Government expenditures (national accounts concept) did not increase significantly. Private consumption was adversely impacted by high food prices. Exports were robust during the two years weakening at the end of 2008. However, price increases came before the increases in aggregate demand in late 2008.

All data for calendar 2007 indicate a very weak growth performance. Industry sources reported limited investments being made. The data indicating weak performance includes the volume of imported capital goods, the volume of imported construction materials, the volume of food production, the widespread reports from the business community of slowing sales and reduced consumption, the many major business houses reporting reduction of their labor force etc. All of this points to a weak level of aggregate demand. During 2008 there was improvement in the indicators, as investment began to revive. But there are no signs of rapid growth of aggregate demand sufficient to trigger inflation.

What is the impact of the sharp rise in food prices experienced in 2007 and 2008 on the macro economy? This section presents a brief analysis of the factors that shape this impact and presents an estimate of the magnitude of the impact in 2008. The conclusion is that the macro-economic impact of the food price increase is small. There is a change in GDP through reduced consumption demand followed by increased production of rice. First prices rose, private consumption fell, GDP slowed, and imports slowed. Inventories of rice probably rose due to the high prices. Subsequently rice production increased building even higher inventories; with inventories above normal levels prices were driven down but total inventories rose. At the end of these events rice inventories have increased. Private consumption has declined and the associated multiplier effects reduced GDP.

First consider the impact on production of rice. The higher wholesale rice price in 2008 had an immediate impact on the paddy price for the 2008 boro crop and induced a substantial increase in output. The increased paddy production resulted in additional contribution to GDP from milling, transport and trading. The estimated increment of boro production from

the higher price is 1.5 million metric tons; this including trade margins, transportation, milling, and farm production represents an increase of about 0.8% of real GDP.

On the demand side the impact of the higher prices for rice will influence private consumption expenditures. In the event it led to slightly greater imports of rice but world prices were very high and trade restrictions limited the amount available so that imports did not respond fast enough to increase domestic availability as much as was desired. However, there was no shortage of rice in Bangladesh. There was instead a price increase driven by the revaluation of the rupee in 2007 and in 2008 by panic reactions to world price increases and rice trade restrictions.

The higher prices of rice and other foods to the consumer resulted in reduced real income. How did consumption adjust? Many households in normal conditions have difficulty paying for the expenditures and reduce assets or increase debt to maintain consumption levels. Bangladesh households kept rice consumption at close to normal levels and reduced consumption of other goods. Rice consumption was largely maintained, use of other commodities was reduced. Quality adjustments were certainly made, shifting to lower quality food products. This reduced consumption expenditures on items other than rice resulting in less demand, leading to a lower level of production of goods and services. This is the basic path by which the higher rice prices influenced the demand side of the economy. Incomes responded in a limited way to the price increases. Domestic producers increased wages; limited data suggest a 5-10% increase in many companies. Remittances have also increased sharply raising incomes for many households but not all. These income increases eased some of the difficulty faced by poor households in the face of higher food prices.

There is no apparent impact of the higher food prices on Bangladesh's exports; in principle one might expect a response through higher wages, higher production costs of exports and hence reduced export sales. However, the link of prices to wages in 2007/08 was very weak. While wages increased in some sectors, the key export sector of garments experienced little increase in wages and there is no evidence that this reduced the volume of exports. Value added may have shifted its composition to more labor income and less return to capital but the volume of exports does not seem to be adversely influenced by higher wages. Similarly there is no evidence of any impact of wage changes on shrimp exports. Export industries regularly complain that higher wages are reducing their competitive position, but most of these industries continue to earn above normal profits so there is little influence of higher wages on export volume. In both shrimp and apparel the constraint on exports has been production capacity not lack of competitiveness. There are many administrative and management factors that adversely influence exports but so far there is no evidence that the wage rates are rising faster than export prices. One would expect worker demands for higher wages to gain momentum if food prices do not stabilize and decline; this pressure is already evident in the apparel industry. But this future threat has not yet materialized. Although there are several factors at work one will face negative implications for the garment sector from sustained pressure for higher labor compensation. The conclusion is that any impact on exports will not occur immediately, but only after a substantial lag. Little information is available as to the correction of industrial wages to the food price increases; eventually real wages will return to previous levels but the time required for adjustment is uncertain.

The same argument can be made with respect to private sector non-residential investment. Factory construction in export industries seems to have slowed over 2007/08 but picked up in the second half of calendar 2008. The bullish attitudes that have been held towards the apparel sector were generating rising demands for expansion of capacity. The expectation of

continuing competitiveness persisted through the sharp increase in rice prices. The world financial crisis is another key element that may discourage investment in the face of greater uncertainty of future export markets. But this consideration arose after the price increases. Based on discussions with the private sector and the available data, the increase in the food prices had little impact on the private sector's decisions to invest.

Government expenditures (National accounts concept excludes transfers) may have been slightly negatively influenced as available revenues were shifted to finance transfers. Again so far there is no evidence of a slowing of Government consumption expenditures. [The fiscal deficit may increase as a consequence of the transfers associated with social safety net programs, but this is not a Government consumption expenditure, rather a transfer.]

In each of these three categories - government expenditures, exports, and private sector investment - the initial impact of the food price increases brings little change. However, one may expect negative influences in future years with less investment, less exports and less government consumption. For these to emerge the high food prices would have to be sustained for several years raising wages, lowering competitiveness and reducing investment in both domestic and export industry. Similarly the increased food transfer programs would have to persist sufficiently long to slow expenditures on regular Government consumption. These appear at the beginning of 2009 to be unlikely outcomes.

To estimate the magnitude of the impact on GDP expenditures the analysis concentrated on the dominant consumption channel and estimated a very simple consumption function linking adjusted income with reported private consumption expenditures. The data for private consumption expenditures has been improved sharply for the past four years but for most of the past 18 years the estimate of private consumption expenditure was a residual determined from estimating GDP, investment, Government consumption, exports and imports. There is little point in pursuing more complex versions of the aggregate consumption function with this quality of consumption data. The econometric results of these estimates are in Annex 6.

The income concept used in the consumption function is GDP less government revenues plus government transfers plus private transfers from abroad. This is calculated in nominal terms [current prices] and deflated with the CPI to obtain a constant price income concept that can be regressed against the private consumption estimate in nominal terms also deflated with the CPI.

To estimate the impact of the increase in rice prices the equation is solved for the change in GDP in nominal terms that is due to the increase in the rice price, the increased distribution of grain to households, and the increased imports of rice. There is a certain amount of judgment in determining how much the rice distribution programs changed due to the price increase and how much of the rice imports rose in response to the rising rice price. Taking account of these factors the estimated result in the GDP declined about 1% due to the rice price increase. See Table 3 for the arithmetic. This is a substantial impact. The calculation is reasonably robust and reflects the policies of greater rice imports and greater food distribution programs to ease the impact on the consumers. Nevertheless, the increase in the CPI reduces consumption with an adverse impact on the expenditure side of the GDP.

To reconcile the two estimates: greater rice production [0.8% increase in GDP] and reduced consumption expenditures [1.0 % decrease in GDP], there must be a change in rice and paddy inventories. These effects are usually not included in the GDP investment estimates in Bangladesh. The impact of the initial rice price increase was to reduce consumption as

inventory holdings increased. This caused the price to increase even more. The higher prices drove up production causing inventories to rise further. As rice began to shift to markets it lowered wholesale and retail prices.

However, the most robust conclusion that one can draw is that the rice price increase raised production, lowered consumption expenditures and raised inventories. The increase in rice inventories virtually cancels the decline in consumption expenditures. In addition the decline in consumption expenditures was partly offset by increased food distribution. This conclusion is based on the observation that the rice price increase induced the higher volume of rice production.

There is a very limited impact on the balance of payments. The reduction in GDP leads to some reduction in imports. This reduction in imports is estimated to be \$300-500 million more than off-setting the increase in rice imports. The net effect on imports is a decline of less than 1%. The conclusion is that there is little impact on the balance of payments.

Table-3

Impact of the rice price increase in GDP expenditure side

1. Change in Government Transfers: + 3000 million Taka of rice distributed

2. Change in Imports: 6165 million Taka additional rice imports

3. Change in CPI index:

Without rice price increase	185.7
With rice price increase	195.5 (actual)
Change in index	7.8

4. Reduced form equation:
 ΔY is change in nominal GDP

<u>GDP Change*</u>	=	<u>Price effect</u>	+	<u>Transfer effect</u>	-	<u>Import effect</u>
.388 ΔY	=	3324 * (7.8)	+	.68 * (3000)	-	6165
ΔY	=	56,191 million Taka				

5. GDP with rice price increase (actual)

Nominal	5419 billion	GDP deflator	168.4
Real	3217 billion		

GDP without rice price increase

Nominal	5363 billion	GDP deflator	165.0
Real	3250 billion		

Loss of real GDP 1%

* Nominal

6. Other Explanations

What are the possible explanations of the sudden increase in food prices? The main focus of this discussion is on rice. The second important product price reviewed is cooking oil where prices are determined by import prices.

This report sets out a description of how the rice price changed in the past two years and how it is likely to change in the near future. There are other possible explanations that have been proposed. These are briefly reviewed.

- (a) The production costs increased. The hypothesis is: Higher transport, irrigation and fertilizer costs have driven up production costs. Indeed production costs did increase but such increases were much less than the actual price increases. Estimates of food production costs are covered in Annex 3 and the supplement to that Annex. Production cost increases were less than 10%. This is far less than the actual price increase.

Critical to understanding the changes in total production and marketing costs is the linkage between the paddy price and the rice price. In the boro crop of 2008 the farm gate paddy price was 19-20 Taka/kg. Since each kilogram of rice requires 1.5 kg of paddy the effective farm gate price of rice was Taka 29-30 Taka/kg. The margin for milling and marketing is of the order of 10%, so the retail price would be Taka 32-33/kg. The ratio linking paddy and rice is essential in following the behavior of the rice price and the underlying farm gate price. One expects to observe a paddy/rice ratio of approximately .6; the data for Bangladesh shows this ratio is maintained over many years.¹ Claims of high margins taken by traders and millers neglect to allow for the rice-paddy conversion ratio. The increase in the farm gate price was about 40-50% while cost increases were approximately 10%.

- (b) There is collusion in the food markets leading to monopoly power raising prices. It has been repeatedly argued in Bangladesh that collusion increases prices. This common view is reviewed in Annex 8. In this Annex the ratio of retail and wholesale prices is examined. For coarse rice the ratio is of the order of 10%, declining to 5% in the past two years. Medium and fine rice show higher margins as one might expect for a higher quality product with less competition, higher marketing costs and longer inventory periods. The case of coarse rice was explained econometrically by lagged prices and the estimated stockpile. The existence of a stable explanation for rice prices indicates there is limited market collusion.

Masur also shows a stable ratio of retail to wholesale price and a 10% margin. The vegetable oils prices indicate stable mark ups declining at the end of 2007 and beginning of 2008. Potato prices showed great volatility with mark ups averaging about 25%. There is substantial waste in the potato market, cold storage costs and higher transport and handling costs so this higher margin is plausible. There were no trends in the retail/wholesale ratio for the non-rice foods.

¹ Price of paddy * 1.5 * 1.1 = retail price
 $\frac{\text{Price of paddy}}{\text{Retail price of rice}} = .60$

There is no evidence of market collusion in the retail markets. This is no surprise as there is so much competition in these markets. The data revealed no trends over the past five years; the data shows considerable fluctuation in the rates as one expects in competitive markets and also reasonable mark ups.

- (c) Import patterns: One hypothesis that has been set forth is that the failure of the business community to import in 2007 led to shortages resulting in price increases. This is discussed in detail in Annex 4.

The imports of a number of food items was studied from 2005 through 2008. No evidence was found to support the idea that there was a change in importer behavior. Only palm oil showed a reduction of imports in the first half of 2007 over past levels. The conclusion is that the anti corruption drive did not bring about a shortfall in imports.

- (d) Another hypothesis is that there was a change in demand sufficient to drive up the price of rice. That is rice demand increased from higher incomes or a shift in the relative price of wheat and rice resulting in less wheat and more rice consumption. This is examined in Annex 5. In this Annex the demand for rice in 2007/2008 is estimated based on the household returns HIES, 2005.² These demand functions are used with 2008 prices and updated incomes to estimate the change in rice demand. The results, taking account of the wheat (atta) price, showed a slight decline in total rice demand. The conclusion is there was no demand increase driving up the rice price.

- (e) Speculation and stock holding are pervasive phenomena in all commodity markets. There is a popular belief that these factors directly cause price increases and are responsible for the recent large price changes. There is no evidence for this belief being relevant for rice.

There is certainly widespread stockholding of rice in response to rising prices. While there is probably hoarding of vegetable oil in a similar way this discussion concentrates on rice. This stockpiling is at all levels: Households increase the amount of rice that they store. This is true particularly of higher income households that have the resources to do so. Millers hold more paddy to sell rice at a higher price. Traders will hold stocks back in a rising market. Rapidly rising prices trigger expectations of further increases and hence consumers protect themselves the best that they can by increasing stocks. Individuals –perhaps market participants or perhaps high income persons may buy rice to hoard, expecting to sell when the price is higher. This behavior is found both post retail and pre-retail market. Data on such behavior is anecdotal as there is no information on actual stockpiles.

If rice demand is price inelastic³ then the increase in price will not reduce consumption much, but it does lead to stockholding that may pass through the retail market or may be stored before rice reaches the retail market. Such behavior is not to increase prices but to take advantage of expected price increases from other forces.

² Bangladesh Bureau of Statistics, Household Income and Expenditure Survey 2005. The statistical analysis is based on the data for the 10,000 households.

³ The price elasticities derived from the HIES 2005 and reported in Annex 5 show zero or very low price elasticities (less than 0.1)

Of course when this behavior is widespread it contributes to increasing the price. This is different from the explanation that there is actual collusion to manipulate prices.

What is not observed in Bangladesh is stockpiles held as a means to increase rice prices. The argument of earlier parts of the paper is that the rice price is largely formed exogenously and that the month to month change depends on previous prices and the rice stockpile. The individual stockpile owner cannot change the price but he can hold more rice on the expectation that prices will rise. The rice market is so large and so well integrated that no person can influence the rice price. Perhaps in earlier days the fragmented markets with high transport costs presented opportunities for direct price manipulation but this is no longer feasible. Holding rice has costs: First there is the interest on the investment in the stock being held; second, rice cannot be stored indefinitely and it is subject to significant loss factors; finally if Government is actively trying to stop hoarding then there is risk of being caught. But one must understand that in this picture when one goes to cash in by selling he has to find someone else who wants to take the rice until it passes through to households for consumption. With households themselves holding high levels of stock their demand for rice drops once the price declines. The holder of stocks runs the risk of being caught having to sell rice at a low price. As the rice price starts to decline this withholding of rice will keep the price higher than expected. Then it will drop sharply as stockholders realize that they lose by waiting.

At the farm and mill level where paddy can be stored things are somewhat different. First, the paddy will store for a longer period than rice. Second, the farmer may wish to sell off gradually if his financial status enables him to do so; generally expecting to get better prices for late sales. However, this is tricky and changing price patterns may lead to losses from such speculative behavior.

The impact of rice stocks on price formation was investigated. Some effect was found. Using the equation for the monthly rice price that included the rice stockpile as one of the independent variables, a backwards calculation was performed to determine what the stock pile should be to be consistent with the prices actually observed. The result was about 3% of the stockpile was missing; that is the actual stockpile, as estimated from production, consumption and import data, was about 3% higher than the stockpile estimated using the equation backwards. This later calculation suggests the actual stockpile was lower than expected. This indicates some hoarding post retail market. But no quantitative conclusion should be drawn.

There is a great deal of public outcry about speculation and hoarding. But this phenomena is so widespread that it is impossible to prevent. This type of speculation has a purpose which conserves rice now in the expectation that there will be a shortage in the future. The hoarder does everyone a favor by smoothing out the supply of rice to the market. In the absence of futures markets and clean ways to hoard rice for future sale the financial management of the rice stock is difficult and inefficient. The important distinction that is made in this section is the purpose of hoarding. By offensive hoarding is meant an attempt to use market power to change the prices. Defensive hoarding based on behavior conditioned by expectations of price increases may also influence the price. In the case of Bangladesh in the spring of 2008 the rapid rise of the world rice price certainly triggered defensive hoarding.

This influenced the distribution of the rice stockpiles but no one had the market power to use such purchases as a means to trigger higher rice price. The society collective triggered the price rise.

The rice market will function more efficiently if storage facilities are modernized and it is legal to own rice in large or small quantities. Moving paddy off the farm rapidly for storage in good facilities will reduce losses. The paddy may continue to be owned by the farmer for sale in the future or may be sold.

Rice production in Bangladesh will continue to be most efficient in large farming operations able to manage inputs, new seed varieties, suitable application of fertilizer, while avoiding high irrigation costs. To continue growth of rice production will require more complex cultivation methods, more use of credit and more careful financial planning. Rice cultivation as it modernizes will need a supportive financial environment. This leads to the need for storage facilities, and financing arrangements that enable farmers to store and sell rice stocks easily.

The basic argument presented here is that rice prices are formed from external factors and domestic supply levels. Under special conditions panic may freeze rice markets reducing sales and consequently raising prices. But this is unusual; further it is not hoarding by large businesses but a society wide reaction to expectation of rice shortages and higher prices that causes the sharp price increase.

- (f) Linkages to foreign prices. In Annex 7 additional results linking foreign prices to domestic prices are presented. This in particular provides supporting information on rice and masur. In addition import price data is presented. The fundamental conclusions are:
- (1) As discussed in Section 2 under historical and normal conditions the Indian parity price is a dominant factor in determining the Bangladesh wsp rice price.
 - (2) For other commodities import parity prices determine the domestic price. In these items the imported share of the market is much greater than for rice.
 - (3) For vegetable oil there is a temporary monopoly power available when there is a sharp increase in world prices but as time passes competition will reduce this monopoly power. Market response takes sometime but eventually competition will prevail.
- (g) Data deficiencies in understanding rice markets. In Annex 2 the data quality is discussed. The conclusion is that there are serious short comings in the production data. This lack of compelling data contributes to public skepticism about the rice supply. It is not possible to fool the market and everyone would be better off when the data on the rice economy is of high quality and widely available.

7. Recommendations

This section makes a number of recommendations related to the management of food prices to maintain a stable price environment and manage price changes gradually. Food prices, particularly rice, are determined by real factors of supply and demand. Through good policy change can be moderated and temporary price shocks smoothed. But real production costs cannot be separated from the market price. Of course macro economic policy has its own imperatives and food prices are only one of a number of factors that might influence policy choices. The control of the rice price is difficult as the international factors are very powerful. Wheat and maize are even more exposed to changes in international prices but the rice price remains the center piece of concern for Bangladesh consumers.

It is also necessary to distinguish between the control of prices to moderate sharp increases or decreases which will cause market disequilibrium, and the equity issues of providing for poor families who may be without enough income to feed themselves. The Government has long had a variety of programs to make up food deficiency for those facing the most serious shortfall of food. These programs are well run and when there is no political interference they are effective.

a. Controlling food prices:

There is little that the Government can do to control key food prices as these are largely determined by external prices and the exchange rate. The two exchange rates that are relevant are the Taka/Rupee and the Taka/dollar rates. The Taka/dollar rate influences particularly cooking oil; the Taka/Rupee rate rice, masur, onions etc. Macro economic policy can influence one of these but not both. The Taka/dollar rate will certainly be the focus of the central bank's efforts. Although the Taka in principle floats with respect to the dollar the central bank can intervene to move the exchange rate as it wants within some limits. It does this by buying or selling reserves of foreign exchange: If it wishes to depreciate the Taka then it buys US dollars; if it wishes to appreciate the Taka it sells dollars. But as a general principle the Government has no influence over the price of food. The rice price is certainly the most important food price; this price is influenced by the Taka/rupee exchange rate and the Indian wholesale price. This rate is determined by the prices of the two currencies with respect to the dollar. Thus the exchange rate relevant for the rice price is not directly a policy objective of the central bank.

It is of course difficult for Government to deny responsibility for food prices when the public believes that it is their duty to keep prices at acceptable levels. Public information officers of the Government should explain over and over that the prices are determined by international markets and it is not possible to control prices. This will produce a great deal of dissent from many quarters particularly by those who believe that there is price manipulation going on. There is no sensible response except to repeat the explanation of the real situation. Those who believe that price manipulation is a key determinate of prices are unlikely to change their minds.

The three critical propositions set forth in this report are:

- (1) Bangladesh is effectively self sufficient in rice.

- (2) In normal periods the Indian parity price of rice is the strongest factor setting the rice price.
- (3) The sharp increase of rice prices in 2007 and 2008 was a panic reaction by the public to fears of a rice shortage.

The policy problem is how to manage the situation when there is a sudden spike in prices? How can Government deal with changing rice prices? For changes of the order of 10-15% per annum arising from changes in the Indian parity price there is no possibility of controlling the price. Effective price controls that kept the market price below the Indian parity price would induce smuggling of rice into India.

The price spike induced by panic may be preventable. How might this be done?

- (1) Persuading the population there is sufficient rice in the country.
- (2) Selling out of the Government stockpile to reduce the upward pressure on the price.
- (3) Drawing on an internationally managed stockpile.

Of these three only the first has any prospect of success. The second works only when the public believes that there is enough rice otherwise the rice sold by Government will be purchased and stored. Selling to target groups does not solve the problem; the rice they would have purchased would now be stored. The same point holds for the third; it is inconceivable that Bangladesh would depend on a SARC food stockpile to persuade the population that there is sufficient rice.

This would never work. The issue is not the actual availability of rice but rather the concerns as to the risk each household perceives.

The only method that will persuade the population that there is sufficient rice is the existence in the hands of the Government of a large stockpile of rice and paddy that it is prepared to sell. It is similar to a financial panic where the central bank pays out the funds until the panic subsides. The difference is that rice cannot be readily imported in periods of crisis so the authorities must have procured rice in advance.

If one wants to avoid price spikes caused by panic then confidence creating measures built around a substantial rice stockpile are necessary. Is it worth the effort and cost? This depends on the frequency with which a price crisis may arise.

The 2008 crisis was triggered by escalating world prices. The source of this price increase rests with the high demand for grain. The rice price will follow the wheat price as in many countries these are substitutes. The world rice price will follow the wheat price with a lag. High wheat prices were caused by drought, rising demand, and shifting of grain acreage to bio fuel crops.

The wheat price driven up by demand increases and supply decreases pulled the rice price along as demand shifted away from wheat and to rice.

Are such conditions likely to be repeated in the next decade?

1. Drought conditions may become more common as world weather conditions seem to be becoming more unstable. But this is obviously difficult to predict.
2. Rapid world economic growth caused the growing demand for grain. The world economy has slowed sharply. Will it return to the growth rates achieved in the years before the world economic crisis? If one believes that rapid growth can again be achieved for a sustained period then the risk of another price spike is substantial.

The recommendation on establishing a stockpile sufficient to persuade the society that there is enough rice is made on the assumption that one concludes from the two above points that the threat of price spikes is substantial.

To be effective the stockpile has to be very large, a very expensive proposition. How large? Large enough to convince people that there is enough rice. Domestic price increases are partly based on expectations of price that in turn are based on concern that there is a shortage of food inside the country or that the external prices are rising rapidly and eventually will come to the Bangladesh market. If the Government has a large stock pile it can sell into this rising market keeping the price lower, offsetting these expectations. This effectively shifts stocks of rice into the hands of the private sector and out of the Government. The private sector will soon sell such stocks moderating prices. If expectations are for continuing shortages and high prices then the sales by Government moderate the expectations and prices will fall.

The management of the stockpile: There are many rules. One such rule when the price of the increases more than 5% in a week starting selling rice from the stockpile. This is through direct sales to anyone. The sale of rice in a panic situation will moderate price increases.

To achieve such a result the Government must own or influence the existence of a larger stock of rice than is now held in the country. The stockpile of rice at its minimum is probably less than one month's consumption [now about 2 million mt]. This is far too low to enable management of prices if access to Indian rice is banned or if public expectations are for higher prices. The procurement and management of such a large stock of rice would be expensive and may initially reduce the price of rice at the farm level. However, once the larger stockpile is in place there should be no negative impact on production. How often would one expect a very high price of rice as was observed in 2008? This has not happened often and but it is probably worth preparing for such events that may become more common in future years. High food prices are necessary to encourage increased production. Within Bangladesh we find that for rice there is no merit to the argument that middlemen capture increases of the rice price; rather in the recent surge of prices these were shifted back to higher farm gate prices, while miller and trading margins did not increase to unusual levels. The response of farmers to the price increase indicates the effectiveness of the markets.

Optimum policy is to focus on food stockpiles in the hands of the Government that amount to two months supply or 4-5 million metric tons of rice at the lowest point in the stock holding cycle. This can be done both by local procurement and by imports of milled rice. The stockpile must be rolled over regularly and replaced with fresh supplies. In a food emergency this should be sufficient to handle the shortfall in domestic

production making food available quickly to those in need and would also permit direct market sales to moderate price increases. [One million metric tons will feed 10 million persons for six months.] The existence of this stockpile will prevent the marked panic experienced in 2008.

World rice prices have declined since the peak in the spring of 2008 due to a strong supply response and a weakening world economy. Bangladesh probably does not face a long run food price crisis but it should be better prepared to moderate price fluctuations brought about by panic reactions.

Bangladesh has a good track record of handling food emergencies and the impact on the rice price that they induce. **For loss of food production due to natural disasters** a combination of easy import procedures for the private sector and selling out of the stock pile at or slightly below market prices will limit the expectation effects. In these situations the Government should provide accurate data on its stockpiles to the public. As external food prices increase it may create panic and stock purchases. The ability of the Government to sell into the market from its stockpiles, shifting the stocks into private hands is the best preventive policy for the famine type panic. About half of the rice production is marketed, implying the market flow is less than 1.25 million metric tons go through the markets to consumers every month. With an always available stockpile of 4-5 million metric tons it should be possible to calm the markets down. The very existence of a larger stockpile will dampen fears of rice shortages. Present stockpiles are too low to provide such confidence. **For feeding programs for poor households** the issues are discussed below. **To follow this policy when faced with price increases caused by speculation and inventory build up** the Government sells from its stockpile, moderating the speculative increases. The every existence of such a policy will limit holding excessive stocks by the private sector. But there is little that can be done if the population learns that the rice prices in international markets have taken dramatic increases except to keep selling off the stockpile and let the panic decline; it will do so quite quickly.

In effect this recommendation shifts about \$1.5 billion of foreign exchange reserves into rice stocks. The benefits of such an enhanced stockpile are an ability to moderate disruptions in supply, damp down price increases based on expectations and strengthen the ability to deal with natural disasters. It will take several years to achieve this but to moderate extreme price fluctuations there is no other choice. Without a larger stockpile of rice one should expect sharp price increases from time to time.

b. Improved data:

Data on the supply of and demand for rice are not satisfactory given the importance of the commodity for Bangladesh. There are various discussions and studies going on to improve the data situation and as these mature the quality of information should improve. A few comments are directed at these concerns. The first and most important is that the Bangladesh Bureau of Statistics does not receive the support in funding and management that it should if it is to provide the required data. This is the underlying problem with the rice data and unless corrected the details of improving data suggested herein cannot be achieved. A change in the governance philosophy of BBS is needed. There is excessive reliance on administrative cadres rather than professional statisticians. There is neglect of audits of process and quality control. Finally much greater use of IT is needed. The data must improve in quality and timeliness.

The data on rice production as described previously suggest that there is a significant surplus of rice, a finding not consistent with import levels and price behavior. Management of the rice economy to limit extreme price fluctuations, achieve efficiency at all levels, and maximize returns to the farmers all require a more accurate and detailed picture of the rice production and flows of paddy and milled rice.

To obtain current, accurate data on rice stocks current laws on hoarding and speculation must be repealed. With threat of criminal prosecution hanging over their heads, owners of rice stocks will not reveal their true holdings. Government should repeal all laws that criminalize hoarding. These do no good except to keep secret the real stock positions, increase costs, and prevent the development of a more efficient rice market.

- (A) Rice production information: The results from the crop cutting survey can be improved by updating the sample frame, insuring that there is use of GPS for location identification of plots cut, and moisture meters to insure that the crop cutting survey has a consistent definition of moisture content. The sample frame will provide estimates of area. The area planted should be regularly benchmarked using satellite imagery. With a more accurate picture of planted area, ground reporting and surveys can focus on the percentage of the planted area that has been harvested. BBS needs urgently to update and revise the sample frame used for estimating rice production.
- (B) Rice consumption information: The present data is very good; it can be improved by running the collection process continuously, increasing the length of the period surveyed (from 14 days in a year to four periods of 10 days in sample households), and being more careful about accounting for the consumption of small children. But the current consumption information is much better than the production estimates and priority in improvement should go to the production component. If the HIES runs continuously then rice and paddy stockpiles can be included in the information collected.
- (C) Losses: Estimating the losses of rice—i.e. how much produced rice cannot be eaten—is a matter for regular studies. This is a very difficult area and one should not expect data improvements rapidly; nevertheless BBS should design and execute small studies to throw more light on these issues.
- (D) Milling: Regular surveys should be done of the millers. These enterprises have valuable information on prices, availability, stockpiles etc. It also important to review the paddy/rice conversion ratio. The millers have information on by products, a key component of their profitability and essential to understand the economies of rice production and trading.
- (E) Rice stocks: Large millers, importers, wholesalers, and large retailers should be registered and required to report stocks every two weeks; these reports should be audited regularly. The audits will insure compliance in the reporting. This type of information will improve the depth of data on the rice situation. These are not simple matters and require serious efforts to develop and implement the data collection programs. It is also urgent to develop trust in collecting data from millers and traders.

(F) The reports on food prices must also be improved. The public has little confidence in these reports and there is sometimes compelling evidence that there is political interference. The very fact that the release of the results must receive clearance from the Ministry of Finance signals concern. BBS should be on a regular schedule for release of the price information; the Minister and the head of Government should be informed of the results in advance but no approval of release should be required. On the contrary BBS must respect the release schedules on food price data.

c. Programs to assist disadvantaged persons:

These programs are generally well run but are vulnerable to political interference and corrupt practices. It is disgraceful that political persons should have the power to direct the rice to their supporters while excluding needy households associated with their political opponents. During the Caretaker Government this practice ceased. As the nation returns to democratic rule it is important to devise procedures to keep the distribution of rice to needy families out of the hands of the politicians and leave it to the local administration, With new ID cards becoming available, these can form the basis for identifying those in need. A transparent process is needed for preparation and maintenance of the list of the needy households; but independent surveys to insure that these persons so listed actually receive their due are necessary. Organizations such as BIDS could have the responsibility to report independently on the success of delivery to those in need. Social power distribution in local areas provides great opportunities for exploitation of the poor, so that independent auditing of programs is essential to learn what is really happening. Problems with these food distribution programs historically have rested with shortcomings of implementation and of funding, the target quantities are usually well worked out.

d. Storage programs

The most important step that the Government can take to improve the functioning of the rice market is to encourage private sector grain storage facilities for rice, paddy, wheat, and maize. These storage facilities should be privately owned and operated but required to meet appropriate standards to insure protection of the grain against rain, animals etc. Such storage facilities would be available to anyone to store rice paddy, maize etc. The individual would store his rice or paddy for an agreed fee. Initially these fees would be determined by the Government to insure that the investor made a reasonable return on his investment. These facilities could be associated with millers but need not be. The existence of such facilities will enable the Government to carry out policies that will make the markets for rice, wheat and maize operate much more effectively and provide the basis for adjusting the size of the rice stockpile. The existence of a system of quality grain storage facilities would reduce losses incurred in substandard storage facilities. Government's role is: To establish a regulatory authority to insure that all storage facilities are compliant with stipulated standards; to encourage private sector investments by encouraging commercial banks to support such investments; that the fee structures for storage are established consistent with costs and that some type of insurance program is made available. Of course any one can store rice in the facilities including the owners of the facility. The key point is that ownership of stored rice may rest with someone other than the owner of the storage facility.

e. New financial instruments

With improved authorized private storage facilities [Government facilities that meet the standards can of course be included although are best leased to the private sector to operate] it is feasible to issue financial instruments for rice or paddy stored at these facilities. Individuals can store their grain for agreed rates and receive “rice warrants”. These warrants—essentially ownership certificates-- can be bought and sold. This process would make the entire rice market much more liquid, and enable use of complex strategies available to millers, farmers, and traders to manage the market more efficiently. New instruments for forward sales can be introduced. These steps would deepen the financial markets in Bangladesh and introduce much greater flexibility to the rice and paddy markets. Modern IT methods would make it feasible to manage this market. Given the volume of rice produced and traded in Bangladesh the magnitude of this market could be very large. [The total value of rice produced is about 200 billion Taka. If 25% passed through this market and was on the average sold twice it would represent an Taka 80 billion annual market.]

Such a system would also make is simpler for the Government to influence rice prices. If the Government stock pile was available for sale then to limit price increases the Government would sell its rice warrants to the public driving down the price of rice. Equally the Government could always raise the price by buying warrants. Ultimately the Government’s role would be limited to regulatory actions and buying and selling warrants.

Development and operating such financial instruments is well within the capacity of the financial system. It would provide a significant increase in the magnitude of financial operations and would attract funds to the most important market in Bangladesh. It would probably raise returns to farmers resulting in more grain production.

f. Improving the functioning of food markets

The food markets function quite well. Nevertheless, there is room for improvement by raising sanitary standards, more rigorous checking of weights and measures, and spelling out the exact conditions that should exist for the buying and selling of rice. Introduction of quality inspections would generate substantial benefits, reducing fraud in quality and packaging and raising standards in the key market in the nation. Standard agreements may be introduced for sales agreements between farmers, merchants or millers; such agreements would follow standard contract terms to reduce the exploitation of one party by the other. At present these transactions are unregulated and there may be significant abuse through fraud or exercise of power. Associated with such improvements in agreements there must be local tribunals established to settle disputes rapidly and justly.

g. Improving the input markets:

The price of rice and other foods will always be closely linked to production costs. The purchased input costs are key component of total costs. The critical input markets for food production are fertilizer, irrigation, and pesticides. The markets for pesticides and fertilizer face significant problems. We focus in these remarks only on fertilizer. The

present system of substantial government interference in this market is open to much abuse and presents only the appearance of working well. Fertilizer pricing cannot remain disconnected from world prices given the proximity of India and Myanmar. Low fertilizer prices have led to substantial smuggling and it is unlikely that the border can be policed to prevent the export of fertilizer, when this is indicated by price differentials. A more open market approach with everyone allowed to buy and sell fertilizer as they deem appropriate, subject only to regulations and inspections to insure that there is no quality manipulation, would make the entire market work better. Stronger regulations on packaging would also help to prevent product fraud.

Improvement of the fertilizer market is the single most important step to increasing rice production. The events of 2008 indicate that the farmers are responsive to higher prices. Their concerns as discovered in the work on farm budgets focused on fertilizer availability. It is not the objective of this report to consider the details of improving the fertilizer market, but it is clear that the heavy burden of regulations harms rather than helps; further, low prices of fertilizer are not really effective, encouraging middle men to enter the market to buy at low price and resell the fertilizer to farmers at higher prices, as well as to smuggle to neighboring countries, and to encourage quality degradation.