CHAPTER 7
SUMMARY AND CONCLUSIONS

Segmentation of food markets into 'administered' and 'free' markets has been an important feature of India's food policy. In the administered market, government undertakes procurement, public distribution, storage and imports and also resorts to price intervention by fixing support/procurement price and issue price. These are supplemented by administrative measures. The free market functions within the normal demand and supply framework but is influenced by administered market.

The present study was taken up to analyse the structure of and interactions between the two markets with reference to rice and wheat. The interactions are explored with the help of a simultaneous equations model which is then used to indicate policy choices. Of these, an important one explored in the model is: between fertiliser subsidy and investment in irrigation which is a better option?

In the beginning of this exercise, the behavioural equations were estimated equation by equation through OLS method and then put together in a simultaneous equations framework. However, on reconsideration of the model, it was felt that simultaneous estimation of the entire system of equations would yield more efficient results as it makes use of the entire information contained in the model and takes account of cross-equation correlation. Therefore, the entire model was reestimated using 3SLS over a period of 20 years from 1969-70 to 1988-89.

The behavioural equations provide estimates of support price, issue price, open market price, output, procurement,
public distribution (concessional absorption), commercial absorption and (through an identity) closing stock of rice and wheat. Imports are treated as exogenous. Attempts to endogenise imports (which have played residual role in recent years) and government's storage policy (which deviates from ground reality) did not prove to be fruitful.

To highlight the main results of the model, supply response equations (based on the Nerlovian model with static expectations) suggest that a 10 per cent increase in relative prices would raise rice output by 2.5 per cent and that of wheat by 2.8 per cent. Elasticity with respect to irrigation is much higher at 1.55 in case of wheat and 2.65 in case of rice. Rainfall is significant in determining rice output and yields a high elasticity of 0.87. But response of wheat output to rainfall of growth period, although statistically significant, is relatively small (0.07).

Elasticity of procurement with respect to output exceeds unity both in case of rice (1.30) and wheat (1.04). Procurement is also responsive to procurement price and open market price. In case of wheat, elasticity of open market price at -1.29 outweighs procurement price elasticity of 0.81. In rice, price ratio was significant (but not when individual prices were used) and provided an elasticity estimate of 0.62. Administrative arrangements such as zoning were not found to be statistically significant. They may be important in determining the level of procurement, but it seems that their effect gets reflected in relative prices.

Public distribution is mainly explained in terms of private final consumption expenditure and ratio of issue price
to open market price. In case of rice, expenditure elasticity at 1.12 is greater than price elasticity of -0.29. The case of wheat is just the reverse; expenditure elasticity at 0.40 is much less than price elasticity of -2.11. Low income levels among rice consumers and greater wedge between issue price and open market price of rice account for this difference in results for rice and wheat.

Commercial absorption is a proxy for free market demand and along with concessional absorption (public distribution) provides an estimate of demand function. The estimated commercial absorption function for wheat yields an expenditure elasticity of 0.92 and price elasticity of -0.42. Corresponding elasticities for rice are 0.55 and -0.32.

In this study, support/procurement price is treated as endogenous to verify, in an ex post sense, the criteria claimed to be followed by CACP while recommending support price. Issue price is similarly endogenised on the premise that adjustments in procurement price must be passed on to the consumers as the government has limited budgetary resource towards food subsidy.

Results indicate that the support/procurement price is more influenced by trend in wholesale prices (with elasticity estimates of 0.54 and 0.43 for wheat and rice respectively) than cost of production (corresponding elasticities of 0.27 and 0.29). The level of these prices has been higher in the eighties following farmers' agitations. Issue price is strongly influenced by movements in procurement price. However, this influence is stronger in case of wheat than rice which presumably indicates that issue price of rice is also
determined by other factors such as low paying capacity of rice consumers. On an average, a 1 per cent increase in procurement price leads to 0.36 per cent increase in issue price of rice but 1.02 per cent in the issue price of wheat.

Open market prices were estimated in terms of current supply variable, non-agricultural GDP, supply of a substitute and lagged dependent variable. Current supply provides an elasticity estimate of -0.88 in case of wheat and -0.48 in case of rice. Corresponding elasticity with respect to demand variable (non-agricultural GDP) has been lower at 0.46 in wheat equations and 0.21 for rice. Supply of a substitute commodity (wheat and rice taken as each other's substitutes) is statistically significant in case of wheat but not that of rice. But lagged dependent variable (used as a proxy for private storage and lag in production and availability) is significant in case of rice but not that of wheat.

The model was validated and it was found that most endogenous variables are measured with small errors as shown in graphs and measured through statistical techniques. Estimated series track the original data closely except in case of closing stocks. Since closing stocks depend (among others) on previous year's closing stocks, high errors in the base period get accumulated. Otherwise, the model not only captures trends reasonably well, most turning points in the data are also correctly predicted.

After satisfying about the reasonableness of the model, it was put to test and five simulations were carried out to see the effect of an exogenous shock on the total system. Major focus in these simulations was to explore the right
policy choice between fertiliser subsidy and investment in irrigation. For this end, three separate simulations were carried out.

In the first one, the simulation results showed that a 10 per cent hike in fertiliser price would reduce rice output by 2.0 per cent and wheat output by 2.6 per cent. This result yields an implicit fertiliser price elasticity of -0.29 and -0.37 for rice and wheat respectively assuming 1:7 as the fertiliser response ratio. These results are comparable with other studies.

Decontrol of potassic and phosphatic fertilisers has led to sharp increase in their prices. If urea (with a consumption weight of around 64 per cent) is also decontrolled then the impact on fertiliser consumption and therefore on output of rice and wheat would be significant. Hence a more gradual approach in tackling the fertiliser subsidy issue is called for with suitable compensatory measure such as, raising procurement price. The simulation shows that a 10 per cent increase in fertiliser price would require procurement price of wheat to be raised by 1.53 per cent and that of rice by 1.10 to neutralise the hike in fertiliser price.

Expansion in irrigated acreage has a much stronger impact on output as the second simulation demonstrates. One per cent increase in irrigation raises rice output by 2.38 per cent and that of wheat by 1.49 per cent. Higher impact on rice is on account of low level of irrigation in rice compared to wheat.

To see the extent to which the impact of hike in fertiliser price can be neutralised by expansion in irrigation, a third simulation was run with a 10 per cent hike
in fertiliser price and expansion in irrigation by 1 per cent. Interestingly, the positive effect of irrigation more or less neutralises the negative effect of fertiliser price.

However, this outcome, which evidently favours irrigation to fertiliser subsidy, begs comparison of costs under the two options. This was done by taking the capital cost of irrigation development (under major and medium projects) at Rs 35,000 per hectare annualised at 10 per cent. Using the output elasticities with respect to irrigation, the area required to be irrigated to neutralise the negative effect of fertiliser price hike was worked out at 4.7 lakh hectares under both rice and wheat. To irrigate this acreage, the government would need to invest Rs 165 crore which is a small fraction (28 per cent) of savings of Rs 578.5 crore effected by raising fertiliser price by 10 per cent (taking Rs 5,000 per tonne as the weighted average price of nutrients and 10.57 million tonnes as the consumption in 1989-90). The result is valid even if a much higher estimate of capital cost of irrigation is taken.

Based on the simulation outcomes above, one can conclude that if policy makers are confronted with the choice between subsidising fertiliser and expanding irrigation the latter is more cost-effective option. However, short-run considerations often force policy makers to opt for fertiliser subsidy or raising support prices.

What are the policy implications? In view of the above conclusion, the declining trend in public investment in agriculture becomes a matter of concern. This investment has registered a decline during the eighties, from Rs 1,797 crore in 1980-81 to Rs 1,223 crore in 1990-91 at 1980-81 prices.
Private investment, which is over two-third of total investment, has at best been stagnant, if not declining. High and rising commitment on account of subsidies has driven away direct public investment in irrigation and other infrastructural facilities. Private investment has been stagnant due to declining public investment and deterioration in terms-of-trade.

In coming years, it would be imperative to reverse this trend of declining investment in agriculture. Improvement in producer incentives following greater liberalisation and concomitant reduction in protection to industry, may lead to greater private investment in agricultural sector. But to ensure and sustain this, public investment in irrigation, research, extension, transport and marketing must be maintained. Top priority must be given to completion of on-going irrigation projects. Resources for public investment can be raised by recovering at least a part of the economic cost of providing a service (such as irrigation or electricity), curtailing subsidy on fertilisers by revamping the fertiliser industry and food subsidy by better targeting.

Targetting of food subsidy has been much in news because a major source of this subsidy is the universal coverage of PDS. Targetting in public distribution means excluding undeserving beneficiaries from the existing coverage and including the deserving ones. Targetting is necessary not only to reduce burden on fiscal resources but also to send right signals in the economy.

Several methods of targetting have been suggested in the literature on the subject. These include income-based
targeting which excludes those above a certain norm of income; targeting by distributing coarse grains largely consumed by the poor; targeting by distributing inferior varieties of rice and wheat; geographical targeting by locating PDS outlets in areas largely inhabited by the poor (revamped PDS is a step in right direction); targeting by excluding asset-owners and income tax-payers; targeting by issuing only small quantities per visit and thus increasing the number of visits to get the required quota; seasonal targeting under which grains are distributed during lean season only and targeting through employment programmes.

Side by side, it would be necessary to make the functioning of FCI more efficient. At the present level of expenses, FCI cannot compete with private traders without subsidy. In the interest of efficiency, private traders should be given a greater role to play.

A few limitations of the present study may be noted. The model presented in the study is a partial model as it does not cover the entire foodgrain sector. It also excludes monetary and fiscal blocks since it was felt that these are more appropriate in country-wide or sectoral models rather than the commodity models of the type attempted here. The model also adopts a narrow definition of government intervention to connote its role only as the single largest and most privileged trader in foodgrain market. The promotional role of the government as a large investor in infrastructure and institutional set-up is treated as exogenous. It should be possible, in a much larger and general equilibrium framework, to endogenise even the promotional role of government.

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Since the period of study ended in 1989-90, the implications of the liberalisation policy announced in July 1991 for the foodgrain sector could not be analysed. The foodgrain economy seems to be moving towards greater openness. But it is unlikely that for rice and wheat, the broad conclusions presented here would change. Research elsewhere has shown that since rice and wheat received lower incentives in relation to international prices, more resources should be allocated to these two crops. This in turn implies maintaining the tempo of public and private investment in agriculture for which various subsidies need to be reviewed and reduced, and terms-of-trade needs to be kept favourable to agriculture.