World Rice Crisis: Issues and Options

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This paper attempts to analyse the current global crisis in the availability and prices of rice by drawing upon the long-term developments in the rice market. The instability and thinness in the world rice markets are shown to be mainly due to the predominantly precautionary export policies of major exporting countries, which in turn are a result of domestic food security considerations. Some possible policy options are also discussed.

The latest crisis in the world rice markets, with rice prices (of Thai 100 per cent B, FOB Bangkok) registering a phenomenal increase from $385 tonne in January 2008 to $854 tonne by May 2008, has sparked a major debate about the role of Asian exporters’ policies and improved levels of consumption in most Asian countries, mainly China and India. Two of the world’s major exporters, India and Vietnam, have banned rice exports – India late last year and Vietnam in 2008. Amid the resulting tightening supply in the international market, the world prices rose to unprecedented levels. In the current scenario, an objective analysis of the present crisis is required to understand the factors underlying the crisis in order to avert a more frequent occurrence of the same.

The world rice market has frequently been marked by withdrawals of major exporting countries in the past, in the face of the first signs of an impending world price rise, which in turn, further aggravated the world market instability. In this context, it becomes important to understand the rationale behind such withdrawals by exporting countries so as to devise suitable policy instruments to reduce the world market instability. The present study is an attempt in this direction. First, an analysis of the structure, long-term behaviour (conduct) and the consequences of such behaviour (performance) of the world rice market is undertaken, followed by an outline of the options for future.

Structure of World Rice Market

The world rice market has traditionally been thin, with the average traded volume over the period of 1960-2000 being about 5 per cent of the world rice production. The thinness of the rice market can be judged from the fact that the traded volume for the other major cereal, wheat, is about 20 per cent of production. There are two main reasons for this low volume of trade. Firstly, there is a very high degree of geographical coincidence of production and consumption in the case of rice, unlike in the case of wheat. The second reason, which is closely linked to the first, is the unstable participation of the major exporters due to domestic food security considerations. The bulk of rice production occurs in the monsoon land of Asia, stretching from Pakistan to Japan. All these countries are densely populated and are major consumers of rice. The coincidence of production and consumption is quite high relative to wheat. As a result, the trade policy of the major exporters is mainly guided by domestic food security.
considerations. When faced with world price rises, the governments in rice exporting countries cut down on exports in order to protect domestic consumers, thereby further aggravating the crisis in the world market. In the latest episode of rice price rises also, the major part has been played by the supply tightness in the international market due to the withdrawal of India and Vietnam.

In the post-war period Thailand, Myanmar, Cambodia and Vietnam were the major exporters to the world market. Of these, only Thailand has managed to maintain a consistently significant share of the world market. Vietnam lost prominence during the 1960s and 1970s but regained some lost ground during the 1980s. Presently, Thailand is the world’s largest exporter with an average share over a period of 1995-2005 of 31 per cent in quantity terms and 29 per cent in value terms. Thailand is followed by India (17 per cent and 17 per cent), Pakistan (10 per cent and 9 per cent), US (9 per cent and 10 per cent), China (9 per cent and 6 per cent) and Vietnam (7 per cent and 5 per cent). China was a major exporter until 1980 after which its market share dropped considerably. The import market is far less concentrated. Indonesia, Brazil, Iran, Bangladesh, Nigeria and the Philippines are typically the largest importers, together importing 25-40 per cent. Other large importers include the EU, Saudi Arabia, Iraq, Malaysia, South Africa and Japan.

**Conduct**

The world market can influence the policy environment in the major countries fundamentally in two ways. The first is through the price signal and the second through the structural peculiarities of the market, like volatility arising out of the thinness of the world market. In the case of rice, the second factor appears to have played a major role in shaping the policy of the major countries. When viewed over a sufficiently long period from the 1960s, this becomes evident [Sekhar 2006; IFPRI 1983]. Most of the importing countries laid emphasis on achieving self-sufficiency through increases in domestic production even when the world prices were low and most of the exporting countries held on to their domestic stocks even when the world prices were rising. This could only be because all the countries viewed the international market as an unreliable supply source in the case of domestic production shocks. For instance, in the case of the Philippines, the greater part of the preparatory work for increasing domestic production was undertaken much before the 1972-73 episodic increase in world rice prices. Similarly, Indonesia launched an import-substituting rice production programme through accelerated irrigation projects, support prices and input subsidies in 1977-78 when rice was available at a very low price in the world market and abundant foreign exchange reserves were available in Indonesia. On the other hand, exporters withdrew from the international market at the prospect of an increase in world prices, as did all the major exporters during the world food crisis in the 1970s. These policies by the importing and exporting countries clearly indicate that the policy framework in these countries was mainly guided by domestic considerations of food security. Overall, more than the importing countries, it was the exporting countries’ stock and export policies that

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had a major bearing on the world rice market. This critical role of the exporting countries becomes clear from the following review of the world rice market.

The world rice market has been characterised by four distinct phases in the last 50 years.

**Phase I (1950-1964):** This was a phase of high and stable prices. The stability in prices was mainly a result of the commercial orientation of the major rice exporters of the time like Burma, Thailand, Cambodia and Vietnam, despite uneven production. These Asian economies were less diversified and more reliant on rice export earnings at that time. Any shortfall in production when there was virtually no rice available in the world markets at any price.

**Phase II (1964-85):** This was a phase of high and unstable prices. A major El Nino event led to a shortfall of 6 per cent in Asian rice production in 1965. Vietnam had banned rice exports by then and did not return till the late 1980s. Exports from Burma too had fallen rapidly from 49 per cent of domestic production in 1957 to 11 per cent in 1967. Burma finally exited the world market in the early 1970s. The exports from Thailand also decreased during the same time. Its revenues from rice export taxes fell from 10 per cent during 1950-65 to just 1 per cent in 1971. During the world food crisis of 1973-75, Thailand’s exports fell to 10 per cent of its domestic production from a high of 33 per cent during a similar El Nino event in 1957. In fact, Thailand banned rice exports for a few months in 1973 and as Cambodia, Vietnam and Burma had already exited the world rice market by that time. This led to a situation where there was virtually no rice available in the world markets at any price.

**Phase III (1986-2007):** This was a phase of lower and stable prices. The main reason for this fall in prices is the high growth in per capita rice production in Asian countries. The production in Indonesia had increased by about 16 per cent from 1961 to 1984 and it attained self-sufficiency from being the largest rice importer in the world. Rapid increases in rice production were also witnessed in China, India and Vietnam. A rapid increase in Thai exports was also witnessed due to the devaluation of the Thai baht. Also, the increasing per capita income around this time in several Asian countries led to a decline in the income elasticity of demand. The major technological breakthroughs led to the development of pest and disease-resistant rice varieties like IR 36. The increased proportion of irrigated land under rice cultivation also led to higher and stable production [BAPPENAS 1999]. Also, there is a renewed commercial orientation of Thailand. The exports from Thailand increased to 40 per cent by mid to late 1980s, also partly due to the devaluation of Thai baht. Vietnam also re-entered the world rice market, with exports of about 20 per cent of its production, in the late 1990s. The increased exports from countries like India, China and Pakistan have further strengthened the world market. Between 1961 and 1993, world rice trade fluctuated between 3.5 per cent and 5 per cent of total rice production, with an overall average of 4.3 per cent. But since 1994, this ratio has exceeded 5 per cent every single year. This reflects the recent outward-looking policies of most Asian rice economies during this period.

**Phase IV (January 2008 to May 2008):** There has been an unprecedented price rise from $385 tonne in January 2008 to $873 tonne by May 2008. The main reason for this is the withdrawal of the two major exporters, India and Vietnam and some smaller exporters like Egypt and Brazil from world market. This is very similar to the developments in phase II. The recent export restrictions by various countries are summarised in the table.

The table clearly indicates the precautionary nature of the exporting countries. In a similar situation in world wheat markets recently, the major wheat exporters did not resort to export restrictions of such an order, pointing to the fundamental differences between the two cereal markets.

Therefore, when viewed over a long period of 1950-2008, it appears that when exporters adopted restrictive export policies, exports fell, leading to high and unstable prices in world markets, as witnessed in phase II and phase IV. The trend in phase I and phase III was the reverse. Over the last six decades, most of the major players in the rice market, mainly the exporters, tried to insulate their domestic markets from international volatility. The key role in domestic price stabilisation in these countries was played by storage. The policies pursued and the conduct of major players suggest that there was a tendency to overstock than export [IFPRI 1983; Sekhar 2006]. This was so even when the stock levels were already high. This was mainly because of the precautionary motives of major countries, particularly after 1973. This behaviour is consistent across the board, whether the country is large, like India or Indonesia or small like the Philippines. An important question that arises in this context is as to why the exporting countries did not use their stocks to earn export revenue in times of high world prices (and in the process smoothen price instability). The answer lies in the scepticism of the countries about the international market as a reliable source of supply in the event of production shocks in future, if stocks are exhausted in the current period.

We have attempted to empirically analyse the long-term behaviour of the major players by estimating the world price equation using a stock-flow model [Desai 1966]. This model is a combination of stock and flow adjustments used to model the world tin market. In this model, flow adjustment describes the pressure of consumption on

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<table>
<thead>
<tr>
<th>Date</th>
<th>Country</th>
<th>Nature of Restriction</th>
</tr>
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<tbody>
<tr>
<td>1 October 2007</td>
<td>India</td>
<td>Ban on export of non-basmati rice but export of superior varieties allowed. MEP of $650/tonne</td>
</tr>
<tr>
<td>2 March 2008</td>
<td>India</td>
<td>Increase in MEP to $1,000/tonne</td>
</tr>
<tr>
<td>3 March 2008</td>
<td>India</td>
<td>Complete ban on exports of non-basmati rice</td>
</tr>
<tr>
<td>4 March 2008</td>
<td>Vietnam</td>
<td>Ban on rice exports until June 2008</td>
</tr>
<tr>
<td>5 April 2008</td>
<td>Pakistan</td>
<td>No blanket ban but export restraints on private trade</td>
</tr>
<tr>
<td>6 April 2008</td>
<td>Brazil</td>
<td>Suspension of rice exports</td>
</tr>
<tr>
<td>7 April 2008</td>
<td>Egypt</td>
<td>Ban on exports until October 2008</td>
</tr>
<tr>
<td>8 April 2008</td>
<td>Indonesia</td>
<td>Curbs on medium grade rice exports</td>
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</tbody>
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Note: MEP denotes minimum export price.
production. This pressure mechanism is then stock formulated in the sense that it reflects the pressure of consumption or production on available stocks. Since the consumption to inventory ratio, when inverted, reflects inventory coverage, the approach can also be equivalently derived from the supply of storage theory [Kaldor 1939; Working 1949].

\[ p_t = f \left( \frac{s_t}{c_t}, q_t, z_t, u_t \right) \] where \( p_t = \) world price of rice, \( s_t = \) stocks of major importing and exporting countries. \( c_t \) and \( q_t \) are the demand and supply of rice in the world market, respectively and \( u_t \) is the error term.

Larger the inventory coverage, lower is the price and vice versa. In the case of international trade, consumption and production may be thought of as identically equal to world imports and world exports respectively, which are, in turn equal. Therefore, the model reduces to

\[ p_t = f \left( \frac{s_t}{X_t}, z_t, u_t \right) \]

where \( X_t = \) exports of the major countries, \( z_t = \) other explanatory variables and \( u_t \) is the error term.

where worldprice\textsuperscript{Rice} is the real world rice price in $, obtained from the unit values of rice traded, deflated by \( CPI\textsuperscript{ITHA}; \) Stocks\textsuperscript{Majcou} – is the aggregate stocks of rice in all major countries (importers + exporters), which is the sum of the estimated stocks of individual countries; Exports\textsuperscript{Majexp} – is the aggregate rice exports of major exporters (tonne), which is the sum of the exports of individual exporting countries; and Worldprice\textsuperscript{Wheat} – is the real world wheat price in $ (indicator of the general level of world cereals price), obtained from the unit values of wheat traded, deflated by \( CPI\textsuperscript{US}. \) World price is calculated as unit values of trade using the data from the Trade Yearbook of Food and Agriculture Organisation (FAO) and www.faostat.org. Exports and stocks are taken from the PS&B database of the ERS-USDA (Economic Research Service, US Department of Agriculture). The B-G test refers to the Breusch-Godfrey L.M test for serial correlation. (It is not possible to estimate Durbin’s h statistic in certain cases, such as when \( n \text{ variance}(b_1) \geq 1 \)).

Estimation results of the world price equation of rice show that the signs of the coefficients of exports and stocks variables are opposite to those expected a priori but are in conformity with the peculiarities of the world rice market discussed so far. The predominantly precautionary and transactions motives of the Asian governments' stockholding policies and the thin world markets together resulted in the anomalous situation of high stocks and high prices in the world markets at the same time in the past.

The stockholding behaviour of the exporting countries has a crucial bearing on the world markets. When a country (or a group of countries) is engaged in the free trade of a commodity, the pressure of import demand (production in the exporting country remaining constant) is reflected in the depleted stock levels of the exporting country. In this case, a scenario of higher world price-lower stocks-higher exports is
witnessed. It is important to note here that without the rise in exports, the increase in world prices would be even greater.

On the other hand, if the country has a restrictive export policy, which is common in the case of rice exporting Asian countries, then the pressure of import demand manifests in a reverse manner. Higher import demand results in higher world prices. Owing to the predominantly precautionary and transactions motives of stockholding of the exporting country, the rise in price results in the withholding of stocks and decrease in exports. This results in a scenario of higher world price-higher stock-lower exports.

These features are reflected in our results in the figure. Our results show a significant positive coefficient for the stocks variable and a significant negative coefficient for the exports variable.

**Performance**

This excessive precautionary behaviour, albeit strange, is not altogether misplaced for two reasons: first, the large rice consuming populations in these countries, particularly China and India; and second, the high levels of poverty and resultant low levels of absolute consumption in these countries. Given these two factors, Asian exporters could not afford to allow the transmission of international instability into their domestic markets. As a result, these countries withdrew from the international market when the first signs of the price rise became visible. In the past, this often led to bizarre situations of high stock levels in some of the exporting countries (as is the case now in India) and high prices in the world markets at the same time. The major participants in the world rice market, particularly the exporters, appear to be caught in an n-country prisoners’ dilemma game. Every country would be better off if all the countries reduced stockholdings and increased reliance on trade. But any single country would be running a risk if it were the only one attempting this. It is in the interest of every country to have a well-functioning international market. However, each country has preferred to avoid depending on the world market (although outward-orientation has slightly improved in the later part of 1990s), as it is perceived to be risky. This consequently led to a residual, thin and unstable world market. The world rice market desperately needs a seller of last resort to smoothen out the instability.

**Options for the Future**

There are few possible options worth exploring. One is to evolve a global rice reserve system, operated by a multilateral organisation like the United Nations or FAO or even by major exporters on the lines of the Organisation of Petroleum Exporting Countries. The second could be for a non-consuming country like the US to undertake stockholding of rice. Traditionally, the US has always fine-tuned its rice production and subsidy programmes in a way so as to avoid major stockholding of rice, unlike in the case of wheat. The third approach is where large countries like China and India build their own stocks while for the rest of the world there can be a smaller reserve system. This approach is preferable to the other two, given the destabilising potential of these two countries’ consumption. Let us illustrate this with a simple example.

Let there be a large country X with consumption equal to half that of world consumption and let there be no stockholding in country X. Let us also assume that X follows a policy of domestic price stabilisation. Let the total world production be 100 units and the price elasticity of demand be -0.1. Suppose there is a 10 per cent drop (10 units) in world production in a particular year. In the absence of a price stabilisation policy in X, the increase in world prices would be 100 per cent resulting in a decline in consumption equal to five units each in country X and rest of the world (row). However, given the price stabilisation policy of X, there will be no adjustment in the country x. As a result, the row needs to reduce its consumption by 10 units, which is 20 per cent of its normal consumption. For such a drop in consumption to be realised, the price rise has to be about 200 per cent, which is double the price rise if X had not pursued a price stabilisation policy. This example can be easily generalised to more countries. Larger the country X, greater is the destabilising effect of domestic price stabilisation through trade. Given the fact that the two major rice consuming countries, China and India, are large in size with domestic price stabilisation objectives in the interest of the consumers, it may not be totally inappropriate for these countries to build comfortable levels of domestic stocks and rely on international markets only marginally. This is not only in their own national interests (of these countries) but also in the interest of the international rice market stability.

**Conclusions**

The instability in the world rice market can be largely attributed to the predominantly precautionary motives of stockholding by the major exporting countries, which in turn, is linked to the high geographical coincidence of production and consumption and higher levels of poverty in Asia. The world rice market needs a seller of last resort. The possibilities of evolving a global food reserve system or other similar options need to be urgently explored.

**Notes**

1 For details see Sekhar (2006).

2 For detailed econometric modelling of the same, see Sekhar (2006).

**References**


