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RAPPORTEUR'S REPORT ON FARM PRICE STRUCTURE

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The term "farm price structure" can be interpreted in several different ways. The synopsis inviting the papers had emphasized two aspects: the farmer's share in the consumer's rupee and input-output price ratios.

Fifty-eight papers on this subject have been accepted for discussion. About two-thirds of the papers have focused mainly on the spectrum of prices from the farm gate to the consumers with a view to discuss the farmers' share in the consumer's rupee. Other aspects of farm price structure covered in some of these plus the remaing papers are: seasonality of prices, market integration, input-output prices, and terms of trade.Of these, the terms of trade aspect has received the least attention and that too in the most perfunctory manner.

The empirical evidence in the papers pertains to virtually all major crops, a number of fruits and vegetables, chrysanthemum, arecanut, coconut, cashewnut and eggs. Among major crops, however, cotton and jute have received much less attention than they deserve. Geographically, the evidence relates to almost all States and Union Territories. Both primary and secondary data have been used in the papers. A number of papers have used primary data for two or more points of time.

The papers are rich in factual details. But in discussing issues pertaining to the farm price structure, the conceptual clarity and analytical quality of most of the papers leave much to be desired. Thus, for instance, there is relatively little analysis of the structure of markets, economics of providing time, place, and form utilities, and the play of demand and supply forces at different stages in the flow of farm output to the consumers in many papers with prime focus on the farmers' share in the consumer's rupee. Consequently, these papers generally convey an impression that middlemen appropriate an unreasonably large proportion of the consumer's rupee – an impression which is, by and large, not supported by the few papers which have examined the seasonality and market integration. Similarly, papers on input-output prices are nearly unanimous in pointing out that despite increase in farm output and its prices, the farmers' net income has not increased because of increase in the prices of inputs. But hardly any paper has examined the issue by taking into account both input-output prices and total factor productivity, and by paying attention to the relevant concept of cost of cultivation. Because of such limitations, many papers do not contribute meaningfully to an analytical and prudent understanding of the farm price structure. For the same reasons, policy prescriptions in many papers appear simplistic, if not altogether populist.

Besides the above, other fairly common shortcomings of the papers are: no information on the reference period of data or methodology behind the estimates of marketing margins, vague or ambiguous use of terms like 'productivity','cost of cultivation', and'marketing margins', lack of discussion on limitations of data used to examine the farm price structure, inconsistency between text and tables, and typing errors.

The next section summarises the major findings and conclusions of the papers under four headings: Price Spread and Producers' Share, Seasonality and Market Integration, Input-Output Prices and Cost of Cultivation, and Price Trends and Terms of Trade. The findings

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of papers on the price spread and the producers' share are grouped by crops because there are many papers on this aspect and producers' share differs vastly in different crops.

Certain conceptual and methodological considerations seem relevant to discuss the findings and conclusions of various papers on the farm price structure. These are highlighted in section II. The concluding part of the report identifies major issues for discussion in the Conference.

I

SUMMARY OF FINDINGS AND CONCLUSIONS

1. Price Spread and Producers' Share

Major Conclusions

Five broad conclusions emerge from the empirical evidence presented by various authors who have discussed the farm price strure by estimating the price spread and the producers' share in the consumer's rupee.

First, the producers' share in the consumer's rupee varied substantially across crops. In general, the share was much higher in non-perishable than in perishable crops. It was also inversely related to the degree of processing required in different crops. The lower share of producers in the consumer's rupee in the case of perishable crops was due to both higher marketing costs and larger margins of the intermediaries.

Second, in the case of virtually all crops, the producers' share in the consumer's rupee differed not only in different regions but also in different marketing channels at the same location. These variations in the producers' share were also due to differences in both marketing costs and margins of the intermediaries. In the case of alternative marketing channels, differences in the producers' share were often due to differences in the marketing functions performed by them.

Third, the producers' share in the consumer's rupee was not always higher in marketing channels with government agencies as intermediaries. The effectiveness of these agencies in protecting the producers' share depended on the scale and efficiency in their operations. Similarly, regulated markets benefited farmers in proportion to the effectiveness with which market committees supervised the functioning of markets. At many locations, there was a large scope for improvements in this respect.

Fourth, with respect to changes in the producers' share in the consumer's rupee over time, the evidence is mixed. Furthermore, changes in both directions were due to changes in marketing costs as well as margins of the intermediaries. The increase in the producers' share was often due to improvements in the infrastructural facilities for marketing. The regional variations in the producers' share in the consumer's rupee seem to have reduced over time.

Fifth, small and marginal farmers' share in the consumers's rupee has been lower than that of big farmers. But the difference might not have been as high as generally believed. Several reasons like village level sales, small quantities of marketed surplus, disposal during the peak arrival periods., poor keeping quality of produce, and credit needs were behind lower share of small and marginal farmers. If these factors are taken into account, the real difference between small and big farmers' share in the consumer's rupee have been even smaller than suggested by the data on prices. Because of the dominance of village level disposal by small and marginal farmers, their easy access to market information and competition among village traders are critically important in protecting their legitimate share in the consumer's rupee.

Highlights of Papers

Rice

A.C. Gangwar and R.N. Pandey have examined the price spread and producers' share in the consumer's price of three varieties of rice in Haryana at two points of time. During 1966-67 producers received 78.2, 78.1 and 79.8 per cent of the consumer's price for coarse, medium, and fine varieties of rice respectively. In 1982-83 the share was lower for all varieties: 71.7 per cent for the coarse variety, 68.5 per cent for the medium variety, and 67.3 per cent for the fine variety. The decline in the producers' share was mainly due to an increase in marketing costs and margins in the case of the coarse variety, both marketing costs and margins of the intermediaries in the case of the medium variety, and solely due to an increase in the intermediaries' margins in the case of the fine variety. The decline in the producers' share was less in the case of coarse and medium varieties, on which the government had imposed levy on rice millers, than in the case of the fine variety on which there was no levy.

The findings of K. C. Talukdar as well as those of S.P. Sinha and Jagdish Prasad suggest that small and marginal farmers received about 5 to 7 percentage points lower share in the consumer's price than big farmers in Assam and Bihar. This was due to several factors like low volume of marketed surplus, village level sales, disposal in the peak arrival period, poor quality, and tie-ups with moneylenders. All categories of farmers received the highest price when rice millers directly procured from farmers. Government intervention was not effective in raising farmers' share in Assam because of low volume of procurement and high cost of marketing. According to Sinha and Prasad, the farmers' share in the consumers' price had not increased significantly since 1974 despite regulatory measures and improvements in the marketing conditions in Muzaffarpur district of Bihar. On the other hand, V.Prasad *et al.* report that during 1983-84 the farmers' share in the consumer's rupee was about three percentage points higher in the regulated markets than in the unregulated markets in Kanpur district of Uttar Pradesh.

The findings of K.N. Rai *et al.* based on farm harvest, wholesale, and retail prices, show that during the early 1970s the producers' share in the consumer's rupee was 64.5 per cent in Uttar Pradesh , 71.4 per cent in Bihar, and 88.9 per cent in Andhra Pradesh. By the late 1970s, the producers' share had risen to 72 per cent in Uttar Pradesh, and 74.8 per cent in Bihar, but fallen to 80.2 per cent in Andhra Pradesh. The share had also marginally increased from 80.2 to 82.5 per cent in Karnataka between the mid-1970s and the late 1970s. The increase in the producers' share in all States was mainly due to a decline in mark-ups at the wholesalers' level. In Andhra Pradesh also there was a decline in the mark-up at the wholesalers' stage but it was more than offset by an increase in the mark-up at the retailers' level. R. Rajagopalan and B. Anuradha's study, also based on farm harvest and retail prices of coarse rice in Thanjavur district of Tamil Nadu, suggests that the producers' share in the consumer's rupee was constant during the 1950s, increased during the 1960s, and declined during the 1970s. During the three decades taken together, however, there was neither an increasing nor a declining trend in the producers' share.

Wheat

Using both the methods of concurrent and lagged margins, P.K. Mishra *et al.* have examined the producers' share in the consumer's price of wheat in Jabalpur district of Madhya Pradesh in 1978-79 and 1984-85. The data relate to the *same* sample of 45 farmers. The relative share of the intermediaries' margin in the consumers' rupee increased

whereas that of marketing costs decreased between the two years. There was also a marginal but statistically significant decline of about one percentage point in the farmers' share in the consumer's rupee.

The findings available in the above paper plus a few others based on primary data from Uttar Pradesh, Bihar, and Maharashtra indicate that small and marginal farmers had a lower share than big farmers mainly because of village level sales. Papers by M.P. Azad *et al.* and J.P. Misra and B.B. Singh reveal that the producers' share differs in different marketing channels – the share being inversely related to the length of the marketing channel. The net price received by the farmers (both in absolute terms and also as a percentage of the consumer's price) was *lower* in the channel with government agency as an intermediary than in the channel with private wholesalers and retailers.

Chhotan Singh and A.K. Vasisht, Rai *et al.* and N.V. Namboodiri have examined secondary data on farm harvest, wholesale and retail prices to study the price spread and the producers' share in the consume's rupee. Together these papers cover seven States and the period between the mid-1960s and the early 1980s. Following broad conclusions are suggested: First, the produces' share in the consumer's rupee varied by as much as 15 percentage points across States in the mid-1960s. Over time, however, the range narrowed with the difference during the early 1980s becoming nine percentage points. Second, the evidence on changes in the producers' share in the consumer's rupee over time is mixed. For instance, between the mid-1960s and the early 1980s, the share increased in Bihar and Rajasthan but declined in Punjab and Uttar Pradesh. Third, there were fairly wide year to year fluctuations in the producers' share during the 1970s. These findings of Namboodiri for Madhya Pradesh and Punjab suggest that it is hazardous to draw conclusions about *trends* in the producers' share by comparing the estimates for two points in time. His analysis also suggests that the relative stability in the share of producers in Punjab as compared to Madhya Pradesh was due to the difference between the two States in the scale of procurement operations of the government.

Other Cereals

B.D. Bhole and P.N. Bidwai report that the share of their sample farmers in the consumers' price for jowar in Akola district of Maharashtra was 76.3 per cent. The mark-up at the retail stage was nearly three times higher than at the wholesale stage.

Examining farm harvest, wholesale, and retail prices, N.S. Viswanath has discussed the producers' share in the consumer's rupee for *ragi* in Andhra Pradesh, Karnataka, and Tamil Nadu for the period 1967 to 1981. In all three States there were wide year to year fluctuations and a declining trend in the producers' share. In Andhra Pradesh and Tamil Nadu the decline in the producers' share was due to an increase in the mark-up at the wholesale level whereas in Karnataka it was due to an increase in the mark-up at the retail level.

Pulses

The paper by Mishra *et al.* gives estimates of the *same* sample farmers' share in the consumer's price of gram in Jabalpur district of Madhya Pradesh at two points of time. In 1984-85 the share came down to 84.8 per cent from 86.5 per cent in 1978-79. This was due to an increase in the margins of the wholesalers. Bhole and Bidwai report that the producers' share in the consumer's rupee spent on *tur* and *mung* was 78 to 79 per cent in Akola district of Maharashtra.

The papers by Rai *et al.* and Singh and Vasisht cover gram using farm harvest, wholesale, and retail prices. The producers' share varied considerably among Haryana, Rajasthan, Uttar Pradesh, Madhya Pradesh and West Bengal at different points of time. In a majority of

the States, the share was lower during the the late 1970s (or early 1980s) than during the mid-1960s (or early 1970s).

While the above two papers have compared the prices of gram at different levels, S.S. Acharya has examined farm harvest prices of gram and retail price of gram *dal* in Rajasthan from 1972-73 to 1979-80. During this period, the producers' share in the retail price of gram *dal* fluctuated widely between 43 and 77 per cent. The maximum mark-up was between the wholesale price of grain and retail price of *dal*. Between April 1975 and March 1980, the farmers' share in the retail price of grain was 82 per cent against 67 per cent in the retail price of *dal*.

Groundnut

M.M. Bhalerao *et al.*, V.T. Raju *et al.*, Anant Ram Verma, and G.N. Singh *et al.* have examined the price spread and the producers' share in the consumer's price for groundnut oil at several locations in three States during the last few years. The producers' share varied from 56.4 per cent in Chittoor district of Andhra Pradesh to 86.4 per cent in the co-operative marketing channel (GROFED) in the Saurashtra region of Gujarat. Even in the channels with private wholesalers, millers, and retailers, the producers' share in Gujarat was considerably higher than in Uttar Pradesh and Andhra Pradesh. This was due to both marketing costs and intermediaries' margins being lower in Gujarat than in Uttar Pradesh and Andhra Pradesh. Between the two, lower margins of the intermediaries were more important in raising the producers' share in Gujarat.

In the eight markets with private traders and millers of Saurashtra covered by Raju *et al.* the producers' share in the consumer's rupee varied between 72.5 per cent in Kalavad and 81.4 per cent in Gondal. This was also due to differences in both marketing costs and intermediaries' margins (mainly millers' and retailers').

On the basis of primary data, Verma reports that the producers' share in the consumer's rupee increased from 66 per cent in 1974-75 to 70 per cent in 1984-85 in Unnao district of Uttar Pradesh. This was due to a decline in the intermediaries' margins from 20.7 to 15 per cent of the consumer's price.

Rape and Mustard

The share of producers in the consumer's rupee seems to have varied across States less in rapeseed and mustard than in groundnut. D.S. Nandal has estimated the share in Hisar district of Haryana at 77.02 and 77.23 per cent in 1974 and 1984 respectively. M.P. Singh and S.A. Ali's estimates put the producers' share between 79 and 83 per cent in different marketing channels in Agra district of Uttar Pradesh during 1983-84. The findings of Singh and Vasisht, based on farm harvest and retail prices, show that during 1978-79 to 1980-81 the producers received 76, 80 and 77 per cent of the consumer's rupee in Haryana, Rajasthan and Uttar Pradesh respectively. They also show a reduction in the variation in the producers' share among the three States over time. Between 1963-64 to 1965-66 and 1978-79 to 1980-81 the producers' share in Haryana and Rajasthan declined whereas it increased in Uttar Pradesh.

A.K. Singhal's findings for Lakhimpur district of Uttar Pradesh clearly establish that village level sales are not necessarily disadvantageous to the farmers once marketing costs are taken into account. He found this true for farmers of all size-groups. Such an outcome was due to high competition among the village traders and availability of market information to farmers.

Tobacco

According to R.R. Doshi, the share of producers in the price of unprocessed bidi tobacco increased from 73.2 to 89.5 per cent between 1963-64 and 1982-83 in the Nipani tract of Belgaum district of Karnataka. In the price of processed bidi tobacco (*jardi*), the producers' share increased from 45.8 to 57.3 per cent. The increase in the farmers' share was mainly due to *(a)* elimination of small traders between growers and traders exporting *jardi* tobacco and *(b)* reduction in the share of net earnings of traders in the price spread of *jardi* tobacco.

According to T.Satyanarayana, the share of Virginia tobacco growers in the Buying, Minimum Export, and Free on Board Prices declined during the period 1977 to 1982. This was mainly due to the traditional unscientific grading practices followed at the stage of sales by the farmers.

Sugarcane

The analysis of Bhopal Singh Rohal *et al.* based on 1980-81 primary data for Muzaffarnagar district of Uttar Pradesh shows that sugarcane growers could increase their share from 65.8 to 73.6 per cent in the retail price of gur when they processed sugarcane into gur themselves.

Analysing 15 years' data from Anakapalle Co-operative Sugar Factory and regulated market for jaggery at Anakapalle, Darsi V.S. Rao has reached three conclusions. First, sugarcane supplies to the two markets fluctuated essentially as a result of violent fluctuations in the price of jaggery. Second, the cane price offered by the sugar factory was higher than the statutory minimum price in all years except one between 1975-76 and 1983-84. During the 1980s, the former was higher than the latter by more than 40 per cent. Third, even though the cane price had a share of only 35 to 55 per cent in the manufacturer's price of sugar, the conversion of one ton of sugarcane into sugar fetched higher price than its conversion into jaggery.

Potato

The papers by Dibakar Naik and S.C.Patnaik, Balwinder Singh, B.K. Gupta *et al.* and Y.S. Chauhan *et al.* suggest that the potato growers' share in the consumer's rupee varied significantly across regions. This was more due to the variations in the margins of intermediaries than in the marketing costs. The share also fluctuated from year to year. According to Gupta *et al.* this was mainly due to changes in marketing costs whereas according to Naik and Patnaik, it was due to changes in both marketing costs and intermediaries' margins. Balwinder Singh reports that the producers' share in the consumer's rupee had increased in Punjab over time due to improvements in market infrastructure, especially cold storage facilities.

The analysis by Singh and Vasisht shows that the ratios of farm harvest to retail price did not vary widely among Uttar Pradesh, West Bengal and Delhi in either harvesting or non-harvesting seasons. Nor was there much change in these ratios over time in either Uttar Pradesh or West Bengal. In Delhi, however, the producers' share increased by more than ten percentage points during the 1970s. Their findings also show that the producers' share in the consumer's rupee during the non-harvesting season was 30 to 40 percentage points lower than harvesting season in all three regions.

Other Vegetables

B. Mahesh Kumar Singh *et al.* have estimated the producers' share in the consumer's price for five vegetables for farmers located in villages around Hyderabad and Secunderabad during August-September 1981 using the method of concurent margins. The producers'

share varied between 29.4 and 44.8 per cent. The retailers' margin was either as high as or higher than the share of farmers. The low share of producers was due to credit dependence of producers and retailers on commission agents, lack of cold storage facilities, ineffective supervision of weighing and auction by the market committee and absence of grading as well as market information.

Fruits

Using the method of following specific lots of consignments through the marketing system, R. Swarup *et al.* have examined the producers' share in the consumer's rupee for Himachal Pradesh apples in Delhi, Lucknow, Jaipur, Jalandhar and Amritsar markets during 1975, 1979 and 1984. The producers' share in the consumer's rupee in the five markets varied between 39.6 and 46 per cent in 1975, between 31.6 and 41.7 per cent in 1979, and between 40.4 and 48.2 per cent in 1984. In four out of five markets the share was lower in 1979 than 1975. But in 1984, it was higher than in both 1975 and 1979 in all five markets. Marketing costs of apple growers and retailers' margins were the two dominant components of price spread. The temporal variations of the producers' share in the consumer's rupee were mainly due to changes in marketing costs of apple growers, the two main elements of which were cost of transportation and packing materials.

B.W. Ashturkar and C.D. Deole have estimated the producers' share in the consumer's price of banana, sweet orange, mandarin orange and sour lime in the Marathwada region of Maharashtra during 1981-83. For banana, the producers' share varied between 45 and 70 per cent in different marketing channels. It was the lowest when the produce was sold to pre-harvest contractors and the highest in the channel without commission agents and processors. In three out of four marketing channels, the maximum mark-up in the price was at the retail stage. In the case of the three citrus fruits, the producers' share in the consumer's rupee was considerably lower — only 28 to 30 per cent. The margins of the intermediaries accounted for about 24 per cent of the consumer's rupee while the remaining 46 to 48 per cent of the consumer's price went towards marketing costs. Handling, transportation, storage, and taxes were the main elements of marketing costs.

T.N. Saikia has estimated the producers' share in the consumer's rupee for pineapple in Meghalaya during 1983. The share was about 26 per cent in marketing channels with intermediaries like trade agents and wholesalers. Marketing cost in these channels was about 24 to 29 per cent of the consumer's rupee. Thus nearly half of the consumer's rupee went towards margins of trade agents, wholesalers, and retailers. When growers located nearby the marketing centres sold pineapples to retailers directly, their share in the consumer's rupee went up to 44 per cent.

Coconut

H.I. Dalvi *et al.* have examined the price spread in the marketing of coconuts in the Konkan region of Maharashtra during 1984. Their findings show that the producers' share in the consumer's rupee varied vastly in different marketing channels — from 60 per cent in the channel with private wholesalers and retailers who operated over large area to 95 per cent when the producers sold directly to the consumers. The producers' share in the co-operative marketing channel was also quite high (70 per cent) but it handled less than one per cent of the market supply. In the channel with private wholesalers and retailers, marketing costs and margins of intermediaries accounted for 18 and 23 per cent of the consumer's rupee respectively.

Arecanut

Gopal Naik and V.P.S. Arora have estimated Karnataka arecanut growers' share in the consumer's rupee at 68.8 per cent in Nagpur and at 57.9 per cent in Kanpur markets for the

period 1981-83. The difference was mainly on account of transportation cost.

Cashewnut

Md. Hasan and P. Raghuram give details of cashewnut processing with data from ten medium and small processing units located in Prakasam district of Andhra Pradesh. Their findings show that about 56 per cent of the consumer's price in the markets located in Delhi, Calcutta, Madras, and Bombay was the cost of raw nuts. In the remaining 44 per cent, the share of processing cost was 12 per cent, that of processors' margin 16 per cent, and that of marketing costs and margins about 16 per cent.

Eggs

R.Prabaharan and S.N. Sivaselvam have examined the price spread and the producers' share in the consumer's rupee for eggs in Tamil Nadu using the method of concurrent margins. In the marketing channel with private wholesalers, semi-wholesalers, and retailers, the share of producers was 74.7 per cent in 1981 and 76 per cent in 1985. Between 1981 and 1985, both marketing costs and intermediaries' margins as per cent of the consumer's price decreased. In the channel with Tamil Nadu Poultry Development Corporation, the producers' share in the consumer's rupee was 89.2 per cent in 1981 and 91.5 per cent in 1985.

2. Seasonality of Prices and Market Integration

Major Conclusions

Three broad conclusions emerge from the empirical findings of various authors on seasonality of prices and market integration.

First, the seasonal variation in prices of at least some agricultural commodities seems to have declined over time due to improvements in marketing systems and government intervention in price determination.

Second, seasonal price differences did not always exceed storage costs. Profits from storage activities, thus, were largely due to astute trading, especially the timing of sale.

Third, there was a fairly high degree of inter-temporal and inter-spatial integration among markets. Over time the degree of market integration seems to have increased. While this was generally true in the case of village level, primary, and secondary markets, it cannot be said about integraton between primary and terminal markets. The lesser degree of integration between these markets was mainly due to various deficiencies in the marketing systems.

Highlights of Papers

N.L.Agarwal has compared inter-seasonal and inter-monthly differences in prices of six foodgrains with storage cost in Rajasthan for the period 1971-72 to 1979-80. His results show that profits from storage depended on astute selection of the timing of sale. Among the six foodgrains, the opportunity of earning profits from storage was generally high *only* in the case of gram.

Using the price data from three regulated markets in Raipur district of Madhya Pradesh for the period from October 1971 to September 1981, M.I. Memon and C.S. Mishra have examined whether it would pay the farmers to store paddy and sell it in the offseason. Their results show that more often than not the storage cost exceeded the seasonal price difference during the ten years. For the period as a whole, it did not pay to store either the fine or the coarse variety of paddy in any of the three market situations examined by the authors.

Singhal reports that the extent of price rise for rapeseed and mustard in Lakhimpur district of Uttar Pradesh in the lean season was *not always* higher than what it warranted by carryover costs. In years of general price rise, the seasonal price differential was excessive, but in other years it was less than carryover costs. Similarly, Nandal's analysis based on data

from Hisar market in Haryana leads him to conclude that there was no price incentive to the farmers to withhold stock and sell in the lean period. Both Singhal and Nandal also find poor association between local market arrivals and prices.

M.K. Dhar and B.A.Baig have drawn attention to sharp seasonal fluctuations in prices of Kashmir apples in Delhi, Bombay, and Calcutta markets, and thus to the need for orderly marketing through developing cold storage facilities and market information systems.

Balwinder Singh has calculated seasonal indices of potato arrivals and prices in Jalandhar market of Punjab for the period 1964-65 to 1982-83. Comparing his estimates with those for the periods 1958 to 1963 and 1968-69 to 1977-78, Singh concludes that the seasonal variation in potato prices has *reduced* due to improvements in market infrastructure, especially greater access to cold storage facilities.

A.C. Gangwar and R.N. Pandey report that even though the concentration of market arrivals of paddy during October, November and December had increased in Haryana in the period 1976-77 to 1982-83 compared to the period 1960-61 to 1965-66, the price of paddy during these months has not only increased but also stabilised because of effective procurement policy.

Analysing the data on seasonal variation in rice price in Tamil Nadu between 1955 and 1977, T.Prabha also observed that the seasonal variation was lower in years of government intervention in the rice market than in those when there was no intervention.

Many authors have made reference to the adverse impact of seasonality in prices on the incomes of small farmers. S.K.Chakravorty has argued that the combination of seasonal fluctuations and steeply rising *trends* in the prices of all commodities makes the impact more severe in real terms.

M.L. Singh has analysed primary data from a sample of farmers, village traders, wholesalers, retailers and consumers in Palamau district of Bihar and shown that monthly prices of both rice and wheat at different market levels were highly integrated. He also found that the difference in the prices between two market levels was only slightly higher than the marketing costs in most of the months. And this, in turn, reflected the disguised interest collection on credit advanced by the traders to the farmers and consumers.

Singhal's findings for rapeseed and mustard marketing in Lakhimpur district of Uttar Pradesh also show that changes in prices offered by the village traders to the farmers in different weeks were closely associated with the price changes in the regulated market, and that the price differentials were no more than the transport cost. He also found that the prices in the five regulated markets studied by him generally moved together suggesting a fair degree of market integration. However, the price differential between pairs of market every week for a period of five years (1973-77) revealed wide fluctuations. In the case of three primary markets, almost every year there were periods of at least six to eight weeks at a stretch when the terminal market price was considerably in excess of primary market price after taking into account marketing costs. According to Singhal, unless this was due to defective data, it indicates lack of proper arbitrage operation among markets because of inadequate and improper provision of information about terminal market condition or operation of unwritten understanding among traders and commission agents.

P.K. Awasthi *et al.* have found high positive correlation between seasonal price indices and also between average annual prices of groundnut in a set of terminal, secondary, and primary markets in western Madhya Pradesh for the period 1972 to 1982. Their findings also show declining trends in the percentage of total groundnut arrivals in the immediate post-harvest period in all three markets.

Balwinder Singh has examined market integration with data from potato producing and consuming markets in Punjab. He found markets competitive and well-integrated. The price differentials did not exceed the cost of transportation and handling in most of the months. Moreover, the price differentials between markets had narrowed over time. Naik and Arora also found a high degree of integration among both primary and secondary arecanut markets. They, however, observe that while both wholesale and retail markets in Nagpur were well-integrated with the primary arecanut markets, it was not so in Kanpur.

3. Input-Output Prices and Cost of Cultivation

Major Conclusions

Three broad conclusions are suggested by the papers which have discussed the farm price structure by examining the input-output prices and cost of cultivation.

First, despite growth in farm output and increase in the prices of crops, the farmers' net income has not risen because of increased cost of cultivation per hectare due to factor price inflation.

Second, changes in the farm price structure have affected the profitability of different crops differently with consequent adverse effects on cropping pattern, demand for different inputs, and income of farmers growing certain crops.

Third, to generate growth in farm output and raise the farmers' net income, there is a need for output price policies which continuously offset factor price inflation and maintain parity in the prices of competing crops. Some authors have also advocated policies to increase productivity of crops and improve marketing facilities.

Highlights of Papers

Using the data on cost of cultivation, M.L. Manrai and D.S. Bhatnagar have examined the impact of changes in input-output prices on income of wheat growers in Punjab, Haryana, Uttar Pradesh, and Madhya Pradesh. Their major conclusions are as follows: Despite a vast increase in the value of output per hectare, there has not been a commensurate increase in the cost of cultivation per hectare. The increase, however, was less pronounced in cash and kind expenditure than in the imputed value of family labour and rent on owned land. After a decline in the returns over cost between the early 1970s and the mid-1970s, the trend was reversed. The difference between per hectare value of output and cost of cultivation in 1981-82 was higher than in the early 1970s in Punjab, Haryana and Madhya Pradesh. This gain in nominal terms, however, was illusory because the wholesale price index for all commodities has increased by 191 per cent between 1970-71 and 1981-82. In the future strategy, price policy should ensure, especially in the years of bumper harvest, that wheat producers at least recover their cost. The small farmers need attention with respect to extension, input supplies, and combining crop husbandry with subsidiary enterprises. Price policy has a limited scope to raise their income because of their small marketed surplus.

U.K. Pandey *et al.* have examined data on per hectare cost of cultivation and cost structure of bajra and wheat; prices, yield and gross returns of wheat, bajra, paddy, gram, cotton, and rapeseed and mustard; and real as well as nominal prices of various inputs in Haryana during 1967-68, 1977-78 and 1983-84. Their single most important conclusion is that "with the increase in the prices of inputs, the cultivators everywhere have experienced a cost-price squeeze." They have argued for "a production-oriented price policy – a policy which leaves a reasonable margin of profit not only for making improvements on farms but also for meeting farmer's aspirations for a better standard of living."

Naik and Patnaik have shown that the average net price received by potato growers in Orissa during 1979 to 1981 was lower than the unit cost of production in two out of three marketing channels. It was higher than the unit cost only when the farmers sold potatoes directly to consumers. The authors have advocated price support policy and improvements in the marketing system to encourage the farmers to use various modern inputs in potato cultivation.

W. Kumar Singh, on the other hand, finds no relationship between the prices of rice and fertilizers, on the one hand, and growth of fertilizer use, on the other hand, in Manipur between 1971-72 and 1982-83. According to him, yield rather than price incentive would be more effective in raising fertilizer use on rice in Manipur. Towards this end, he has recommended improvements in technology and education of farmers.

S.B. Dangat *et al.* have examined the impact of changes in input-output prices on the farmers' income for a flower crop (chrysanthemum) using primary data for 1969-70 and 1981-82 from Ahmednagar district of Maharashtra. Per hectare net income of farmers in 1981-82 was only 37 per cent of what it was in 1969-70. Attributing this mainly to increased cost of cultivation, the authors have recommended parity between the prices of inputs and output besides efforts to increase productivity of the crop.

On the basis of the estimates of costs and returns for different crops for a sample of farmers located in Vishakhapatnam district of Andhra Pradesh, T. Hanumantha Rao has concluded that faulty price policies for both inputs and outputs have made sugarcane cultivation (especially for conversion into gur) far more profitable than crops like paddy, *ragi*, bajra and gingelly.

P. Rajasekharan has also attributed changes in the crop pattern of Kerala to changes in the price environment. Between 1960-61 and 1983-84 there were shifts in area from more labour intensive food crops like paddy and tapioca to less labour intensive perennial crops like rubber and coconut leading to aggravation in the unemployement problem. The cropping pattern has changed due to changes in the relative prices of competing crops as well as input-output price ratios. To arrest such trends, he has advocated stability in the relative prices of competing crops, parity in the input-output prices, cost effective methods of production, and development of infrastructure and marketing facilities.

K. Sain and D. Dhar have highlighted the inter-temporal and inter-spatial variations in the prices of major crops and inputs and also in the ratio of per hectare revenue to cost of cultivation in West Bengal between 1977-78 and 1981-82. Using Markovian chain analysis, the authors have predicted a substantial rise in the prices of inputs by 1989-90 and concluded that the prices of crops will have to rise simultaneously or farming will have to be subsidised through suitable fiscal and monetary measures.

Using a simplified version of the unified approach developed by Quizon and Binswanger, Praduman Kumar *et al.* have estimated a model to evaluate the effects of several variables on demand for three variable inputs (human labour, bullock labour and fertilizer), output supply, and net crop income. The model is estimated for paddy and wheat in Punjab from cost of cultivation data for the period 1977-78 to 1979-80. Four major results of the estimated model are as follows: First, increase in wages, fertilizer price, and price of bullock labour raise the equilibrium price of both rice and wheat and reduce the demand for the three variable inputs. The effect of increase in these inputs' prices is negative on output supply but *positive* on net income of farmers from both crops. Second, intensive use of irrigation and capital inputs have mild effects on output supply but strong negative effects on crop income. Further growth in the use of these inputs is thus undesirable on both paddy and wheat. Third, in the case of either paddy or wheat, as the acreage increases or technology improves, output increases and price falls. These changes, also lead to a *reduction* in the demand for the

three variable inputs and also in the farmers' net income from the two crops. Fourth, procurement has strong positive effect on the prices of both crops, demand for the three variable inputs, output supply, and farmers' net income. The simulations of the model suggest a need for a downward revision in the rate at which paddy price is annually increased and an upward revision in the rate at which wheat price is annually increased to maintain growth in the supply of the two crops with parity in incomes from them.

4. Price Trends and Terms of Trade

Some papers have commented on certain aspects of price trends and terms of trade. It is difficult to draw broad common conclusions from these papers because of their diverse nature. The following paragraphs highlight major thrusts and findings of these papers.

Hem Chandra Lal Das has estimated the trends in all-India prices of different groups of agricultural commodities and also of all commodities taken together for the period 1948 to 1977. His overall conclusion is that agrarian prices have witnessed greater variation than the general price level and that the latter depends on the former to a great extent.

Himmat Singh and V.K. Singh have examined farm harvest prices of 11 crops in Haryana at four points in time between 1966-67 and 1983-84. In nominal terms, the prices of all crops except sugarcane were about 2 to 4 times higher in 1983-84 than in 1966-67. But in real terms, the prices of five out of 11 crops were lower. The authors do not find statistically significant and conceptually meaningful relationship between production of a crop and its farm harvest price.

G.D. Diwakar has examined the terms of trade in Rajasthan for the period 1957 to 1981 by computing wholesale price parity ratios of cereals, pulses, edible oil, and sugar and gur. The parity ratios are calculated using index numbers of general price as well as price indices of industrial raw materials, manufactured goods, fertilizer, diesel, and electricity. His overall conclusion is that price relationship between agricultural and non-agricultural commodities was 'incompatible', and that if such a situation continues, it would lead to long-term stagnation, uncertain productivity, and discouragement to investment in agriculture.

T. Shankar and S. Varadarajan have also highlighted the need for parity in the farm price structure of Tamil Nadu by examining the index numbers of prices received and paid by farmers during the period from 1968 to 1984 — index numbers with base in 1954-55. Their three tentative conclusions are as follows: First, the terms of trade have remained unfavourable to the farmers in all years between 1968 and 1984. Second, non-food crops were relatively more remunerative than food crops. Third, the farmers gained more from stability than from rise in agricultural prices as they had a higher share in the consumer's rupee during the period of stable prices than during the period of rising prices.

Gangwar and Pandey have pointed out that despite vast increase in rice production in Haryana between 1965-66 and 1982-83, farm harvest price of paddy has remained higher than its procurement price since 1972-73 due to healthy competition among private traders and effective functioning of the government procurement agencies. Similarly, Namboodiri has pointed out the significance of wheat procurement operations for a more stable relationship between farm harvest price and procurement price by comparing the ratios between these two prices in Punjab and Madhya Pradesh during the 1970s.

Nandal has examined the relative farm harvest prices of wheat, barley, gram and rapeseed and mustard in Haryana between 1966-67 and 1983-84. Barley prices remained lower in comparison with wheat prices whereas the prices of rapeseed and mustard as well as gram remained higher than wheat prices. There were, however, wide fluctuations in price parities. For instance, the parity ratio between prices of rapeseed-mustard and wheat fluctuated between 166 and 323 per cent.

II

CONCEPTUAL AND METHODOLOGICAL CONSIDERATIONS

Many conclusions and policy recommendation on farm price structure are based on the estimates of the producers' share in the consumer's rupee and the impact of input-output prices on the farmers' income. To discuss them meaningfully, it is important to recognize their conceptual and methodological limitations.

Producers' Share in Consumer's Rupee and Farm Price Structure

Quite apart from certain shortcomings of the estimates of the producers' share in the consumer's rupee in the papers under consideration, there is a more basic question: Can one develop a sound analytical understanding of the farm price structure from the estimates of the producers' share in the consumer's rupee *alone* even if the estimates are 'perfect'?

This spectrum of prices from farm gates to the consumers is an outcome of *demand* and *supply* transactions at different stages in the flow of farm output from the producers to the consumers. These transactions are between farmers and market intermediaries, between intermediaries at different levels in the marketing system, and finally between market intermediaries and ultimate consumers. Behind the demand and supply transactions (and hence, the spectrum of prices) are: (1) cost of production and supply of farm output, (2) structure of markets, (3) costs and returns of adding time, place, and form utilities to farm output, and (4) demand for farm output by the ultimate consumers. Government policies also influence the spectrum of prices, both directly and indirectly.

Viewed thus, the spectrum of prices from farm gates to the consumers cannot be understood analytically from *only* the ratios of prices at the two ends of the spectrum. These ratios are the *eventual* outcome of price determination at various levels in the flow of farm output to the consumers. Therefore, it is important to pay sufficient attention to major factors like the ones mentioned in the previous paragraph to gain a meaningful understanding of *why* the producers' share in the consumer's rupee is what it is. But such a conceptualization is missing in the papers which have discussed the farm price structure with the main focus on the estimates of the producers' share in the consumer's rupee. Of course, there are interesting details of marketing arrangements and of estimates of mark-ups in prices at different stages. But obviously these details, by themselves, also do not suffice to reveal the more important forces behind the farm price structure.

Three other limitations of these papers are: excessive and simplistic concern with the size of the ratio of the price received by the farmers to the price paid by the consumers to judge whether the farm price structure is favourable to the farmers, hasty conclusions about whether the price spread is reasonable, and absence of critical examination of the data on prices.

In paper after paper, one gathers an impression that, according to the authors, the higher the ratio of the price received by the farmers to the price paid by the consumers, the more favourable is the farm price structure to the farmers. This concern with the size of the ratio of the two prices to reach such an important conclusion on the farm price structure seems puzzling. A higher ratio does not necessarily mean a higher farm level price in absolute terms; it could be high simply because the consumer's price is low! And this, in turn, could be due to markets being geographically or temporally restricted — circumstances which are not favourable to the farmers. In fact, both historical experiences of developed countries and *a priori* reasoning suggest that as an economy develops and markets for farm output expand, the ratio of farm level price to the consumer's price *falls* because moe utilities are added to farm output as it flows from the farms to the consumers.

Similarly, the conclusions of a large number of papers on whether the price spread between the farm gate and the consumers is reasonable seem hasty. The reasonableness of price spreads, inter-channel and inter-State differences in them, and changes in the price spreads over time cannot be judged without taking into account various functions performed by the market intermediaries plus costs and returns of performing these functions. Few authors, who have examined these aspects (*e.g.*, Singhal, Agarwal, Balwinder Singh, and M.L. Singh), do not find the inter-spatial or inter-temporal differences in prices unreasonable. On the other hand, a number of authors, who have merely focused on the size of the price spread and the ratios of farm level to retail prices, suggest that an unreasonably large proportion of the consumer's rupee is appropriated by the market intermediaries. Often this is due to a lack of sharp distinction between gross and net marketing margins and also between marketing margins of intermediaries and *net* profit earned by them. Similarly, the estimates of marketing costs seldom include cost of credit advanced by the market intermediaries to the farmers or consumers, cost of bearing risks and uncertainties, and opportunity cost of middlemen's labour and enterprise. This seems strange when one notes that some of these authors have used the concept of 'Cost C' to highlight low income of farmers.

It is also important to note that not all data on prices are ideally suited to draw definitive conclusions about the farm price structure. This is especially so with respect to conclusions about intet-State differences and temporal changes in the structure of prices. Take, for instance, the secondary data on farm harvest prices. Even in the early 1980s, these data were collected from ten villages in each district in only 12 States and 2 Union Territories. In the remaining States and Union Territories, these data were collected from only a few selected centres. Moreover, most of the State Governments do not specify the varieties and qualities of all commodities for which farm harvest prices are collected. The geographical base and the varieties and qualities of commodities behind farm harvest prices might have also changed over time. When the limitations of data on wholesale and retail prices are also taken into account, it is clear that conclusions on farm price structure based on mere comparisons of these prices could be misleading.

Nor are the primary data on prices (generated through sample surveys) always ideal to draw generally valid conclusions about the farm price structure. Small sample size and peculiarities of sampling design often restrict the representative character of these data. When changes in the farm price structure are deciphered from primary data for two points in time, the question of whether these data are comparable becomes relevant. Furthermore, the method of 'concurrent' margins used in many papers to generate the data on prices does not take into account the time lag between purchase and sale of the produce by the same party. Yet another limitation of the conclusions on the producers' share based on primary data is their sensitivity to the location of the retailers or consumers. Often the consumer's price relates to local markets which could be very different from the one in markets to which the bulk of the output flows.

Despite the relevance of above considerations, hardly any paper has discussed the nature and limitations of primary or secondary data on prices it has used to reach conclusions on the farm price structure.

Notwithstanding all the above limitations, a number of authors have concluded that the farm price structure is 'unfavourable' to the farmers and recommended such things as larger procurement by government agencies at higher prices, elimination of village level traders, and establishment of organizations like vertically integrated co-operatives. The case for such recommendations may be strong in specific situations but it does not logically follow from the estimates of the ratios of farm level to retail prices or changes in them over time. As the findings of papers on seasonality and market integration clearly suggest, market imperfections and inefficiencies are not as high as are sometimes inferred from the estimates of the producers' share in the consumer's rupee. More importantly, these imperfections and

nefficiencies seem to have gone down rather than increased over time, although quite slowly. Thus, to improve the spectrum of prices from the farmers' viewpoint, recommendations such as effective implementation of the regulatory measures, introduction of scientific grading practices, improvements in marketing infrastructure, and strengthening of systems to disseminate market information are far more relevant than higher procurement prices and elimination of village level traders. This is especially so both in the interests of small and marginal farmers and sound agricultural development.

Input-Output Prices and Farmers' Income

The single most important conclusion of the papers covering this aspect is that despite vast increase in the output of several commodities and their prices, the farmers' net income has not gone up because of increase in the prices of inputs. This conclusion and price policy recommendations based on it need to be examined carefully on both conceptual and methodological grounds. The following questions seem relevant: Should the impact of input-output prices on the farmers' net income and price policy issues be discussed without any reference to productivity of inputs? Which concept of cost (and hence, of net income) is relevant in discussing the impact of input-output prices on the farmers' income? How sound are the empirical results on the impact of input-output prices on various facets of the farm economy like farmers' income, demand for inputs, and cropping pattern? Are the price policy recommendations prudent? It is beyond the scope of this report to comment on all these aspects at length. A brief discussion, however, may not be out of place.

In discussing either the impact of input-output prices on the farmers' income or price policy issues, it is illogical to focus only on prices. The productivity aspects also need attention because the farmers' income depends on both inputs-output prices and physical productivity of *all* inputs (*i.e.*, the total factor productivity). Moreover, the main objective of the price policies with respect to various inputs and farm output has been to increase agricultural production through technological change, and *thus* raise the farmers' income. Technological change means an increase in the productivity of all inputs taken together (*i.e.*, a reduction in the average real cost of one unit of farm output) and not just the use of more inputs or increase in yields alone.

Virtually the entire discussion on input-output prices in the papers under consideration, however, bypasses the productivity considerations. Surely, many papers provide evidence on per hectare cost of cultivation. They also draw attention to the impact of changes in the input prices on the farmers' income through the impact on the cost of cultivation per hectare. But hardly any paper has examined the productivity performance in drawing the conclusions. One obvious way to do this would have been to divide the per hectare cost of cultivation by per hectare yields to obtain the estimates of average cost of production per unit of output, and then compare these estimates with the prices of farm output. A more balanced picture would have emerged if in such an exercise attention was also paid to the different concepts of cost of cultivation and farmers' income. This is as important as taking into account the total productivity performance. In the context of the subject under discussion, prices of market purchased inputs are relevant and not all inputs' prices including imputed value of family labour and rental value of own land. These two elements still account for a substantial proportion of the total cost of cultivation in many situations. Therefore, conclusions on the impact of increased cost of cultivation on the farmers' income would substantially differ depending on whether the imputed value of family labour and rental value of own land are included in per hectare cost of cultivation. A scrutiny of empirical evidence in some papers (*e.g.*, Pandey *et al.*, Manrai and Bhatnagar, Bhalerao *et al.*, and Dangat *et al.*) clearly indicate that to draw constructive conclusions on input-output prices, it is crucial to pay attention to productivity considerations and the concept of the cost of cultivation which is relevant to discussion.

Finally, it also seems important to pay attention to the quality of empirical evidence and appropriateness of methodologies used to analyse the evidence. Take, for instance, the evidence on inter-temporal and inter-spatial variation in the prices of inputs and crops in the paper by Sain and Dhar. Why was there such a high degree of variation? Did the prices at different locations relate to the same variety of crops and the same quality of inputs? It is puzzling to find vast variation in fertilizer price which is statutorily controlled. Could this be due to different types of fertilizers being used at different locations? If the variations in prices were due to these reasons, how sound are the conclusions? Similarly, it is difficult to appreciate the conclusions based on the results of the model estimated by Kumar *et al.*, How appropriate is this model which ignores the interrelationships between competing crops and also between Punjab and the rest of the country? Why is weather excluded as one of the explanatory variables even though the model is estimated from data for three years? What is the definition of the variable 'technology' and why is it not included in the factor demand equations? What is the meaning of the results which show that acreage increases and technology improvements lead to *reductions* in the demand for the variable inputs and also in the farmers' *net* income from paddy and wheat?

III

ISSUES FOR DISCUSSION

The previous two sections summarise the major findings and conclusions of the papers under consideration as well as highlight certain conceptual and methodological considerations which require attention while discussing the papers. The deliberations in the Conference may be organized around questions such as the following:

1. How useful are the concepts of 'price spread' and "producers' share in consumer's rupee" in understanding the spectrum of prices from the farm gate to the consumer?

2. Given the limitations of these concepts and also of the empirical estimates based on them, what conclusions should be drawn from papers which have examined the farm price structure with main focus on these concepts and estimates?

3. Has seasonality in farm prices declined and the degree in market integration increased over time as suggested by some authors? Which factors have contributed to these changes in the farm price structure? What are the policy implications to accelerate these changes?

4. How important are the productivity considerations vis-a-vis input-output prices in determining the farmers' net income and demand for various inputs? What is the relevant concept of cost of cultivation in this context?

5. What are the price and non-price policy implications of the rising costs of farm inputs and constraints in the effective demand for certain agricultural commodities for further agricultural development?

6. Which aspects of farm price structure other than the ones covered in the papers under discussion deserve attention?

7. What are the lessons for further research on farm price structure? What improvements in secondary data are necessary for meaningful research on farm price structure?