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# Government Intervention in Foodgrain Markets in the New Context



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राष्ट्रीय कृषि आर्थिकी एवं नीति अनुसंधान केन्द्र

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# **GOVERNMENT INTERVENTION IN FOODGRAIN MARKETS IN THE NEW CONTEXT**

**Ramesh Chand**

**Policy Paper 19**



**NATIONAL  
CENTRE FOR  
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**Government Intervention in Foodgrain Markets  
in the New Context**

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## FOREWORD

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This report is the outcome of the study on “Government Intervention in the Foodgrain Markets in the New Context” sponsored by Department of Food and Public Distribution, Ministry of Consumer Affairs, Food and Public Distribution, Government of India. The provocation for the study was to identify the reasons for increase in the prices of rice and wheat even during the years following normal and above normal production and seek suggestions regarding fixing price band (temporal and spatial) beyond which government should start direct intervention in foodgrain markets. Besides addressing these limited questions, the scope of the study was enlarged to look into government intervention in implementation of guaranteed prices, maintaining buffer stocks and inter year price stability and to suggest alternatives and options for food management in the country to achieve various goals like cost effectiveness, growth, efficiency, equity and food security. In order to address these issues the study has examined several important aspects relating to demand side factors, supply, technology, foodgrain stocks, inter and intra-year fluctuations in prices, incentives for private trade, cost concepts and norms for fixing support prices, buffer stock and trade options etc. Additional objectives of food management, viz., balanced production, regional equity, growth and efficiency and above all minimum burden on exchequer were also evaluated. It made use of time series data available from various sources and also generated required data through surveys. The study has developed innovative methodologies and analytical techniques to deal with complexities of foodgrain pricing system.

The study discuss positive contributions of food policy followed in the country and indicate the limits beyond which government intervention turns counterproductive. It emphasizes the importance of demand side factors in planning government intervention and favourable environment for participation of private trade in grain markets. The author makes innovative and bold suggestions for reforms in government intervention in foodgrain markets that are consistent with present demand, supply, trade and policy

scenario and which would help in promoting efficiency in production, regional equity, output growth and private sector participation.

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March 2003

Mruthyunjaya  
Director

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This study was initially conceived by Shree M.D. Asthana, the then Secretary, Department of Food and Public Distribution, Ministry of Consumer Affairs, Food and Public Distribution, Government of India. Shree Asthana and other officials of his ministry and concerned departments raised serious questions about government intervention in foodgrain markets in the changed context of liberalisation, which formed the basis for formulating this study. I am grateful to them for suggesting various dimensions of food policy that requires empirical answers. I acknowledge and thank the financial assistance provided by the Ministry of Consumer Affairs, Food and Public Distribution, Government of India, for this study. I have also received prompt and willing support from various officials of the ministry as and when I approached them for any help for the study. In particular I would like to put our appreciation for Mrs. I. Cherian who was ever willing and enthusiastic to extend her cooperation for the study.

Besides me team of other researchers has contributed to the study in various ways. Professor Dayanatha Jha and Dr. M. S. Bhatia contributed to this study as consultants. Professor Jha executed the study in the initial stage and Dr. M. S. Bhatia helped in the analysis relating to inter and intra year price variations. Mr. Linu Mathew Philip, Ms.Sonia Chauhan and Mr. Javed Ali collected the data and helped in tabulation and data analysis work. Their contributions are gratefully acknowledged.

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Ramesh Chand



## EXECUTIVE SUMMARY

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Demand and supply scenario for agriculture in India has undergone profound changes during last 10-15 years. However, farm price policy and policy for food management have not been changed to adjust to new situation. This has created serious imbalances in production and has raised several other problems like accumulation of huge grain stocks, increase in food subsidy bill, neglect of efficiency and quality, setback to private trade and strong regional bias in government support to agriculture. The stage has now reached where current level of rice and wheat production cannot be absorbed at existing level of their prices, while there is massive shortage of edible oils and pulses in the country.

An important reason for strong policy support to grains to continue till recently is that demand projections for grains did not take note of diversification in consumption pattern experienced in rural as well as urban areas. Because of changes in food habits, demand for non cereal foods is rising by more than 50 per cent the growth in cereal demand. Similarly, growth in supply of major commodities like edible oil and pulses has not been keeping pace with the growth in demand. This has resulted in fast growth in import of edible oils while pulse deficit is reflected in both imports as well as in the increase in domestic prices of pulses. There is a need for suitable policy to address these imbalances.

Under liberalised trade, export and import are considered the main instrument for stabilisation of domestic demand and supply. However, due to high volatility in international prices and because of being residual exporter, India could not use trade options very satisfactorily to stabilise supply of foodgrains. The trade option has particularly become difficult to dispose off large stock of rice and wheat in India in international market in the recent years. International prices of grains have dropped sharply even in Rupee terms after 1998-99 but domestic prices have been moving up mainly under the pressure of increasing support prices. This has reduced

competitiveness and profitability of grain exports. India is able to sell its surplus stock in foreign market at a huge subsidy in relation to economic cost and open market prices. Wheat and rice are being released for export at the PDS price for below poverty line households.

In India about 26 percent population is reported to be below poverty line and is undernourished. Cereals are the main source of calorie and food security for such population. Due to slowdown in output of cereals and accumulation of production in the government stock, concerns have been expressed about the availability of cereals particularly to poor in the country. Post 1990 period shows two clear indications relating to cereal production and consumption in India. One, growth rate in cereal production has decelerated to the level of population growth. Two, average availability of cereals has declined in the recent years.

The recent decline in per capita availability of cereals is not a result of slack in production nor it has resulted from export of cereals. This is entirely due to accretion to stock of cereals held by government agencies. There are two reasons for production going to stock rather than being consumed. One, PDS prices during 1990s have increased in jumps and at a faster rate compared to open market prices which has caused a decline in per capita PDS demand in the recent years. Similarly, retail prices of rice and wheat in open have also risen at a much faster rate during 1990s compared to 1980s causing adverse impact on cereal demand during 1990s. Another reason for slowdown in per capita demand for cereals is diversification in consumption pattern, which is associated with improvement in per capita income and shift in food preference.

Rice and wheat are the staple food for Indian population. Therefore, stability in prices of these two commodities has remained an important goal for the country. In the case of wheat, annual change in its output, buffer stock of wheat as on 1<sup>st</sup> July, export of wheat during the year, change in procurement price over the previous year, change in issue price of wheat during the year, and, per capita offtake of wheat for PDS were found to be the main factors explaining variation in monthly and yearly prices of wheat. Issue price of wheat caused stronger impact on open market prices as compared to the impact of procurement price. Buffer stock of wheat acted as a significant

deterrent for inflation in wheat price. Wheat prices are quite sensitive to export. Besides their social welfare impact, issue price and buffer stock are found to be strong instrument in regulating prices and inflation in food.

Unlike wheat, policy variables were less relevant in affecting changes in prices of rice. Intra year price variation in rice was caused mainly by changes in procurement price, quantity supplied through PDS, and rice export. Inter year price variation resulted mainly from changes in output of rice, output of other cereals, procurement price and issue price. Variation in rice output caused much smaller variation in prices compared to that in wheat. Similarly, rice price was relatively less sensitive to export compared to wheat.

As intra and inter year price variations are caused by several factors and their interacting influences, there are instances when prices of rice and wheat had risen very high despite normal or even above normal domestic production. This can happen when combined effect of other variables dominates the effect of production on prices.

The government's procurement, distribution, and buffer stocking programmes are reported to have had negative impact of repressing private foodgrain marketing, undercutting its potential contribution to long term food security. This is further said to discourage modernisation of marketing resulting into losses and inefficiencies. It is being proposed that government should use regulatory mechanism only when price movements are outside the desired price band representing width between the ceiling and floor price, which permits reasonable marketing margin for profitable private sector operations. This underscores the need to evolve new kind of mechanism for government intervention in food grains markets which allows and encourages active participation of private trade but keeps a check on exploitative tendencies of private trade. This can be done by creating the environment which provides reasonable incentive to private sector to operate in foodgrain market. This implies that as long as private trade takes normal margin for delivering the commodities across space and time, government would not intervene in the market. Implementing such mechanism would require developing norms that can be used to find out whether private trade is charging reasonable prices or is indulging in exploitation of consumers and producers. We have prepared estimates of price band between farm

harvest prices of wheat and paddy in surplus states and wholesale and retail price in subsequent months in all major states of the country that are required/justified for participation of private trade in grain marketing.

At existing structure of statutory charges/taxes, and transport and other costs, retail price for wheat in surplus states should be higher than farm harvest price by 36 to 60 percent in various months to attract private trade. In the deficit state like Maharashtra, retail price before harvest need to be more than double the farm harvest price in surplus states to provide reasonable incentive to private trade. Similarly the band suggests that retail prices of rice should be 96 to 213 percent higher than the farm harvest price of paddy to attract private trade to buy paddy and supply rice in various months and in various states. Price difference beyond this band would imply exploitation by private trade which would need government intervention. Transport cost and statutory charges are the main element of price spread and price band can be narrowed down by curtailing these costs.

In order to bring stability in prices and farm income, it was considered imperative to maintain buffer stock of grains which involved purchases from the market during the good harvest years and releasing stock during lean years or when production is below envisaged trend. Purchase from market and release of stock in this manner ensures that supply of produce in the market would move on a smooth trend. If growth in demand keeps pace with the envisaged trend in supply then purchase/release of stock based on deviations from trend level of production would ensure perfect balance between demand and supply assuming closed market. This should ensure that there is no disturbance to price stability as far as genuine factors on demand and supply side are concerned.

Based on this logic, deviations in actual production from stipulated trend should serve as a basis for quantity of grain to be purchased and buffer stock needed for maintaining inter year price stability. During the decade of 1990s fluctuations in cereal output declined considerably as deviations from normal production remained below 7.06 million tonne on either side. However, procurement by official agencies during 1990s rose sharply. Like the increase in procurement of foodgrains by government, level of buffer stock of cereals has also moved up over time. Thus, reduction in instability

in cereal production in the country was not accompanied by decline in quantity of output purchased by government and buffer stock.

Assuming that private trade would not play major role in maintaining inter year price stability, government can base its decision to buy above normal output on advance estimates of production available around harvest time. This would be given by deviation of estimated output from stipulated trend, which can be estimated quite reliably for medium term. Similarly, level of buffer stock for such purpose can be worked out from negative deviations of actual output from stipulated trend which indicate that buffer stock of around 7.63 million tonne is sufficient to make up for the decline in cereal output from normal level.

Total requirement for PDS is estimated to be 21 million tonne per annum. Procurement for PDS would be a continuous exercise requiring purchase of rice and wheat each year. Thus, maximum level of buffer stock should be 18.13 million tonne which is sum of stock needed for PDS for six months and highest shortfall observed in grain production during the recent 10 years.

Government ensures guaranteed prices to producers by buying grains delivered at the support price. If support price is consistent with demand and supply for the given commodity, then competitive market should ensure that market price does not go below the level of support price. In such a situation there would be no need for government procurement to ensure minimum price to producers. In case market price determined by supply and demand does not leave adequate margin over support price, private trade would not buy the produce at support price, howsoever competitive the market may be. This can happen when growth in demand does not keep pace with the supply and, support price is fixed based on supply side factors. This is exactly what is being experienced in the case of cereals in the country.

To the extent deficiency of cereal demand is resulting from long run changes in consumption pattern, prices would not be very potent instrument for boosting demand and for restoring balance between demand and supply. The solution lies in adjusting supply to demand.

If demand for cereal remains deficit and cereal output increase to their normal (trend) level then required decrease in price to maintain balance between supply and demand works out to be enormous. This kind of purely price based solutions would result in steep decline in crop income and would cause adverse impact on agriculture sector which is already under threat due to trade liberalisation and, is not able to cope up with low level of international prices.

The best way to ensure remunerative prices to foodgrain producers and reducing unwanted surplus in future is to take measures that result in some shift in resources from cereals to non cereal enterprises and encourage growth of cereal output in efficient producing regions. This strategy should not be based only on reducing profitability of grain production by lowering their prices, but it should involve developing and providing alternatives which are more remunerative than cereals.

Experience shows that mere announcement of higher support prices for commodities, which are not effectively backed up by procurement arrangement, does not serve the purpose of raising level of prices received by producers. Therefore, attempts by CACP to raise support prices of crops like edible oils and pulses, in which India is deficit, relative to support prices for rice and wheat which are in excess supply, cannot be expected to result in shift of resources from rice and wheat to the deficit crops.

Another serious criticism of government intervention in grain markets is that the regional concentration in government procurement of grain has remained quite strong. Proportion of marketed surplus procured by official agencies across states vary from below 2 percent to more than 85 percent. During recent years there have been frequent reports from states of Orissa, Madhya Pradesh and Bihar about distress sale of rice and maize below MSP. These states have been late adopter of new technology. Though they are food deficit at aggregate state level, several growth pockets have emerged in these states having surplus foodgrains. These pockets are in the first stage of green revolution and agricultural development, when private trade and market institutions are not in place to provide incentive to encourage adoption of new technology and hence output growth. Agriculture growth would get a serious setback in such areas if institutional support in the form of guaranteed price is not provided.

Several reasons are responsible for accumulation of grain stock much above the genuinely required level. First, during the decade of 1990s procurement prices of rice and wheat were given unjustifiable hefty increases much higher than the increase in general prices. As demand side factors did not support this increase in price, growth in retail prices started trailing behind the growth rate in largely government influenced wholesale prices. This caused adverse impact on the margin of private trade which slowly started withdrawing from the market. Accumulation of cereal stock with government agencies created a feeling that release of excess stock can anytime depress open market prices. These two factors led to withdrawal of private trade from grain markets in surplus states causing increase in procurement by government agencies, even when there was no shortfall in production. Another reason for reduced role of private trade in direct purchases from producers is the release of stock for open market sale and export at a much lower price than what would be the unit cost of rice/wheat to private trade from direct purchases from producers. This created perverse incentive to private trade - not to participate in primary market and buy from government rather than buying produce from producers.

Second, increase in PDS prices and diversification in food consumption habits led to demand deficiency resulting in diversion of production to inventory. Third, steep decline in international prices of cereals since 1997 has caused adverse impact on export of cereals and excess stock could not be smoothly sold in international market.

Unless excessive stocks are liquidated, grain markets in India would continue to remain in trouble. In addition to options like increasing BPL quota, expanding employment generation programmes and universal PDS at BPL prices in calamity affected areas, some other options also need to be tried. Very old stock that has deteriorated in quality should be disposed off as a feed in international and domestic market at whatever price it can fetch. If still excessive stock remains, some of it should be given as food aid to needy countries.

Buffer stocks have been used by the government as an important instrument for the purpose of price stabilisation. However this involved heavy cost in terms of procurements, handling, carrying, storage etc. which is becoming fiscally unsustainable. As an alternative it has been suggested

that government should use the instrument of variable levies on external trade to stabilise domestic prices. A comparison of domestic stabilisation measures and trade shows that selling and buying wheat in international market to stabilise domestic output does not result in large changes in international prices of wheat due to large volume of world trade in wheat. However, in the case of rice, stabilising domestic supply through trade caused sharp fluctuation in international price of rice. Among the two options viz. domestic stabilisation through buffer stock and stabilisation through trade the latter is found to be costlier than domestic stabilisation in most of the years though it also depend upon fluctuation in international price. If the relationship between domestic and international price in future remains the same, as observed during the last 26 years, then policy of price stabilisation through buffer stock seems to be better option than trade.

Food Corporation of India has remained in the centre stage of government intervention in agricultural marketing due to scale of its operation and due to its role in food security. Though this agency has played significant role in ensuring guaranteed price, and hence in adoption of improved technology in traditional green revolution region, its cost of operation and efficiency have remained subject of criticism and are seen as the main factor for mounting food subsidy in the country. The economic cost of FCI that is often used to justify its operation, does not take into account implicit value of quality deterioration of produce at various levels. This happens due to purchase of lower than specified grade of produce, weight manipulations at points of purchase and dispatch, excessive charges of FCI contractors, and adulteration and supply of poor stuff under levy and custom milling of rice. Deterioration in value of produce resulting from such practices is the main source of leakage in FCI operations and is not reflected in cost or price calculations. The produce gets sold because it is offered to various states at a subsidised price and the difference between economic cost and issue price is shown as food subsidy. This way the inefficiency of FCI is concealed.

The inefficiency and high cost of FCI are often used to make a case for winding up FCI and to pave the way for greater private sector participation. In this context it is worth mentioning that in the absence of public agencies, private trade may turn out to be exploitative and what now go as inefficiency



of FCI would go as excessive profit of private trade. Therefore this public agency should be retained but it should plan its operations in such a way so as to keep check on private trade to exploit market situations. However, the area of operation of this parastatal should be reduced and its efficiency should be improved by modernisation of its operations on scientific lines and by imparting professionalism to its management.

Minimum support prices for various commodities must reflect the society's preference for the produce and should promote efficiency and quality. In the present form the guaranteed prices have given rise to several problems. As it is not feasible to ensure price guarantee for every crop, only selected crops should be covered under MSP.

In the long run, country needs to develop new mechanism to provide protection to farmers income. Achieving this objective through price intervention alone results in several distortions. Government should provide support to develop viable crop insurance for protecting crop income.

Due to changes taking place in consumption basket of food, there is lot of emphasis to develop technologies that promote diversification of agriculture sector. Price interventions should be such as to encourage agricultural diversification to address imbalances in Indian agriculture.

When the emphasis of production is shifting from food security to market led production, it is not justified to base MSP on cost of production. Similarly, there are concerns relating to definition of cost of production on which MSP should be based. Some of the cost concepts like Cost C3 are such that the price based on those is not quite relevant to qualify as "minimum support price". There is a need to develop more relevant norms/ criteria for price support.

There could be cases where private trade turns out to be exploitative and farmers are paid price below MSP. One way to address this kind of situation is to compensate farmers through "deficiency price payment" a part of the difference between actual price received by farmers and MSP. Similarly, it is not possible to carry out procurement in all the markets in the country to ensure MSP, and, stock position may not justify procurement in some years.

The system of deficiency price payment can work as an alternative to procurement operations in such situations. This would help in preventing unwanted stocks and help in providing price incentive to producers in all the regions considered relevant for the purpose. Thus the system of “deficiency price payment” can help in achieving economy in procurement and regional equity in implementing guaranteed price.

The system of deficiency price payment should be implemented for the produce sold through regulated markets in all surplus generating areas using district as a unit for determining surplus area. In order to ensure that resale of produce does not take place, the magnitude of deficiency payment should be kept less than the charges involved in first sale of produce like mandi fee, auction, labour charges etc. This kind of mechanism would not suffer from problems like regional bias and excessive stocks.

Government intervention should be such that it promotes private trade and competition. With the development of countrywide transport and communication network, availability of different items has improved considerably in all parts of the country. Therefore, if incentives are favourable, private trade should be able to supply grains everywhere including remote areas.

Government intervention in the form of procurement should be selective. In a normal production year, quantity of procurement should not exceed PDS requirement. There is a need to maintain food security buffer stock which should be maintained by purchasing grains during above normal production and releasing stock during low harvest years. The level of buffer stock around 7 million tonne would be adequate to meet supply shortfalls in most of the years.

The amount of foodgrains needed for PDS supply and inter year price stabilisation should be purchased through competitive bid from the markets where prices are ruling lowest.

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# 1 INTRODUCTION

Institutional intervention of some kind in foodgrain marketing and trade in India has a long history and it has passed through several phases. The strongest intervention began in mid 1960s, which has been very closely associated with changes in agricultural technology. Due to various factors like, succession of bad harvests, massive food shortages and near famine like conditions in some parts of the country, challenges to national integrity due to dependence on food aid, and costly food imports, the then government decided to follow policy of self sufficiency in food. This coincided with the advent of new seeds of high yielding varieties of wheat, which later came to be known as green revolution alongwith similar breakthrough in rice. Adoption of these new seeds involved use of modern inputs and investments on the part of the farmers. This made it necessary to create incentive and favourable price environment for the farmers who adopt the new seeds. To achieve this, two new institutions, namely Agricultural Prices Commission (later on renamed as Commission for Agricultural Costs and Prices) and Food Corporation of India, were created that have dominated India's food administration ever since (Broca 1999).

Agricultural Prices Commission (APC) was set up in 1965 to advise the government on a regular basis for evolving a balanced and integrated price structure. While formulating such policy the Commission was required to keep in view (a) the need to provide incentive to the producers for adopting the new technology and maximising production and (b) likely effect of the price policy on cost of living, level of wages and industrial cost structure. The policy has been quite effective in encouraging adoption of new technology in the areas well endowed with irrigation and helped in achieving high growth in production of wheat and rice. This made the situation on foodgrain front comfortable, as a sort of balance between demand and supply was in sight by 1980 (Acharya 2000).

With the easing of strain on foodgrain production it was rightly thought to follow policy that leads to balanced allocation of resources towards various

enterprises. Thus terms of reference of APC were changed in 1980 to shift emphasis from maximising production to developing a production pattern consistent with the overall need of the economy. The Commission was also renamed as Commission for Agricultural Costs and Prices mainly to satisfy the demand from farmers groups that the Commission fully accounts for cost of production while making recommendation on support/procurement price.

Commodities covered under minimum support price (MSP) and thus having the price guarantee are: paddy (rice), wheat, sorghum, pearl millet, finger millet, maize, ragi, barley, gram, pigeon pea, moong, urad, tur, rapeseed/mustard, toria, groundnut, sunflower, soybean, sesamum, nigerseed, cotton, jute, copra and tobacco while sugarcane is covered under statutory minimum price (SMP). It is illegal for anybody to purchase the commodity at less than its minimum support price when the commodity is covered under the system of statutory minimum price. Apart from major commodities, support price has been extended to some commodities like onion, ginger, potato, castor seed, and some fruits in some states under market intervention scheme.

Here it is pertinent to mention that mere announcement of MSP does not automatically guarantee that the price would not fall below MSP. According to various *Reports of the Commission on Agriculture Costs and Prices*, there are instances of market prices ruling below the support price in some markets for some crops. This shows that mere announcement of support price does not serve the purpose of checking price level falling below the floor if it is not backed by proper market intervention. Experience shows that institutional intervention in ensuring guaranteed price is effective only in those regions and crops where government or public sector agencies procure the concerned commodities in a big way. For instance, official agencies procure wheat and paddy in Punjab and Haryana in a big way, and if price of maize or sunflower in these states fall below the minimum support price there is hardly any intervention by the official procurement agencies. Similarly, if wheat price in markets in say West Bengal or Bihar falls below MSP there is no intervention by official agencies. The purpose of these illustrations is to bring home the point that MSP without effective procurement or intervention apparatus does not guarantee that prices would not fall below the floor set by the government. Implementation of MSP

shows that rice and wheat are the main beneficiaries from the policy while cotton at large and edible oil and pulses in some pockets have also benefited from the policy.

During recent years there have been frequent reports from states of Orissa, Madhya Pradesh and Bihar about distress sale of rice and maize below MSP. These states have been late adopter of new technology. Though these states are food deficit at aggregate level, several growth pockets having surplus foodgrains have emerged in these states. These pockets are in the first stage of green revolution and agricultural development, when private trade and market institutions are not in place to provide incentive to encourage adoption of new technology and hence output growth. Agriculture growth would get a serious setback in such areas if institutional support in the form of guaranteed prices is not provided.

One of the serious criticisms of price support policy has been that it has favoured mainly rice and wheat and even in these crops it has favoured the regions which were early adopters of new technology. There is a need to discuss how MSP can be made effective in various commodities and in major producing regions. As it is not feasible to ensure that prices would not fall below MSP in any commodity, can we think of criteria as to what crops should be covered under MSP. Some scholars (Vyas 2000) have suggested that crops which can be considered as price leader or the crops for which technological breakthrough is imminent ought to be covered under the MSP and other candidates for support price would be the crops grown in high risk environment. Vyas further adds that in all these cases MSP should be treated as a transient measure *i.e.* till we are able to have viable crop insurance and or forward trade programme.

Due to changes taking place in consumption basket of food, there is lot of emphasis to develop technologies that promote diversification of agriculture sector. There is thus a need to plan price interventions that encourage agricultural diversification.

There is also a need to discuss criteria on which MSP should be based in the changing context. The popular perception is that MSP is determined based on cost of production. When the emphasis of production is shifting

from food security to market led production, is it justified to base MSP on cost of production. Similarly, there are concerns relating to definition of cost of production on which MSP should be based. Some of the cost concepts like Cost C3 are such that the price based on those represent “Profitable Price” rather than “minimum support price”.

Government has been seriously influencing structure conduct and performance of rice and wheat markets in various ways like procurement by public agencies, maintenance of stock and distribution etc. To ensure implementation of guaranteed price and to stabilise prices and to run public distribution system, government procures large quantities of foodgrains through FCI and other official agencies from market at a procurement price, which is invariably same as the minimum support price. This blurring between MSP and procurement price has come under severe criticism. It is argued that in order to procure required quantities for PDS and buffer stock, such market conditions are created wherein prices are artificially forced down to the level of procurement prices by measures like putting stock limit, denial of credit, not supplying railway wagons and restrictions on movement of commodities (Johl 1995). The second consequence of this is that government is forced to buy whatever produce comes in the market irrespective of its requirements. Thus government has to carry excessive stock which is again sold back after some time for free sale in the market. In this process government has to bear the losses due to quantity and quality deterioration, and inefficient handling and transportation of the produce by the official agencies. It is thus argued that procurement price and MSP should be different. Under this kind of dispensation, government should announce MSP which will provide for only variable cost plus some margin and protect farmer against seasonal price slumps due to gluts. The procurement of quantity required by government should be done at open market price determined by supply and demand in a distortion free market environment. This would have the advantage of buying only the needed quantity, whereas, in the present policy government has been buying whatever is offered for sale (Mahendra Dev 1997).

The foodgrains procured by public agencies are sold either through PDS or at open market price. This system has attracted lot of criticism in the recent years mainly on the ground of efficiency and heavy losses incurred by the

public agencies (Gulati et al 2000; World Bank 1999). The government's procurement, distribution, and buffer stocking programmes are reported to have had negative impact of repressing private foodgrain marketing, undercutting its potential contribution to long term food security (World Bank 1999). This is further said to discourage modernisation of marketing resulting into losses and inefficiencies. The World Bank (1999) study proposes that government should use regulatory mechanism only when price movements are outside the desired price band representing width between the ceiling and floor price, which permits reasonable marketing margin for profitable public sector operations. Expenditure Reforms Commission (ERC) set up by the government also recommends that state governments and private trade should be encouraged to enter procurement, trade and export of foodgrains through an assurance of continuity of policy over the next 15 years.

How this shift from public sector dominance in foodgrain trade to private sector would affect farm level prices and price stability? What is the appropriate price band beyond which government should intervene into the market? What are the implications of this band for consumers? These are some of the questions which need to be discussed to understand the implications of proposed changes in government intervention in grain trade.

According to the World Bank study (1999) there is considerable scope to reduce the price spread by modernisation of storage, handling, processing and other processes involved in foodgrain marketing. Two major items of price spread are statutory charges and transport cost. It has been observed that that the proportion of produce sold through regulated markets is on a decline and there is growing tendency to sell produce through informal markets (Maheshwari 1998) to avoid market charges and taxes in regulated markets. This is also happening because of declining credibility of regulated markets to provide competitive price to producer sellers.

There were several formal as well as informal restrictions on inter state movement of agricultural produce, stocking and trading till recently. Even when all requirements are fulfilled there is harassment by official machinery, and one cannot get away without making payment at several places. The consequences of this are: slow movement of produce from surplus to deficit

markets, low market integration, depressed prices in producing areas and high prices in consuming areas.

There is system of levy under which millers are required to sell a part of rice milled by them to the government at a price derived from procurement price. The levy on rice is as high as 75 percent in agriculturally progressive northern states. Millers often complain that after contributing as high as 3/4th of rice, at a price which is often below open market price, they are left with small produce to run their business. In reality, the levy component of rice is an important source of economic cost, food subsidy and inefficiency of Food Corporation of India in the rice marketing. What the millers do is that they retain best grade rice with them and supply inferior, broken, adulterated rice to FCI which would sell at a very low price in open market. Except at a subsidised price under PDS, such stock would not be lifted by states for their consumers. Same is the case of custom milling<sup>1</sup> of paddy.

Country has been following a policy of maintaining buffer stock to meet the PDS requirement and for price stabilisation in the wake of year to year fluctuations in production. Maintenance of buffer stocks involves heavy cost on exchequer and suggestions have been made to explore other alternatives for price stabilisation and food security. Some scholars find that option of variable levies turn out to be far superior compared to buffer stock in stabilising prices under liberalised trade (Jha and Srinivasan 1999), whereas, some other studies find that imports turn out to be much costlier than what appears from international price when country of India's size go for importing food commodity to meet its deficit (Chand 2000).

As per the recommendation of ERC a national food security buffer stock of 10 million tonne comprising 4 million tonne of wheat and 6 million tonne of rice should be maintained at all times. The Commission further recommends that objective of procurement policy should be to maintain food security buffer of 10 million tonne and availability of 21 million per annum for distribution through PDS. This way, total buffer stock should not be more than 21 million tonne.

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<sup>1</sup> Refers to the arrangement under which paddy procured by FCI is got milled from private rice mills



Such restrictions on buffer stock and proposal to reduce role of FCI in procurement for PDS might affect enforcement of MSP. In such situations where should FCI concentrate its operations? Should it continue to procure needed quantity from the traditional regions from where it has been buying earlier or it should shift focus to newly emerging growth pockets.

Several agencies in public sector are involved in the procurement, storage and distribution of foodgrains. Prominent among them are Food Corporation of India (FCI), Warehousing Corporations and state level agencies. Among all these agencies Food Corporation of India has remained in the centre stage of government intervention in foodgrain marketing due to scale of its operation and due to its role in food security. Though this agency has played significant role in ensuring guaranteed price, and hence in adoption of improved technology in traditional green revolution region, its cost of operation and efficiency have remained subject of criticism and are seen as the main factor for mounting food subsidy in the country. Some studies find that FCI cannot be blamed for high cost of foodgrain handling and distribution and economic cost of its operation turns out to be lower than the private trade if latter pays same statutory charges and serve the same purpose which former has been doing (Acharya 2000). Similarly, Madhura Swaminathan (1999) also finds that costs of FCI were justified and that this organisation is vital for food security of the country. In contrast to this, some other studies conclude that there are several negative effects of government of India's foodgrain marketing policy and operations of FCI which are found to be increasingly costly and inefficient. Technical and managerial inefficiencies in FCI operations are said to be responsible for its high costs (World Bank 1999).

Government has also been intervening directly as well as indirectly in external trade in foodgrains. Though quantitative restrictions (QRs) like quotas and licenses or canalisation through some trading organisation have been relaxed to meet WTO commitments there is still considerable government influence on import and export of foodgrains. Through its procurement policy and stock operations government exercises considerable control over the price at which rice and wheat are available for export. Similarly, imports of foodgrains are subjected to certain stipulations.

The present system of intervention in foodgrains market has come under serious question in recent years. It is felt that the cost of such intervention as reflected in food subsidy bill is mounting year after year and is causing severe strain on country's fiscal resources. There are reports of leakages in the PDS due to which the benefits accruing to target beneficiaries are said to be far from the cost involved (Radhakrishna and Subbarao 1997). Concern is also expressed about the efficiency as well as desirability of scale of procurement, buffer stocks and distribution system of foodgrains by public agencies in the fast liberalising economic world.

There is a strong feeling that in the new economic environment where buying and selling from international market would be much easier compared to the past the country need not procure large quantity and hold large buffer stock of foodgrains to meet domestic needs (Krishnaswamy 1994). It has also been demonstrated by some studies that trade is an important alternative for price stabilisation than the present policy of buffer stock (Srinivasan and Jha 1999). Suggestions are also made for increased role for private trade to bring in efficiency in foodgrain marketing system. The biggest criticism of government intervention in grain markets is that it has resulted into piling up of huge stock of grains with government which are unwarranted and are causing huge losses to state exchequer. This has put the country into a paradoxical situation where more than 60 million tonne grains are lying in government stock but one fourth of country's population is not able to have access to even minimum required food.

Though scattered information about various aspects of government intervention in food markets is available in pieces no study in recent years has taken comprehensive view of government intervention in food management that encompasses producers interest, consumers interest, food security, cost to state exchequer etc. In the absence of this, ad hoc and subjective methods have often employed in procurement, buffer stocking and in issuing/releasing stocks.

In the light of this and in the light of different alternatives, which are now available to meet objectives of food policy, it has become imperative to explore more efficient ways of intervention in foodgrain markets. The present study is an attempt in this direction. Since there was no precedence

for this study, it had to innovate methodology to find answers to pressing and difficult questions of policy relevance.

The study focused on following objectives:

- (1). To estimate region-wise price bands between harvest prices and prices during the lean months that provide reasonable incentive to private trade in rice and wheat marketing.
- (2). To suggest intervention strategies to maintain reasonable price band between farm harvest and retail prices of rice and wheat over different months between harvest season and subsequent pre harvest season.
- (3). To analyse the factors underlying intra year price fluctuations and explain the paradox of abnormal price rise during normal production.
- (4). To explore and compare different alternatives to ensure incentive prices to foodgrain producers and reasonable prices to consumers.
- (5). To assess various options to deal with year to year fluctuations in foodgrain prices arising out of production variability.
- (6). To suggest specific strategy for market intervention to reduce the level of fiscal burden without jeopardising country's production capability and food security.

## **1.1 Scope of the Study**

The study maps wheat and rice production and consumption in various states of the country and identify deficit/surplus regions and sources to meet the deficit demand under different production scenarios. It uses the data for the past 10-15 years for representative markets throughout the country to estimate spatial and temporal cost of wheat and rice marketing. Based on this the study estimates the price spread that provide reasonable incentive for trade in rice and wheat. The study evaluates benefits and costs of government intervention in foodgrains markets in India. It compares the cost of foodgrain handling/marketing by official agencies vis a vis private trade. The study also discusses the impact of current intervention policy on wholesale and retail prices in different regions of the country and compute the level of stock required to maintain price stability. It also compares the cost of price stabilisation through buffer stocks with price stabilisation

through import/export and suggests the strategy that put minimum burden on public resources. This has been attempted through evaluation of alternative price stabilisation mechanisms. The results have been used to suggest optimal level of buffer stock at different times of the year and to propose cost effective strategy to respond to changes in market price signals.

## **1.2 Organisation of the Study**

The study is organised into six chapters including the Introduction. The second chapter discuss the emerging scenario of food demand, supply, trade and marketing. Factors affecting intra and inter year changes in prices of rice and wheat are identified in Chapter 3 and their effect is also estimated. The chapter also explains abnormal increase in price during normal and above normal production. Price band between farm harvest – wholesale and retail prices in deficit and surplus states and over various months that would enable private trade in grain is presented in the fourth Chapter. Chapter 5 undertakes detailed discussion on various aspects of government intervention in food management and suggests options and policy changes for food management relevant in the present context. Study conclusions and policy recommendations are summarised in the last Chapter.

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## **2 EMERGING FOOD DEMAND, SUPPLY, MARKETING AND TRADE SCENARIO**

Indian agriculture in the beginning of 21<sup>st</sup> century is facing some serious contradictions and challenges. On one hand the country has 60 million tonne of foodgrains in public stock and on the other hand every fourth Indian is reported to be underfed and does not get even minimum calorie required by human body. Similarly, the country is facing massive shortage of pulses and edible oils, which is met through imports, having detrimental effect on the producers in the unfavourable dryland areas, whereas, surplus of wheat and rice is being sold as export at a great cost to the state exchequer. These imbalances are causing serious concern to the country.

The reason for emergence of demand and supply imbalances in Indian agriculture lies mainly in technological and policy factors. The technological breakthrough of green revolution category has been highly biased towards cereals, particularly wheat and rice, which raised their relative profitability and has led to large shift in land and other resources away from other crops. The technological advantage has been further provided strong policy support through remunerative and assured prices for select cereals. This way, rice and wheat enjoy not only productivity advantage but also enjoy stable and assured economic environment. This combination of technological breakthrough and strong policy support has served the important purpose of ushering in a sort of food security in the country. However, the stage has been reached where current level of rice and wheat production cannot be absorbed at existing level of their prices while there is massive shortage of edible oils and pulses. How can these imbalances be corrected? What are the policy options to change the existing production pattern in the desired direction? What kind of input - output pricing policy related to subsidies and price intervention is required to restore balance in structure of agricultural production? These are some of the challenges requiring urgent policy attention. Other challenges confronting policy makers in the area of food policy are: (a) providing growth impetus to agriculture in hitherto underdeveloped regions (b) availability of food to weaker sections of the society at affordable prices (c) preparing farm sector to face competition

from trade liberalisations and (d) maintain price stability and ensure remunerative prices to producers.

## **2.1 Food Demand and Requirements**

Precise information on future food demand trends and requirement is essential for formulation of food policy. There is lot of confusion about future requirement of food in India, which stems from following reasons. One, the estimates on demand projections by various experts show large divergence. Two, demands for food is often considered synonymous with demand for foodgrains or even cereals. Sometimes very narrow view of food security is taken by looking at availability of only rice and wheat, which creates an erroneous impression about food security. Thus, when the concept of food is taken in proper and broad sense, which includes fruits, vegetables, animal products etc., it may give entirely different demand scenario compared to the one which equates food to grains alone.

### **2.1.1 Demand projections**

Two sets of estimates giving demand projections for food towards the year 2020 have been widely discussed in the recent years. One set is based on the study by Bhalla, Hazell and Kerr (1999) published by Washington based International Food Policy Research Institute (IFPRI) and the other one is based on the study by Kumar (1998) published by Indian Agricultural Research Institute, New Delhi. The two sets basically differ on two counts viz. estimates of expenditure elasticity, which is at the core of demand projection, and estimates of feed demand. These estimates, as used by the two studies, are presented in Table 2.1; they reveal the percent change in demand of the given commodity or commodity group in response to a unit percent increase in income represented by expenditure.

IFPRI study is designed to include changes in elasticity parameter over time, whereas, study by Kumar assumes same elasticity throughout. As can be seen from the Table, there is wide divergence in elasticity estimates used by the two studies in making demand projection. For example, assuming 3 percent growth rate in per capita income during the period 2000 AD to 2020 AD, IFPRI study would imply about 8 percent growth in

per person cereal demand whereas Kumar's study implies 1.6 per cent decline in per capita cereal demand. Thus, according to Kumar, direct demand for cereal would rise only on account of increase in population, whereas, Bhalla, Hazell and Kerr (hereafter referred as BHK) report large increase in demand due to growth in income beside the impact of population growth.

**Table 2.1: Estimates of expenditure elasticities based on IFPRI and IARI study**

Source	Year	Cereals	Meat and egg	Milk and milk product
Bhalla, Hazel and Kerr				
Rural	1993	0.29	1.01	1.53
	2001	0.10	1.25	1.53
Urban	1993	0.18	0.71	0.94
	2001	0.10	0.74	1.05
Kumar				
Rural	1993-94	-0.007	0.848	0.458
Urban	1993-94	-0.037	0.633	0.372

Source: 1. Bhalla, hazell and Kerr (1999).  
2. Kumar (1998).

According to Kumar any increase in per capita income of Indian population would result in a small decline in direct consumption of cereals and modest to high growth in demand for livestock products, fruits and vegetables. BHK finds that income growth would raise demand for livestock products at a much higher rate than that reported by Kumar and they are not in agreement with Kumar on negative income elasticity of cereal demand. However, scholars working in this area like Murthy (1998, 1999) and Rao (2000) also observed decline in per capita foodgrain consumption in rural India in the recent period which lends support to negative, albeit small, expenditure elasticity of cereals reported by Kumar.

The second source of divergence between the projections by Kumar, and Bhalla, Hazell and Kerr is the estimate for feed demand. BHK assumes that expansion in livestock production would entail increase in feed coefficient to level of 1.2 kg of cereal per kg of meat and egg and 0.72 kg of

cereal per kg of milk as they observed that traditional sources of feed like grazing areas are shrinking. They also assumed higher growth in demand for livestock products compared to Kumar, which further increases the difference in feed demand estimates of the two studies.

The demand projections made by the two studies are presented in Table 2.2. According to BHK, domestic demand for cereals would grow at the trend rate of 2.53 per cent corresponding to 3.5 per cent annual growth rate in per capita income. According to Kumar the rate of growth in cereal demand would be 1.88 per cent.

**Table 2.2: Demand projection for cereals towards 2020, million tonne**

Source		Food	Feed	Sub total	All uses	Growth rate
Bhalla Hazel and Ker						
	1993	147.12	3.71	150.83	-	
	2020	246.08	50.11	296.19	-	2.53
Kumar <sup>@</sup>						
	1995	150.6	6.54	156.60	166.67	
	2020	237.6	15.19	252.25	265.8	1.88

<sup>@</sup> Kumar's projections correspond to 5 per cent growth rate in GDP.

Now the most important question is which growth rates is likely to hold for India. The two estimates have been widely discussed in various seminars where the consensus is that actual demand growth would be within these two estimates as the higher side estimate is believed to be over-estimate and the lower one is believed to under-estimate the cereal demand. The average of the two comes to 2.20 per cent, which can be taken as reasonable estimate to reflect growth in cereal demand in India.

As against the growth rate of demand, Kumar has projected somewhat higher growth in supply of cereals, which would leave positive surplus of total cereals towards the year 2020 even under deceleration in total factor productivity growth. Based on Kumar's projections India is not going to face deficit of cereals up to 2020. Further, Kumar has noted significant changes in composition of food basket which has implications for domestic



production and resources allocated to various enterprises. To have some idea about that, we are presenting the growth rate in demand for other food commodities along side the recent growth rates in their output in Table 2.3. The Table shows that demand for non cereal foods is projected to grow by more than 50 per cent the growth in cereal demand. Demand for pulses, edible oils and vegetables would increase in the range of 2.9-3.0 per cent and that of fruits and livestock product by more than 3.20 percent annually. The Table shows that growth rates achieved in supply in the recent past are higher than the growth rate in demand, for all the commodities except pulses and oilseeds. In case the growth in supply of deficit commodities fails to keep pace with the trend in demand, the gap has to be filled either through imports or it would result in increase in relative prices of the concerned commodities.

**Table 2.3: Projected growth rates in demand for major foods towards 2020 AD and recent growth in supply**

Commodity	Demand growth rate 1995-2020 <sup>@</sup>	Output growth rate in last 10 years <sup>#</sup>
Cereals	1.88	2.16
Pulses	2.98	0.63
Edible Oil	2.91 <sup>B</sup>	2.06
Oilseeds	-	2.29
Milk	3.26	4.14
Fruit	3.20	5.75
Vegetable	2.91	4.79
Egg	3.76	4.59
Fish	3.75	4.28

<sup>@</sup> Taken from Kumar (1998) for 5% growth in GDP

<sup>#</sup> Our own estimates based on official data on production.

<sup>B</sup> Derived by us using the elasticity reported by Kumar (1998)

## 2.2 Promoting Demand Driven Crop Diversification

It has been shown in the previous section that growth in supply of edible oil and pulses has not been keeping pace with the growth in demand. This has

resulted in fast growth in import of edible oils while pulse deficit is reflected in both imports as well as in the increase in domestic prices of pulses. It would be seen from Table 2.4 that in the beginning of 1990s India imported very small quantity of edible oil which further declined to around 100 thousand tonne by 1993-94. After this year, edible oil imports witnessed sharp increase. During 1999-2000 India has emerged as the largest importer of edible oil in the world with import exceeding 4 million tonne involving

**Table 2.4: Import dependence of edible oil and pulses and grain stock with Central government**

Year	Import 000 tonne				Production 000 tonne		Grain stock mill. Tonne	
	Rapeseed/ mustard oil	Soy- bean oil	All Edible oils	Pulses	Edible Oil	Pulses	Mini- mum	Maxi- mum
1988-89	186	32.12	1083	756	4980	1385	8.2	12.4
1989-90	2	29.45	324	470	4811	1286	6.2	12.8
1990-91	3	21.61	525	1273	4877	1426	10.4	18.9
1991-92	3.3	22	226	313	5022	1202	13.9	20.9
1992-93	0.48	62	103	383	5247	1282	11.1	13.8
1993-94	1.1	29	114	628	5397	1330	12.7	24.2
1994-95	2	39	347	554	5531	1404	20.5	30.7
1995-96	22.24	101	1062	486	5611	1231	26.8	35.6
1996-97	0.79	21	1416	692	6170	1425	19.8	27.0
1997-98	5.69	46	1265	1084	5041	1298	15.3	22.4
1998-99	227.65	438.9	2622	629	5685	1490	18.2	28.5
1999-00	286.45	593.61	4196	269	4603	1340	21.9	33.1
2000-01	44.46	366.91	4177	350	3998	1070	21.7	45.7
2001-02			4213	2177			44.7	68.0

Sources of basic data:

1. Monthly Statistics of Foreign Trade of India, Volume I and II, Annual Number, DGCIS, Ministry of Commerce, Calcutta, Various issues.
2. Food Statistics, Ministry of PDS and Consumer Affairs, GOI, New Delhi
3. Economic Survey, Ministry of Finance, GOI, New Delhi
4. Agricultural Statistics at a Glance, Ministry of Agriculture, GOI, New Delhi
5. Reports of the Commission for Agricultural Costs and Prices, MOA, GOI, New Delhi

total value of about Rs. 8000 crore. With such magnitude of import, India meets more than 40 per cent of its edible oil demand from other countries.

Sharp increase in edible oil imports resulting from liberalisation policy has depressed domestic prices considerably which can be seen from Table 2.5 which shows changes in index number of wholesale prices of selected commodities using the recent base year. Though palm oil constitutes predominant share in edible oil the impact of import is realised on all edible oilseeds due to close substitution among different edible oils. The Table shows that during 1993-94 to 2000-01 price of edible oil in rupee has increased merely by 3 per cent whereas prices of rice, wheat and pulses in the same period have increased by 68, 78 and 79 percent respectively. Thus, relative prices and profitability of edible oils has sharply declined during the last 8 years causing adverse impact on farmers growing oilseed crops.

**Table 2.5: Changes in wholesale prices of selected agricultural commodities as revealed by wholesale price index (WPI) with base 1993-94**

Year	Primary food	Rice	Wheat	Pulses	Edible Oil
1993-94	100	100	100	100	100
1994-95	113	111	109	122	111
1995-96	122	117	112	135	117
1996-97	137	128	137	151	115
1997-98	141	134	138	145	113
1998-99	159	146	151	160	139
1999-00	165	171	175	166	122
2000-01	171	168	178	179	103

Source: Economic Survey, Ministry of Finance, GOI, New Delhi.

Like edible oils, India depends heavily on import to meet its pulse's requirement. Average import of pulses during 1998-99 to 2000-01 was 416 thousand tonne, which constituted 3.4 per cent of domestic demand for pulses. During the year 2001-02 import of pulses exceeded 2.1 million tonne which corresponds to about 16 percent of domestic demand for pulses. Despite reliance on imports, pulse deficiency in Indian diet has been increasing continuously. During the year 2000 per capita per day net availability of pulses in India dropped to 31.2 gm, which is less than half of

the level that existed during early 1960s i.e. before the onset of green revolution in India.

Compared to massive shortages of edible oils and pulses, India is facing serious problem of selling its cereal surplus. Buffer stock of rice and wheat before arrival of wheat crop of rabi 2000-2001 was reported to be 46 million tonne and after the procurement of rabi season of the year 2001 the buffer stock with central agencies has exceeded 60 million tonne. During the agricultural year 2000-01 more than one fourth of rice and wheat output of the country has remained in public sector stocks. This is causing serious strain on state exchequer due to cost of storage, interest on blocked capital and deterioration in value of stored produce.

How can these imbalances be addressed? What are the hindrances and constraints to diversify some of the area from rice and wheat or other cereals towards pulses and oilseeds to achieve balances in domestic needs and production? We begin to look at answers to these questions by examining the differences in net return to farmers over paid-out cost for various crops. These estimates of net return refer to triennium average ending 1996-97 for kharif crops and 1997-98 for the rabi crops. This is the latest triennium for which published data is available from 'Cost of Cultivation Scheme' of Directorate of Economics and Statistics, Ministry of Agriculture, GOI – the only set of data which is comprehensive, comparable and representative for the major states producing the referred commodities. The estimates are presented in Table 2.6 and are available only for the major crops grown in different states.

Among kharif crops cotton and in rabi season wheat are found to be the most remunerative in most of the states. In Andhra Pradesh, urad was highest paying pulse crop but its net return was only Rs. 6790 compared to Rs. 10098 from paddy. Similarly, net return from groundnut (oilseed) was quite low compared to paddy. Net income from rapeseed/mustard cultivation in Punjab is less than one fifth of the net income from wheat. In Rajasthan, chickpea requires 130 per cent and rapeseed/mustard needs 72 per cent increase in net income to compete with wheat.

Relatively low return is one of the factors for production of oilseed and pulses not keeping pace with the domestic demand. The other factors are

**Table 2.6: Net return from selected crops grown in different states Rs./hectare**

Crops	Andhra Pradesh	Gujarat	Haryana	Madhya Pradesh	Maha-rashtra	Orissa	Rajasthan	Punjab	Tamil Nadu	Uttar Pradesh
<b>Kharif crops</b>										
Paddy	10098		10105	5567		6926		11337		9510
Jowar	2144			3070	4239				2447	
Bajra		3814	3836		2075		2551		2173	4231
Maize	3352			2715			5657			3806
Urad	6790			3690	2861	4022			6145	3914
Moong	3620				2356	2583				
Arhar		9468		8157		3156				13838
Groundnut	4203	7444			6176	8888			5636	
Seasamum						2197		3477	3034	
Soyabean				5516	6397		6214			
Nigerseed						1945				
Sunflower					2832					
Cotton	12159	9702	20885	6135	7231		17315	15778	11496	
<b>Rabi crops</b>										
Wheat	9957		14262	6722			13663	12717		10241
Barley							8809			8351
Chickpea			7666	5544			5923			8129
R/Mustard	3551	9486	8980	5923			7934	2406		10137
Sugarcane	32460		33110	20671	20302			39680		25534

Note: Net return refers to gross return less operational costs.

Source: Cost of Cultivation of Principal Crops, 2000, Ministry of Agriculture, GOI, New Delhi.

high uncertainty and risk associated with their yields and prices. It would be seen from Table 2.7 that prices of rice and wheat in the representative market of the country deviated around trend by less than 9 per cent. Compared to this, instability in prices of pulses, as indicated by chickpea, was 28.75 per cent. Similarly, instability in prices of rapeseed/mustard was more than double the instability in rice and wheat prices.

**Table 2.7: Instability in domestic prices and productivity of selected crops 1980-81 to 1998-99**

Unit: Percent annual deviations from the underlying trend

Crop	Price instability		Yield instability
	Market	Instability	
Wheat	Hapur	8.82	5.62
Rice	Delhi	6.64	6.64
Sorghum	Nagpur	23.30	18.83
Maize	Kanpur	19.87	13.76
Cotton	Broach	26.88	14.51
Chickpea	Jabalpur	28.75	11.89
Tur	Aurangabad	19.94	15.76
Groundnut	Rajkot	14.09	17.80
R/Mustard	Kanpur	19.41	15.67

Source: Agricultural Prices in India, Ministry of Agriculture, GOI.  
Indian Agriculture in Brief, Ministry of Agriculture, GOI.

The above results show that cultivation of pulses and oilseeds in India is characterised by low returns and high degree of yield and price risks. Therefore, diversification towards these crops would require increase in yield and prices along with stability in productivity and prices.

### **2.3 Prospects of Grain Exports**

Under liberalised trade, export and import are considered the main instrument for stabilisation of domestic demand and supply. However, due to high volatility in international prices and because of being residual exporter, India could not use trade options very satisfactorily to stabilise supply of foodgrains. The trade option has particularly become difficult to

dispose off large stock of rice and wheat in India in international market in the recent years (Chand 2002, Ch.2).

Despite surplus stock, export of rice (non basmati type) witnessed a big setback during 1999-00 and 2000-01 mainly because of two reasons. One, international prices of rice have dropped sharply even in Rupee terms after 1998-99. Two, domestic prices have been moving up mainly under the pressure of increasing support prices. This has reduced competitiveness and profitability of rice exports. The net result has been piling up of rice in government stocks which has remained above 22 million tonne during early months of the year 2001 as against 15 million tonne a year back. In order to reduce the level of buffer stock to reasonable level, Food Corporation of India had to sell rice at Rs. 5650 and parboiled rice at Rs. 6000 per tonne to traders for export even though open market price in the country is ruling around Rs. 9500 per tonne during the year 2001. This offer has attracted good response as private traders are able to book export orders at a price of \$ 175 to \$ 210 or approximately Rs. 8242 to Rs. 9891 (Business Standard, 9 August, 2001, Delhi). However, these exports are causing huge loss to FCI because cost of acquisition of rice to FCI works out to be around Rs. 10230 per tonne. Corresponding to these costs and export price, the country is incurring a loss of more than Rs. 4290 for each tonne of export of non basmati rice. The estimate of loss is worked out as under:

1. Support price of paddy: Rs. 510 for common grade and Rs. 540 for grade A
2. Ratio of cost of acquisition of one quintal rice to MSP of paddy: 1.98 (Annual report of Ministry of Consumer affairs and PDS)
3. Cost of acquisition of 100 kg rice: Rs. 994 common grade and Rs. 1052 grade A
4. Price charged for stock released for export: Rs. 565-600/ quintal
5. Difference between (3) and (4): Rs. 429 to 452 / quintal

Actual loss would be much higher if cost of storage and transport are fully reckoned.

As has been the case with rice, international prices of wheat have experienced sharp fall during the recent years. Despite a decline in

the \$ - Rupee exchange rate, international wheat prices after 1996-97 declined in Rupees term by 20, 14 and 7 percent in the next three years. In contrast to this, domestic prices of wheat registered upward growth, mainly on account of raise in support price, rendering import of wheat profitable. As a consequence, 1.333 million tonne wheat was imported by the private traders during 1999-00 despite record level of buffer stock in the country.

The more recent experience of wheat export (2001-02), resulting from the bid to dispose off excessive stock with the government, is yet another evidence of India's failure to get international price for wheat. In contrast to international price of around \$130/tonne, India found it difficult to sell wheat abroad even at a price of \$103 per tonne. As against economic cost of Rs. 8300/tonne to Food Corporation of India, and open market price of Rs. 7000/tonne, wheat was offered for export at Rs. 4300 per tonne for May 2001 (Economic Times, May 16, 2001). This amounts to implicit subsidy or loss of Rs.4000 per tonne of wheat export.

The justification given for export of rice and wheat at a huge loss and at a price below domestic market price is that there is no alternative to dispose off the massive stock of wheat that has accumulated with government agencies. Releasing such stock in open market, rather than its sale as export, would put downward pressure on domestic prices and might force domestic prices to go below minimum support price. The more serious implication of such move would be its adverse impact on future output growth and supply. On the other hand, demand side factors favour reduction in domestic price on two counts. One, on the ground of market clearance and two, to improve access to food as more than one fourth of the population of India can't afford to buy adequate food at existing prices. Thus, dealing with the situation of wheat surplus is posing challenge to the government.

The government needs to take different kinds of measures to address the immediate problem of surplus and to sustain food security in the long run. In the short run, surplus stock of grains should be diverted for food for work and alike employment generation programmes, at a price not higher than what is fetched from export. The real food subsidy for such uses is represented by the difference between the opportunity cost of stock, i.e. export price, and the price at which the produce is offered under the



programme. This would hardly involve any extra cost to the state exchequer. In the medium run, it would be desirable to bring balance between demand and supply factors. This would involve a check or even small decline in minimum support price in case international price of wheat remains low or do not provide scope for export at remunerative price. The long run policy should aim at adjustment in crop pattern consistent mainly with domestic requirements. Price policy in the long run should ensure increased participation of private sector in the wheat trade.

## 2.4 Paradox of Hunger and Declining Demand for Grains

In India large population is reported to be below poverty line and is undernourished. Cereals are the main source of calorie and food security for such population. In the recent years huge quantity of cereals (rice and wheat) has piled up in government stocks which has reached a level of about 60 million tonne. This constitutes more than one third of the total production of rice and wheat in the country and is far above the quantity genuinely needed<sup>2</sup> in the buffer stock in the country (Table 2.8).

Some analysts believe that this has reduced availability of grain to needy public and is being attributed to various factors like high rise in procurement

**Table 2.8: Central foodgrain stocks: actual and the norm (million tonne).**

Year	January	April	June	October
Actual stock				
1997	20.0	16.4	22.4	15.3
1998	18.3	18.2	28.5	24.2
1999	24.4	21.9	33.1	28.0
2000	31.4	21.7	42.2	40.0
2001	45.7	44.7	61.7	58.3
2002	58.0	62.4		
Norm	16.8	15.8	24.3	18.1

Source: Economic Survey 2001-2002.

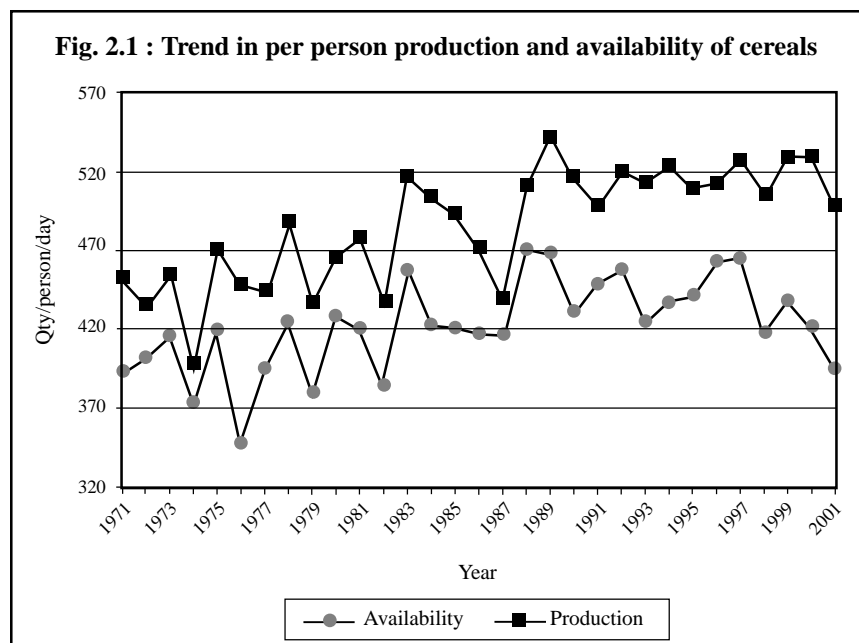
<sup>2</sup> Genuinely required quantity includes buffer stock needed for public distribution system and to maintain inter year instability in production.

prices of rice and wheat after 1990-91. To find the exact nature of change in cereal demand and its causes we have looked into the trends in per capita production and availability of cereals, prices of various commodities and changes in consumption pattern in the country. Information on per capita production and availability is presented in Table 2.9 and in Fig. 2.1, which provides better view of the trend in the series.

**Table 2.9: Trend in production and availability of cereals in India 1971-2001**

Year	Cereal output: million tonne			Net import ml. tonne	Change in stock ml. tonne	Net availability ml ton	Population Million	Per person availability gm/day	Production per person gm/day
	Kharif	Rabi	Total						
1971	59.65	31.56	91.2	2.0	2.6	79.2	551.3	393.6	453.3
1972	55.46	34.42	89.9	-0.5	-4.7	82.8	563.9	402.5	436.7
1973	64.21	31.66	95.9	3.6	-0.3	87.8	576.8	417.0	455.4
1974	55.53	30.44	86.0	5.2	-0.4	80.8	590.0	375.3	399.2
1975	69.45	34.28	103.7	7.5	5.6	92.7	603.5	420.7	470.9
1976	62.64	38.54	101.2	0.7	10.7	78.5	617.2	348.6	449.1
1977	73.48	37.17	110.7	0.1	-1.6	98.5	681.3	396.2	445.0
1978	74.13	40.96	115.1	-0.8	-0.3	100.2	645.7	425.2	488.3
1979	59.90	45.59	105.5	-0.3	0.4	91.6	660.3	380.1	437.7
1980	73.89	41.23	115.1	-0.5	-5.8	106.0	676.6	429.3	466.1
1981	75.05	45.08	120.1	0.5	-0.2	105.8	688.5	421.1	478.0
1982	65.77	46.74	112.5	1.6	1.3	98.7	703.8	384.4	438.0
1983	83.86	51.89	135.8	4.1	2.7	120.2	718.9	458.0	517.3
1984	79.75	55.62	135.4	2.4	7.1	113.7	734.5	424.3	504.9
1985	81.54	53.83	135.4	-0.3	2.7	115.4	750.4	421.5	494.2
1986	76.00	55.99	132.0	-0.1	-1.6	117.0	766.5	418.2	471.8
1987	70.20	55.70	125.9	-0.4	-9.5	119.3	782.7	417.5	440.7
1988	90.00	59.20	149.2	2.3	-4.6	137.5	799.2	471.2	511.5
1989	95.50	66.10	161.6	0.8	2.6	139.6	815.8	468.8	542.7
1990	94.50	62.70	157.2	0.0	6.2	131.4	832.6	432.2	517.3
1991	87.2	68.1	155.3	-0.6	-4.4	139.7	851.7	449.3	499.6
1992	95.8	69.2	165.0	-0.7	-1.6	145.3	867.8	458.6	520.9
1993	95.0	70.8	165.8	2.6	10.3	137.4	883.9	425.8	513.9
1994	96.4	75.9	172.3	0.5	7.5	143.8	899.9	437.7	524.6
1995	90.5	81.1	171.6	-3.0	-1.7	148.9	922.0	442.3	509.9
1996	98.4	77.6	176.0	-3.5	-8.5	159.0	939.5	463.7	513.2
1997	97.3	86.8	184.1	-0.6	-1.8	162.3	955.2	465.5	528.0
1998	97.7	82.0	179.7	-2.9	6.1	148.2	970.9	418.3	507.1
1999	99.9	90.9	190.8	-1.5	7.5	158.0	986.6	438.6	529.8
2000	98.4	95.6	194.0	-1.4	13.9	154.5	1002.1	422.3	530.5
2001	100.4	86.6	187.0	-2.9	12.5	148.2	1027.0	395.4	498.8

Source: Economic Survey, Various issues.



For the sake of proper correspondence between production and consumption and agricultural year and financial year, production of rabi and kharif in the same calendar year are added together. For example, 1971 includes output of Kharif season of 1971-72 and rabi output of the year 1970-71. Rabi output of cereals shown under the year 1970-71 as per the official documents, include output of rabi crops whose harvest normally starts in March and extends to the month of May. Kharif cereal output put under year 1971-72 in the official data refer to the output almost all of which is harvested in 1971. Thus, to study the relationship between different variables reported on the basis of financial year (April – March) on the one hand and cereal output on the other hand, it seems reasonable to use cereal output harvested during March to December of the same year rather taking output harvested during July to next year June as followed in the official statistics.

Past trends in cereal production and availability show that both, per capita production as well as availability<sup>3</sup> of cereals, have moved on a somewhat rising trend during 1970 and 1980s. Per capita production of cereals reached

<sup>3</sup>Net availability has been computed after making adjustments for export and import, changes in stock with official agencies, and after making allowance for seed, feed and waste.

peak level in TE 1990 when India produced 524 gram cereals per capita per day. Since then, cereal production has risen almost at the same rate as the growth rate in India's population. Accordingly, per person production of cereals during 1990s fluctuated around level of 520 gram.

During 1970s and 1980s, trend in per capita availability, which in a somewhat crude sense can be considered to represent per capita consumption, kept pace with trend in per capita production of cereals. However, during 1990s per capita consumption in cereals shows signs of decline. This way, the decade of 1990s extending to earlier year of first decade of new Century, shows two clear indications relating to cereal production and consumption in India. One, growth rate in cereal production decelerated to the level of population growth after 1990. Two, average availability of cereals has followed a decline in the recent years and it has gone down to the same level as observed during 1987 which was a very bad drought year.

However, the recent decline in per capita availability is not a result of slack in production nor it has resulted from export of cereals. In fact the decline in per capita availability of cereals despite no similar decline in production is explained by accretion to stock of cereals held by various government agencies. As can be seen from Table 2.9, net addition to stock has witnessed a very large increase in the last four years. Even during the year of very poor production, stock show increase to the tune of 7 percent of total production of cereals.

Another aspect of total cereal use in the country is its composition in terms of open market supply and supply through public distribution system which is sold at a subsidised or concessional rate. Information presented in Table 2.10 below shows that the decline experienced in per capita availability of cereals in the recent years resulted from decline in both, open market demand as well as PDS supply. Thus decline in per capita availability of cereals in the country in the recent years has affected all kind of consumers – those depending upon PDS as well as those depending upon open market.

The vital question now is why cereals have gone into stock rather than being consumed by people. There are three possible explanations for this.

**Table 2.10: Per capita availability of cereals in open market and under PDS  
(Unit: gram)**

Year	Total	Open market	PDS
1990-91	449.3	414.8	34.59
1991-92	458.6	416.4	42.28
1992-93	425.8	387.6	38.24
1993-94	437.7	403.0	34.71
1994-95	442.3	412.9	29.38
1995-96	463.7	428.5	35.18
1996-97	465.5	423.1	42.40
1997-98	418.3	381.8	36.48
1998-99	438.6	393.9	44.68
1999-00	422.3	383.4	38.92
2000-01	395.4	367.6	27.73

Source: Economic Survey, various issues.

One, as procurement and issue prices fixed by the government play a major role in determining market price of cereals, sharp rise in these prices during 1990s is said to be the cause for decline in per capita consumption. Two, change in taste and consumption pattern could be the reason for the decline in cereal consumption. Three, decline in quantity supplied through public distribution system can also be the cause for overall decline in cereal consumption.

#### **2.4.1 Price trends**

Information on prices for rice and wheat and other commodities is presented in Table 2.11 and annual rates of growth in the same are presented in Table 2.12. Procurement price of wheat was raised by more than 20 percent continuously for three years during 1990-91, 1991-92 and 1992-93. This raise is almost double the highest raise in procurement price recorded during 1980s. Once again during 1990s procurement price of wheat was jacked up by 25 percent during 1996-97. In the remaining years procurement price of wheat was raised by 2.86 to 7.84 percent.

Changes in consumer level prices can be seen from the changes in rural retail prices of wheat. During the decade of 1980s highest increase in wheat prices was recorded during 1988-89, which followed very bad drought of

**Table 2.11: Prices of rice and wheat and Consumer Price Index 1980-81 to 2001-02**

Year	Rural retail price Rs./quintal		CPI for industrial workers 1982=100		Procurement price Rs./quintal		PDS Price Rs./quintal		PDS price for BPL Rs./quintal	
	Rice	Wheat	Food	General	Paddy	Wheat	Rice	Wheat	Rice	Wheat
1980-81	218	166	84	81	105	117				
1981-82	238	185	96	91	116	130				
1982-83	262	200	102	99	122	142	188	160		
1983-84	323	217	117	111	132	151	188	172		
1984-85	294	193	122	118	137	152	208	172		
1985-86	299	212	128	126	142	157	217	172		
1986-87	317	232	141	137	146	162	217	190		
1987-88	344	250	152	149	150	166	239	195		
1988-89	404	300	169	163	160	173	239	204		
1989-90	459	316	177	173	185	183	244	204		
1990-91	461	337	199	193	205	225	289	234		
1991-92	501	407	230	219	230	275	377	280		
1992-93	582	450	254	240	270	330	377	280		
1993-94	587	439	272	258	310	350	437	330		
1994-95	689	479	297	279	340	360	537	402		
1995-96	733	489	337	313	360	380	537	402		
1996-97	807	690	369	342	380	475	537	402		
1997-98	820	655	388	366	415	510	700	450	350	250
1998-99	900	684	431	414	440	550	905	650	350	250
1999-00	995	746	446	428	490	580	905	682	350	250
2000-01					510	610	1130	830	565	415
2001-02					530		830	610	565	415

Source: Agricultural Prices in India, Ministry of Agriculture, GOI.

Bulletin of Food Statistics, Ministry of Agriculture, GOI.

year 1987, when prices shot up by 20 percent. During 1990s rural retail prices increased by close to 21 percent during 1991-92 and by as high as 41 percent during 1996-97. Similarly, PDS price of wheat was frequently revised upward during 1990s. The biggest increase was witnessed in 1998-99 when PDS price of wheat was raised by 44.44 percent. Because of this raise in PDS price, average retail price of wheat in the country in open market turned lower than the PDS price. PDS price of wheat was again increased by 22 percent in 2000-01 eventhough offtake from PDS was on a decline. In the same year PDS price for population below poverty line was increased by 65 percent. The impact of these increases in PDS prices is reflected in sharp decline in PDS supply which dropped to mere 27 grams/person/day during 2000-01.

As has been the case with wheat, procurement prices of rice witnessed much higher increase during 1990s as compared with 1980s. During the five years between 1989-90 and 1993-94 rice procurement price was raised by about 11 to 17 percent each year. However, rural retail prices of rice did not show higher increase during 1990s as compared to that during 1980s. In contrast to free market price in rural India, PDS price of rice witnessed hefty increases in most of the years during 1990s. This first narrowed down the difference between open market retail prices and PDS prices and then rendered PDS prices higher than average of rural retail price during 1998-99. Similarly, PDS price for population below poverty line was hiked by 61 percent during the year 2000-01.

#### **2.4.2 Changes in rice and wheat prices relative to other prices**

It is interesting to analyse behaviour of rice and wheat prices vis a vis prices of other foods relative to overall index of consumer prices in the country. This has been studied by examining the behaviour of rice, wheat and food prices deflated by the general consumer price index (CPI) with base 1982=100. The series are plotted in Fig 2.2 and Fig. 2.3 for wheat and rice respectively. The series show that during 1990-91 to 1996-97, food prices increased at a slightly higher rate compared to overall price index after which real food prices returned to the level of early 1980s. During the entire decade of 1980s procurement prices of wheat increased at a slower rate as compared to food prices and overall CPI. The rate of increase in

**Table 2.12: Annual percent change in prices of rice and wheat and Consumer Price Index**

	Rural Retail Prices		CPI for industrial workers		Procurement Price		PDS Price	
	Rice	Wheat	Food	General	Paddy	Wheat	Rice	Wheat
1981-82	9.17	11.45	13.60	12.47	10.48	11.11		
1982-83	10.08	8.11	6.72	7.76	5.17	9.23		
1983-84	23.28	8.50	14.70	12.55	8.20	6.34	0.00	7.50
1984-85	-8.98	-11.06	4.27	6.40	3.79	0.66	10.64	0.00
1985-86	1.70	9.84	4.92	6.53	3.65	3.29	4.33	0.00
1986-87	6.02	9.43	10.16	8.94	2.82	3.18	0.00	10.47
1987-88	8.52	7.76	7.80	8.76	2.74	2.47	10.14	2.63
1988-89	17.44	20.00	11.18	9.40	6.67	4.22	0.00	4.62
1989-90	13.61	5.33	4.73	6.13	15.63	5.78	2.09	0.00
1990-91	0.44	6.65	12.43	11.56	10.81	22.95	18.44	14.71
1991-92	8.68	20.77	15.58	13.47	12.20	22.22	30.45	19.66
1992-93	16.17	10.57	10.43	9.59	17.39	20.00	0.00	0.00
1993-94	0.86	-2.44	7.09	7.50	14.81	6.06	15.92	17.86
1994-95	17.38	9.11	9.19	8.14	9.68	2.86	22.88	21.82
1995-96	6.39	2.09	13.47	12.19	5.88	5.56	0.00	0.00
1996-97	10.10	41.10	9.50	9.27	5.56	25.00	0.00	0.00
1997-98	1.61	-5.07	5.15	7.02	9.21	7.37	30.35	11.94
1998-99	9.76	4.43	11.08	13.11	6.02	7.84	29.29	44.44
1999-00	10.56	9.06	3.48	3.38	11.36	5.45	0.00	4.92
2000-01					4.08	5.17	24.86	21.70
					3.92		-26.55	-26.51

Source: Table 2.11

procurement price of wheat turned out to be faster than CPI and other foods during 1990-91 to 1992-93 which set off the decline faced during 1980s. Again there was a decline in procurement price of wheat relative to prices of other foods and other commodities for three years after which procurement prices in real terms moved closer to the level of early 1980s.

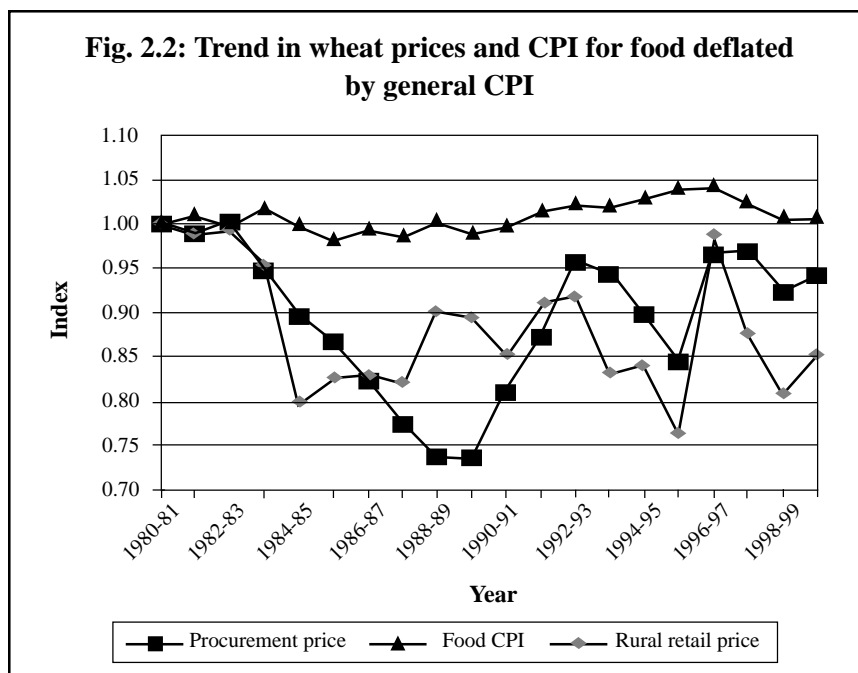
Rural retail prices of wheat in real terms followed decline in early 1980s and then fluctuated sharply. Retail prices of wheat relative to CPI remained lower throughout.

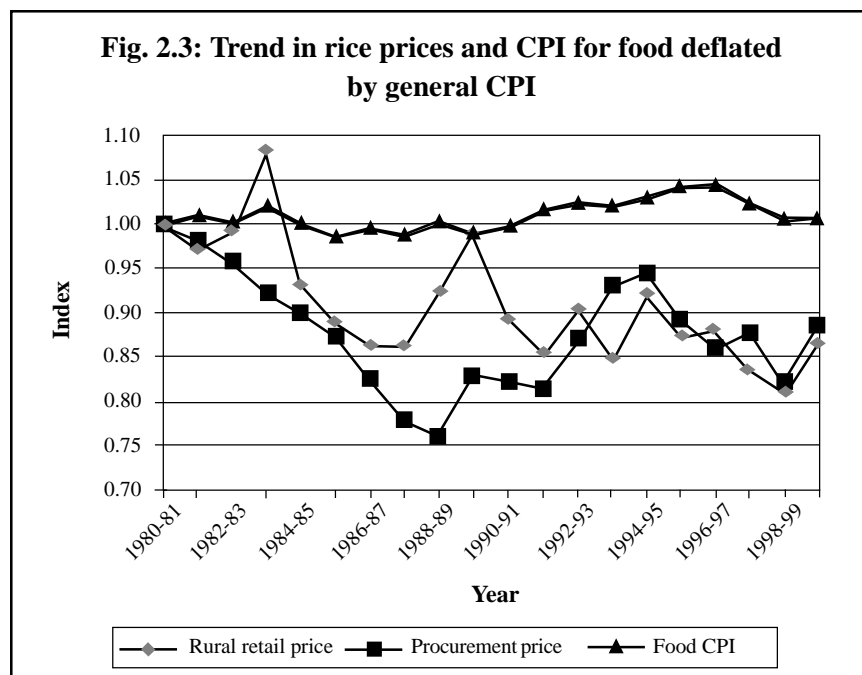
Series for rice prices show that real procurement prices for paddy have declined throughout during 1980s as has been the case with wheat. This



was followed by faster growth in procurement price of paddy relative to consumer price index for about five years which turned procurement price favourable in real terms only for two years after which again growth in procurement prices turned lower than general CPI. Rural retail prices of rice, in real terms, followed declining trend during 1980s as well as during 1990s.

In order to have a clear idea about the growth rates in different prices during 1980s and 1990s trend growth rates are presented in Table 2.13. Procurement prices of wheat increased by 10.53 percent annually during 1990s which is more than double the growth rate recorded during 1980s. Similarly, procurement price of paddy show annual growth rate of 9.65 percent during 1990s compared to 5.42 percent during the previous decade. Wholesale prices of wheat and rice, which were strongly influenced by government intervention, also showed much higher growth during 1990s compared with 1980s. Second, increase in procurement prices during 1980s was quite smaller compared to the growth rate in prices of food and other commodities, whereas during 1990s, growth rate in procurement prices turn out to be higher than the general rate of inflation.





**Table 2.13: Growth rates in different prices of rice and wheat: Percent/annum**

Commodity	Price	1980-81 to 1989-90	1990-91 to 1999-00
Wheat:	Procurement price	4.36	10.53
	Wholesale price	5.67	9.48
	Retail price	6.62	8.88
	PDS price	3.74	11.85
Rice:	Procurement price	5.42	9.65
	Wholesale price	5.24	9.24
	Retail price	7.36	8.69
	PDS price	5.80	12.96
CPI:	Food	8.38	9.39
	General	8.58	9.31

Growth rate in rural retail prices also showed increase during 1990s but the increase was much smaller compared to the increase in procurement prices and in wholesale prices of rice and wheat. During 1980s growth rate in rural retail prices was higher than the growth rate in wholesale prices of wheat whereas during 1990s retail prices showed lower growth rate

compared to wholesale and procurement prices. This shows that high growth rate in procurement and wholesale prices was not backed by demand side, causing the retail prices to trail behind the wholesale prices. This also caused adverse impact on participation of private sector in rice and wheat trade.

## 2.5 Diversification in Consumption Pattern

While recent decline in per capita demand for cereals from PDS seems to have resulted from sharp increases in PDS price for APL consumers, the decline in open market demand seems to be caused by increase in open market retail prices of rice and wheat as well as by non price factors. Beside prices, demand is also affected by change in income and preferences. The net effect of all these factors is reflected in changes in per capita demand for cereals and non cereals presented in Table 2.14 based on NSSO's nation-wide survey on consumption expenditure which is considered as a fairly reliable indicator of macro situation. The Table shows that both in rural as well as in urban areas per capita consumption of rice, wheat and coarse cereals has declined sharply since 1987-88. In contrast to this, per-capita consumption of edible oil, vegetables, fruits and meat, egg and fish has shown appreciable increase. This provides strong evidence that in India food consumption pattern is getting increasingly diversified towards non-cereal products.

**Table 2.14: Changes in food consumption pattern in rural and urban India, 1977-1999 (quantity in kg/person/annum)**

Items	Rural				Urban			
	1977	1987	1993	1999	1977	1987	1993	1999
Rice	86.5	88.1	85.4	81.0	67.6	68.1	64.2	62.5
Wheat	49.4	61.6	53.5	53.9	64.6	60.4	57.4	55.4
Coarse cereals	56.7	29.8	24.1	17.7	14.8	10.6	7.7	7.1
Total cereals	192.6	179.5	163.0	152.6	147.0	139.1	129.3	125.0
Pulses	8.7	11.5	9.2	10.1	11.7	12.2	10.5	12.0
Milk/milk product	24.6	58.0	51.4	50.5	39.7	64.9	68.3	72.4
Edible oils	2.7	4.3	4.6	6	4.8	6.8	6.3	8.6
Vegetables	24.7	50.8	53.2	66	39.7	66.4	63.1	70.0
Fruits	2.6	10.3	9.8	17	5.9	18.8	20.1	19.0
Meat, egg, fish	2.7	3.3	4.1	5.0	4.8	4.9	6.3	6.8
Sugar and gur	13.5	11.0	9.2	10.1	17.1	12.3	11.8	12.0

Source: NSSO

There are scholars who view this change in consumption basket as a healthy trend but some researchers consider it as adverse to consumers. According to former, increasing mechanisation of human activities, particularly in rural areas, has reduced physical exertion and access to modern transport facility is bringing improvement in comforts. All these add up to reduced calorie requirement. Secondly, when income improves, there is a tendency to improve variety in food intake and go for nutritious and healthy food rather than increasing calorie intake. Improvement in communication and transport network and development of marketing system has made food produced in one region easily accessible in other and far flung regions. This has improved supply of non-cereal foods at micro level, and has contributed towards diversification in food consumption.

On the other hand, some scholars consider decline in per capita cereal consumption as adverse for the consumers, particularly for low income group. It is argued that improvement in per capita income should result in fast increase in the indirect demand for cereals which should lead to increase in overall per capita demand for grains in the country. The argument goes like this. Improvement in income leads to fast growth in demand for livestock products, which should result in higher growth in the use of food grain as feed. This argument has been buttressed by citing example of China and by showing that per capita total food grain use in countries with better income is higher than that in India. Here, there is a need to distinguish Indian situation from other countries. Despite observed growth in demand for livestock products, per capita consumption of meat, egg and fish in India remains very low. This seems to be largely due to cultural factors. Even if it can be afforded, people in India do not eat meat etc. on a regular basis. For a vast majority of those who are non-vegetarian, meat intake is preferred occasionally and not as a part of regular diet. Therefore, India is not likely to witness serious competition between food and feed uses of grain. Similarly, cultural difference between India and other countries need to be kept in mind when comparing per capita food consumption, particularly food grain consumption. According to Indian value system, there is emphasis on eating only that much which is needed for survival and there is no tendency to eat more and expend the same by doing exercise etc. as is the case in developed countries. In the light of these factors, cereal demand in India should not be expected to grow at faster rate than the population

growth rate. This has implications for planning agriculture production in future.

## 2.6 Market Arrivals and Procurements

Initial objective of procurement of foodgrains by the government agencies was to ensure remunerative prices to producers and reasonable prices to consumers and to maintain price stability. Since private trade was not performing these tasks satisfactorily, government had to intervene in grain markets. As a result of this intervention, government procured substantial part of marketed surplus from food surplus states. Procurement by government constituted 10 to 15 percent of total rice output during 1985-86 to 1989-90 (Table 2.15). In the case of wheat 15 to 22 percent of production was purchased by government. When India initiated economic reforms in year 1991, a move towards increased participation by private sector in various spheres of economic activities was started which in other

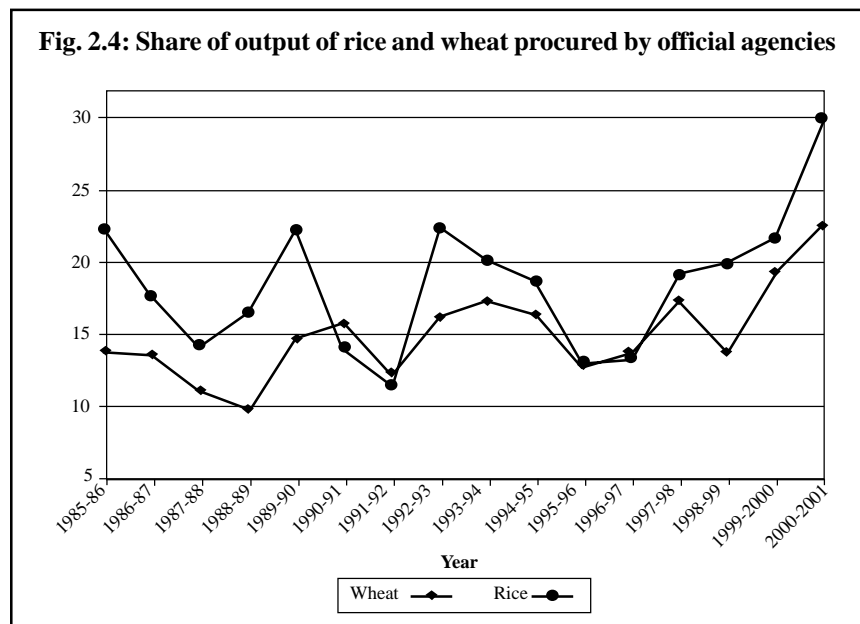
**Table 2.15: Production and procurement of rice and wheat by official agencies, 1985-86 to 2000-01**

Year	Production Lakh tonne		Procurement Lakh tonne		Procurement as % of production	
	Rice	Wheat	Rice	Wheat	Rice	Wheat
1985-86	638	471	99	103	15.51	21.89
1986-87	606	443	92	105	15.19	23.69
1987-88	569	462	69	79	12.13	17.11
1988-89	705	541	77	66	10.92	12.20
1989-90	736	499	118	89	16.04	17.85
1990-91	743	551	127	111	17.09	20.13
1991-92	747	557	102	78	13.66	14.01
1992-93	729	572	130	64	17.84	11.19
1993-94	790	591	143	128	18.10	21.65
1994-95	818	658	137	119	16.75	18.09
1995-96	770	621	100	123	12.99	19.81
1996-97	817	694	130	82	15.90	11.82
1997-98	825	663	155	93	18.78	14.02
1998-99	860	708	126	127	14.65	17.94
1999-00	895	756	182	141	20.34	18.66
2000-01	849	687	208	164	24.50	23.87
2001-02	907	735	202	206	22.27	28.03

Source: Bulletin of Food Statistics, Ministry of Agriculture, various issues

words imply reduced role of Government in marketing and services. Government started gradually reducing its participation in industry and services sector. In the case of agriculture, particularly the food grain trade, some reduction in the role of government took place after 1992-93. Between 1992-93 and 1996-97 percent of wheat output procured by government declined from 22.3 percent to 13.41 percent.

Similarly, government procurement of rice declined from 17 percent in 1993-94 to about 14 percent in 1996-97. However, this decline turned out to be the part of cyclical variation resulting from production fluctuation as experienced in the past and government procurement witnessed steep increase in the recent years (Fig. 2.4). The difference in the current and the past situation is that hike in quantity procurement by government took place despite very comfortable situation of food stock. During the year 2000-01, government had to procure all time high share of wheat and rice produced in the country. This increase took place despite two odds. One, production during year 2000-01 was low compared with the past 2 years and two, buffer stock with government was already double the requirement for such stocks. This shows that in the recent years private trade played much-reduced role in grain trade. The reason for this could be huge build up of buffer



stock. Private sector had a feeling that government would be required to reduce the level of excessive stock, which would dampen the domestic prices and might cause losses to the private sector. This way, the recent years witnessed decline in the role of private trade in grain marketing, which is not a healthy trend for long run development of grain trade in the country.

Another serious criticism of government intervention in grain markets is the regional bias in its operation. Official procurement is alleged to be helping a few states and concentrating their operations in already developed states. This can be seen from the information presented in Tables 2.16 and 2.17. Table 2.16 shows that states like Bihar, Gujarat, Madhya Pradesh, Karnataka and Maharashtra have experienced sharp increase in marketed surplus of wheat during 1990s. Similarly, percent of marketed surplus of rice has witnessed substantial increase in several states like Bihar, Karnataka, Madhya Pradesh, and Orissa (Table 2.17). But these states have hardly benefited from government procurement.

**Table 2.16: Market arrivals of wheat as % of production in selected states**

State	TE 1983-84	TE 1986-87	TE 1990-91	TE 1993-94	TE 1996-97	TE 1999-00
Bihar	10.87	10.93	15.20	17.13	16.20	17.13
Gujarat	38.10	38.00	45.70	50.47	52.30	63.20
Haryana	37.80	40.93	41.93	46.17	43.80	44.57
Karnataka	9.03	8.17	8.93	16.53	25.43	29.07
M.P.	10.43	10.37	10.77	17.27	24.17	40.50
Maharashtra	26.47	27.40	30.03	44.90	38.60	59.03
Punjab	52.97	47.67	47.27	50.77	54.20	51.33
Rajasthan	19.00	20.67	18.87	19.20	18.63	20.33
U.P.	15.63	17.07	18.60	17.80	17.67	23.40
All India	26.80	27.27	27.87	29.77	30.27	34.17

Source: Bulletin of Food Statistics, Ministry of Agriculture, various issues

It is striking to observe that 88 percent of wheat that arrived in market in Punjab was procured by official agencies whereas only 2.2 per cent of marketed surplus in the states other than Punjab, Haryana, Uttar Pradesh and Rajasthan was procured by official agencies. Similarly, in the case of rice more than three fourths of market arrivals in Punjab, 59 percent in

**Table 2.17: Market arrivals of wheat as % of production in selected states**

State	TE 1983-84	TE 1986-87	TE 1990-91	TE 1993-94	TE 1996-97	TE 1999-00
A.P.	42.67	43.00	42.33	52.53	62.10	70.97
Bihar	16.13	16.57	14.87	18.10	21.90	24.50
Gujarat	43.57	46.93	50.23	52.33	49.60	60.20
Haryana	91.23	86.47	70.70	83.40	85.97	77.33
Karnataka	18.23	19.77	23.77	24.87	27.63	44.13
Kerala	11.33	9.90	8.53	22.93	24.73	26.30
M.P.	13.57	15.30	14.00	27.90	40.57	45.50
Maharashtra	15.87	18.00	22.10	30.13	38.40	45.83
Orissa	4.87	5.37	5.97	5.83	18.80	25.00
Punjab	88.00	86.00	84.80	85.50	81.50	82.83
Rajasthan	34.00	28.23	27.97	43.03	49.73	62.50
Tamil Nadu	34.63	36.40	34.47	36.27	39.47	43.57
U.P.	26.20	29.10	28.50	35.00	36.13	40.13
W.B.	16.37	18.53	15.97	14.83	14.77	15.53
All India	31.27	31.67	30.23	37.63	38.47	41.53

Source: Bulletin of Food Statistics, Ministry of Agriculture, various issues

**Table 2.18: Percent of market arrival of rice and wheat procured by official agencies in various states, average of 1994-95 to 1996-97**

State	Rice	Wheat
Punjab	76.05	87.81
Haryana	59.17	75.61
U.P.	20.15	18.04
Rajasthan		29.98
Andhra Pradesh	68.14	
Madhya Pradesh	27.42	
Orissa	135.99	
Tamil Nadu	15.60	
West Bengal	8.16	
Others	2.71	2.20
All India	39.70	49.94

Source: Agricultural Statistics at a Glance, Ministry of Agriculture, various issues  
Bulletin on Food Statistics, DES, Ministry of Agriculture, various issues.

Haryana and 68 percent in Andhra Pradesh was procured by government agencies. Government agencies purchased between 8 to 37 percent of rice brought to market in Madhya Pradesh, Orissa, Tamil Nadu and West Bengal.



In other states, government procurement was below 3 per cent of market arrival. This shows very strong regional concentration of government intervention in selected few states.

Information furnished above shows that the main beneficiaries of wheat procurement have been Punjab and Haryana and to some extent UP and Rajasthan. In the case of rice main beneficiaries have been Punjab, Andhra Pradesh, and Haryana while states like Uttar Pradesh, West Bengal, Orissa, Tamil Nadu have also been benefited to some extent. The remaining States have hardly been benefited from government procurement of grains even through these neglected states have shown tremendous increase in generating market surplus.



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### **3. INTRA AND INTER YEAR PRICE FLUCTUATIONS AND PARADOX OF ABNORMAL PRICE RISE DURING NORMAL PRODUCTION**

Rice and wheat are the staple food for Indian population. Therefore, their prices cause significant impact on the well being of general population. These two commodities being wage goods, determine consumption level of vast majority of population and overall price level of the economy. In the wholesale price index (refers to base 1981-82), agricultural commodities account for 27.45 per cent weight, out of which rice and wheat respectively account for 13.4 per cent and 8.2 per cent weights. In the overall price level, rice and wheat constitute 3.68 per cent and 2.25 per cent weight respectively. Due to their importance in consumption basket and in determination of the overall price level, prices of these two commodities attract considerable attention of the policy makers. Stability in prices of these two commodities has remained an important goal for the country. Because of all these factors there has been considerable interest to know the factors affecting yearly and monthly variation in prices of rice and wheat. One of the obvious factors affecting price level and changes therein is production level of the commodities. However, it has been often observed that even during the years of normal production sometime prices tend to show abnormal rise, which underscores the need to identify the other factors affecting changes in rice and wheat prices. The present exercise is a step in this direction to analyse various factors affecting intra-year and inter-year variation in prices of rice and wheat in the country.

#### **3.1 Analytical Procedure**

With respect to time, there is two kind of change in prices of agricultural commodities viz. intra-year and inter-year. Sometime intra-year variation may not be captured by year to year variation in prices. This is particularly true in the case of agricultural commodities where there is strong seasonality. In such cases it can so happen that monthly price spread can go very high without raising annual price. In order to reckon such situations we have analysed changes in monthly prices.

It was hypothesised that both intra as well as inter-year prices are affected by factors on demand side, supply side and by policy interventions. Following model was used to identify factors affecting intra-year and inter-year price variation.

### 3.1.1 The Model

Changes in monthly and yearly prices of rice and wheat were estimated based on their wholesale price index for the whole country with base 1981-82 = 100. Monthly change in price was estimated by fitting trend to monthly wholesale price index. This was done after identifying the month in which prices were the lowest and the one in which prices were the highest. In the case of rice, prices turned out to be lowest in the month of November and they were highest in the month of September during the study period. Similarly, in the case of wheat, April turned out to be the lowest and February turned out to be the month with the highest price. Monthly growth rate in price was estimated as under:

$$\ln \text{MWPI} = b_0 + b_1 T + u_t$$

Where Ln is natural log, MWPI refers to monthly wholesale price index of the concerned commodity, T refers to the time designating months viz. November to September for rice and April to February for wheat. Monthly trend growth rate in price was given by  $b_1$ .

Monthly growth rate in price was multiplied by 12 to get annual rate of inflation in monthly price. These rates of inflation in monthly or intra-year price were used as dependent variables to study the factors affecting growth in intra year prices.

Year to year change in price was calculated as under:

Rice:

$$\frac{[\text{Average of WPI for January to December in year (t) - WPI for year (t-1)}]}{[\text{WPI in year (t-1)}]} \times 100$$

Wheat:

$$\frac{[\text{Average of WPI for April to March in year (t) - WPI for year (t-1)]}{[\text{WPI in year (t-1)}] \times 100}$$

Following variables were tried to explain inter and intra year inflation in prices of rice and wheat.

1. Change in output of the concerned commodity over the previous year (%)
2. Output of coarse cereals - million tonne
3. Growth in output of cereals excluding rice / wheat over previous year %
4. Growth in procurement price over previous year of the concerned commodity %
5. Growth in the PDS issue price of the concerned commodity over previous year %
6. Growth in money supply %
7. Per capita real income in the country at 1980-81 prices
8. Export of concerned commodity – million tonne
9. Import of the concerned commodity – million tonne
10. Buffer stock of the concerned commodity at different times – million tonne
11. Per capita output of the concerned commodity - Kg/year
12. Per capita quantity of the concerned commodity supplied through PDS- Kg/year
13. Net trade of the concerned commodity – million tonne.

Multiple linear regression model was used to estimate the impact of different variables on intra and inter-year price variations. As mentioned above, all the variables having trend in them were expressed in growth rates while variables not exhibiting definite trend were used as such. This way, following forms of regression equations were estimated:

$$\frac{\Delta \text{WPI}}{\text{WPI}} = b_0 + b_1 \frac{\Delta \text{PRCP}}{\text{PRCP}} + b_2 \frac{\Delta \text{ISSPR}}{\text{ISSPR}} + b_3 \frac{\Delta \text{OUT}}{\text{ISSPR}} + b_4 \text{BUFF} + b_5 \text{EXP} + b_6 \text{IMP} + b_7 \text{PDSPC}$$

Where

$\Delta$  refers to change

WPI the whole sale price index of the concerned crop

PRCP Procurement price of the concerned crop

ISSPR Issue price of the concerned crop

OUT Production of the concerned crop

BUFF Buffer stock of the concerned crop

EXP Export of the concerned crop

IMP Import of the concerned crop

PDSPC Per capita of the PDS supplied of the concerned crop

Raw data in respect of all the relevant variables, which were used to identify factor(s) causing abnormal price rise in specific years particularly when production is normal is presented in Annexures 3.1 and 3.2.

### **3.2 Intra Year Price Variation in Wheat**

A large number of combinations of different variables were tried to arrive at variables relevant to explain the rate of inflation in monthly and annual prices. Results of important regression trials are presented in Table 3.1. In the first run, annual change in wheat output, buffer stock of wheat as on 1<sup>st</sup> July, export of wheat during the year, change in procurement price over the previous year, change in issue price of wheat in the year and per capita offtake of wheat for PDS were used as explanatory variables. These variables explained 74 per cent variation in monthly price inflation of wheat. In this run all variables except procurement price and offtake for PDS were significant at 5 per cent or lower levels.

In the second round, both the variables, which were non-significant in the first run, were dropped from the equation. In this round R<sup>2</sup> decreased slightly but the adjusted R<sup>2</sup> improved from 0.636 to 0.664. All the four explanatory variables turned out to be significant at 1 percent level. As expected, output growth and buffer stock of wheat caused negative impact on growth rate in monthly price of wheat whereas export and issue price of wheat caused

increase in the monthly price. This equation shows that 1 per cent increase in wheat output reduces monthly rate of inflation by 0.08 % measured on per month basis or by 0.96 % measured on annual basis. On the other hand, 1 per cent increase in issue price of wheat resulted in 1.02% growth in monthly index of wheat prices during a full year (Table 3.1).

In the third run, variable representing issue price was replaced by the variable representing annual growth in procurement price. In this run the  $R^2$  declined somewhat, however, the fit was significant at 1% level of significance as revealed by F-test. Again, all the four variables showed statistically significant impact on open market prices. Impact of raise in procurement price was positive and statistically significant at 5 per cent level.

A comparison of results of second and third set reveals that issue price of wheat caused stronger impact on open market prices as compared to the impact of procurement price. For instance, in a 12-month period 1 per cent increase in issue price raised inflation in market price by 1.05 percent point while similar increase in procurement price raised rate of inflation of monthly price by 0.69 percent point. It is also brought out by the analysis that whereas PDS price is significant determinant of variation in monthly wheat price, PDS quantity did not show significant impact.

Several other variables given in the list in the section on Analytical procedure were also tested for their impact on monthly price variation in wheat but none of them turns out to be relevant. This includes the import and output of coarse cereals.

Here it is pertinent to mention that none of the explanatory variables show high correlation with each other and there was no serious problem of multicollinearity.

### **3.3 Inter Year Price Variation in Wheat**

Same explanatory variables were used to estimate their impact on change in annual price index of wheat. When all the 5 variables namely percent change in output, issue price and procurement price and level of buffer stock of wheat and its export were used as explanatory variables,  $R^2$  was

**Table 3.1 : Results of regression analysis showing impact of various factors on growth rate in monthly price of wheat**

Explanatory Variables	1st Set		2nd Set		3rd Set		4th Set	
	Coefficient	LOS	Coefficient	LOS	Coefficient	LOS	Coefficient	LOS
1) Constant	29.424	5.00%	34.44	0.00%	37.872	0.00%	34.416	0.00%
2) Growth rate of wheat Output	-0.9058	0.50%	-0.9664	0.10%	-0.804	1.40%	-0.863	0.20%
3) Buffer stock of wheat million ton	-2.1120	0.40%	-1.8840	0.10%	-2.064	0.30%	-1.968	0.10%
4) Wheat Export million ton	19.0560	0.20%	19.5840	0.00%	18.420	0.30%	20.088	0.00%
5) Growth rate of procurement price of wheat	0.2938	42.60%			0.699	4.80%	0.231	48.20%
6) Growth rate of issue price of PDS Wheat	0.8744	2.00%	1.0273	0.10%			0.910	1.10%
7) Per capita offtake of wheat for PDS kg/year	0.6072	66.50%						
R <sup>2</sup>	0.7400		0.7280		0.602		0.737	
Adjusted R <sup>2</sup>	0.6360		0.6640		0.509		0.655	
F value	7.12	0.10%	11.39	0.00%	6.43	0.20%	8.95	0.00%
DW Statistics	2.11		2.26		2.32		2.16	

LOS – Level of significance



0.73 and the equation turned to be highly significant (vide Table 3.2). Except procurement price, all variables showed significant impact on annual rate of change in whole sale price index of wheat. Based on this set of regression equation, 1 per cent increase on PDS price of wheat raises open market price of wheat by 0.43 percent point. Output growth has a strong negative impact on year to year price change. One per cent increase in wheat output reduces wheat price by 0.6 per cent. Among other factors, increase in buffer stock of wheat by 1 million tonnes depresses the inflation by 0.78 percent points. This is the main factor for very low rate of inflation in wheat price in the last two years. Export of same magnitude was found to raise rate of inflation by 5.83 points. This is consistent with another study which show that export of wheat exceeding one million tonne destabilise domestic wheat market in India.<sup>4</sup>

**Table 3.2: Results of regression analysis showing impact of various factors on inter year change in wheat prices**

Explanatory Variables	1st Set		2nd Set		3rd Set	
	Coefficient	LOS	Coefficient	LOS	Coefficient	LOS
1) Constant	14.957	0.00%	16.5850	0.00%	14.9680	0.00%
2) Growth rate of wheat output	-0.602	0.00%	-0.5340	0.10%	-0.6140	0.00%
3) Buffer stock of wheat	-0.789	0.50%	-0.8360	0.90%	-0.7270	0.60%
4) Wheat Export	5.834	1.40%	5.0460	5.80%	5.4830	1.80%
5) Growth rate of procurement price of wheat	0.161	30.40%	0.3820	2.50%		
6) Growth rate of issue price of PDS wheat	0.429	1.20%			0.5110	0.10%
R <sup>2</sup>	0.733		0.5980		0.7140	
Adjusted R <sup>2</sup>	0.650		0.5040		0.6470	
F value	8.79	0.00%	6.33	0.30%	10.63	0.00%
DW Statistics	2.17		2.03		2.22	

LOS – Level of significance

<sup>4</sup>Refer to Chand (2002), *Trade Liberalisation, WTO and Indian Agriculture*, Mittal Publications, New Delhi, pp. 13-16.

In the second set, variable representing issue price was dropped from the model to find out whether impact of procurement price growth could not be captured due to positive correlation between issue price and procurement price. Exclusion of issue price resulted in turning the coefficient of procurement price significant at 2.5 per cent level. Though dropping of issue price reduced the value of adjusted R<sup>2</sup> from 0.650 to 0.50, F-value was significant at 0.3 % level indicating that the fit was good. Durbin-Watson statistics was also not significant, ruling out first order auto-correlation. This equation showed that 1 percent increase in procurement price accelerated the rate of inflation in open market price of wheat by 0.38 percent.

In the third run, instead of procurement price, issue price was used as one of the explanatory variables. In this case, adjusted R<sup>2</sup> turned out to be 0.647, which is almost same as in the first run. The results of different set of equation show that issue price is a much stronger determinant of market price as compared to the impact of procurement price on open market price.

### 3.4 Intra Year Price Variation in Rice

After a large number of trials with different variables, two sets of equations were retained to explain intra year variation in prices of rice. In the first set, five variables were used as predictors. The equation explained 59 percent

**Table 3.3: Results of regression analysis showing impact of various factors on growth rate in monthly price of rice**

Explanatory Variables	Coefficient	Level of significance
1) Constant	22.836	0.00%
2) Growth rate of rice output	-0.1304	17.10%
3) Rice Export	3.4764	2.70%
4) Growth rate of procurement price of rice	1.0655	0.20%
5) Per capita PDS offtake	-2.244	0.40%
R <sup>2</sup>	0.5910	
Adjusted R <sup>2</sup>	0.4940	
F value	6.1340	0.00%
DW Statistics	3.2040	

variation in monthly prices of rice. All the variables had expected sign but the impact of issue price of PDS rice and output growth did not exhibit statistically significant influence upto 10 percent level on monthly price variation.

In the second round, growth rate in issue price of PDS rice was dropped and other variables including quantity of PDS rice were retained. This did not make any difference to the explanatory power of the equation. In this set, significance level of all the retained variables improved, however, impact of output growth on the monthly open market prices turned significant only at 17 percent level. This equation seems to explain best the inflation in monthly price of rice during the period 1977-78 to 1998-99. Based on the results of this equation, one percent increase/decrease in output of rice reduces/raises rate of inflation in monthly prices by 0.13 point. Impact of changes in procurement price was quite strong - monthly prices rise by almost same level (1.06 point) as the change in procurement price. An increase of 1 kg rice per capita for PDS reduces the rate of inflation in monthly price by 0.187 points. Export of rice results in increase in open market prices and the impact was significant at 2.7 percent. Export of rice to the tune of 1 million tonne raises intra year price inflation by 3.16 percentage points.

The reason for output growth not showing significant impact on intra year price rise seems to be lower level of seasonality in its production. Unlike wheat, growing season and harvest of rice are not confined to one season. Though in north India rice is grown during mid June to October, in southern and eastern parts of the country its cultivation is not confined to these months alone. This is also evident from the monthly market arrival pattern of rice. For instance, figures for the year 1995-96 shows that 65 percent market arrival of wheat is concentrated in the quarter April to June as compared to 56 percent in the case of rice in the months of September to December.

Variables like import and buffer stock of rice were not found relevant to explain monthly variation in rice prices. Spread of rice cultivation throughout the year could be the reason for buffer stock of rice not showing significant impact on the price variations.

### 3.5 Inter Year Price Variation in Rice

Results of regression equation estimated to explain year to year changes in rice price are presented in Table 4.4. The equation explained 75 percent variation in inter year price inflation and gave highly significant fit. The equation uses growth in procurement price, growth in PDS price of rice, output growth, level of output of coarse cereals, quantity of rice exported as predictors. All the variables except export were statistically significant at one percent level.

Most significant influence was caused by procurement price. Corresponding to one percent increase in procurement price, index of open market price rise by 0.889 percent. One percent change in issue price of PDS rice or in output of rice change open market price by 0.24 percent; the impact was positive in the case of issue price and negative in the case of output growth. Fluctuations in output of coarse cereal by 1 million tonne, changes rice price by 1.578 percent in the opposite direction. This shows that coarse cereals are close substitute of rice in India.

**Table 3.4: Results of regression analysis showing impact of various factors on inter year changes in rice price**

Explanatory Variables	Coefficient	Level of significance
1) Constant	46.4930	0.00%
1) Growth rate of rice output	-0.2440	0.10%
2) Growth rate of procurment price of rice	0.8890	0.00%
3) Growth rate of issue price of PDS rice	0.2460	1.00%
4) Output of other cereals	-1.5780	0.00%
5) Rice Export	0.0867	90.20%
R <sup>2</sup>	0.8090	
Adjusted R <sup>2</sup>	0.7450	
F value	12.70	0.00%
DW Statistics	1.96	

### **3.6 Abnormal Price Rise in the Wake of Normal Production**

There have been instances when prices of rice and wheat used to rise very high despite normal or even above normal domestic production. These have often caused concern as it generally used to be believed that such instances reflect poor management of food economy. Blame has also been put on private trade for manipulating market to take advantage of high off season rise in prices which has not been justified by factors on production side. There is need to identify factors which gave rise to this kind of situations.

It has been shown in the previous section that intra and inter year price variations are caused by several factors and their interacting influences. However, it is instructive to identify specific situations and underlying factors when prices go abnormally high despite normal production. To accomplish this we use the information on price rise and related factors provided in Annexure 3.1 and 3.2 for wheat and rice respectively.

In the first step, years showing abnormal or excessive increase in wheat price need to be identified. This requires a norm that can be considered as normal. One way to do this is to take average and standard deviation of the concerned observations and to classify those observations as abnormal whose deviation from mean exceed standard deviation. This way, during last 22 years covering period 1977-78 to 1998-99 intra year price rise in the case of wheat was abnormal during 1988-89, 1990-91, 1991-92 and 1996-97. There are also instances to use some subjective norm to identify abnormal years. This is generally done by choosing some arbitrary norms. For example, if we consider monthly growth rate in prices above 2% as abnormal, it would capture situation which deviates more than 35% from the average. Based on this, 2 more years namely 1980-81 and 1982-83 also turn out to be the abnormal years during which intra year price spread exceeded 24%.

Out of these six years identified to experience abnormal price rise, production was below trend during 1980-81, 1990-91 and 1996-97, which substantially contributed to high rate of intra year price inflation. In the remaining 3 years there were factors other than production, which are responsible for high rate of price increase.

In 1981-82 procurement price for the first time was raised by 11.1% whereas average rate of growth in procurement price during the chosen period was 7.33%. Another factor, which seems to have contributed to high price rise is low level of buffer stock. Other two factors responsible for high price rise in this year are low capita supply of PDS wheat and above average increase in its issue price.

During 1988-89, buffer stock of wheat in July 1988 had touched level of 7.6 million tonne, which was lowest during the previous decade. This is the main factor for abnormal price rise during 1988-89. Beside, stagnant production and high export in previous year have also been favourable for price rise of high magnitude.

In the case of rice, average rate of growth in monthly prices during the last 22 years was about 1 percent and its standard deviation was 0.621 percent. Growth in monthly prices exceeded this average plus standard deviation in only 3 years viz. 1979-80, 1981-82 and 1991-92. This does not provide adequate number of observations to identify factors other than output responsible for sharp price rise. In order to have more number of observations to study this phenomenon, price rise exceeding 1.25 percent monthly growth or 15 percent annual growth was considered as abnormal price increase year. This way 7 years were identified as abnormal years. This includes 1977-78, 1979-80, 1980-81, 1981-82, 1983-84, 1989-90 and 1990-91. In addition to these years 1988-89 and 1992-93 were also considered as abnormal years due to abnormal inter year price rise. This way 9 out of 22 years showed abnormal price rise. Out of these, rice output was below normal during 1979-80 and 1992-93, while per capita PDS supply was lowest during 1979-80 and output of coarse cereals was lowest in 1992-93 in the entire period of study – these explain high rise in rice prices. Increase in procurement price turned out to be the major factor for abnormal price rise in most of the years. During 1980-81, 1983-84 and 1992-93 low output of coarse cereals also contributed towards sharp rise in rice price.

**Annexure 3.1: Data set on price changes and related factors in the case of wheat: 1977-78 to 1998-99.**

Year	Monthly price growth rate %	Output million tonne	Output growth %/year	Output of other cereals million tonne	Export 000Tonne	Import 000Tonne	Buffer stock million tonne	Procurement price Rs / quintal	Growth rate in proc. Price %	Per capita PDS kg	Growth rate in issue price %	Growth rate in annual price %
1977-78	1.33	29.01	0.59	82.69	493.53	178.60	14.65	110.00	0.00	10.93	0.00	2.98
1978-79	1.02	31.75	9.45	84.21	778.26	.	12.22	112.50	4.76	10.22	4.00	-1.69
1979-80	1.63	35.51	11.84	69.30	640.94	.	11.72	115.00	2.27	11.91	0.00	4.44
1980-81	2.48	31.83	-10.36	82.65	75.38	48.50	9.00	117.00	2.22	10.91	0.00	9.68
1981-82	0.92	36.31	14.07	84.34	1.41	2117.30	7.73	130.00	1.74	9.51	11.54	9.26
1982-83	2.10	37.45	3.14	74.87	0.00	1952.10	10.18	142.00	11.11	10.99	10.35	15.32
1983-84	-0.25	42.79	14.26	94.00	3.27	3738.80	13.01	151.00	9.23	10.14	7.50	2.13
1984-85	-0.41	45.48	6.29	89.51	39.51	689.50	17.81	152.00	6.34	8.96	0.00	-3.72
1985-86	0.59	44.07	-3.10	90.03	229.61	.	20.74	157.00	0.66	15.29	0.00	8.13
1986-87	0.60	47.05	6.76	87.39	221.78	.	18.90	162.00	3.29	13.22	10.47	5.07
1987-88	1.29	44.32	-5.80	83.22	274.97	.	14.86	166.00	3.19	15.99	2.63	8.44
1988-89	2.74	46.17	4.17	101.96	15.80	2011.00	7.55	173.00	2.47	10.62	4.62	13.32
1989-90	0.31	54.11	17.20	108.33	11.79	.	9.50	183.00	4.22	9.02	0.00	-3.94
1990-91	3.21	49.85	-7.87	106.99	139.54	.	13.15	215.00	5.78	10.07	14.71	16.13
1991-92	4.46	55.14	10.61	100.67	660.43	.	11.04	225.00	17.49	12.08	19.66	18.37
1992-93	0.55	55.69	1.00	109.45	37.75	2589.00	6.48	280.00	4.65	9.12	0.00	11.41
1993-94	1.70	57.21	2.73	111.12	3.88	476.00	14.89	330.00	24.44	10.16	17.86	11.40
1994-95	0.66	59.84	4.60	111.69	92.17	.	17.49	350.00	17.86	11.56	21.82	7.83
1995-96	0.85	65.77	9.91	106.01	1091.59	.	19.22	360.00	6.06	13.76	0.00	-0.12
1996-97	3.83	62.10	-5.58	115.84	1847.77	798.00	14.13	380.00	2.86	13.99	0.00	21.28
1997-98	1.56	69.35	11.67	112.93	22.49	1970.50	11.42	475.00	5.56	7.99	11.94	0.90
1998-99	1.48	66.35	-4.33	117.45	3.55	1414.50	16.48	510.00	25.00	9.02	0.00	10.76
1999-00	.	70.78	6.68	.	.	.	.	550.00	7.37	.	44.44	.
Average	1.48	49.48	4.26	96.58	303.88	1498.65	13.28	.	7.33	11.16	7.89	7.61

Source of basic data:

1. Agricultural Statistics at a Glance, MOA, various Issues.
2. Bulletin of Food Statistics, MOA, various issues.
3. Agricultural Prices in India, MOA, various issues
4. Economic Survey, Ministry of Finance, various issues.

**Annexure 3.2: Data set on price changes and related factors in the case of rice: 1977-78 to 1998-99.**

Year	Monthly price growth rate %	Output million tonne	Output growth %/year	Output of coarse cereals million tonne	Export 000 tonne	Net trade tonne	Buffer stock million tonne	Procurement price growth %	Growth rate in issue price %	Per capita PDS kg	Growth rate in annual price %
1977-78	1.32	52.67	25.64	28.88	37.89	-20.00	5.70	4.05	0.00	6.43	5.58
1978-79	1.13	53.77	2.09	30.02	40.49	139.00	5.60	10.39	0.00	6.69	-2.78
1979-80	2.11	42.33	-21.28	30.44	0.00	329.00	7.98	11.77	0.00	4.85	10.30
1980-81	1.33	53.63	26.70	26.97	0.00	745.39	9.04	10.53	0.00	7.23	14.99
1981-82	1.76	53.25	-0.71	29.02	727.35	937.47	6.62	9.52	16.67	8.54	9.29
1982-83	0.12	47.12	-11.51	31.09	872.53	472.90	6.21	6.09	7.43	9.58	3.42
1983-84	1.45	60.10	27.55	27.75	453.57	584.40	5.44	8.20	0.00	10.70	17.23
1984-85	-0.71	58.34	-2.93	33.90	175.66	596.29	4.69	3.79	10.64	10.44	-4.90
1985-86	0.54	63.83	9.41	31.17	247.69	288.85	7.75	3.65	4.33	8.81	1.36
1986-87	0.63	60.56	-5.12	26.20	245.02	255.08	9.88	2.82	10.14	9.65	6.12
1987-88	0.21	56.86	-6.11	26.83	248.19	394.17	9.45	2.74	0.00	11.54	6.66
1988-89	0.67	70.49	23.97	26.36	388.79	1055.51	6.48	6.67	0.00	12.65	13.04
1989-90	1.30	73.57	4.37	31.47	349.57	890.39	4.85	15.63	2.09	11.13	3.43
1990-91	1.08	74.29	0.98	34.76	421.76	571.03	6.96	10.81	18.44	8.98	2.90
1991-92	1.95	74.68	0.52	32.70	504.99	690.36	9.63	12.20	30.45	9.29	17.95
1992-93	0.89	72.86	-2.44	25.99	678.24	682.78	9.29	17.39	0.00	11.82	21.94
1993-94	1.25	80.30	10.21	36.59	580.40	843.19	8.52	14.82	15.92	11.19	4.60
1994-95	1.19	81.81	1.88	30.82	767.67	897.56	11.17	9.68	22.88	10.51	10.49
1995-96	0.82	76.98	-5.90	29.88	890.57	4914.09	17.42	5.88	0.00	9.66	8.62
1996-97	1.19	81.74	6.18	29.03	4914.01	2511.98	15.41	5.56	0.00	15.02	8.30
1997-98	0.48	82.53	0.97	34.10	2511.98	2388.93	12.94	9.21	30.35	13.12	7.73
1998-99	1.11	85.99	4.19	30.40	2388.87	4946.35	11.49	6.02	29.29	11.70	5.59
1999-00	1.12			31.46	4941.78	.	11.68	.	0.00	11.99	13.81
Average	0.99		4.02	30.20	792.97	1141.58	8.75	8.52	9.46	9.98	7.81

Source: Same as in Annexure 3.1.



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## **4 TEMPORAL AND SPATIAL PRICE BAND FOR PRIVATE SECTOR PARTICIPATION IN RICE AND WHEAT TRADE**

India's food grain sector has undergone tremendous changes since the launch of green revolution technology during late 1960s. The most profound impact has been witnessed in the case of rice and wheat whose production has shown spectacular increase and enabled the country to move from chronic food shortages to an era of food surplus. Besides technology and increased use of inputs, other factors like government intervention and support in terms of guaranteed minimum prices for output, and large scale procurements from producers at remunerative prices have played key role in growth of food grain output particularly of rice and wheat. These government interventions have been affected through parastatals like Food Corporation of India (FCI) which procures rice and wheat from surplus regions, maintains their stock, supplies rice and wheat for public distribution system in various states and undertakes open market sales. This intervention has been quite effective in achieving goal of food security for the country, but its sustenance has been putting large burden on the state exchequer in the form of food subsidy which have been growing year after year.

Government is increasingly finding it difficult to bear the burden of mounting food subsidy; and questions are being raised whether the benefits of food subsidy are reaching the poorer sections of the society. It is being suggested that food subsidies can be decreased considerably by encouraging participation of private trade in food grains. These suggestions follow from the fact that the country is in a comfortable position on production front and a sound network of roads and markets have been developed for efficient functioning of private trade. On the other hand, there are fears of the past that private trade would not pay remunerative prices to producers and would manipulate market to exploit consumers. It is also feared that withdrawal of government intervention in grain markets would jeopardise food security. This underscores the need to evolve new kind of mechanism for government intervention in food grains markets which allows and encourages active participation of private trade but keeps a check on exploitative tendencies

of private trade. This can be done by creating an environment that provide reasonable incentive to private sector to operate in food grain market. This implies that as long as private trade charges normal margin for delivering the commodities across space and time, government would not intervene in the market. Implementing such mechanism would require developing norms which can be used to find out whether private trade is charging reasonable prices or is indulging in exploitation of consumers and producers. This Chapter is an attempt in constructing such norms. It estimates the price band for rice and wheat at different levels of transactions over time, form and space. The study prepares estimates of price spread between farm harvest prices, wholesale prices and retail prices of rice and wheat. By reckoning all relevant costs like statutory charges, labour charges, processing charges, transport cost, storage cost and cost of working capital, and reasonable margins for different functionaries, the study develops estimates of price band between farm harvest prices of wheat and paddy in surplus states and wholesale and retail price in subsequent months in all major states of the country. The acceptable price band includes reasonable margin for wholesalers, rice millers and retailers, and, marketing costs like (1) statutory charges, (2) labour charges, (3) material (packaging) cost, (4) local transport and freight to different states (5) milling charges for rice (6) storage charges and (7) interest on working capital.

#### **4.1 Methodology**

The price band has been estimated for rice and wheat which are most important food grains for the country from production as well as food security point of view. The band corresponds to grain trade that takes place between surplus and deficit states. A state has been termed as surplus or deficit depending upon the difference in per capita net production and consumption during the recent triennium. Per capita net production of rice and wheat in each state has been taken after deducting 12.5 and 10 per cent of output of wheat and rice respectively as allowance for feed, seed and wastage. Estimates of per capita consumption have been taken from 50<sup>th</sup> round of N.S.S pertaining to the year 1993-94.

Price band has been computed in two steps by taking farm harvest price as the lower threshold. In the first step price band has been computed between farm harvest price (price paid to producers by buyers in primary market)

and wholesale price. In the second step the band has been extended to retail level. This implicitly assumes following type of marketing channels for rice and wheat in deficit and surplus states:

Wheat (surplus states)

Producer — wholesalers in primary market — retailer

Wheat (deficit states)

Producer — wholesaler in primary market — wholesaler in secondary market — retailer

Paddy/Rice (surplus States)

Producer — Wholesaler cum rice millers in primary market — retailer

Producer — rice miller — wholesaler in primary market — retailer

Paddy/rice (deficit states)

Producer — rice miller — wholesaler in primary market — wholesaler in secondary market — retailer

The trade flows take place like this. In the case of wheat wholesaler buys wheat from farmers in the primary market in surplus state and pays (i) statutory charges like mandi fee and commission (ii) cost of labour and material. When these cost are added to farm harvest price it becomes wholesale price in the surplus state for the harvest season. Taking the produce to deficit states during harvest season would involve transport cost, margin of wholesaler in the primary market and freight charges. When these costs are added to wholesale price in surplus state it gives the price paid by wholesaler in the deficit states. It is assumed that during harvest season transactions are instant and that there is no storage and no capital is blocked in the business.

Wholesale price in the subsequent months is derived by adding storage cost, interest on working capital and wholesaler's margin (see Table 4.1). The storage cost and interest on working capital are charged for half of the duration of harvest season i.e. 45 days and for the duration of period after harvest season. For the deficit states transport charges and forwarding charges are also added. Forwarding charges include labour charges for loading the produce in trucks to despatch to other destinations.

**Table 4.1: Description of cost items in price band from harvest to wholesale level in surplus and deficit states for wheat**

Type of state	Harvest season April – June	Subsequent season July - next March
Surplus	<ol style="list-style-type: none"> <li>1. Statutory marketing charges</li> <li>2. Cost of labour and bag</li> </ol>	<ol style="list-style-type: none"> <li>1. Statutory marketing charges</li> <li>2. Cost of labour and bag</li> <li>3. Storage cost for 45 days (half) of harvest season</li> <li>4. Storage charges for lapsed months</li> <li>5. Interest cost for 45 days (half) of harvest season</li> <li>6. Interest cost for lapsed month</li> <li>7. Wholesaler's margin</li> </ol>
Deficit	<ol style="list-style-type: none"> <li>1. (1) and (2) as above</li> <li>2. Wholesaler's margin</li> <li>3. Forwarding charges</li> <li>4. Transport cost</li> </ol>	<ol style="list-style-type: none"> <li>1. (1) to (7) as above</li> <li>2. Wholesaler's margin</li> <li>3. Forwarding charges</li> <li>4. Transport cost</li> </ol>

In the case of rice, farm harvest price of paddy in surplus region is used as the lower brand. Various cost items added to farm harvest price to arrive at wholesale price in deficit and surplus states are shown in Table 4.2.

The second step involves estimation of price spread between wholesale and retail price. It was assumed that difference or ratio of long run average of retail and wholesale prices of comparable grade in each state would represent normal price spread which includes wholesalers margin, retailer's margin and costs included in movement of produce from wholesale to retail level in the same state. Based on this, average of percent difference between wholesale and retail price of rice and wheat for same grade for the last 12 years (1986-98) was used as price spread between wholesale and retail. Due to lack of consistent data series, price spread between wholesale and retail in some states could not be estimated. In such cases estimates for other grain i.e. wheat for rice or rice for wheat were used.

Each state was identified as surplus or deficit in rice and wheat based on the difference between per capita net production and consumption. This information for the triennium average 1996-97 to 1998-99 is presented in

Table 4.3. Punjab, Haryana, Uttar Pradesh turned out to be surplus in both rice and wheat. Among other states, Rajasthan and Himachal Pradesh were surplus in wheat while West Bengal was surplus in rice.

Out of the surplus states, Punjab was chosen to represent surplus region as highest surplus is available in this state. Within Punjab, Khanna market was selected to represent farm harvest prices and wholesale prices in the surplus state. Detailed information on marketing costs and margin, processing cost and transportation cost was collected from various market functionaries in Khanna market. These functionaries include traders, commission agents, wholesaler, miller, transport companies, and officials of market committee.

**Table 4.2: Description of cost items in price band from harvest price to wholesale level in surplus and deficit states: farm harvest price paddy to wholesale price rice**

Type of State	Harvest season October - December	Subsequent season Next January – September
Surplus	<ol style="list-style-type: none"> <li>1. Statutory marketing charges</li> <li>2. Cost of labour and bag used for paddy</li> <li>3. Carriage to rice mill</li> <li>4. Processing cost</li> <li>5. Cost of bag for rice</li> <li>6. Handling/ stacking charges</li> <li>7. Rice miller's margin</li> </ol>	<ol style="list-style-type: none"> <li>1. Statutory marketing charges</li> <li>2. Cost of labour and bag used for paddy</li> <li>3. Carriage to rice mill</li> <li>4. Processing cost</li> <li>5. Cost of bag for rice</li> <li>6. Handling/ stacking charges</li> <li>7. Rice miller's margin</li> <li>8. Storage charges for 45 days (half) of harvest season</li> <li>9. Storage charges for lapsed months</li> <li>10. Interest cost for 45 days (half) of harvest season</li> <li>11. Interest cost for lapsed months</li> <li>12. Wholesaler's margin</li> </ol>
Deficit	<ol style="list-style-type: none"> <li>1. (1) to (7) as above</li> <li>2. Wholesaler's margin</li> <li>3. Forwarding charges</li> <li>4. Transport cost</li> </ol>	<ol style="list-style-type: none"> <li>1. (1) to (12) as above</li> <li>2. Wholesaler's margin</li> <li>3. Forwarding charges</li> <li>4. Transport cost</li> </ol>

**Table 4.3: Per capita per month production and consumption of rice and wheat in major states, 1996-97 to 1998-99.**

Unit: Kilogram

States	Per capita consumption		Per capita production		Per capita surplus/deficit	
	Rice	Wheat	Rice	Wheat	Rice	Wheat
Andhra Pradesh	10.84	0.22	11.07	0.01	-0.88	-0.21
Assam	11.92	0.62	9.73	0.34	-3.17	-0.32
Bihar	7.59	5.26	5.89	3.81	-2.29	-1.93
Gujarat	1.95	4.22	1.78	2.78	-0.35	-1.79
Haryana	0.94	9.76	10.65	34.27	8.65	20.22
Himachal Pradesh	3.64	5.96	1.64	8.59	-2.16	1.55
Jammu and Kashmir	4.69	7.06	4.75	3.56	-0.41	-3.95
Karnataka	5.55	0.74	5.46	0.29	-0.63	-0.48
Kerala	8.97	0.43	1.98	0.00	-7.19	-0.43
Madhya Pradesh	5.32	5.88	5.76	8.48	-0.14	1.54
Maharashtra	2.91	2.83	2.32	0.95	-0.82	-2.00
Orissa	14.14	0.46	12.48	0.01	-2.91	-0.45
Punjab	0.79	8.98	27.95	49.35	24.37	34.20
Rajasthan	0.30	9.19	0.30	10.90	-0.03	0.35
Tamil Nadu	9.88	0.33	9.47	0.00	-1.36	-0.33
Uttar Pradesh	3.63	8.68	6.10	12.02	1.86	1.84
West Bengal	11.34	1.49	13.83	0.86	1.11	-0.74
Goa	6.64	1.93	9.60	0.00	2.00	-1.93
All India	6.41	4.17	7.24	5.98	0.11	1.06

Source: 1. Consumption of Some Important Commodities in India, NSS 50<sup>th</sup> Round, 1993-94, NSSO, March 1997.

2. Statistical Abstract of India, various issues.

## 4.2 Price Band Estimates for Wheat

Farm harvest price of wheat during April-June, 2000 was taken as lower band of price. This price was reported to be Rs.582 in Khanna market in Punjab. After purchase of wheat the seller pays purchase tax (4%), surcharge (1%), market fee and rural development fund (4%) and commission (2.5%). These are termed as statutory charges and they sum up to 11.5 per cent of the price paid by wholesalers to producers in assembly market (see Table 4.4 for detail). Wheat is then filled in bags of about 95 Kg weight<sup>5</sup>, which

<sup>5</sup> Size of bag is now being changed to 50 kg.

are then stitched and weighed and then transported either to godowns for storage and sale in subsequent months or despatched directly to secondary markets mainly in deficit states. Wholesaler bears labour charges for filling, stitching, weighing and loading and unloading and charges for transporting produce to godown. Wholesaler also pays for packaging material (jute bag) which is generally used twice. When all these costs are added then reference wholesale price in surplus state comes to be Rs.666.42 per quintal.

**Table 4.4: Estimates of marketing costs and margin between farm harvest prices in surplus states and corresponding wholesale price of wheat during 2000-01.**

Farm Harvest Price Rs / quintal: 582			
S.N.	Items	Rate	Amount Rs./quintal
A.	Statutory charges		
1.	Purchase tax	4%	23.28
2.	Surcharge	1%	5.82
3.	Market fees and RDF	4%	23.28
4.	Commission	2.50%	14.55
B.	Cost of material		
	Cost of bag	20	10.00
C.	Labour charges		
1.	Bag filling/stitching	2.5	2.50
2.	Weighing	1	1.00
3.	Labour and transport charges to take produce from mandi to godown	3.99	3.99
	Sum of A to C		84.42
	<i>Reference wholesale price in surplus state</i>		666.42
D.	Storage cost per month	1	1.00
E.	Forwarding charges	1	1.00
F.	Interest on working capital/month	16%	17.77
G.	Transport cost (see Table 4.5)		
H.	Traders margin	20	20.00

Output stored for sale in subsequent months is charged Rs. 1 per bag per month as storage charges and interest on working capital. Wholesalers in Khanna market reported that they get finance from two sources viz. private and institutions. They pay 14 per cent annual interest on institutional advances and 18 per cent on private advances; we have used average of

interest rate of two sources i.e. 16%. Subsequently when produce is released for sale in lean period, wholesaler incurs cost of Rs. 1.00 per bag as loading or forwarding charges. According to the wholesalers in Khanna mandi they require a margin of Rs. 20 per bag as profit or incentive to remain in the business and to meet their establishment costs. This level of margin is close to the actual margin realised by wholesaler in wheat trade which is reported to be Rs. 25.10 per quintal according to a World Bank study (Piggot and Sidhu 1998).

Transportation charges particularly by road (truck) keep changing frequently. Transport cost per quintal of foodgrain between surplus state (Khanna market) and other states as applicable during April - September 2000 is given in Table 4.5.

**Table 4.5 : Transport cost per quintal produce by truck to various states from surplus state (Punjab)**

State	Market	Freight
Andhra Pradesh	Hyderabad	261.00
Assam	Gwuahati	297.50
Bihar	Muzzafarpur	216.50
Gujarat	Anand	122.00
Haryana	Karnal	41.50
Himachal Pradesh	Simla	75.00
Jammu & Kashmir	Srinagar	186.00
Karnataka	Hubli	247.00
Kerala	Ernakulam	286.50
Madhya Pradesh	Indore	127.50
Maharashtra	Mumbai	191.50
Orissa	Cuttack	161.50
Punjab	Khanna	
Rajasthan	Kota	67.00
Tamil Nadu	Chennai	275.00
Uttar Pradesh	Kanpur	111.00
West Bengal	Calcutta	247.00
Goa	Panjim	275.00
Delhi	Delhi	50.00

Month wise price spread between farm harvest prices and wholesale prices, except transport cost, is shown in Table 4.6. Marketing cost, mandi labour and material charges comes out to be Rs.84.43 per quintal of produce and



they do not vary over months. Storage and interest charges for half of the harvest season and for half of the following month are included in the month following harvest season. This way first month following harvest season includes interest and storage charges for two months time. For the next 8 months monthly charges are added to the July charges. This way marketing costs and margin are estimated to increase from Rs. 105.42 per quintal of wheat during April- June to Rs. 204.39 in March next year. Adding all these costs and transport cost to farm harvest price gives upper price band for wholesale price. These wholesale prices for each state and month are presented in Table 4.7.

It would be seen from Table 4.7 that corresponding to farm harvest price of Rs. 582, wholesale price of Rs. 666 in harvest period to Rs. 786 in March next year provides reasonable incentive to private sector to undertake marketing of wheat in surplus states. The range is higher for deficit states. For instance, wholesale price between Rs. 948 - Rs.1052 in different months is reasonable for state of Andhra Pradesh. Wholesale price exceeding this range would indicate that private trade is exploiting market situation to earn excessive profit. Upper price band for wholesale price of wheat in Delhi market comes to Rs 737 for April to June, and it extends to Rs. 836 by March next year.

The second stage of price band between wholesale price in a state and the retail price has been estimated by multiplying wholesale price by average of the ratio of retail to wholesale price for the last twelve years beginning 1986. This long run average assumes that the abnormal profit/losses cancel out in the long run and that long run average presents normal margin. These estimates show that retail price of wheat in the country were higher by 15.46 per cent of the wholesale price. Minimum price spread was observed in the case of West Bengal where retail price of wheat exceeded wholesale price only by 5.27 per cent and highest price spread was observed in the case of Maharashtra where the retail price of wheat was 24 per cent higher than the wholesale price in the state (see Table 4.8). Major reason for variation in price spread between wholesale and retail level seems to be due to differences in tax structure. For some of the states consistent price data was not available to estimate spread between prices. In such cases price spread of other food grains i.e. wheat for rice or rice for wheat was used.

**Table 4. 6: Estimates of different items of price band in wheat other than transport cost for deficit states, 2000-01**

State	April -June	July	August	September	October	November	December	January	February	March
1. Marketing/ labour/ bag charges	84.42	84.42	84.42	84.42	84.42	84.42	84.42	84.42	84.42	84.42
2. Storage cost	—	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
3. Interest cost	—	17.77	26.67	35.57	44.47	53.37	62.27	71.17	80.07	88.97
4. Wholesaler's margin	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
5. Forwarding charges	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sum of 1 to 5	105.42	125.19	135.09	144.99	154.89	164.79	174.69	184.59	194.49	204.39
6. Transport cost Depending upon the state										
7. Price band: (Sum of 1 to 6 and FHP)										

**Table 4.7: Month wise price band for wheat between farm harvest prices in Punjab and wholesale prices in various states during 2000-01**

Farm harvest price of wheat Rs./quintal: 582

State	Status	April-June	July	August	September	October	November	December	January	February	March
Andhra Pradesh	Deficit	948	968	978	988	998	1008	1018	1028	1037	1047
Assam	Deficit	985	1005	1015	1024	1034	1044	1054	1064	1074	1084
Bihar	Deficit	904	924	934	943	953	963	973	983	993	1003
Gujarat	Deficit	809	829	839	849	859	869	879	889	898	908
Haryana	Surplus	666	707	717	727	737	747	757	767	776	786
Himachal Pradesh	Surplus	666	707	717	727	737	747	757	767	776	786
Jammu & Kashmir	Deficit	873	893	903	913	923	933	943	953	962	972
Karnataka	Deficit	934	954	964	974	984	994	1004	1014	1023	1033
Kerala	Deficit	974	994	1004	1013	1023	1033	1043	1053	1063	1073
Madhya Pradesh	Deficit	815	835	845	854	864	874	884	894	904	914
Maharashtra	Deficit	879	899	909	918	928	938	948	958	968	978
Orissa	Deficit	849	869	879	888	898	908	918	928	938	948
Punjab	Surplus	666	707	717	727	737	747	757	767	776	786
Rajasthan	Surplus	666	707	717	727	737	747	757	767	776	786
Tamil Nadu	Deficit	962	982	992	1002	1012	1022	1032	1042	1051	1061
Uttar Pradesh	Surplus	798	707	717	727	737	747	757	767	776	786
West Bengal	Deficit	934	954	964	974	984	994	1004	1014	1023	1033
Goa	Deficit	962	982	992	1002	1012	1022	1032	1042	1051	1061
Delhi	Deficit	737	757	767	777	787	797	807	817	826	836

**Table 4.8: Price spread between wholesale and retail prices of foodgrains  
1986-98**

State	Unit: percent	
	Rice	Wheat
Andhra Pradesh	14.40	
Assam	17.05	
Bihar	10.55	15.77
Gujarat		23.04
Karnataka	7.11	
Kerala	10.76	
Madhya Pradesh	8.88	10.52
Maharashtra	12.26	24.09
Orissa	8.37	
Punjab		18.51
Rajasthan		13.69
Tamil Nadu	16.03	9.66
Uttar Pradesh	14.36	13.25
West Bengal	7.04	5.27
Delhi	15.12	20.84
Average	11.83	15.46

Retail price band that leaves reasonable margin for private trade and that takes into account various costs is presented in Table 4.9. Retail price band turns out to be lowest for the state by Rajasthan where it ranged between Rs.758 to Rs.894. Highest retail prices were observed in the case of Goa. During 2000-01, private trade earns reasonable margin by selling wheat in retail at Rs. 891 during April to June to Rs. 1011 in March next year in Delhi market.

Ratio of retail prices, providing normal margin for private trade, and farm harvest price in surplus states are presented in Table 4.10. Private trade would have incentive to undertake marketing of wheat by realising retail price 30 to 105% higher than farm harvest price. In wheat surplus states retail prices that are 30 –36 per cent above farm harvest prices would be profitable for private trade. The margin increases with the distance of deficit states from surplus states and time difference after harvest season. By the month of March next year retail prices in Andhra Pradesh, Assam, Kerala, Maharashtra, Goa and Tamil Nadu must be double or more than farm harvest prices in surplus states to provide incentive to private trade to remain in wheat trade.

**Table 4.9: Month wise price band for wheat between farm harvest prices in Punjab and retail prices in various states during 2000-01**

State	Farm harvest price of wheat Rs./quintal: 582									
	April-June	July	August	September	October	November	December	January	February	March
Andhra Pradesh	1085	1108	1119	1130	1142	1153	1164	1176	1187	1198
Assam	1153	1176	1188	1199	1211	1222	1234	1246	1257	1269
Bihar	1046	1069	1081	1092	1104	1115	1127	1138	1150	1161
Gujarat	996	1020	1032	1045	1057	1069	1081	1093	1106	1118
Haryana	790	838	850	862	873	885	897	908	920	932
Himachal Pradesh	790	838	850	862	873	885	897	908	920	932
Jammu & Kashmir	1035	1059	1070	1082	1094	1105	1117	1129	1141	1152
Karnataka	1001	1022	1033	1043	1054	1064	1075	1086	1096	1107
Kerala	1079	1101	1112	1123	1133	1144	1155	1166	1177	1188
Madhya Pradesh	901	923	933	944	955	966	977	988	999	1010
Maharashtra	1091	1115	1127	1140	1152	1164	1177	1189	1201	1213
Orissa	920	941	952	963	974	984	995	1006	1017	1027
Punjab	790	838	850	862	873	885	897	908	920	932
Rajasthan	758	804	815	827	838	849	860	872	883	894
Tamil Nadu	1055	1077	1088	1099	1110	1120	1131	1142	1153	1164
Uttar Pradesh	904	801	812	823	835	846	857	868	879	891
West Bengal	984	1004	1015	1025	1036	1046	1057	1067	1077	1088
Goa	1194	1219	1231	1243	1256	1268	1280	1293	1305	1317
Delhi	891	915	927	939	951	963	975	987	999	1011

**Table 4.10: Month wise ratio of retail price based on band for wheat and farm harvest prices in Punjab during 2000-01**

State	Farm harvest price of wheat Rs./quintal: 582									
	April-June	July	August	September	October	November	December	January	February	March
Andhra Pradesh	1.86	1.90	1.92	1.94	1.96	1.98	2.00	2.02	2.04	2.06
Assam	1.98	2.02	2.04	2.06	2.08	2.10	2.12	2.14	2.16	2.18
Bihar	1.80	1.84	1.86	1.88	1.90	1.92	1.94	1.96	1.98	1.99
Gujarat	1.71	1.75	1.77	1.79	1.82	1.84	1.86	1.88	1.90	1.92
Haryana	1.36	1.44	1.46	1.48	1.50	1.52	1.54	1.56	1.58	1.60
Himachal Pradesh	1.36	1.44	1.46	1.48	1.50	1.52	1.54	1.56	1.58	1.60
Jammu & Kashmir	1.78	1.82	1.84	1.86	1.88	1.90	1.92	1.94	1.96	1.98
Karnataka	1.72	1.76	1.77	1.79	1.81	1.83	1.85	1.87	1.88	1.90
Kerala	1.85	1.89	1.91	1.93	1.95	1.97	1.99	2.00	2.02	2.04
Madhya Pradesh	1.55	1.59	1.60	1.62	1.64	1.66	1.68	1.70	1.72	1.74
Maharashtra	1.87	1.92	1.94	1.96	1.98	2.00	2.02	2.04	2.06	2.08
Orissa	1.58	1.62	1.64	1.65	1.67	1.69	1.71	1.73	1.75	1.77
Punjab	1.36	1.44	1.46	1.48	1.50	1.52	1.54	1.56	1.58	1.60
Rajasthan	1.30	1.38	1.40	1.42	1.44	1.46	1.48	1.50	1.52	1.54
Tamil Nadu	1.81	1.85	1.87	1.89	1.91	1.93	1.94	1.96	1.98	2.00
Uttar Pradesh	1.55	1.38	1.40	1.41	1.43	1.45	1.47	1.49	1.51	1.53
West Bengal	1.69	1.73	1.74	1.76	1.78	1.80	1.82	1.83	1.85	1.87
Goa	2.05	2.09	2.12	2.14	2.16	2.18	2.20	2.22	2.24	2.26
Delhi	1.53	1.57	1.59	1.61	1.63	1.65	1.67	1.70	1.72	1.74

### 4.3 Price Band estimates for Rice

One major difference between rice and wheat marketing is that the latter is traded mainly in the grain form purchased from farmers while former involves processing/milling of paddy to convert it into rice. Farm harvest price of paddy (fine grade) has been used as lower threshold for computing corresponding wholesale and retail prices of rice. In the trade flow it is assumed that farmers sell paddy which is purchased by rice miller who in most of the cases also happens to be rice wholesaler. Like wheat, miller/wholesaler pays 11.5 per cent of the purchase price of paddy as statutory charges (see Table 4.11). Other charges paid by the wholesaler cum miller in the market are not proportional to value of produce but are paid on per bag basis which consists of about 60 kg paddy. For one quintal of paddy these charges are estimated at Rs. 3.85 for bag filling and stitching, Rs. 1.54 for weighing and Rs. 5.77 towards loading and transport to rice mill. Paddy wholesaler also pays for cost of gunny bag. We were told that one gunny bag which costs Rs. 20 can be used thrice for paddy after which its junk value would be Rs. 2. Thus cost of packaging material comes to be Rs. 6 per bag or Rs. 10 per quintal of paddy. All these costs sum up to Rs. 80.96 per quintal of paddy.

After its purchase, paddy is processed into rice. Accordingly to the information furnished by rice millers in Khanna market, cost of processing one quintal paddy is about Rs. 26. Rice millers recover a large part of this cost from sale of rice husk and rice bran. Based on our sample information rice bran and husk derived from milling 100 kg paddy gives a return of about Rs. 19.60 depending on the price realised for bran and husk. Thus, net cost of processing 1 quintal paddy comes to Rs. 6.40 (Rs. 26 less Rs. 19.60). This cost was further used to arrive at estimate of rice miller's margin. Rice millers process paddy to rice for Food Corporation of India by charging Rs. 13 per quintal of paddy under custom milling arrangement. Based on this, net margin to miller turns out to be Rs. 6.60 per quintal of paddy.

A comparison of processing cost and margin of rice millers and wholesalers based on our study and other recent studies is provided in Table 4.12. According to information furnished by rice millers to us genuine cost of

**Table 4.11: Estimates of marketing costs and margin between farm harvest prices of paddy in surplus states and corresponding wholesale price of rice during 1999-2000**

Reference price: Farm harvest price paddy (fine) /quintal; 520

Items	Rate	Amount
A. Statutory charges		
1. Purchase tax	4%	20.8
2. Surcharge	1%	5.2
3. Market fees and RDF	4%	20.8
4. Commission	2.50%	13
B. Cost of material: bag	20	10
C. Labour charges		
1. Bag filling/stitching	3.85	3.85
2. Weighing	1.54	1.54
3. Labour and transport charges to take produce from mandi to sheller	5.77	5.77
4. Sum of A to C		80.96
D. Millers Cost and margin		
1. Net cost of processing 1 quintal paddy	6.4	6.4
2. Interest on working capital/month	16%	12.02
3. Millers margin	6.6	6.6
4. Sum of D1 to 3		25.02
5. Packing/stocking of 1 qtl rice	2.5	2.5
6. Cost of bag:	23	11.5
7. Miller's cost and margin for 1 quintal rice		51.53
8. Marketing and processing cost and miller's margin for one quintal rice (C4+D4)*1.5+D5+D6		172.97
<i>Reference price of rice (corresponding to 1.5 quintal paddy) Rice</i>		952.97
E. Storage cost/month	1	1
F. Forwarding charges	1	1
G. Interest on working capital/month	16%	12.71
H. Margin of wholesaler per quintal	20.27	20.27
I. Transport cost (as per Table 4.5)		

processing one quintal paddy comes to be Rs. 26. Compared to this a study done for World Bank by Piggot and Sidhu finds this cost for year 1998-99 to be Rs. 26.09 when land rent is not considered. (This study includes land



rent of Rs. 5000 per day among fixed cost of rice mill which in our opinion should not be considered among fixed cost). Similarly, a study in Andhra Pradesh reports that cost of milling one quintal paddy in Andhra Pradesh during 1993-94 was Rs. 20 (Veeraswamy 1994). Cost of marketing and processing paddy to give one quintal of rice is estimated to be Rs. 174.44 according to our study for the year 1999-2000. This cost according to Piggot and Sidhu (1998) for the year 1997-98 is Rs.157.20 There is huge difference in the miller's margin suggested by our study and actual margin realised by rice millers during 1997-98 as reported by Piggot and Sidhu and used by World Bank (1999). According to Piggot and Sidhu rice millers during 1997-98 realised profit of Rs. 28.58 per quintal of paddy milled by them.

**Table 4.12: Comparative cost of rice processing and marketing based on different studies**

Particular	Source	Amount	Ref year
1 Cost of marketing and processing to convert paddy into 1 quintal rice	This study	174.44	1999
	Sidhu and Piggot	157.20	1997-98
2 Cost of processing one quintal of paddy	This study	26.00	1999
	Sidhu and Piggot a.	26.09	1993-94
	Sidhu and Piggot b.	38.59	
3 Return to miller from sale of bran and husk	Veeraswamy (A.P.)	20.00	1993-94
	This study		
4 Margin to miller/qtl. Paddy	Sidhu and Piggot	20.50	
	Veeraswamy	10.00	
	This study	6.60	1999
5 Margin to wholesaler	Sidhu and Piggot	28.58	1997-98
	Veeraswamy	5.00	
	This study	20.27	1999
	Sidhu and Piggot/ World Bank	18.15	1997-98

After milling, rice is stacked/stored which involves cost of labour and gunny bag. There is also cost of capital which is estimated at the rate of 16 percent for half of the duration of harvest season. As one quintal of rice is extracted from 1.5 quintals of paddy, all these costs and cost of one quintal paddy are multiplied by a factor of 1.5 to get cost of one quintal rice to wholesaler. This way wholesaler's price for rice turns out to be Rs. 952.97. When this

rice is further sold by wholesalers to retailers in surplus states or to wholesaler in deficit states it would involve wholesaler's margin of Rs. 20.27.

Monthwise price spread between prices of paddy and rice is presented in Table 4.13. The price spread except transport cost works out to be Rs. 454 during October to December and it increases to Rs. 571.36 by September next year. It may be noted that this price spread includes Rs. 260 as cost of additional 50 Kg paddy in excess of 1 quintal paddy to get 1 quintal of milled rice. This way, corresponding to farm harvest price of Rs. 520 for paddy, wholesale price of rice in surplus states comes out to be Rs. 953 during October- December and between Rs., 982 to Rs. 1091 in the subsequent months (see Table 4.14 for details). Incentive wholesale price for private trade at peak time i.e. in September works out to be between Rs. 1300 to 1400 in all the Southern States, Assam, Bihar and Goa. In Delhi wholesale price between Rs. 1024 to 1141 is justified for private trade.

Subsequently retail prices band was also estimated by incorporating price spread between wholesale price and retail prices given in Table 4.8. When farm harvest price in Punjab is Rs. 520 per quintal private trade would sell rice to consumers between Rs. 1129 to Rs. 1293 in different months to earn normal margin (Table 4.15). Retail price range is lower in West Bengal and Uttar Pradesh due to smaller price spread between wholesale and retail price. Among deficit states upper band for retail price would vary between Rs. 1179 in Delhi to Rs. 1489 in Assam during October to December. At extreme, retail prices of rice per kg would vary between Rs. 14.34 and 15.85 in southern states if private sector pays marketing transport and processing cost as reported in this study.

Ratios of retail prices of rice containing incentive for private trade and farm harvest price of paddy in surplus states are presented in Table 4.16. At the given cost structure, private trade would sell rice to consumers at almost double the price of paddy in West Bengal during the harvest season. Retail price of rice increases to 2.25 times the farm harvest price of paddy by month of September in following year. During the peak time, retail prices of rice by private trade in most of the deficit states would be close to three times the paddy price during October to December.



**Table 4.14: Month wise wholesale price for rice based on price band corresponding to farm harvest prices of paddy in Punjab**

State	Status	Farm price of fine paddy Rs./qtl. 520									
		October-December	January	February	March	April	May	June	July	August	September
Andhra Pradesh	Deficit	1235	1243	1256	1270	1284	1297	1311	1325	1339	1352
Assam	Deficit	1272	1279	1293	1307	1320	1334	1348	1361	1375	1389
Bihar	Deficit	1191	1198	1212	1226	1239	1253	1267	1280	1294	1308
Gujarat	Deficit	1096	1104	1117	1131	1145	1158	1172	1186	1200	1213
Haryana	Surplus	953	982	995	1009	1023	1036	1050	1064	1078	1091
Himachal Pradesh	Deficit	1049	1057	1070	1084	1098	1111	1125	1139	1153	1166
Jammu & Kashmir	Deficit	1160	1168	1181	1195	1209	1222	1236	1250	1264	1277
Karnataka	Deficit	1221	1229	1242	1256	1270	1283	1297	1311	1325	1338
Kerala	Deficit	1261	1268	1282	1296	1309	1323	1337	1350	1364	1378
Madhya Pradesh	Deficit	1102	1109	1123	1137	1150	1164	1178	1191	1205	1219
Maharashtra	Deficit	1166	1173	1187	1201	1214	1228	1242	1255	1269	1283
Orissa	Deficit	1136	1143	1157	1171	1184	1198	1212	1225	1239	1253
Punjab	Surplus	953	982	995	1009	1023	1036	1050	1064	1078	1091
Rajasthan	Deficit	1041	1049	1062	1076	1090	1103	1117	1131	1145	1158
Tamil Nadu	Deficit	1249	1257	1270	1284	1298	1311	1325	1339	1353	1366
Uttar Pradesh	Surplus	953	982	995	1009	1023	1036	1050	1064	1078	1091
West Bengal	Surplus	953	982	995	1009	1023	1036	1050	1064	1078	1091
Goa	Deficit	1249	1257	1270	1284	1298	1311	1325	1339	1353	1366
Delhi	Deficit	1024	1032	1045	1059	1073	1086	1100	1114	1128	1141

**Table 4.15: Month wise price band for rice between farm harvest prices of paddy in Punjab and retail prices of rice in various states**

State	Farm harvest price of paddy fine grade: Rs. 520/quintal									
	October-December	January	February	March	April	May	June	July	August	September
Andhra Pradesh	1413	1422	1437	1453	1469	1484	1500	1516	1531	1547
Assam	1489	1497	1513	1529	1545	1561	1577	1593	1610	1626
Bihar	1316	1324	1340	1355	1370	1385	1400	1415	1431	1446
Gujarat	1349	1358	1375	1392	1409	1425	1442	1459	1476	1493
Haryana	1129	1163	1180	1196	1212	1228	1245	1261	1277	1293
Himachal Pradesh	1243	1252	1268	1285	1301	1317	1333	1350	1366	1382
Jammu & Kashmir	1375	1384	1400	1416	1433	1449	1465	1481	1498	1514
Karnataka	1308	1316	1331	1345	1360	1375	1389	1404	1419	1434
Kerala	1396	1405	1420	1435	1450	1465	1481	1496	1511	1526
Madhya Pradesh	1200	1208	1223	1237	1252	1267	1282	1297	1312	1327
Maharashtra	1309	1317	1332	1348	1363	1379	1394	1409	1425	1440
Orissa	1231	1239	1254	1269	1283	1298	1313	1328	1343	1358
Punjab	1129	1163	1180	1196	1212	1228	1245	1261	1277	1293
Rajasthan	1184	1192	1208	1223	1239	1255	1270	1286	1301	1317
Tamil Nadu	1450	1458	1474	1490	1506	1522	1538	1554	1570	1585
Uttar Pradesh	1090	1123	1138	1154	1170	1185	1201	1217	1232	1248
West Bengal	1020	1051	1065	1080	1095	1109	1124	1139	1153	1168
Goa	1402	1411	1426	1441	1457	1472	1488	1503	1518	1534
Delhi	1179	1188	1203	1219	1235	1251	1267	1282	1298	1314

**Table 4.16: Month wise ratio of retail price based on band for rice and farm harvest price of paddy in Punjab**

State	Farm harvest price of paddy fine grade: Rs. 520/quintal									
	October-December	January	February	March	April	May	June	July	August	September
Andhra Pradesh	2.72	2.73	2.76	2.79	2.82	2.85	2.88	2.91	2.95	2.98
Assam	2.86	2.88	2.91	2.94	2.97	3.00	3.03	3.06	3.10	3.13
Bihar	2.53	2.55	2.58	2.61	2.63	2.66	2.69	2.72	2.75	2.78
Gujarat	2.59	2.61	2.64	2.68	2.71	2.74	2.77	2.81	2.84	2.87
Haryana	2.17	2.24	2.27	2.30	2.33	2.36	2.39	2.42	2.46	2.49
Himachal Pradesh	2.39	2.41	2.44	2.47	2.50	2.53	2.56	2.60	2.63	2.66
Jammu & Kashmir	2.64	2.66	2.69	2.72	2.75	2.79	2.82	2.85	2.88	2.91
Karnataka	2.52	2.53	2.56	2.59	2.62	2.64	2.67	2.70	2.73	2.76
Kerala	2.69	2.70	2.73	2.76	2.79	2.82	2.85	2.88	2.91	2.93
Madhya Pradesh	2.31	2.32	2.35	2.38	2.41	2.44	2.47	2.49	2.52	2.55
Maharashtra	2.52	2.53	2.56	2.59	2.62	2.65	2.68	2.71	2.74	2.77
Orissa	2.37	2.38	2.41	2.44	2.47	2.50	2.53	2.55	2.58	2.61
Punjab	2.17	2.24	2.27	2.30	2.33	2.36	2.39	2.42	2.46	2.49
Rajasthan	2.28	2.29	2.32	2.35	2.38	2.41	2.44	2.47	2.50	2.53
Tamil Nadu	2.79	2.80	2.83	2.87	2.90	2.93	2.96	2.99	3.02	3.05
Uttar Pradesh	2.10	2.16	2.19	2.22	2.25	2.28	2.31	2.34	2.37	2.40
West Bengal	1.96	2.02	2.05	2.08	2.11	2.13	2.16	2.19	2.22	2.25
Goa	2.70	2.71	2.74	2.77	2.80	2.83	2.86	2.89	2.92	2.95
Delhi	2.27	2.28	2.31	2.34	2.37	2.41	2.44	2.47	2.50	2.53

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## **5 POLICY OPTIONS AND STRATEGY FOR FOOD MANAGEMENT**

Foodgrain management operations of government have recently come under increasing criticism due to various problems associated with such operations and in the context of prevailing environment for policy reforms. These operations include government intervention in maintaining buffer stock for food security and price stabilisation, procurement and distribution of foodgrains and farm price policy. It is contended that all these interventions were justified in the time of food shortages and scarcity and when marketing infrastructure and institutions were not sufficiently developed and competitive to protect interest of producers and consumers. Easing of strain on domestic food availability, accumulation of massive stock of cereals, emergence of shortages in edible oils and pulses and new options for price stabilisation are cited as strong reasons for re-looking into the entire policy of food management and government intervention in foodgrain markets. This Chapter looks at various dimensions of India's foodgrain sector and suggests changes in government policy on food management that is relevant in the present context.

### **5.1 Inter Year Price Stability**

Cereals being the basic and staple food were considered as the most important component of food security. Their demand and supply are both inelastic implying that small fluctuation in output is likely to cause large increases/decreases in their prices which in turn would result in sharp fluctuations in farm income and expose consumers to high volatility in food prices. Thus, in order to bring stability in prices and farm income it was considered imperative to maintain buffer stock of grains which involved purchases from the market during the good harvest years and releasing stock during lean years or when production is below envisaged trend.

Purchase from market and release of stock in this manner ensures that supply of produce in the market would move on a smooth trend. If growth in demand keeps pace with the envisaged trend in supply then purchase/release of

stock based on deviations from trend level of production would ensure perfect balance between demand and supply assuming closed market from external trade. This should ensure that there is no disturbance to price stability as for as genuine factors on demand and supply side are concerned.

Based on this logic, deviations in actual production from stipulated trend should serve as a basis for quantity of grain to be purchased and buffer stock needed for maintaining inter year price stability. Actual data on these aspects is presented in Table 5.1. The Table shows that during 1970s highest positive deviation from trend level of production (henceforth also referred to as normal production) was 12.81 million tonne and highest negative deviation was 15.31 million tonne. Thus, during the decade of 1970s highest procurement of 12.81 million tonne and buffer stock of 15.31 tonne was required to take care of fluctuations in supply. Procurement of cereals during this decade varied between 6.25 and 14.46 million tonne.

During 1980s actual production exceeded normal level by 8.52 million tonne during 1983-84 which was highest for the decade while highest negative deviation was experienced during 1987-88 when cereal output declined from normal production by 16 million tonne. Procurement during this decade varied between 12.31 and 23.13 million tonne.

During the decade of 1990s fluctuations in cereal output declined considerably as deviations from normal production remained below 7.06 million tonne on either side. However, procurement by official agencies during 1990s rose sharply and ranged from foodgrain 16.23 to 31.53 million tonne. Like the increase in government procurement of foodgrain, level of buffer stock of cereals also moved up over time. This shows that reduction in instability in cereal production in the country was not followed by decline in quantity of output purchased by government and buffer stock. To be more critical, quantity of foodgrains purchased by government and level of buffer stock have not been dictated or guided by fluctuations in output. If maintaining inter year price stability was the important consideration for government intervention in grain markets then reduced fluctuations in output, experienced in the country, should have resulted in decrease in level of procurement and buffer stock rather than following increase over time.



**Table 5.1: Actual deviations in cereal output from trend and level of procurement by official agencies, million tonne**

Year	Deviations in output from trend				Procurement	PDS offtake	Stock as on
	Rice	Wheat	Coarse cereals	All cereals	All cereals	Rice and wheat	1st July
1970-71	5.81	3.99	3.01	12.81	8.79	9.11	5.35
1971-72	4.93	4.81	-3.08	6.66	8.31	8.44	7.94
1972-73	-0.63	1.39	-4.68	-3.93	7.56	8.27	8.56
1973-74	2.45	-3.33	0.86	-0.01	6.25	8.27	4.31
1974-75	-3.74	-2.77	-1.98	-8.49	8.15	7.99	3.77
1975-76	3.69	0.21	2.16	6.06	13.26	9.48	5.80
1976-77	-4.86	-1.37	0.49	-5.75	9.82	8.29	16.78
1977-78	4.16	-0.39	1.48	5.25	10.35	10.77	20.23
1978-79	3.53	1.61	1.76	6.9	14.46	11.13	18.81
1979-80	-9.64	-3.83	-1.85	-15.31	9.82	11.19	21.36
1980-81	-0.06	-1.1	0.05	-1.11	12.31	12.99	16.09
1981-82	-2.17	-1.72	1.98	-1.91	15.27	12.56	13.57
1982-83	-10.03	1.86	-1.5	-9.67	15.51	11.08	15.28
1983-84	1.22	2.8	4.51	8.52	17.07	18.32	16.80
1984-85	-2.27	-0.37	1.63	-1.01	20.42	13.49	22.43
1985-86	1.49	0.85	-3.48	-1.13	20.51	16.26	28.50
1986-87	-3.5	-3.64	-2.99	-10.13	17.05	14.12	28.16
1987-88	-8.93	-3.54	-3.61	-16.08	13.65	13.10	23.21
1988-89	2.97	2.64	1.36	6.97	16.77	14.95	11.71
1989-90	4.32	-3.38	4.51	5.45	23.13	19.00	13.41
1990-91	3.31	0.15	2.3	5.77	20.63	17.40	20.63
1991-92	1.98	-1.05	-4.55	-3.63	16.63	14.78	20.76
1992-93	-1.57	-1.29	5.91	3.05	26.69	12.86	15.05
1993-94	4.14	-0.42	0	3.72	26.24	14.75	25.66
1994-95	3.92	3.76	-1.09	6.59	26.03	19.66	32.20
1995-96	-2.64	-1.67	-2.08	-6.39	18.23	16.98	35.60
1996-97	0.39	3.82	2.85	7.06	22.27	18.69	27.00
1997-98	-0.54	-0.94	-1	-2.48	28.23	17.07	22.40
1998-99	1.28	2.25	-0.2	3.33	26.68	11.72	28.50
1999-00	2.95	4.77	-1.2	6.52	31.53	8.38	33.10
2000-01	-1.96	-4.1	-1.57	-7.63	35.45		42.30
2001-02							61.70

Source: Economic Survey, various issues  
Agricultural Statistics at a Glance, various issues

Assuming that private trade would not play major role in maintaining inter year price stability, government can base its decision to buy above normal output on advance estimates of production available around harvest time. This would be given by deviation of estimated output from stipulated trend, which can be estimated quite reliably for medium term. Similarly, level of

buffer stock for such purpose can be worked out from negative deviations of actual output from stipulated trend. During the last decade highest decline from trend level was observed to be 7.63 million tonne. Also, after 1987-88 India did not face two consecutive bad years of cereal production. It is thus safe to assume that buffer stock of around 7.63 million tonne is sufficient to make up for the deficiency in cereal output from normal level.

There would be instances of severe drought like one experienced during 1979-80 and 1987-88 when decline in output could go quite high. Should buffer stock be maintained to take care of such serious shortfall which occurs once in a while in about 15 years period? This kind of events are highly unpredictable about their severity as well as occurrence. It does not seem to be prudent to link level of buffer stocks to magnitude of output decline in such years as it includes maintaining very huge level of buffer stock for a very long period. Normal buffer stock would take care of about half of the output shortfall in the time of severe droughts. Some of the output deficiencies can be met from international market and some can be compensated for by reduced consumption. As far as procurement from domestic markets for price stabilisation is concerned, it is suggested that the Centre should carry out open market purchases and sales from the market (Ray 1996).

## **5.2 Supplies for PDS**

Foodgrains are also procured by government to service Public Distribution System and other welfare schemes of the Government. Strong debate is going on about the desirability of continuing present system of public distribution and suggestions have been made to replace it with more efficient “food stamp” system (Ramaswami 2002 and Gulati et al 2000). Here, we are not going into the merits and demerits of PDS and feel that for the time being some sort of PDS would be needed as a safety net for vulnerable sections of the society.

Total requirement for PDS is estimated to be 21 million tonne per annum (Economic Survey 2000-01, p. 50). Procurement for PDS would be a continuous exercise requiring purchase of rice and wheat each year. This is in sharp contrast to the procurement to meet inter year stability in supply

which should arise only when anticipated output is above the trend or normal level of output. Thus, total procurement of grain in a given year should be around the sum of quantity needed for PDS and excess of estimated output from normal production. Similarly, maximum level of buffer stock should be 18.13 million tonne which is sum of stock needed for PDS for six months (21 divided by 2) and highest shortfall observed in grain production during the recent 10 years (which is found to be 7.63 million tonne).

### **5.3 Implementing Guaranteed Prices**

Besides maintaining inter year price stability and PDS supply, third important goal of government intervention in grain markets has been to ensure guaranteed prices to producers as announced by government before harvest season. This is ensured by buying all grains delivered at the support price. If market price is above support price then there is no need for procurement by government to ensure guaranteed price.

Here it is important to understand implications of guaranteed purchases to ensure minimum support price for the produce. If support price is consistent with demand and supply for the given commodity then competitive market should ensure that market price does not go below the level of support price. To elaborate it further, if difference between support price and subsequent open market price leaves adequate margin for private trade then, under competitive markets, private trade would be offering price to producers higher than the support price. In such a situation there would be no need for government procurement to ensure minimum price to producers. However, if market is not competitive or is unfavourable for private trade then there could be need for government to ensure minimum support through purchases from the market. Thus, when market price in the lean months, as determined by demand and supply, leaves enough margin above support price then support price can be ensured through competitive market and trade without government procurement.

In case the market price determined by supply and demand does not leave adequate margin over support price, private trade would not buy the produce at support price howsoever competitive the market may be. This can happen when growth in demand does not keep pace with the supply and, when

support price is fixed based on supply side factors only. This is exactly what is being experienced in the case of rice and wheat in the country.

Coming to the demand side, macro data presented in Table 2.9 and household data based on NSSO survey presented in Table 2.13 provide a clear indication of declining trend in per capita consumption of cereals which has resulted into demand deficiency for cereals in the country. Both price and non price factors are responsible for this. Information on price factors is presented in Table 5.2 which provides trend growth rate in different types of prices of rice and wheat and other commodities during the last decade. During 1990s procurement prices and wholesale prices of rice and wheat increased at a much faster rates than the growth rate in general price index. Similarly, the rate of inflation in rice and wheat prices during 1990s was significantly higher compared to the 10 years period preceding 1990-91. Rural retail prices and PDS prices, which actually matter for consumption, also increased at a much faster rate during 1990s compared to 1980s. Thus both open market purchases and PDS demand have been affected by the high growth in prices causing a decline in per person purchase from PDS and open market.

**Table 5.2: Annual rate of growth in prices of rice and wheat and all commodities during 1980-81 to 1999-00**

Price	Commodity	Growth rate %	
		1980-81 to 1989-90	1990-91 to 1999-00
Wheat:	Procurement price	4.36	10.53
	Wholesale price	5.67	9.48
	Retail price	6.62	8.88
	PDS price	3.74	11.85
Rice:	Procurement price	5.42	9.65
	Wholesale price	5.24	9.24
	Retail price	7.36	8.69
	PDS price	5.80	12.96
CPI:	Food	8.38	9.39
	General	8.58	9.31
Wholesale price index	All commodities	6.72	8.07

Beside prices there are indications of cereal demand getting reduced to some extent due to changes in consumption pattern. This is evident from the fact that despite the lower growth in retail prices of cereals compared to prices of other food, implying decline in real terms, per capita cereal demand has followed declining trend. This way, both price factor as well as change in consumers preference to shift from cereals to non cereal products are responsible for decline in per capita cereal demand in the recent years.

To the extent deficiency of cereal demand is resulting from long run changes in consumption pattern, prices would not be very potent instrument for boosting demand and for restoring balance between demand and supply. The solution lies in adjusting supply to demand. One way to do this is to bring some reduction in area under cereals in inefficient producing regions.

Price based solution to restore balance between cereal supply and demand in the present situation requires market prices to come down to raise the level of demand and reduce the level of supply till they are in equilibrium. However, it has very serious implications which may not be desirable from long run food security point of view. Taking year 2000-01 as an example, purely price based solution implies that to maintain balance between supply and demand, cereal prices should have been lower by 27 percent.<sup>6</sup> It is worth noting that year 2001 was not agriculturally good year and cereal output was about 7 million tonne below normal level based on trend. Despite that and despite net export of 2.9 million tonne, cereal stock increased by 12.5 million tonne in the year 2001. If demand for cereal remains deficit and cereal output increase to their normal (trend) level then required decrease in price to maintain balance between supply and demand works out to be enormous. This kind of purely price based solutions would result in steep

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<sup>6</sup>The estimate refers to year 2001 and cereal output of 187 million tonne, against which change in stock was recorded to be +12.5 million tonne. It assumes there would be net export of 2.9 million tonne and cereal availability would be 87.5 percent of output. This way net availability or demand for cereal works out to be 148.2 million tonne which is lower from supply by 12.5 million tonne. Assuming price elasticity of demand for cereals to be -0.268 and short run elasticity of supply to be 0.20 (computed from estimates of Kumar 1998) change in price to bring equilibrium in demand supply works out to be 27 percent involving decrease in supply by 5.4 million tonne and increase in demand by 7.2 million tonne.

decline in crop income and would cause adverse impact on agriculture sector which is already under threat due to trade liberalisation and, is not able to cope up with low level of international prices.

The best way to ensure remunerative prices to foodgrain producers and reducing unwanted surplus in future is to take measures that result in some shift in resources from cereals to non cereal enterprises and encourage growth of cereal output in efficient producing regions. This strategy should not be based only on reducing profitability of grain production by lowering their prices but it should involve providing and developing alternatives which are more remunerative than cereals.

There is also a need to examine that if the level of guaranteed prices based on a particular criterion is encouraging production that society can't afford to buy then what other criterion should be used to fix guaranteed price. This change is also important as experience shows that it is not feasible to enforce guaranteed prices everywhere in the country. Enforcement of such prices requires mechanism for procurement, which now exists only in a few states. In rest of the markets agricultural produce is purchased by private trade. If private trade has a feeling that guaranteed prices are too high to be supported by demand side factors, it would not buy produce at that price.<sup>7</sup> This is what has been experienced in the case of rice and wheat in the last 2-3 seasons. Actual prices received by farmers are reported to have remained lower than guaranteed prices in several markets other than those where government procured the produce.

Regarding implementation of guaranteed prices, some important lessons have been learnt in the recent years. Mere announcement of higher support prices for commodities, which are not effectively backed up by procurement arrangement, does not serve the purpose of raising level of prices received by producers. Therefore, attempts by CACP to raise support prices of crops like edible oils and pulses, in which India is deficit, relative to support prices for rice and wheat which are in excess supply, cannot be expected to result in shift of resources from rice and wheat to the deficit crops.

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<sup>7</sup> Private trade can also indulge into this kind of practice to earn excessive profit if market is not competitive. But, we are referring to genuine reason for private trade not to offer guaranteed price.

## 5.4 Dealing with Grain Stocks

During the last five years level of cereal stock has accumulated to such a high level that it has put the government in a very embarrassing situation besides putting huge financial burden involved in carrying these stocks. Several reasons have been given for accumulation of grain stock much above the genuinely required level. The foremost reason is said to be hefty hike in procurement prices and consequent increase in open market wholesale prices of rice and wheat which then resulted in reduced demand. In fact several factors combined together to build up so called “mountains of grains” in the country.

First, during the decade of 1990s procurement prices of rice and wheat were given a comfortable increase which was quite higher than the increase in general prices. This was followed by steep rise in procurement by government agencies in surplus regions. The increase in procurement prices necessitated increase in issue prices and, because substantial part of marketed surplus was with the government, its policy on quantity and price of stock released had a determining influence on open market wholesale prices of rice and wheat. The influence on wholesale prices was such that they increased by even higher rate than procurement prices. As demand side factors did not support this increase in price, growth in retail prices started trailing behind the growth rate in, largely government influenced, wholesale prices. This caused adverse impact on the margin of private trade which slowly started withdrawing from the market. Accumulation of cereal stock with government agencies created a feeling that release of excess stock can anytime depress open market prices. These two factors led to withdrawal of private trade from grain markets in surplus states causing increase in procurement by government agencies. Another reason for reduced role of private trade in direct purchases from producers is the release of stock for open market sale and export at a much lower price than what would be the unit cost of rice/wheat to private trade from direct purchases from producers. This created perverse incentive to private trade - not to participate in primary market and buy from government rather than buying produce from producers<sup>8</sup>.

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<sup>8</sup> This is also evident from the fact that price of wheat in post harvest lean months in major markets did not exceed its support price, making it rational for private trade not to buy produce at the harvest time.

Second, as discussed in Section 5.2 above, increase in PDS and open market prices and diversification in food consumption habits led to demand deficiency resulting in diversion of production to inventory.

Third, steep decline in international prices of cereals since 1997 has caused adverse impact on export of cereals and excess stock could not be smoothly sold in international market.

Unless excessive stocks are liquidated, grain markets in India would continue to remain in trouble. There is no single and easy way to do this and several options need to be tried. Some of such options are already suggested in the Economic Survey 2001-02 (p.127) which need to be pursued seriously. These are (i) increasing BPL quota (ii) expanding employment generation programmes (iii) universal PDS at BPL prices in calamity affected areas. In addition to these, some other options also need to be tried. Very old stock that has deteriorated in quality should be disposed off as a feed in international and domestic market at whatever price it can fetch. If still excessive stock remains, some of it should be given as food aid to needy countries.

### **5.5 Trade as an Alternative to Buffer Stock**

As mentioned before, buffer stocks have been used by the government as an important instrument for the purpose of price stabilisation. However, this involved heavy cost in terms of procurements, handling, carrying, storage etc. which is becoming fiscally unsustainable. As an alternative it has been suggested that government should use the instrument of variable levies on external trade to stabilise domestic prices. Under this, it is suggested that when international prices are low, tariff on import should be fixed high to provide price support to domestic producers and when international prices go high, tariff should be reduced. Similarly, variable levies on export can be worked out for net exporting countries (Srinivasan and Jha 1999 and Jha and Srinivasan 1999). These authors found the trade option to be superior compared to buffer stock in stabilising prices under liberalised trade regime.

On the other hand, it is contended that due to its large size of demand and supply, India can't rely on international market to meet its demand for staple food. It is often said that meeting grain deficits during lean years and selling



surplus during years of bumper harvest in international market for domestic stability would destabilise international prices. Thus, international prices would turn out to be much higher during import and they would go very low during export. Thus trade option is believed to be appropriate for counties or products with small demand/supply.

In order to examine the implications of trade options for domestic price stabilisation in India, we have estimated the changes in international prices when India sells/buys its surplus/deficit grain in international market. The relevant information is presented in Table 5.3 for wheat and in Table 5.4 for rice. The Tables also contains information on domestic wholesale price and economic cost of grain to Food Corporation of India. The impact of India's export and import on international price of wheat assumes that price elasticity of wheat prices with respect to changes in quantum of world trade is unity (Mitchell 1996 as reported by Jha and Srinivasan 1999). Similarly, the impact on rice prices is estimated based on the assumption that changes of one million tonne export of rice by India results in 4.7 percent change in international price of rice (IFPRI Impact Model as reported by Jha and Srinivasan 1999). It was further assumed that inter year price stability requires purchase by government exceeding trend output and sale from buffer stock to the tune of deficiency of output from the trend output. The deviations of actual output from trend are presented in column 6 of the concerned tables.

The impact of buying deficit and selling surplus output in international market on international prices can be seen by comparing international prices presented in columns 2 and 6. For instance, for year 1975, wheat output fell short of stipulated trend by 2.77 million tonne. When this quantity is purchased from international market it raised international price of wheat from Rs. 1303 to Rs.1358 per tonne. During the period 1975-2000, wheat production exceeded trend in 10 years and it was below the trend in 16 years. The highest shortfall during this period was recorded in year 1980, when output was short by 3.83 million tonne. Buying this entire quantity from international market raised international price nearly by 4 per cent. On the other hand, highest positive deviation was observed during the year 2000. Disposing off entire surplus of that year in international market reduced international price by 4.76 per cent. This shows that stabilising

India's domestic supply of wheat through sale and purchase from world market did not cause very high impact on world prices. The reason for this is that global trade in wheat is quite large and deviation in India's output constitutes less than 5 percent of the global trade. This shows that the fear of very high fluctuation in international price due to India's dependence on International market for price stability (for wheat) is misplaced.

The next question is whether trade option could be superior to the policy of domestic stabilisation through buffer stock. This comparison involves lot of complications and several assumptions. To accomplish this, we have estimated another set of trade prices named as import parity prices (IPP) and export parity price (EPP). Import Parity Price for wheat is sum of following:

- a) International price for wheat (US HRW2, FOB US gulf ports)
- b) Ocean freight rate from US to India
- c) 5 per cent value of FOB price as port clearance and marketing charges.
- d) Cost of internal transport from port to consuming region as wheat is mainly consumed in the non coastal states.

Import parity price computed this way is comparable with economic cost of FCI for the country. Similarly, export parity price is computed by subtracting following cost from FOB wheat price for US HRW wheat adjusted for India's export:

- i) Cost of transport from producing state to port.
- ii) Cost of produce handling, marketing and port charges taken as 5 per cent for domestic wholesale price.

Wheat price in Hapur market was used as a reference price for this.

A somewhat crude measure of gain/loss to consumers from government intervention in maintaining domestic price stability is given by the difference between import parity price and economic cost of FCI for importable situation. Similarly, difference between export parity price and domestic wholesale price for exportable situation is considered as the loss/gain to producers from government intervention for price stability. This comparison

**Table 5.3: Domestic, international and trade parity prices and economic cost of FCI for wheat**

Year	Inter-national price	Domestic price	Economic cost to FCI	World trade	Output deviation from trend million ton	Int. price with India's instability	Import parity price IPP	Export parity price EPP	Rs./tonne	
									Difference between IPP and Economic cost	Difference between EPP and domestic price
1975	1303	1370	1616	66	-2.77	1358	1767	1130	152	
1976	1242	1070	1542	62	0.21	1238	1620	1060		-10
1977	938	1220	1491	72	-1.37	955	1335	753	-156	
1978	1092	1250	1574	72	-0.39	1098	1524	891	-50	
1979	1352	1280	1574	86	1.61	1327	1909	1115		-165
1980	1411	1344	1699	94	-3.83	1468	2122	1245	422	
1981	1582	1507	2035	101	-1.10	1599	2258	1349	223	
1982	1538	1538	2199	96	-1.72	1565	2102	1310	-97	
1983	1602	1720	2335	100	1.86	1572	2154	1286		-434
1984	1739	1623	2394	103	2.80	1692	2306	1423		-200
1985	1706	1763	2463	84	-0.37	1714	2375	1421	-88	
1986	1450	1873	2732	90	0.85	1436	2044	1125		-747
1987	1490	2011	2747	107	-3.64	1540	2184	1207	-563	
1988	2032	2373	2960	98	-3.54	2105	3092	1711	132	
1989	2758	2355	3063	95	2.64	2681	3770	2290		-65
1990	2397	2428	3585	101	-3.38	2478	3601	2074	16	-354
1991	2927	3250	3908	124	0.15	2923	4363	2398		
1992	3940	3582	5041	124	-1.05	3973	5684	3378	643	
1993	4434	3592	5320	101	-1.29	4490	6521	3828	1201	
1994	4738	4030	5512	101	-0.42	4757	6941	4022	1429	
1995	5771	4043	5840	99	3.76	5552	7845	4761		718
1996	7440	5153	6625	101	-1.67	7563	10147	6658	3522	
1997	5884	5621	7978	101	3.82	5661	8253	4669		-952
1998	5241	5679	8003	100	-0.94	5290	8087	4224	84	
1999	4822	6760	8723	110	2.25	4724	7673	3533		-3227
2000	5168	6560	8583	100	4.77	4922	7968	3654		-2906
2001				106	-4.10					

for wheat shows that out of 16 years, when domestic supply was short of trend, cost of meeting the supply deficit from domestic sources (economic cost to FCI) was lower than import parity price in ten years. In 6 years, meeting shortfall in supply from import turns out to be cheaper option for maintaining stability in domestic supply.

If domestic wholesale price is assumed to be the outcome of government policy of price stabilization, then its comparison with the net price that can be earned from sale of produce in international market during the years of above normal production indicates gain/loss to producers from domestic price stabilisation. Wheat production was above normal in 11 out of 26 years. Out of these 11 years, price realised from export turns out to be lower in as many as 10 years. Selling in international market would have fetched better price than that available under government intervention in only three years.

In the case of rice, price of permal rice in Delhi market was used as domestic reference price for export, which is comparable with price of 5 percent broken Thai rice. However, economic cost of FCI for rice refers to common rice which is generally of a poor quality and is comparable with 35 per cent broken Thai rice. Thus, for comparing import parity price (IPP) with economic cost of FCI rice, price of 5 percent broken Thai rice was discounted by 20 per cent which took that price closer to the price of 35 percent broken rice. For importable scenario, ocean freight rate from Bangkok to Indian port and 5 percent cost of marketing, handling and port changes was added to discounted price of 5 per cent Thai rice. But, domestic transport cost was not added to it as coastal states are the major consumers of rice.

World trade in rice is quite thin compared to the volume of wheat trade. Therefore, India's export/import corresponding to deviation in rice output caused large changes in international price. For instance, in the year 1975, when rice output was 3.74 million tonne below the trend, meeting this deficit through import raised international price from Rs. 3051 per tonne to Rs. 3516 (Table 5.4) showing an increase of 15.2 percent. In the case of rice production, India sometimes faced severe supply shocks reaching the level of more than 9 million tonne. In such cases, India's import to meet the output deficiency raised international price by more than 39 percent. Positive deviations in the case of rice were quite low compared to negative deviations.

**Table 5.4: Domestic, international and trade parity prices and economic cost of FCI for Rice**

Year	Inter-national price	Domestic price	Economic cost to FCI	World trade ml. ton	Output deviation from trend million ton	Int. price with India's instability	Import parity price IPP	Export parity price EPP	Rs./tonne	
									Difference between IPP and Economic cost	Difference between EPP and domestic price
1975	3051	2210	1546	8	-3.74	3516	3044	3251	1499	
1976	2295	1630	1563	11	3.69	1951	1740	1755		125
1977	2383	1750	1551	10	-4.86	2855	2486	2645	935	
1978	3022	1670	1693	12	4.16	2511	2205	2310		640
1979	2721	1690	1737	13	3.53	2330	2124	2127		437
1980	3420	2030	1933	13	-9.64	4761	4170	4518	2236	
1981	4199	2545	2237	11	-0.06	4209	3678	3904	1441	
1982	2781	2779	2491	12	-2.17	3027	2665	2694	174	
1983	2808	3113	2756	12	-10.03	3955	3444	3581	687	
1984	2865	3052	2988	12	1.22	2722	2420	2356		-696
1985	2671	3067	3053	12	-2.27	2917	2589	2549	-464	
1986	2660	3131	3187	13	1.49	2498	2226	2122		-1009
1987	2980	3386	3276	12	-3.50	3405	3005	2998	-271	
1988	4202	3860	3697	15	-8.93	5730	4994	5267	1297	
1989	5192	4080	4186	12	2.97	4564	4045	4074		-6
1990	4742	4590	4575	13	4.32	3908	3514	3357		-1233
1991	6671	5270	4970	15	3.31	5771	5120	5144		-126
1992	6947	5800	5853	16	1.98	6388	5703	5682		-118
1993	7452	6510	6651	17	-1.57	7929	7089	7121	438	
1994	8471	6930	6947	21	4.14	7044	6382	6164		-766
1995	10407	6900	7628	21	3.92	8746	7863	7812		912
1996	11975	8486	8581	20	-2.64	13260	11643	12189	3062	
1997	10968	9083	9373	28	0.39	10792	9551	9627		544
1998	12586	9625	9952	23	-0.54	12865	11302	11602	1350	
1999	10678	9740	11109	22.8	1.28	10122	9049	8782		-958
2000	9078	9500	11805	23.4	2.95	7988	7256	6573		-2927

A comparison of domestic stabilisation measures and trade shows that during the 12 years since 1975, when output was short of trend, economic case of rice with government agencies was lower than IPP in as many as 10 years. Only in 2 out of 12 years import was more cost effective option than domestic stabilisation.

In the case of second scenario, when actual output exceeded the trend, domestic producers could earn better from export only in five out of 14 years. In the remaining 9 years domestic wholesale price as determined by government intervention turned out to be higher than export parity price.

The above analysis shows that selling and buying wheat in international market to stabilise domestic output does not result in large changes in international prices of wheat due to large volume of world trade in wheat. However, in the case of rice, stabilising domestic supply through trade caused sharp fluctuation in international price of rice. Among the two options viz. domestic stabilisation through buffer stock and stabilisation through trade the latter is found to be costlier than domestic stabilisation in most of the years though it also depend upon fluctuation in international price. If the relationship between domestic and international price in future remains same, as observed during the last 26 years, than policy of price stabilisation through buffer stock seems to be better option than trade.

## **5.6 Performance of FCI**

Food Corporation of India has remained in the centre stage of government intervention in agricultural marketing due to scale of its operation and due to its role in food security. Though this agency has played significant role in ensuring guaranteed price, and hence in adoption of improved technology in traditional green revolution region, its cost of operation and efficiency have remained subject of criticism and are seen as the main factor for mounting food subsidy in the country. Some studies find that FCI cannot be blamed for high cost of foodgrain handling and distribution and economic cost of its operation turns out to be lower than the private trade if latter pays same statutory charges and serve the same purpose which former has been doing (Acharya 2000). Similarly, Madhura Swaminathan also find that costs of FCI were justified and that this organisation is vital for food

security of the country (Swaminathan 1999). In contrast to this, some other studies conclude that India does not require a public agency of the size and type that FCI is today (Gulati et al. 2000) and that there are several negative effects of government of India's foodgrain marketing policy and operation of FCI which are found to be increasingly costly and inefficient. Technical and managerial inefficiencies in FCI operations are said to be responsible for its high costs (World Bank 1999).

Though one can find some justification in economic cost of FCI but this justification does not take into account implicit value of quality deterioration of produce at various levels. This happens due to purchase of lower than specified grade of produce, weight manipulations at points of purchase and dispatch, excessive charges of FCI contractors, and adulteration and supply of poor stuff under levy and custom milling of rice. Deterioration in value of produce resulting from such practices is the main source of leakage in FCI operations and is not reflected in cost or price calculations. The produce get sold because it is offered to various states at a subsidised price and the difference between economic cost and issue price is shown as food subsidy. This way the inefficiency of FCI is concealed.

One way to ascertain and quantify this kind of leakage is by comparing market value of PDS supply with ruling market price of FAQ produce. If PDS supply can sell at the same rate as the ruling market price then there is no quality deterioration. If it sells at a price lower than market price, the difference represents allowance for quality deterioration or leakage. The studies that justify cost of FCI, do not reckon this aspect. If such leakage are accounted for separately, food subsidy bill would go down significantly and we feel it is not difficult to check such leakage.

We collected some samples of rice and wheat supplied through PDS outlets from Orissa, Andhra Pradesh and Rajasthan to compare the value of PDS produce with open market price of produce having same quality as PDS supply and with economic cost of produce to FCI. The results are presented in Table 5.5.

The Table shows that in Rajasthan wheat was sold to below poverty line households at the issue price of Rs. 4.60/kg. We took the sample of PDS supply to find out its market price. The price of produce of same quality as

sold in PDS varied between Rs. 5.50 to Rs. 7.00 in open market. Thus market value of PDS supply was below the economic cost of FCI which was Rs. 8.71 for the year 2000-02.

**Table 5.5: PDS prices for below poverty line and open market prices in selected areas of Rajasthan, Orissa and Andhra Pradesh and economic cost of grains to FCI. Unit: Rs./kg**

State/Address	Commo -dity	Issue price	Market Price	Economic cost of FCI
<b>Rajasthan</b>				
Mahamood Husan, Chhatidy, P.O.-Gangwana, Ajmer	Wheat	4.60	6.00-7.00	8.71
Shurma Bano, Kayampura, P.O.-Narva, Ajmer	Wheat	4.60	5.50-6.00	8.71
Meraj Khan, Ajmer, Gagwana Karan Singh, Farkiya, P.O.-Farkiya, Ajmer	Wheat	4.60	7.00	8.71
Bawar lal, Village-Halohipatta, Farkiya, Ajmer	Wheat	4.60	6.50-7.00	8.71
Hanuman Singh, Kanpura, P.O.- Kanpura, Ajmer	Wheat	4.60	6.50-7.00	8.71
<b>Orissa</b>				
Om Niramani Shalm, Village- Bhagwanpur, Khurda	Rice	6.30	7.00	12.04
Kirti chandra Rai, Village-Dakhina, Janla, Khurda	Rice	6.50	6.50-7.00	12.04
S.K. Nadu, P.O.-P.N. Collage, Khurda	Rice	6.30	6.00	12.04
A.K. Behra, Podashahi, Khurda	Rice	6.25	7.00	12.04
Surender Shahu, Kuderu Bazar, Jalni, Khurda	Rice	6.30	6.50	12.04
<b>Andhra Pradesh</b>				
E.Kistaish, Village- Vuqaranigudla, Dhone Mandal, Kurnool	Rice	5.25	6.00	12.04
Geetanaa, Village- Dharamavaram, Dhone Mandal, Kurnool	Rice	5.25	6.50-7.00	12.04
Yarranala, Udumudapadu, Dhone Mandal, Kurnool	Rice	5.25	6.00	12.04
Jaya lakshmi, Abbireddy Pally, Dhone Mandal, Kurnool	Rice	5.25	8.00	12.04
Madusudana Gupta, Dhone Mandal Kurnool	Rice	5.25	7.50	12.04

Source: Sample Survey, September – October 2001.



The market value of PDS rice in Orissa and Andhra Pradesh was quite low compared to economic cost of FCI. The market value was found to vary between Rs. 6.00 and Rs. 8.00 whereas the economic cost of rice to FCI was Rs. 12.04. The actual subsidy going to PDS consumer is the difference between issue price and market price of the same quality of produce. Whereas, as per FCI account books, the subsidy accruing to PDS consumer is taken as the difference between economic cost and issue price. The difference in market price and economic cost of FCI mainly results from quality deterioration of stock with FCI, which is not reckoned in calculation of economic cost.

The inefficiency and high cost of FCI are often used to make case for binding up FCI and to pave the way for greater private sector participation. In this context it is worth mentioning that in the absence of public agencies, private trade may turn out to be exploitative and what now go as inefficiency of FCI would go as excessive profit of private trade. Therefore this public agency should be retained but it should plan its operations in such a way so as to keep check on private trade to exploit market situations. However, the area of operation of this parastatal should be reduced and its efficiency should be improved by modernisation of its operations on scientific lines and by professionalisation of its management.

## **5.7 Suggestions for Government Intervention In Food Management**

The comfortable situation on foodgrain front, new options like export-import to stabilise supply, growing burden of cost of food management, production imbalances caused by food policy, strong regional bias and some other problems associated with food management provide strong reasons to look into the policy of food management and change it appropriately.

This would involve several steps beginning with guaranteed support prices. The purpose and the basis of these prices need to be reviewed periodically with the change in circumstances. These prices must reflect the society's preference for the produce and should promote efficiency and quality. In the present form the guaranteed prices have given rise to several problems.

As it is not feasible to ensure that prices would not fall below MSP in any commodity, only selected crops should be covered under MSP. It is suggested that crops which can be considered as price leader or the crops for which technological breakthrough is imminent ought to be covered under the MSP and other candidates for support price would be the crops grown in high risk environment (Vyas 2000). In the long run country needs to develop new mechanisms to provide protection to farmers income. Achieving this objective through price intervention alone results in several distortions. Government should provide support to develop viable crop insurance for protecting crop income.

Due to changes taking place in consumption basket of food, there is lot of emphasis to develop technologies that promote diversification of agriculture sector. Price interventions should be such as to encourage agricultural diversification.

There is also a need to discuss criteria on which MSP should be based in the changing context. The popular perception is that MSP is determined based on cost of production. When the emphasis of production is shifting from food security to market led production, it is not justified to base MSP on cost of production. Similarly, there are concerns relating to definition of cost of production on which MSP should be based. Some of the cost concepts like Cost C3 are such that the price based on those is not quite relevant to qualify as “minimum support price”.

Second, government intervention should be such that it promotes private trade and competition. With the development of countrywide transport and communication network, availability of different items has improved considerably in all parts of the country. Therefore, if incentives are favourable, private trade should be able to supply grains everywhere including remote areas.

Government intervention in the form of procurement should be selective. In a normal production year, quantity of procurement should not exceed PDS requirement. There is a need to maintain food security buffer stock which should be maintained by purchasing grains during above normal production and releasing stock during low harvest years. The level of buffer

stock around 7 million tonne would be adequate to meet supply shortfalls in most of the years.

If the level of minimum support price reasonably corresponds to the price level as dictated by demand and supply factors than market price should not go below MSP in competitive markets in normal year of production. Hence the need for government procurement in normal years of production should not arise. When production is forecast to be above normal and this information is available at harvest time then government should procure above trend quantity. This should ensure that prices do not go below MSP. Still there could be cases where private trade turns out to be exploitative and farmers are paid price below MSP. One way to address this kind of situation is to make “deficiency price payment” to farmers covering a part of the difference between actual price received by farmers and MSP. Similarly, it is not possible to carry out procurement in all the markets in the country to ensure MSP, and, stock position may not justify procurement in some years. The system of deficiency price payment can work as an alternative to procurement operations in such situations. This would help in preventing unwanted stocks and help in providing price incentive to producers in all the regions considered relevant for the purpose. Thus the system of “deficiency price payment” can help in achieving economy in procurement and regional equity in implementing guaranteed price.

The most serious problem with “deficiency price payment (DPP)” is said to be its administration and problem due to recycling of produce. For this we suggest that the system of deficiency price payment should be implemented for the produce sold through regulated markets in all surplus generating areas using district as a unit for determining surplus area. In order to ensure that resale of produce does not take place, the magnitude of deficiency payment should be kept less than the charges involved in first sale of produce like mandi fee, auction, labour charges etc. This kind of mechanism would not suffer from problems like regional bias and excessive stocks.

The amount of foodgrains needed for PDS supply and inter year price stabilisation should be purchased through competitive bid from the markets where prices are ruling lowest.



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## **6 CONCLUSIONS AND POLICY RECOMMENDATIONS**

### **6.1 Conclusions**

India's food management system has undergone tremendous changes since the launch of green revolution technology during late 1960s. The most profound impact has been witnessed in the case of rice and wheat whose production has shown spectacular increase and enabled the country to move from chronic food shortage to an era of food surplus. Besides technology and increased use of inputs, government intervention and support in terms of guaranteed minimum prices for output and large scale procurements from producers at remunerative prices have played key role in growth of output of rice and wheat. These government interventions have been affected through price policy and parastatls like Food Corporation of India (FCI) which procures rice and wheat from surplus regions, maintain buffer stock, supplies rice and wheat for public distribution system in various states and undertakes open market sales. This intervention has been quite effective in achieving goal of food security for the country but its sustenance has been putting large burden on the state exchequer in the form of food subsidy which has been growing year after year. Government intervention is also found to be strongly biased towards some regions and has caused adverse impact on quality and efficiency of production and participation of private trade in grain marketing.

Demand and supply scenario for agriculture has undergone profound changes during last 10-15 years. However, farm price policy and policy for food management have not been changed to adjust to new situation. The result has been that Indian agriculture in the beginning of 21<sup>st</sup> century is facing some serious contradictions and challenges. On one hand the country has 60 million ton of foodgrains in public stock and on the other hand every fourth Indian is reported to be underfed and does not get even minimum calorie required by human body. Similarly, the country is facing massive shortage of pulses and edible oils, which is met through imports, having detrimental effect on the producers in the unfavourable dryland areas,

whereas, surplus of wheat and rice is being sold as export at a large cost to the state exchequer. These imbalances are causing serious concern to the country.

The reason for emergence of demand and supply imbalances in Indian agriculture lies in both, technological and policy factors. The technological breakthrough of green revolution category has been highly biased towards cereals, particularly wheat and rice, which raised their relative profitability and has led to large shift in land and other resources away from other crops. The technological advantage has been further provided strong policy support through remunerative and assured prices for rice and wheat. The stage has now been reached where current level of rice and wheat production cannot be absorbed at existing level of their prices while there is massive shortage of edible oils and pulses.

One of the reasons for continuing high policy support to grains till recently is that demand projections for grains did not take note of diversification in consumption pattern experienced in rural as well as urban areas. Because of changes in food habits, demand for non cereal foods is likely to rise by more than 50 percent of the growth in cereal demand. Similarly, growth in supply of major commodities like edible oil and pulses has not been keeping pace with the growth in demand. This has resulted in fast growth in import of edible oils while pulse deficit is reflected in both imports as well as in the increase in domestic prices of pulses. There is a need for suitable policy to address these imbalances.

Under liberalised trade, export and import are considered the main instrument for stabilisation of domestic demand and supply. However, due to high volatility in international prices and because of being residual exporter, India could not use trade options very satisfactorily to stabilise supply of foodgrains. The trade option has particularly become difficult to dispose off large stock of rice and wheat in India in international market in the recent years. International prices of grains have dropped sharply even in Rupee terms after 1998-99 but domestic prices have been moving up mainly under the pressure of increasing support prices. This has reduced competitiveness and profitability of grain exports. India is able to sell its surplus stock in foreign market at a huge subsidy in relation to economic cost and open market prices. Wheat and rice are being released

for export at a price charged from below poverty line households for PDS supply.

In India about 26 percent population is reported to be below poverty line and is undernourished. Cereals are the main source of calorie and food security for such population. In the recent years huge quantity of cereals (rice and wheat) has piled up in government stocks which constitutes more than one third of the total production of rice and wheat in the country and is far above the quantity genuinely needed in the buffer stock. This has reduced availability of grains in the country, implications of which need to be understood properly.

On production side, per capita production as well as availability of cereals, have moved on a somewhat rising trend during 1970 and 1980s. Per capita production of cereals reached peak level around 1990, after which cereal output and India's population have risen almost at the same rate. Per capita availability, which in a somewhat crude sense can be considered to represent per capita consumption, kept pace with trend in per capita production of cereals during 1970s and 1980s. However, after 1990 per capita consumption of cereals has shown a decline. This way, post 1990 period show two clear indications relating to cereal production and consumption in India. One, growth rate in cereal production has decelerated to the level of population growth. Two, average availability of cereals has followed a decline in the recent years and it has gone down to the same level as observed during 1987 which was a very bad drought year.

The recent decline in per capita availability of cereals is neither a result of slack in production, nor it has resulted from export of cereals. This is entirely due to accretion to stock of cereals held by government agencies. There are two reasons for production going to stock rather than being consumed. One, PDS prices during 1990s have increased in jumps and at a faster rate compared to open market prices and prices of other food and other commodities, which caused a decline in per capita PDS demand in the recent years. Similarly, open market retail prices of rice and wheat have also increased at a much faster rate during 1990s compared to 1980s. Thirdly, consumption pattern in India is changing towards non cereal foods.

The change in consumption basket is being considered a healthy trend in some quarters whereas some researchers consider it adverse for the poor. The decline is explained due to increasing mechanisation of human activities, reduced physical exertion and improved access to modern transport facility and income effect on food preference for variety in food intake and for nutritious and healthy food rather than increasing calorie intake. On the other hand, it is contended that improvement in per capita income should result in fast increase in the indirect demand for cereals which should lead to increase in overall per capita demand for grains in the country. The argument is based on the logic that improvement in income leads to fast growth in demand for livestock products, which should result in higher growth in the use of food grain as feed as experienced in countries like China. Here, there is a need to distinguish Indian situation from other countries. Despite observed growth in demand for livestock products, per capita consumption of meat, egg and fish in India remains very low. This seems to be largely due to cultural factors. Even if it can be afforded, people in India do not eat meat etc. on a regular basis. For a vast majority of those who are non-vegetarian, meat intake is preferred occasionally and not as a part of regular diet. Therefore, India is not likely to witness serious competition between food and feed uses of grain. Similarly, according to Indian value system, there is emphasis on eating only that much which is needed for survival and there is no tendency to eat more and expend the same by doing exercise etc., unlike in developed countries. In the light of these factors, cereal demand in India should not be expected to grow at faster rate than the population growth rate.

Rice and wheat are the staple food for Indian population. Therefore, their prices cause significant impact on the well being of general population. These two commodities being wage goods, determine consumption level of vast majority of population and have strong effect on overall price level of the economy. Stability in prices of these two commodities has remained an important goal for the country. One of the obvious factors affecting price level and changes therein is production level of the commodities. However, it has been often observed that even during the years of normal production sometime prices tend to show abnormal rise.

In the case of wheat, annual change in its output, buffer stock of wheat as on 1<sup>st</sup> July, export of wheat during the year, change in procurement price



over the previous year, change in issue price of wheat during the year and per capita offtake of wheat for PDS were found to be the main factors which explain variation in monthly and yearly prices of wheat. Issue price of wheat caused stronger impact on open market prices as compared to the impact of procurement price. Increase in issue price raised open market monthly price to the same magnitude as the percent change in issue price. It is also brought out by our study that whereas PDS price is significant determinant of variation in monthly and yearly wheat price, PDS quantity did not show significant impact. Buffer stock of wheat acted as a significant deterrent for inflation in wheat price. Wheat prices are quite sensitive to export. Besides their social welfare impact, issue price and buffer stock are found to be strong instrument in regulating prices and inflation in food.

Unlike wheat, policy variables were less relevant in affecting changes in prices of rice. Importance of different variables also differ for intra year and inter year variation. Intra year price variation was caused mainly by changes in procurement price, quantity supplied through PDS, and rice export. Inter year price variation resulted mainly from changes in output of rice, output of other cereals, procurement price and issue price. Variation in rice output caused much smaller variation in prices compared to that in wheat. Similarly, rice price was relatively less sensitive to export compared to wheat. The reason for different policy variables not showing similar impact on rice price, unlike wheat, could be lesser seasonality in rice production and wider production base of rice.

As intra and inter year price variations are caused by several factors and their interacting influences, there are instances when prices of rice and wheat had risen very high despite normal or even above normal domestic production. This can happen when combined effect of other variables dominates the effect of production on prices.

When India initiated economic reforms in year 1991, a move towards increased participation by private sector in various spheres of economic activities was made. In the case of agriculture, particularly the food grain trade, some reduction in the role of government took place between 1992-93 and 1996-97. However, this decline turned out to be the part of cyclical variation resulting from production fluctuation as experienced in the past and government procurement witnessed steep increase in the recent years.

The difference in the current and the past situation is that government procurement increased despite very comfortable situation of food stock and below normal production. The reason has been the reduced role of private trade in grain trade. Huge buffer stock with government created a fear with private trade that release of excessive stock could dampen the domestic prices at any time.

The government's procurement, distribution, and buffer stocking programmes are reported to have had negative impact of repressing private foodgrain marketing, undercutting its potential contribution to long term food security. This is further said to discourage modernisation of marketing resulting into losses and inefficiencies. It is being proposed that government should use regulatory mechanism only when price movements are outside the desired price band representing width between the ceiling and floor price, which permits reasonable marketing margin for profitable public sector operations. This underscores the need to evolve new kind of mechanism for government intervention in food grains markets which allows and encourages active participation of private trade but keeps a check on exploitative tendencies of private trade. This can be done by creating an environment that provides reasonable incentive to private sector to operate in food grain market. This implies that as long as private trade charges normal margin for delivering the commodities across space and time, government would not intervene in the market. Implementing such mechanism would require developing norms which can be used to find out whether private trade is charging reasonable prices or is indulging in exploitation of consumers and producers. We have prepared estimates of price band between farm harvest prices of wheat and paddy in surplus states and wholesale and retail price in subsequent months in all major states of the country. The acceptable price band includes reasonable margin for wholesalers, rice millers and retailers, and, marketing costs like (1) statutory charges, (2) labour charges, (3) material (packaging) cost, (4) local transport and freight to different states (5) milling charges for rice (6) storage charges and (7) interest on working capital.

At existing structure of statutory charges/taxes, and transport and other costs, retail price for wheat in surplus states should be higher than farm harvest price by 36 to 60 percent in various months to attract private trade.

In the deficit state like Maharashtra, retail price before harvest need to be more than double the farm harvest price in surplus states to provide reasonable incentive to private trade. Similarly the band suggests that retail prices of rice should be 96 to 213 percent higher than the farm harvest price of paddy to attract private trade to buy paddy and supply rice in various months and in various states. Price difference beyond this band would imply exploitation by private trade which would need government intervention. Transport cost and statutory charges are the main element of price spread and price band can be narrowed down by curtailing these costs.

Due to inelastic nature of their demand and supply, small fluctuation in output of cereal is likely to cause large increases/decreases in their prices which in turn would result in sharp fluctuations in farm income and expose consumers to high volatility in food prices. Thus, in order to bring stability in prices and farm income it was considered imperative to maintain buffer stock of grains which involved purchases from the market during the good harvest years and releasing stock during lean years or when production is below envisaged trend. Purchase from market and release of stock in this manner ensures that supply of produce in the market would move on a smooth trend. If growth in demand keeps pace with the envisaged trend in supply then purchase/release of stock based on deviations from trend level of production would ensure perfect balance between demand and supply assuming closed market from external trade. This should ensure that there is no disturbance to price stability as far as genuine factors on demand and supply side are concerned.

Based on this logic, deviations in actual production from stipulated trend should serve as a basis for quantity of grain to be purchased and buffer stock needed for maintaining inter year price stability. During the decade of 1990s fluctuations in cereal output declined considerably as deviations from normal production remained below 7.06 million tonne on either side. However, procurement by official agencies during 1990s rose sharply. Like the increase in procurement of foodgrains by government, level of buffer stock of cereals has also moved up over time. Thus, reduction in instability in cereal production in the country was not accompanied by decline in quantity of output purchased by government and buffer stock. Quantity of foodgrains purchased by government and level of buffer stock have not

been dictated or guided by fluctuations in output. If maintaining inter year price stability was the important consideration for government intervention in grain markets then reduced fluctuations in output, experienced in the country, should have resulted in decrease in level of procurement and buffer stock rather than following increase over time.

Assuming that private trade would not play major role in maintaining inter year price stability, government can base its decision to buy above normal output on advance estimates of production available around harvest time. This would be given by deviation of estimated output from stipulated trend, which can be estimated quite reliably for medium term. Similarly, level of buffer stock for such purpose can be worked out from negative deviations of actual output from stipulated trend which indicate that buffer stock of around 7.63 million tonne is sufficient to make up for the decline in cereal output from the normal level.

There would be some instances of severe drought, like those experienced during 1979-80 and 1987-88 and recently during 2002, when decline in output could go quite high. This kind of event is highly unpredictable about its severity as well as occurrence. It would not be prudent to link level of buffer stocks to magnitude of output decline in such years as it requires maintaining huge level of buffer stock for a very long period. Normal buffer stock would take care of about half of the output shortfall in the time of severe draughts. Some of the output deficiency in such events can be met from international market, and, some downward adjustment in consumption can also compensate a part of it.

Total requirement for PDS is estimated to be 21 million tonne per annum. Procurement for PDS would be a continuous exercise requiring purchase of rice and wheat each year. Thus, total procurement of grain in a given year should be around the sum of quantity needed for PDS and excess of estimated output from normal production. Similarly, maximum level of buffer stock should be 18.13 million tonne, which is sum of stock needed for PDS for six months and highest shortfall observed in grain production during the recent 10 years.

Government ensures guaranteed prices to producers by buying grains delivered at the support prices. If support price is consistent with demand

and supply for the given commodity then competitive market should ensure that market price does not go below the level of support price. In such a situation there would be no need for government procurement to ensure minimum price to producers. However, if market is not competitive or is unfavourable for private trade then there could be need for government to ensure minimum support through purchases from the market.

In case market price determined by supply and demand does not leave adequate margin over support price, private trade would not buy the produce at support price, howsoever competitive the market may be. This can happen when growth in demand does not keep pace with the supply and, support price is fixed based on supply side factors. This is exactly what is being experienced in the case of cereals in the country.

Indian consumers meet their demand for cereals from own production, open market purchases and PDS supplies. Thus, open market prices at retail level and PDS prices matter in determining demand. Both PDS price as well as retail prices have increased sharply during 1990s leaving adverse effect on demand. Demand for cereals has also been hit due to changes in consumption pattern away from cereals towards non cereal food.

Stagnation in per capita production and rising stock with government in the recent years indicate that government intervention in rice and wheat market through prices, procurement and buffer stock has reached a stage where it is depriving common consumer of availability of basic food.

To the extent deficiency of cereal demand is resulting from long run changes in consumption pattern, prices would not be very potent instrument for boosting demand and for restoring balance between demand and supply. The solution lies in adjusting supply to demand.

If demand for cereal remains deficit and cereal output increase to their normal (trend) level than required decrease in price to maintain balance between supply and demand works out to be enormous. This kind of purely price based solutions would result in steep decline in crop income and would cause adverse impact on agriculture sector which is already under threat due to trade liberalisation, and, is not able to cope up with low level of international prices.

The best way to ensure remunerative prices to foodgrain producers and reducing unwanted surplus in future is to take measures that result in some shift in resources from cereals to non cereal enterprises and encourage growth of cereal output in efficient producing regions. This strategy should not be based only on reducing profitability of grain production by lowering their prices but it should involve providing and developing alternatives which are more remunerative than cereals.

Experience shows that mere announcement of higher support prices for commodities, which are not effectively backed up by procurement arrangement, does not serve the purpose of raising level of prices received by producers. Therefore, attempts by CACP to raise support prices of crops like edible oils and pulses, in which India is deficit, relative to support prices for rice and wheat which are in excess supply, cannot be expected to result in shift of resources from rice and wheat to the deficit crops.

Another serious criticism of government intervention in grain markets is that regional concentration in government procurement of grain has remained quite strong. Proportion of marketed surplus procured by official agencies across states vary from below 2 percent to more than 85 percent. During recent years there have been frequent reports from states of Orissa, Madhya Pradesh, Bihar about distress sale of rice and maize below MSP. These states have been late adopter of new technology. Though they are food deficit at aggregate state level, several growth pockets have emerged in these states having surplus foodgrains. These pockets are in the first stage of green revolution and agricultural development, when private trade and market institutions are not in place to provide incentive to encourage adoption of new technology and hence output growth. Agriculture growth would get a serious setback in such areas if institutional support in the form of guaranteed price is not provided.

Several reasons are responsible for accumulation of grain stock much above the genuinely required level. First, during the decade of 1990s procurement prices of rice and wheat were given a comfortable increase which was quite higher than the increase in general prices. This was followed by steep rise in procurement by government agencies in surplus regions. The increase in procurement prices necessitated increase in issue prices and, because

substantial part of marketed surplus was with the government, its policy on quantity and price of stock released had a determining influence on open market wholesale prices of rice and wheat. The influence on wholesale prices was such that they increased by even higher rate than procurement prices. As demand side factors did not support this increase in price, growth in retail prices started trailing behind the growth rate in largely government influenced wholesale prices. This caused adverse impact on the margin of private trade which slowly started withdrawing from the market. Accumulation of cereal stock with government agencies created a feeling that release of excess stock can anytime depress open market prices. These two factors led to withdrawal of private trade from grain markets in surplus states causing increase in procurement by government agencies, even when there was no shortfall in production.

Second, increase in PDS prices and diversification in food consumption habits led to demand deficiency resulting in diversion of production to inventory. Third, steep decline in international prices of cereals since 1997 has caused adverse impact on export of cereals and excess stock could not be smoothly sold in international market.

Unless excessive stocks are liquidated, grain markets in India would continue to remain in trouble. There is no single and easy way to do this and several options need to be tried. Some of such options are (i) increasing BPL quota (ii) expanding employment generation programmes (iii) universal PDS at BPL prices in calamity affected areas. In addition to these, some other options also need to be tried. Very old stock that has deteriorated in quality should be disposed off as a feed in international and domestic market at whatever price it can fetch. If still excessive stock remains, some of it should be given as food aid to needy countries.

Buffer stocks have been used by the government as an important instrument for the purpose of price stabilisation. However this involved heavy cost in terms of procurements, handling, carrying, storage etc. which is becoming fiscally unsustainable. As an alternative it has been suggested that government should use the instrument of variable levies on external trade to stabilise domestic prices. A comparison of domestic stabilisation measures and trade shows that selling and buying wheat in international market to

stabilise domestic output does not result in large changes in international prices of wheat due to large volume of world trade in wheat. However, in the case of rice, stabilising domestic supply through trade caused sharp fluctuation in international price of rice. Among the two options viz. domestic stabilisation through buffer stock and stabilisation through trade the latter is found to be costlier than domestic stabilisation in most of the years though it also depend upon fluctuation in international price. If the relationship between domestic and international prices in future remains same as observed during the last 26 years, than policy of price stabilisation through buffer stock seems to be better option than trade.

Food Corporation of India has remained in the centre stage of government intervention in agricultural marketing due to scale of its operation and due to its role in food security. Though this agency has played significant role in ensuring guaranteed price, and hence in adoption of improved technology in traditional green revolution region, its cost of operation and efficiency have remained subject of criticism and are seen as the main factor for mounting food subsidy in the country. The economic cost of FCI that is often used to justify its operation, does not take into account implicit value of quality deterioration of produce at various levels. This happens due to purchase of lower than specified grade of produce, weight manipulations at points of purchase and dispatch, excessive charges of FCI contractors, and adulteration and supply of poor stuff under levy and custom milling of rice. Deterioration in value of produce resulting from such practices is the main source of leakage in FCI operations and is not reflected in cost or price calculations. The produce get sold because it is offered to various states at a subsidised price and the difference between economic cost and issue price is shown as food subsidy. This way the inefficiency of FCI is concealed.

The inefficiency and high cost of FCI are often used to make case for binding up FCI and to pave the way for greater private sector participation. In this context it is worth mentioning that in the absence of public agencies, private trade may turn out to be exploitative and what now go as inefficiency of FCI would go as excessive profit of private trade. Therefore this public agency should be retained but it should plan its operations in such a way so as to keep check on private trade to exploit market situations. However,



the area of operation of this parastatal should be reduced and its efficiency should be improved by modernisation of its operations on scientific lines and by professionalisation of its management.

Minimum support prices for various commodities must reflect the society's preference for the produce and should promote efficiency and quality. In the present form the guaranteed prices have given rise to several problems. As it is not feasible to ensure that prices would not fall below MSP in any commodity, only selected crops should be covered under MSP.

In the long run country needs to develop new mechanism to provide protection to farmers income. Achieving this objective through price intervention alone results in several distortions. Government should provide support to develop viable crop insurance for protecting crop income.

Due to changes taking place in consumption basket of food, there is lot of emphasis to develop technologies that promote diversification of agriculture sector. Price interventions should be such as to encourage agricultural diversification to address imbalances in Indian agriculture.

There are concerns relating to definition of cost of production on which MSP should be based. Some of the cost concepts like Cost C3 are such that the price based on those is not quite relevant to qualify as "minimum support price". There is a need to develop more relevant norms/ criteria for price support.

Still there could be cases where private trade turns out to be exploitative and farmers are paid price below MSP. One way to address this kind of situation is to make "deficiency price payment" to farmers covering a part of the difference between actual price received by farmers and MSP. Similarly, it is not possible to carry out procurement in all the markets in the country to ensure MSP, and, stock position may not justify procurement in some years. The system of deficiency price payment can work as an alternative to procurement operations in such situations. This would help in preventing unwanted stocks and help in providing price incentive to producers in all the regions considered relevant for the purpose. Thus the

system of “deficiency price payment” can help in achieving economy in procurement and regional equity in providing incentives to producers.

The system of deficiency price payment should be implemented for the produce sold through regulated markets in all surplus generating areas using district as a unit for determining surplus area. In order to ensure that resale of produce does not take place, the magnitude of deficiency payment should be kept less than the charges involved in first sale of produce like mandi fee, auction, labour charges etc. This kind of mechanism would not suffer from problems like regional bias and excessive stocks.

Government intervention should be such that it promotes private trade and competition. With the development of countrywide transport and communication network, availability of different items has improved considerably in all parts of the country. Therefore, if incentives are favourable, private trade should be able to supply grains everywhere including remote areas.

Government intervention in the form of procurement should be selective. In a normal production year, quantity of procurement should not exceed PDS requirement. There is a need to maintain food security buffer stock which should be maintained by purchasing grains during above normal production and releasing stock during low harvest years. The level of buffer stock around 7 million tonne would be adequate to meet supply shortfalls in most of the years.

The amount of foodgrains needed for PDS supply and inter year price stabilisation should be purchased through competitive bid from the markets where prices are lowest.

## **6.2. Policy Recommendations**

1. The system of guaranteed prices for important foodgrains must continue but level of these prices is the first step for reform in government intervention in grain markets. These prices should not ignore society’s preference and thus reflect demand side factors. These prices should also provide incentive for quality and efficiency.

2. Minimum support prices for essential and basic foods should be guaranteed in all surplus generating areas. District can be a reasonable unit to ascertain status of an area being surplus or deficit.
3. MSP should be ensured through need based procurement and system of “deficiency price payment”.
4. Deficiency price payment should be used as an alternative to procurement when stocks do not justify procurement and at places where procurement is not done.
5. Inter year stability in prices of cereal should be maintained through policy of buffer stocks rather than relying on export and import.
6. There is a need for Central food management agency like FCI to maintain buffer stock, price stability and PDS supply and to keep a check on private trade. However, its operations should be strictly limited to the genuine needs and scale as per the norms.
7. There is considerable scope for improving efficiency of FCI related to quality deterioration not reckoned in economic cost and which is concealed in sale of its produce due to subsidy content.
8. When open market is above MSP, needed procurement for PDS should be made through competitive bidding from the markets having lowest prices.
9. Inverse incentives to private trade that result in its withdrawal from primary market and encourage it to depend upon government supply, must be stopped.
10. Government intervention in procurement and wholesale prices that ignore demand side factors cause withdrawal by private sector, which may be detrimental to food security. The intervention should not replace private trade under normal circumstances.
11. For realising full potential of grain export, private trade should be encouraged to depend on supply from the producers rather than supply from the government.
12. Long run solution to grain demand deficiency is technology revolution which reduces cost of production. To achieve this, more reliance should be placed on untapped grain potential pockets in the country to meet future demand for foodgrains.

Sometime back government of India set up a committee known as “High Level Committee on Long Term Grain Policy” under the Chairmanship of Prof. Abhijit Sen to suggest long term policy on foodgrain in the country. As there were several common areas and aspects covered by the present study and the committee it would be interesting to see the similarities and differences in the recommendations of the two reports relating to main aspects of food management policy. These recommendations are summarised below:

**Major Recommendations from High Level Committee on Long Term Grain Policy and from this Study**

Aspect	High Level Committee	This Study
1. Accumulation of excess stock	Resulted from fall in consumption – should not dilute effort to raise foodgrain production	Resulted from fall in consumption both due to high prices for cereals and diversification in consumption pattern. Future growth strategy for cereals should be based on situation of demand.
2. Ensuring MSP	Continue with open ended purchases	Procurement alone can’t serve the purpose of ensuring MSP in all regions and for all cereals. Alternative options like Deficiency Price Payment should be used alongwith Procurement.
3. Basis for MSP	Strictly based on cost of production	Cost based MSP serves only to augment supply and totally ignores society’s preference and purchasing power.  MSP must take into account demand side factor and should correspond to market clearance price for normal production net of normal external trade.
4. Regional coverage of MSP	All regions	Surplus districts based on level of production and consumption estimates.
5. Price stabilisation	Variable import and export tariff policy	Buffer stocks are better option than trade (variable tariff levy) for price stabilisation in the long run

6. Continuation of FCI	Necessary but considerable scope to improve FCI's performance and to lower its cost	Need for Central Food Management agency however its operation should be strictly limited to genuine needs.
7. Role of private trade	Legal reforms (in ECA) needed to open up avenues for private sector	Government procurement and price intervention ignoring demand on the ground is driving away private trade. Need to encourage private trade to play its due role.
8. Genuine boundaries for government intervention	—	Ensure MSP to producers that is supported by domestic demand side factors. Intervene in open market price outside the band.
9. Long term solution for grain demand deficiency	Exploit untapped production potential in western and eastern India	Technology spread and new technological breakthrough needed to reduce cost of production.

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## REFERENCES

- Acharya, S.S. (1998). Agricultural Marketing in India: Some Facts and Emerging Issues, *Indian Journal of Agricultural Economics*, Conference no. 53(3): July – September.
- Acharya, S.S. (2000). *Domestic Agricultural Marketing : Policies, Incentives and Integration*, Paper prepared as a part of ACIAR study on Equity Driven Trade and Marketing Policy Strategies for Improved Performance of Indian Agriculture, Institute of Development Studies, Jaipur, May.
- Acharya, S.S. (2001). Domestic Agricultural Marketing : Policies, Incentives and Integration, in D. P. Chaudhri and S.S. Acharya (Ed) *Indian Agricultural Policy at the Crossroads*, Rawat Publications, Jaipur.
- Bhalla G.S., Peter Hazell and John Kerr (1999). *Prospects for India's Cereal supply and Demand to 2020*, Food, agriculture, and Environment Discussion Paper 29, International Food Policy Research Institute, Washington.
- Broca Sumiter (1999). Food Security, Trade in Foodgrains and Trade Liberalisation: The Case of India, Paper presented at the NCAER-IEG-World Bank Conference on Reforms in the Agriculture Sector for Growth, Efficiency, Equity and Sustainability, April 15-16, 1999, Delhi.
- Chand Ramesh (2000). Equity Driven Trade and Marketing Policy Strategies for Improved Performance of Indian Agriculture, Sub Project: Trade Liberalisation, ACIAR-ICAR Collaborative Study, National Centre for Agricultural Economics and Policy Research, New Delhi.
- Chand Ramesh (2002). *Trade Liberalisation, WTO and Indian Agriculture: Experience and Prospects*, Mittal Publications, New Delhi.
- Economic Times*, May 16, 2001, Commodity Compass, Delhi edition.
- Gulati Ashok, S Kahkonen and Pradeep Sharma (2000). The Food Corporation of India: Successes and Failures in Indian Marketing, in Satu Kahkonen and Anthony Lanyi ed *Institutions, Incentives and Economic Reforms in India*, Sage Publications, New Delhi.

- Gulati Ashok, S Kahkonen and Pradeep Sharma (2000). The Food Corporation of India: Successes and Failures in Indian Marketing, in Satu Kahkonen and Anthony Lanyi ed *Institutions, Incentives and Economic Reforms in India*, Sage Publications, New Delhi.
- Jha Shikha and P.V. Srinivasan (1999). Food Security through Price stabilisation: Buffer Stocks vs Variable Levies, *Economic and Political Weekly*, 34(46 &47): 3299-3304, November 20.
- Jha Shikha and P.V. Srinivasan (1999). Grain Price Stabilization in India: Evaluation of Policy Alternatives, *Agricultural Economics*, Vol.21, No.1, 93-108.
- Johl, S. S. (1995). Agriculture Sector and New Economic Policy, *Indian Journal of Agricultural Economics*, Conference no. 50(3): July - September.
- Kumar Praduman (1998). Food Demand and Supply Projections for India, Agricultural Economics Policy Paper 98-01, Indian Agricultural Research Institute, New Delhi.
- Mahendera Dev, S. (1997). Subsidies and Investments in Indian Agriculture: Issues and Perspectives, RGCIS Project No. 21, Subsidies and Investments in Indian Agriculture, Conference Papers, Rajiv Gandhi Institute for Contemporary Studies, New Delhi.
- Maheshwari, Asha (1998). Regulation of Markets, Growth of Production and Market arrivals – Statewise Analysis of Rice, *Indian Journal of Agricultural Economics*, Conference no. 53(3): July – September.
- Mitchel D. (1996). *The Small Country Assumption and the World Grain Exports*, Mimeo.
- Murty K. N. (1998). Foodgrain Demand in India to 2020 – A comment, *Economic and Political Weekly*, Nov.14.
- Piggot, R. and D.S. Sidhu (1998). *Efficiency of Foodgrain Marketing in India*, Background Working Paper, World Bank, Mimeo.
- Ramaswamy Bharat (2002). Efficiency and Equity of Food Market Interventions, *Economic and Political Weekly*, Vol. 37 No. 12, March 23-29.

- Rao C.H. Hanumantha (2000). Declining Demand for Foodgrains in Rural India: Causes and Implications, *Economic and Political Weekly*, Vol. 35 No. 4, Jan 22.
- Ray S. K. (1996). Food Management Revisited, *Journal of Indian school of Political Economy*, Vol. 6 No.2, April – June.
- Srinivasan P.V. and Shikha Jha (1999). Food Security through Price stabilisation: Buffer Stocks vs Variable Levies, *Economic and Political Weekly*, 34(46 &47): 3299-3304, November 20.
- Swaminathan Madhura (1999). Understanding the Costs of Food Corporation of India, *Economic and Political Weekly*, 34(52): A121-AA132, December 25.
- Veeraswami P. (1994). *Production and Marketing of Paddy in Nalgonda District of A.P.*, M.Sc. Thesis, Department of Agricultural Economics, Andhra Pradesh Agricultural University, Hyderabad.
- Vyas, V.S. (2000). Agriculture: The Second Round of Reforms, *Dantwala Memorial Lecture*, Delivered at 83<sup>rd</sup> Conference of Indian Economic Association, Jammu.
- World Bank (1999). India Foodgrain Marketing Policies: Reforming to Meet Food Security Needs, vol.I and II, Report no. 18329-IN, April 17.



## NCAP Publications

### Policy Papers

4. Maji, C.C. and A. Bhattacharya. 1995. GATT and Agricultural Exports-Hopes and Realities.
5. Maji, C.C., T. Haque and A. Bhattacharya. 1995. Small Farms. Employment and Surplus Generation : A Case of West Bengal.
6. Chand, Ramesh. 1997. Import Liberalization and Indian Agriculture: The Challenge and Strategy.
7. Suresh Pal and Alka Singh. 1997. Agricultural Research and Extension in India: Institutional Structure and Investments.
8. Farrington, J., Rasheed Sulaiman V. and Suresh Pal. 1998. Improving the Effectiveness of Agricultural Research and Extension in India: An Analysis of Institutional and Socio-Economic Issues in Rainfed Areas.
9. Birthal, P. S., Anjani Kumar, A. Ravishankar and U. K. Pandey, 1999. Sources of Growth in the Livestock Sector.
10. Sulaiman V., Rasheed and V. V. Sadamate. 2000. Privatising Agricultural Extension in India.
11. Chand, Ramesh. 2000. Emerging Trends and Regional Variations in Agricultural Investments and Their Implications for Growth and Equity.
12. Pal Suresh, Robert Tripp. and A. Janaiah. 2000. The Public-Private Interface and Information Flow in the Rico Seed System of Andhra Pradesh (India)
13. Haque. T. 2001. Impact on Tenancy Reforms on Productivity Improvement and Socio-Economic Status of Poor Tenants.
14. Selvarajan, S. A. Ravishankar, and P. A. Lakshmi Prasanna. 2001. Irrigation Development and Equity Impacts in India.
15. Birthal, P. S., P. K. Joshi, and Anjani Kumar. 2002. Assessment of Research Priorities for Livestock Sector in India.
16. Pal Suresh and Derek Byerlee. 2003. The Funding and Organisation of Agricultural Research in India: Evolution and Emerging Policy Issues
17. Adhiguru, P. and Ramasamy, C. 2003. Agricultural-based Interventions for Sustainable Nutritional Security.
18. Birthal, P. S. 2003. Economic Potential of Biological Substitutes for Agrochemicals

### Policy Briefs

4. Ravishankar. A., 1996. Intellectual Property Rights and Indian Agriculture: Some Issues.
5. Farrington, J., Rasheed Sulaiman V. and Suresh Pal. 1997. Strengthening Research and Extension for Rainfed Farming: Role of Social Science and Institutional Factors.
6. Jha. D. 1999. On the New Agricultural Policy.
7. Ravishankar, A. and Pratap S. Birthal. 1999. Livestock Sector in India: Agenda for the future.
8. Chand, Ramesh and Sonia Chauhan. 1999. Are Disparities in Indian Agriculture Growing?
9. Sulaiman V., Rasheed and A. W. van den Ban. 2000. Agricultural Extension in India- The Next Step.
10. Ravishankar, A. and Sunil Archak. 2000. IPRs and Agricultural Technology : Interplay and Implications for India.
11. Ravishankar, A. and Sunil Archak. 2000. Plant Variety Protection Technology: Interplay and Implications for India.
12. Gill, Gerard J., Diana Carney and Suresh Pal. 2000. Improving Competitive Agricultural Research Funding in India.
13. Andy Hall, Norman Clark and Rasheed Sulaiman V. MVS Sivamohan and B. Yoganand. 2000. Coping with New Policy Agendas for Agricultural Research: The Role of Institutional Innovations.
14. Chand, Ramesh and Linu Mathew Philip. 2001. Subsidies and Support in World Agriculture: Is WTO Providing Level Playing Field ?
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16. Sulaiman. V., Rasheed and Andy Hall. 2002. Beyond Technology Dissemination-Can Indian Agricultural Extension Re-invent itself?

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