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## **Rising Global Food Prices: Implications for India**

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## **Rising Global Food Prices: Implications for India\***

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Global food prices witnessed very sharp increase during the year 2007 and they are continuing to rise further. Initially it was thought that the increase in food prices is a part of their cyclical nature, aggravated by adverse impact of weather on production in some parts of the world. However, the continuing surge and level of global food prices seen in recent months make it abundantly clear that the recent trend cannot be attributed to volatility aspect of international prices (Fig 1), and there are fears that food prices may stay at these high levels or may even go up. This is causing worldwide concerns. The severity of problem can be felt from the fact that food prices based on IMF Food Price index increased by 9.5 percent between April 2006 and April 2007 and by 45.6 percent during the next 12 months. The increase has been particularly very sharp for staple foods. Rice prices doubled in five months between Nov 2007 and March 2008, wheat prices more than doubled in 12 months between March 2007 and 2008 and maize prices doubled in one and half year after August 2006.

These increases in prices of staple foods have led to food emergency and rationing in a large number of countries and reports of food riots are pouring in from various parts of the globe. The picture is turning gloomy day by day. The factors being held responsible for high food inflation are (a) diversion of foodgrains for bio-fuel (b) adverse weather and climate change (c) increase in crude oil prices (d) dietary shifts in China and India following improvement in income and living standards and (e) neglect of agriculture for a long time etc. Food prices staying at a very high level after dramatic

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escalation is a clear pointer to the emerging global food crisis. The crisis has generated renewed interest in prophecies made in the past, but often proved wrong, like resource exhaustion by Club of Rome and Malthusian population spectrum.

There is no comprehensive study on why the food situation took a dramatic turn after 2005 and what are the prospects for the future. The present paper analyses severity and underlying causes for emerging food crisis and also ventures to look into future food scenarios. The paper is organised into four sections. The first section discuss various factors that are responsible for the present state of food crisis and examine their impact on increase in prices of staple food. Second section analyse long term trends in food prices with a view to understand the future direction of food prices. It compares similarities and dissimilarities between the present and the previous food crisis to comprehend the gravity and implications of high food prices on food security in future. Third section discuss implications of high global food prices on India. Future prospects of global food supply and demand, and conclusions of the paper are presented in the fourth section.

## **1. Factors Underlying the Food Price Surge**

Most important and direct indicator of food crisis in a market economy is abnormal and persistent increase in real food prices. This could result from factors on the supply side, factors on demand side or both. Supply side factors are shortage in food availability caused either by setback to production or diversion of food for non food use and increase in cost of inputs that go into food production like increase in prices of crude oil and other sources of energy. Factors on demand side are higher use which could result from growth in population, improvement in purchasing power, shift in dietary pattern due to increase in income or taste. These are all real factors. Prices can also increase due to speculative activities and artificial scarcities created by business firm or other entities. Relevance of all such factors in emerging food crisis is discussed below.

### **1.1 Supply and Demand Imbalances**

Long term trend in global food production shows that with the beginning of green revolution, production of staple food started rising at a much faster rate as compared to

growth rate in human population which led to significant improvement in food supply. Per capita annual production of cereals in the world increased from 271 kg during 1961-1965 to 295 kg during 1966-1970, which were the starting years of green revolution technology. The uptrend continued for about two decades (Table 1) and per capita cereal production peaked by mid 1980s at a level of 334 kg per person per year. After mid 1980s growth rate in cereal production slowed down and it started lagging behind growth rate in population eventhough growth rate in population was also coming down. Per capita production of cereals declined to less than 315 Kg during the first eight years of twenty first Century. Though there was some improvement in per capita availability of cereals during last four years (2004-2007) but this increase was not available for use as food and feed, due to diversion of foodgrain for production of bio fuel (Fig.2). When total production is netted out for quantity of corn used for biofuel in USA then per capita production reduces to 307 kg which is lowest during any five years period since 1971. This shows that the shortage of staple food has been building for several years and it became quite large in the recent years.

**Table 1: Trend in per capita cereal production during 1961 to 2007, Kg**

| Period    | Wheat | Rice/milled | Maize | Total cereals |
|-----------|-------|-------------|-------|---------------|
| 1961-65   | 67    | 50          | 77    | 271           |
| 1966-70   | 74    | 54          | 87    | 295           |
| 1971-75   | 90    | 56          | 81    | 308           |
| 1976-80   | 98    | 58          | 90    | 324           |
| 1981-85   | 104   | 63          | 93    | 334           |
| 1986-90   | 104   | 64          | 90    | 327           |
| 1991-95   | 100   | 64          | 94    | 317           |
| 1996-2000 | 100   | 66          | 101   | 319           |
| 2001-05   | 95    | 63          | 104   | 310           |
| 2003-07   | 94    | 65          | 108   | 314           |

Source FAOSTAT and FAO Food Outlook

There are several reasons for this slowdown. First, there was deterioration in terms of trade for agriculture in almost all countries, after post WTO trade liberalisation, which caused adverse impact on private investments in the sector. Two, awfully low international prices of cereals and other foods during late 1990s created a sense of complacency among policy makers and frustration among the producers, This led to

downgrading of priority attached to production of staple foods. Three, overseas development assistance for agriculture development, which was quite important for improving rural infrastructure and for spread of new technology in many developing countries, witnessed very sharp decline. In absolute term in 2004 US\$ ODA declined from US\$ 8 billion in 1984 to US\$ 3.4 billion by 2004 (World Bank 2008 p.41). Four, green revolution technology approached its plateau in many regions towards the end of the last century, and the second generation problem of green revolution marred productivity growth in such areas. Technological breakthrough of similar kind at global level has not been seen in wheat and rice, which are the major cereals, after high yielding varieties of late 1960s. Maize is the only cereal crop whose production is rising faster than growth rate in population (Fig. 3).

Initially, total utilization of cereals in the world adjusted to slowdown in production but as the decline in per capita availability became large, per capita utilization of cereals did not follow the trend in production, and the gap was met by drawing from stocks. As can be seen from Fig 4 total utilisation of cereals exceeded production in all the years since 1999-00 except the year 2004-05 and 2005-06 when production was a little higher than utilisation. This reduced level of world stock of cereals to awfully low level by 2006-07. The ratio of world stock of cereals ending year 2007-08 to trend world utilisation is forecast to fall to lowest level in 3 decades (FAO, April 2008). Past behaviour of international prices shows that they are highly sensitive to level of stock. It would be seen from Fig 5 that change in stock is closely associated with change in price in opposite direction. When stock peaks, prices are at trough and when stock reach trough prices reach peak. Correlation coefficient between level of stock and prices of wheat during 1980-81 to 2006-07 turned out to be  $-0.68$ . As the cereal stock is used as a credible indicator of food scarcity, it affect price as a real factor and also by influencing expectations about scarcity and inflation.

The trend in production and utilization of cereals indicate that increase in imbalance between demand and supply of cereals has been building for a couple of years and it has become a real cause for putting pressure on prices.

## 1.2 Increase in Crude Oil Prices

Increase in price of crude oil, gas and such sources of energy affect almost all sectors. They directly impact cereal prices in several ways; through increase in prices of fertiliser and agriculture chemicals used as inputs in agriculture, increase in cost of operation of farm power and machinery, and increase in transport cost. Between 2004 and 2007 crude oil prices increased by 89 percent and prices of urea (FOB Ukraine) increased by 77 percent.

Long run association between prices of crude oil and food prices can be seen from Fig 6, which presents index of food prices and crude oil price with base 2005=100. This shows that fluctuations in crude oil prices are much higher and bigger than fluctuation in food prices. Second, food prices are not affected by small fluctuations in crude prices but large and consistent decrease or increase exerts very strong influence on food prices. This is evident from the correlation between crude prices and food prices in different phases of trend in crude prices. When crude prices fluctuated around a flat trend then food prices followed almost independent trend, affected by other factors. This refers to the period 1987 to 1999 (Table 2). However, when crude prices followed sharp decline for couple of years then food prices also decline, though less sharply than crude prices (period 1980 to 1986). Conversely, when crude oil prices rise sharply for couple of years food prices also increase sharply as is evident from the correlation for the period 2000 to 2007 which was as high as 0.95.

**Table 2: Correlation between crude oil price and food price index during different phases of trend in crude oil prices**

| Period       | Correlation |
|--------------|-------------|
| 1980 to 2007 | 0.485       |
| 1980 to 2008 | 0.709       |
| 1980 to 1986 | 0.865       |
| 1987 to 1999 | 0.244       |
| 2000 to 2007 | 0.951       |

The impact varies across commodities, regions and farming practices. According to some studies transmission coefficient of crude oil prices on cereals and food is around 0.18 (Baffes 2007). This figure is consistent with another estimate which indicates that energy costs accounted for 16% cost of production in US agriculture (World Bank 2008 p. 66). Therefore, total spillover effect of increase in crude prices between year 2003,

when crude oil prices started rising sharply, and Jan – March 2008, turns out to be 39.4 percent<sup>†</sup>. Food prices in the same period increased by 84 percent. This shows that based on carry over effect estimated by Baffes (2007), 47 percent of total increase in food prices can be attributed to increase in energy prices and remaining 53 percent is attributed to other factors.

### 1.3 Bio fuel Factor

Sharp increase in prices of fossil fuels necessitated search for alternative sources of energy, and liquid bio fuel is seen as a viable substitute. This has been particularly beneficial for developed countries like USA and EU in more than one ways. These countries can give support and subsidies to their producers for producing bio fuel crops for domestic use without inviting the ire of other countries or any question in WTO. Trend towards bio fuel production also helps in reducing subsidies and tariff as it leads to higher prices. Substitution of fossil by bio fuel is also helpful in meeting requirement of Kyoto protocol on climate change to reduce green gas emissions. Most importantly, USA, as a long term energy strategy, is looking for energy security and is working hard to reduce dependence on OPEC and other crude oil exporting countries for energy. Liquid biofuel is seen as an important alternative to achieve this goal. No wonder, close to one fourth of total corn produced in USA was used for bio fuel during 2007-08 as against 11.9% five years back. According to USDA, one third of corn produced in USA would be used for bio energy during 2008-09 (Table 3).

**Table 3: Use of corn for ethanol production in USA, million tone**

| S.n. | Particular                         | 2002-03 | 2007-08 | 2008-09 |
|------|------------------------------------|---------|---------|---------|
| 1.   | Corn used for ethanol production   | 27.1    | 81.6    | 108.9#  |
| 2.   | (1) as % of US corn production     | 11.9    | 24.6    | 32.8    |
| 3.   | (1) as % of global corn production | 4.5     | 11.6    | 15.4    |

# Planned estimate reported by USDA

Source: [http://www.fas.usda.gov/grain\\_arc.asp](http://www.fas.usda.gov/grain_arc.asp)

As mentioned before, diversion of grain as feedstock to produce bio energy in the form of ethanol triggered shift in demand for grains and caused a major surge in their

<sup>†</sup> During this period crude oil prices increased from US\$ 28.85 to 91.92, involving 218% increase.

prices in last two years. The magnitude of impact of diversion of grain for bio fuel can be seen from the fact that, this quantity, equals one third of the global trade in cereals and it can increase cereal availability by 12.4 kg for entire population of the world. If corn alone used for bio fuel in USA is made available as food, it would increase availability of cereals used as food by close to 10 percent for the whole population of the world. It is shown in Fig 2, how diversion of grain for biofuel production aggravated scarcity of cereals for use as food and feed.

#### **1.4 India - China Factor**

A view is expressed in some quarters that dietary changes and increased food intake in India and China due to growing prosperity of these two countries is largely responsible for increase in global food prices. Similar explanation was given by US President George Bush in April 2008, which invited strong counter comments from several Indians, most of whom hold consumption pattern in US responsible for the present food crisis. Changes in dietary pattern due to increase in income has two major dimension. One is simple, i.e. increase in per capita intake itself. The second aspect is that increased consumption of livestock products, that takes place independently or due to shift from low priced calorie food like cereals to high priced calories food like meat and egg, require much higher increase in consumption of cereals or other ingredients. There is wide variation in estimates of conversion ratio of feed to meat depending upon type of meat like poultry, beef, pig etc. The conversion ratio in USA is 7 kg of corn to produce 1 kg of beef, 6.5 Kg of corn to produce 1 kg of pork, and 2.6 Kg of corn to produce 1 kg of chicken (ERS, USDA 2008). This shows that a unit increase in consumption of livestock products generally involves several times more consumption of cereals. The exact impact of dietary pattern in India and China on food price surge can be ascertained by looking at the level and pattern of consumption in India and China and comparing the same with the consumption pattern in USA and the world.

Per capita consumption of cereals, meat, milk and egg in these three countries and world averages are presented in Table 4. It is pertinent here to mention that consumption here indicates total use as food and feed which thus captures impact of dietary change on cereal demand as feed. During the recent three years for which the data is available per



capita consumption of cereals was 175 kg in India and 288 kg in China. Average consumption of cereals in the world is 80 percent higher than that in India and about 10 percent higher than China. This shows that a consumer in India and China consumes much less cereals, as food plus feed, as compared to the world average. Per capita consumption of cereals in USA is 953 kg which is three times the world average, 3.3 times the average of China and 5.4 times the average of India. The main factor behind such a high level of cereal consumption in USA is their meat and egg consumption. An average US consumer consumes 127 kg meat in a year which is more than the quantity of meat consumed by 25 consumers in India.

**Table 4: Per capita consumption of selected food items in India, china, USA and world during, 2004 to 2006: Kg/year**

|             | India | China | USA   | World |
|-------------|-------|-------|-------|-------|
| All cereals | 175.1 | 287.9 | 953.0 | 316.0 |
| Meat        | 5.3   | 56.8  | 126.6 | 40.2  |
| Milk        | 84.5  | 22.7  | Na    | 97.8  |
| Eggs        | 1.8   | 21.6  | 15.2  | 9.7   |

China's meat consumption is higher than the world average and its egg consumption is higher than even USA but milk consumption per person is quite low. China is catching up with developed countries in consumption of livestock product ‡ which could be a factor in pressure on global food demand and supply. It is clear that despite high growth in its economy, dietary pattern in India are not contributing to shortage of cereals which are considered staple food. On the contrary, if global dietary pattern corresponds to that of India there would be a huge surplus of food.

### **1.5 Other Factors**

Increase in prices of food commodities initially and mainly resulted from real factors on demand and supply but these prices in some cases have been driven to astronomical level like rice price crossing US\$ 1000 in April and wheat prices crossing US\$ 400 in March by precautionary and panic action by governments, trade and consumers as well as by speculative investors who smelled high return in this kind of situation. It is being suspected that some Index funds and hedge funds affected by sub

prime crisis in USA have put investments in commodity market. However, impact of such investments is expected to peter out in long run with fundamentals assuming determining influence on market. But some of the recent increase in food commodity prices is because of such and other non real factors.

## **2. Past Experience of Global Food Prices**

The present surge in global food prices is similar in some respects to the price rise witnessed during 1972 and 1973. International prices of staple food shot up by more than 100 percent in a few months during 1972 -73 and skyrocketed for some time for some commodities, particularly in the case of rice. The world then faced serious food crisis. There are some similarities between 1973-1975 food crisis and present food crisis. There are also strong dissimilarities between the two situations which are more important to understand the consequences, severity and duration of the present crisis.

In both the situations rise in food prices started with a very sharp increase in prices of staple foods. As can be seen from Table 5, annual prices of wheat and rice increased by more than 100 per cent between 1972 and 1973 and price of corn and index of food prices increased by 75 and 81 percent. There was further increase during 1974 and after that the prices settled at a new equilibrium which was almost double the average level of prices during 1950 to 1971. The increase in prices during 1973 was very sudden and followed from a single factor i.e. shock due to increase in crude oil prices which affected prices of large number of food commodities at the same time and then spread to non food items also.

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‡ High meat consumption in China is not reflected in cereal use as soybean is used as a major feed for livestock in China. China's imports of soybean increased from about 2 million tonne during 1990 to more than 22 million tonne during 2000 and 2004.

**Table 5: Comparing food price level and increase of 1970s with post 2005 situation**

| Year/month          | Nominal Prices US \$/tone |                     |                 | Food price Index |
|---------------------|---------------------------|---------------------|-----------------|------------------|
|                     | Wheat HRW US\$            | Rice Thai 5% broken | Maize US Yellow |                  |
|                     |                           |                     |                 | Base 1990        |
| 1971                | 64                        | 129                 | 58              | 49.4             |
| 1972                | 72                        | 147                 | 56              | 53.3             |
| 1973                | 145                       | 350                 | 98              | 96.2             |
| 1974                | 187                       | 542                 | 132             | 119.0            |
| 1975                | 155                       | 363                 | 120             | 95.5             |
| 1976                | 138                       | 255                 | 112             | 89.5             |
|                     |                           |                     |                 | Base 2005        |
| 2005                | 152                       | 288                 | 98              | 100.00           |
| 2006                | 192                       | 304                 | 122             | 110.49           |
| 2007                | 255                       | 332                 | 163             | 127.31           |
| January 2008        | 370                       | 393                 | 207             | 153.03           |
| February 2008       | 425                       | 481                 | 220             | 165.53           |
| March 2008          | 440                       | 580                 | 234             | 170.41           |
| April 2008          |                           |                     |                 |                  |
| 1950 to 1971: Mean  | 65                        | 151                 | 54              |                  |
| 1950 to 1971: Range | 57-72                     | 132-206             | 43-63           |                  |
| 1975 to 2005: Mean  | 146                       | 280                 | 110             |                  |
| 1975 to 2005: Range | 107-207                   | 173-434             | 76-165          |                  |

Source: IMF Financial Statistics, various issues.

The recent increase in food prices built over a period of two years and it was not as sudden as the price increase seen during 1973. It is also not due to shock of single factor, but a result of several direct and indirect factors spread over time. Wheat took the lead and its price started rising in early 2006. Maize followed next and then it spread to rice and other foods. Another major difference between 1973 and present situation is that the price increase in 1973 took place when global cereal production was rising faster than growth in population, and green revolution technology, having high potential for output growth in developing countries, was taking off. Food supply during the time of food crisis of 1973- 1974 was rising much faster than growth rate in world population (Table 1) and there was no pressure from output supply side for a big jump in prices. It was purely the raise in crude oil prices which caused upward shift in price trends. In the present situation production of staple food is rising at a lower rate than the population growth and there id added dimension of diversion of grain for uses other than food and feed.

Long term trend in prices of food commodities reveals very interesting pattern. In nominal terms prices of wheat, rice and maize fluctuated around flat trend during 1950 to 1972 (Fig 6 a to c). Wheat prices during this period fluctuated in a narrow band between US \$ 57-72 with average at 65. Rice prices in the same period fluctuated between US\$ 132-206 and maize price between US\$ 43-63. Big jump in food prices during 1973 and 1974 led to completely new equilibrium in grain prices in nominal terms. From 1975 to 2005 food prices fluctuated around new means, which were \$146 for wheat \$280 for rice and \$110 for maize. There were much bigger fluctuation in prices after 1975 compared to 1950-1972 but long term trend remained flat. The prices ranged between \$ 107-207 for wheat, \$ 173-434 for rice and from \$ 76-165 for maize. Wheat price crossed this range during 2007 when it reached all time high level of \$ 255 per tonne. The price touched level of \$ 440 in March 2008 which is --- higher than peak monthly price recorded in the past. Rice price followed much wider swings as compared to wheat. However, rice price at \$ 580 per tonne recorded in the month of March, 2008 is higher than previous peak of monthly prices seen in 1975. The increase in maize price in the recent months is also unprecedented. International price of maize remained above \$ 207 per tonne since the beginning of 2008 which is all time high. Prices in the month of April increased to more than \$ 1000 for rice and \$ 246 for maize.

Recent level of cereal prices indicates a break from the past patterns and there is a clear upward shift in prices. Cereal prices are clearly moving toward new equilibrium. These prices may come down but they are not likely fluctuate around the mean/ trend witnessed during 1975 to 2005.

Another very important aspect of price is their movement in real terms. Past data indicate that cereal prices in the long run moved on a declining trend (Fig. 7). The price spurt witnessed during 1973 and 1974 petered out after a year or two as affect of crude oil prices spread to other spheres of economy. Thus, though there was a large upward shift in nominal prices of cereals in 1973, in real terms prices of staple foods followed a decline and there was no brake in downward trend during 1950 to 2005.

The recent level of prices of cereals show increase even in real terms, though the period is short as yet, as the common deflators like US GDP implicit deflator and WPI of

industrialised countries is rising at less than 3 percent, which is far less than food price inflation.

### **3. Implications for India**

India has so far largely succeeded in insulating itself against transmission of abnormally high global prices of cereals. This does not mean that food prices did not increase here at all. Wheat prices in India increased by about 20 percent between December 2005 and 2006 which is considered quite high. International prices in the same period increased by 24 percent. What is remarkable is that between December 2006 and December 2007 international wheat prices increased by 80 percent whereas domestic prices declined by 1.3 percent. Prices of wheat and rice in global market in first four months of year 2008 increased substantially whereas in India the increase has been negative for wheat and below 6 percent for rice. This shows that staple food prices in India have not been affected by the abnormal increase in international prices, particularly witnessed after mid 2007. This could happen due to (a) increase in food production during 2006-7 and 2007-08, in which favourable weather also played important role, (b) timely and effective government intervention in domestic market and (c) almost complete insulation of cost of crop production from transmission of increase in crude oil prices in international market

As compared to average of 2003-04 to 2005-06, foodgrain production in the country increased by 4.5 percent during 2006-7 and by more than 10 per cent during 2007-08 as per the advance estimates. After the difficulties faced in procuring wheat in domestic market and importing from global market during 2007, government was very careful this time. It completely banned export of wheat as early as .....and after sensing spurt in global prices of rice, export of non basmati varieties of rice was also banned..... to virtually check against transmission of high international prices to domestic market and to check against domestic shortage due to export. Bumper wheat harvest during 2007-08 and various direct and indirect restrictions on large scale purchase by private sector helped maintaining wheat prices at the level of the MSP paid by the government. However, the biggest factor that prevented sharp rise in food prices in India is that fertilizer prices and diesel prices have not been increased in response to increase in

international prices. Global crude oil prices between 2004 and 2007 increased by 89 percent and prices of urea (FOB Ukraine) increased by 77 percent. In contrast to this, weighted price of NPK during 2001-02 to 2006-07 increased by less than 6 percent and urea prices did not increase at all (Chand and Pandey 2008). Similarly, diesel prices in the country during last three years have seen only a nominal increase. It is worth mentioning that about half of the increase in global food prices is due to increase in prices of crude oil. By providing subsidy on fertiliser and diesel India could ensure that increase in global crude oil prices which raised global prices by 47 percent does not affect food prices in India.

The important question now is for how long India can check cost of food production going up by checking rise against fertiliser price and diesel price and how it would adjust to increase in global food prices. It seems India would be forced to raise domestic prices of diesel and fertiliser under the pressure of rising global prices of crude oil which would become a major source of increase in food prices. It would also not be possible for the country under liberalised trade regime to maintain big gap between international and domestic prices over a long period of time. Once international prices settle at some equilibrium, producers group are going to put pressure on aligning domestic prices with international prices.

Looking into the future possibilities of global food prices, India would do well to strengthen food self sufficiency, and develop technologies which are less energy consuming and more energy efficient.

#### **4. Future Prospects**

The main factors for escalation in food prices are increase in price of crude oil, and supplies not keeping pace with demand for many years. Diversion of grain for bio fuel has directly contributed to increased demand and scarcities. Precautionary measures like export bans and rationing taken in various countries exacerbate the price surge. Global cereal harvest is expected to increase by more than 3 percent in 2008 and this has already started showing some impact - wheat price in April down from in April 2008 to in May and pressure on rice prices seems to be easing, but prices are still much higher than the level witnessed in past several years. There is great anxiety and worry about the

future course of food prices particularly of staple food like cereals. Would this crisis last for only 2 years or so like 1973-1975 food crisis, and food prices would return to their previous level. Would higher prices stimulate enough supply response to bring them down? Is this crisis short run or likely to endure? These questions are haunting global community and all other concerned about food security of people.

Any conjecture about future price trend can be made after looking into prospects of supply and demand. Higher food prices would certainly stimulate production but scope of such increase is constrained by factors related to climate change, stress on land, growing water scarcities and hike in prices of fertiliser and energy inputs. The only possibility of large shift in supply or production is through technological breakthrough which raises production function significantly up. There is also a possibility of large increase in food production in Africa which has been bypassed by green revolution. There is some move by China to undertake food production in some African countries. Much of the success would depend upon peace and political stability in African countries. On demand side, population increase is a very big factor which is not being given enough attention. Global population is rising by more than 1.15 percent every year which is net addition to demand for food and which reduces available resources for food production. Similarly, as all scary predictions are being made about crude oil prices, pressure on use of grain for bio fuel as an alternative to hydro carbon energy is going to increase. Increase in crude oil prices, which nobody is doubting, would keep pushing cost of production up and also make transport of food to distant places very costly.

From all available indications it appears prices are not going to return to their earlier (pre 2006) level. Just like experience of 1973-1975, future trend in food prices in nominal terms would have much higher intercept as compared to the trend during 1976 to 2005. However, what causes major concern is, that, unlike the post food crisis years of early 1970s, this time food prices are not likely to decline in real terms. On the contrary there is strong likelihood that food prices in foreseeable future would increase in real term (as indicated by line b-b in Fig. ). Such predictions were made even in the past but they were proved wrong<sup>§</sup> and prices of food during whole of twentieth century followed

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<sup>§</sup> Long back Malthus (1826) and more recently Lester Brown, Paul Ehrlich and Club of Rome prophesied that growth of demand for food was outpacing the growth of supply, and that this would result in upward

a downward trend in real terms notwithstanding occasional price spikes<sup>\*\*</sup>. But it seems really hard to prove Malthus and others, who made such predictions, wrong, this time. Beside green revolution technology what brought real food prices down after 1973-1975 was decline in crude prices in real terms. This fact is rarely acknowledged. With energy prices moving up in real terms, it would not be possible to bring down food prices to pre 2006 level with the present methods of farming. Therefore, global community has to work out coping up strategy to deal with the harsh reality of high food prices.

Some of the possible ways to reduce intensity of price rise are shift towards vegetarian diet and reduced intake of meat which require high conversion of cereal as feed. Alternative like organic farming could also offer some relief from impact of rising prices of fertiliser. World may also be forced to embrace genetically modified food crops which can give higher output per unit of input. Further, as global market become less dependable and freight charge turns too high, food self sufficiency would become crucial for food security, particularly in developing countries, who would not be able to afford costly imported food.

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trend in prices of food and similar agricultural commodities. However, this view has been refuted by the dynamics of demand and supply.

<sup>\*\*</sup> Prebisch and Singer ( ) shows that prices of primary commodities declined relative to prices of manufacturing throughout the first half of twentieth Century and Johnson (1997) showed they have been declining in the second half of Century.



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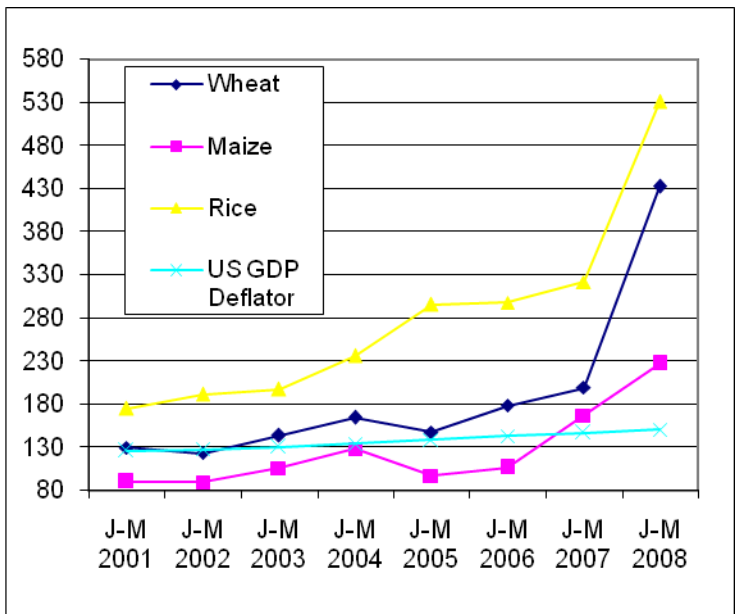
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Fig.1: International prices of staple food commodities and US GDP deflator



Prices in US \$/tonne.  
 GDP deflator with base 190=100

Fig. 2: Global cereal production per person, Kg/year

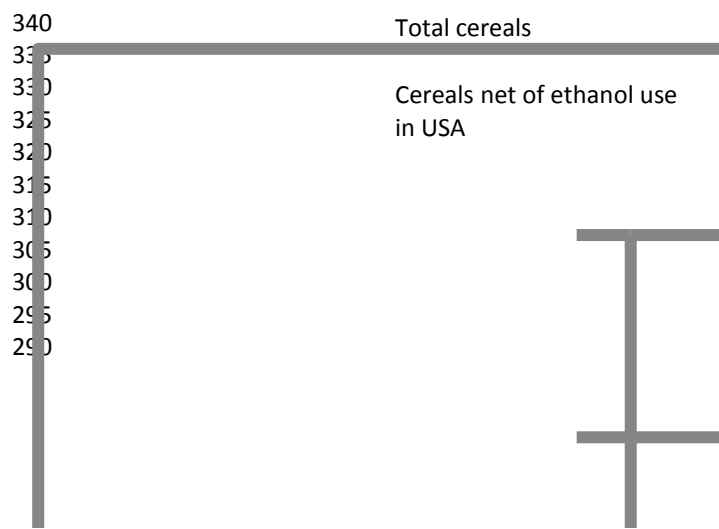


Fig. 3: Trend in per capita production of rice, maize and wheat in the world, Kg/person

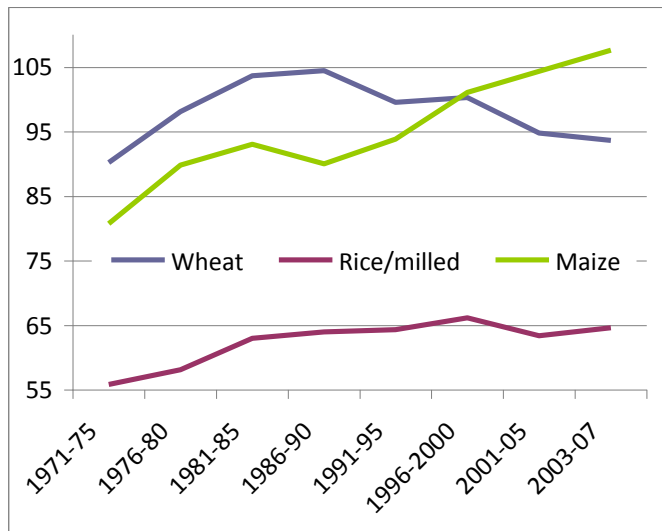


Fig.4: Annual production and utilization of cereals in the world since 1995-96

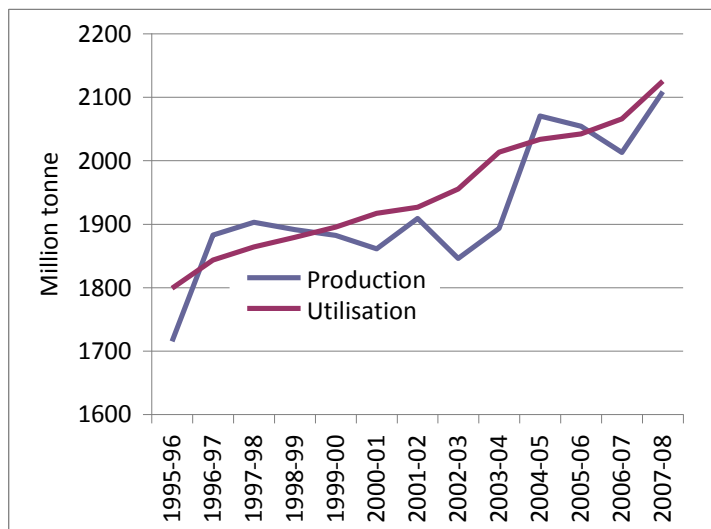


Fig. 5: Global wheat stock and price

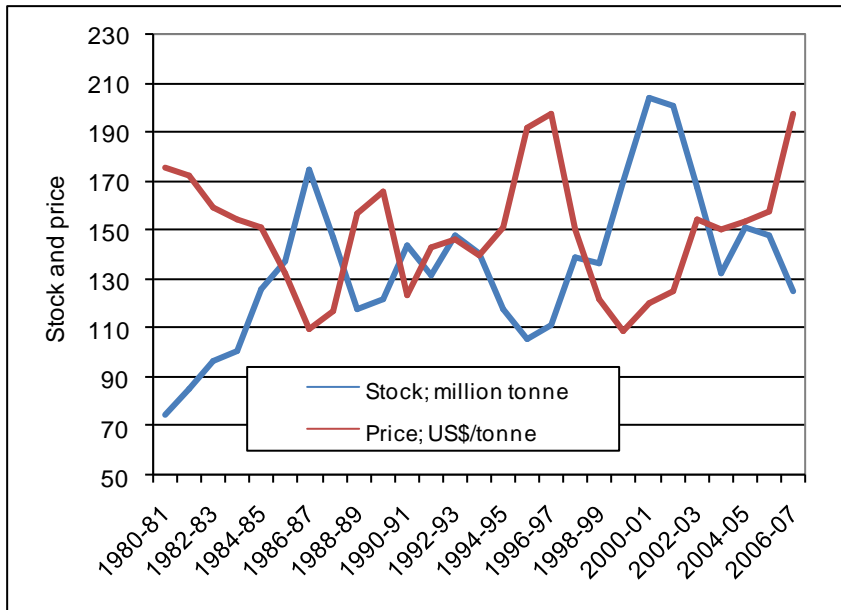


Fig. 6: Long Term Trend in Nominal International Prices, US\$/tonne

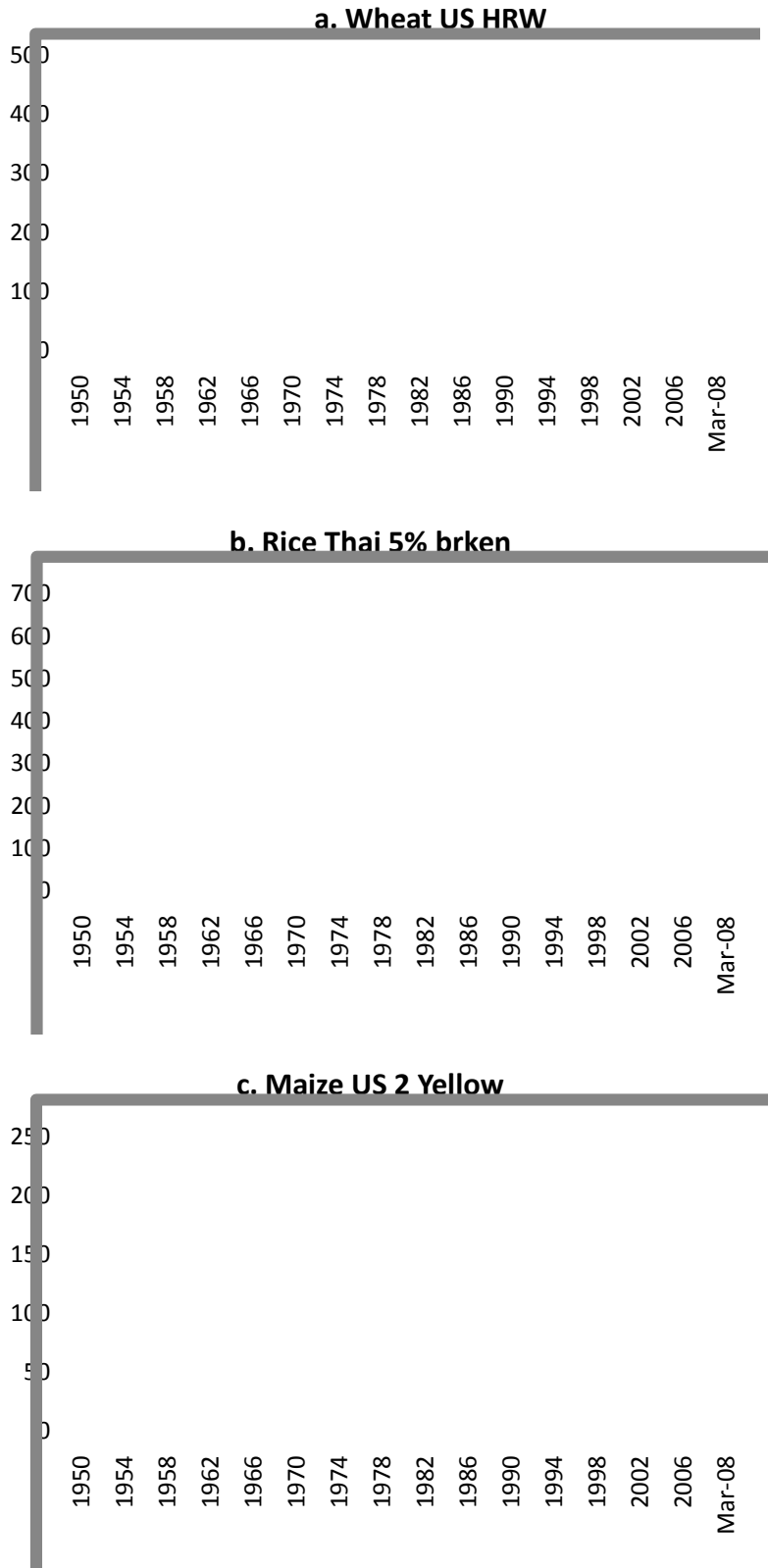


Fig. 7: Long term trend in cereal prices in real term

