CHAPTER SEVEN
Conclusions and Policy Implications

"... It must be the primary purpose of control to prevent wide and rapid fluctuations in world prices of primary products..." J. M. Keynes (1942)

The above maxim is, perhaps, quite apt in the case of Bangladesh agriculture. That this sector is subject to considerable variations and fluctuations is an undeniable reality. Given its dependence on the vagaries of nature, agricultural production is inherently unstable. This sector is confronted by both exogenous as well as endogenous forces such as seasonal fluctuations, structural imbalances, high man-land ratio, under-employment of farm population and low price elasticity of primary products. In the short run, the interaction of relatively inelastic demand with relatively inelastic supply gives rise to large price fluctuations within the agricultural sector as well as the rest of the economy. If prices are to serve as an adequate guide to production plans and efficient resource allocation, stabilisation of agricultural prices becomes imperative. It is this aspect of agriculture that has been dealt with in this study, namely, the experience of Bangladesh in respect of foodgrain price stabilisation.

Home to more than 120 million people, Bangladesh is one of the poorest economies in the world. Prior to the 1950s, the country lived under a fairly comfortable food situation. However, with a limited agricultural land base, a persistently high rate of growth of population and consequently, a worsening land-man ratio, it has been unable to maintain the required food-population balance. With a sort of dead-end having been reached with respect to bringing more land under the plough, the burgeoning population has resulted in fragmentation of farms to tiny units. The resultant under-employment in this sector has created a tremendous pressure for opening up of expanding vistas of non-agricultural employment. In fact, the number of rural households moving away from the primary sector and turning to markets for their requirement of foodgrains has been on the rise. Rice, which accounts for
approximately 90 per cent of the total foodgrains production, is the staple food of the Bangladeshis. This is followed by wheat, the share of which in the total foodgrain production is about 8.5 per cent. Though, relative to rice, this is a minor proportion, the crop is becoming more and more popular in Bangladesh. Given the overwhelming importance of rice in the Bangladesh economy, it is obvious that fluctuations in the price of this crop would have adverse impacts on the agricultural sector as a whole which, in turn, would affect the rest of the economy. A stable food price regime is, therefore, of paramount importance for a smooth growth process and for social stability in Bangladesh.

Price stabilisation does not mean pegging of prices at a certain fixed level. Rather, it calls for a mitigation of price fluctuations by moderating the peaks and the troughs. In Bangladesh, unlike in India, important institutions such as the Commission for Agricultural Costs and Prices are conspicuous by their absence. Not only that, the need for government intervention in moderating the demand and supply side abnormalities was never seriously felt till about the mid-1970s. It was only in the late 1970s that price stabilisation was explicitly introduced as a part of the country’s agricultural growth policy.

The study examines the nature of policy changes and their impact on foodgrain price regime in Bangladesh, based on a 27-year long time series data. The time series extending from 1972/73 to 1998/99, clearly stands divided into two distinct phases: Period I (1972/73 to 1978/79) corresponds to the pre-intervention phase when effective government intervention measures were largely absent while period II (1979/80 to 1998/99) corresponds to the phase when price stabilisation measures were explicitly introduced and acted upon, in varying form and content. When free trade policy is introduced into the picture, the second period is further split into two sub-periods. Sub-period IIa (1979/80 to 1992/93) corresponding to pre-liberalisation period and sub-period IIb (1993/94 to 1998/99) is the period of liberalised food import regime.

The two main crops viz. rice and wheat were selected for the study. Since rice is the principal crop determining the performance of the agricultural sector in Bangladesh,
changes in the rice sector have been analysed more elaborately. The analysis of rice was done variety-wise viz. *Aman*, *Aus* and *Boro*. The first two are *kharif* crops while the third is a *rabi* crop. It is worth mentioning here that the years 1972 to 1974 were a tumultuous period for Bangladesh, both socially as well as economically; the country had just emerged victorious after a nine-month long battle that left some three million people dead. Because of these problems, to the reader, who is not conversant with Bangladesh, some parts of the analysis may seem unbalanced. Nevertheless, since these developments threw up economic issues of substantial magnitude, especially in the realm of food production and prices, these years have also been included, wherever the data permitted.

Foodgrain prices have been analysed using the needed statistical and econometric techniques. Since price elasticities have an important role to play in the context of price stabilisation efforts, a supply response analysis was carried out. For this purpose, time series econometrics, using cointegration and error correction modelling was adopted. Most studies conducted on supply response have used the traditional Nerlovian partial adjustment-adaptive expectations models. However, recent advances in time series econometrics caution that classical regression techniques are invalid when applied to non-stationary time series data. Keeping this in mind, the data were first tested for stationarity (unit roots) using the Dickey-Fuller and/or Augmented Dickey-Fuller tests. On the basis of the presence of unit roots, a cointegration and hence an error correction model was fitted to estimate supply response parameters. Harvest prices were used for this analysis. To test the presence or otherwise of cointegration, the Engle and Granger test was employed. Since these tools bear asymptotic properties, the results may have small sample bias which, however, could not be helped due to data constraints. The above limitation, notwithstanding, our exercise throws up important estimates and insights that are of great import for agricultural price policy analysis and production planning in Bangladesh.

To measure the variability in both nominal as well as real prices, simple statistical tools such as coefficient of variation and a fitted trend line using the technique of moving average and simple linear regression proved quite handy. The coefficient of variation used was the de-trended coefficient of variation. Seasonal variation was
examined by suitably decomposing wholesale prices; seasonal indices of prices were arrived at by using the ratio to moving average technique.

When an economy opens up its external trade frontiers, just as Bangladesh did for the food sector in the early 1990s, price stabilisation also implies stabilisation of domestic prices vis-à-vis the rest of the world, the inherent volatility of world trade and prices of food commodities, notwithstanding. In our study, a comparison was drawn between the variability in domestic prices and that of border prices. Border prices were computed by converting the world prices to domestic currency using the official exchange rate. For Bangladesh, which liberalised its foodgrain trade in the early 1990s, such an exercise is highly relevant. For this analysis, the world price of rice, upto 1992/93, has been taken as the f.o.b. price of 15% broken Thai rice. Beyond 1992/93, domestic prices have been compared with Indian rice prices since the post-1992 liberalisation brought in a spate of Indian rice imports. For wheat, the f.o.b. price of US wheat, Hard Red Winter No. 2 Variety, has been taken as the surrogate for world price.

To analyse the implementation and impact of price stabilisation programmes in Bangladesh, along with descriptive statistics like averages, ratios and percentages, graphical representation has also been used as a tool. **Nominal Protection Coefficient** (NPC) was worked out to assess the extent of government protection to domestic producers. **Import and export parity prices** were calculated and compared with domestic wholesale prices to gauge the impact of private foodgrain imports on domestic foodgrain prices. Finally, a simple model using a dummy variable was fitted to see if the regime of augmented imports has brought about a structural change in the impact of imports on domestic prices in the post-liberalisation period, compared with the pre-liberalisation regime.

The subsistence nature of Bangladesh’s agriculture would tempt many analysts to conclude that Bangladeshi farmers are largely insulated from market impulses when they make their planting decisions. However, the elasticities obtained through the
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supply response analysis reveal a different story.\(^1\) The analysis was conducted using crop acreage as the dependent variable. Ideally, planned output or actual output, should have been used as the dependent variable. However, since output is not under the allocative control of the farmer, output could not be chosen. Apart from harvest price as one of the explanatory variables, several other price and non-price factors namely price risk, expected yield and yield risk were also taken, since these too play their respective roles in determining the size of elasticities.

For *Aman* rice and its different varieties, long run elasticities have gone up in the post-intervention period. Interestingly, the price elasticities for Broadcast *Aman* and HYV *Aman* with respect to area turned out to be negative. The former variety is a traditional one, which hardly uses modern inputs and is, therefore, characterised by low yield rates. These are normally grown in low-lying areas. With developments in flood control technology and improvements in embankments, this crop is gradually giving way to jute crop. This could be a plausible reason for the observed negative elasticity. On the other hand, the HYV *Aman* crop is a lucrative one and positive elasticities would naturally be expected in its case. However, as the name indicates, this crop is a modern variety that uses substantial new production technology. It is possible that the technology-inspired increase in output more than offsets the increase in output through area expansion. With the severe land constraint that afflicts Bangladesh, such a phenomenon is more than welcome.

Another interesting observation with respect to these two crops is that most of the short run elasticities bore signs opposite to those of the long run elasticities. This could be due to the fact that in the short run, factors of production are fixed and change in production is basically of a qualitative nature. In the short run, farmers do try to maximise their output and in some cases, a part of the augmented output might as well be available through short run minor land-use adjustments. In the long run, he is able to vary his inputs, and may opt to augment his output through strengthening of

\(^1\) The supply response regressions were run for the periods: 1972/73 to 1998/99 and 1979/80 to 1998/99. This had to be done because of the very small number of observations available for the pre-intervention phase.
yields or through a shift to a more lucrative crop or crop combinations. This could trigger off a reaction very different from that in the short run.

Transplant *Aman*, which covers a major portion of the total rice area, exhibited positive and increased short and long run elasticities in the second period (i.e. 1979/80 to 1997/98). Since this crop is grown on land which has low substitution possibilities, the results show that more and more land is being brought under this variety of *Aman* but at the cost of yield. It seems, farmers feel that they can minimise the risk factor by doing so. This fact is corroborated by the positive and significant acreage elasticity obtained with respect to price risk in both the periods.

Supply response to price showed an increase for *Aus* crop as well. However, the long run and short run elasticities had opposite signs implying that in the short run, the farmers are apprehensive about future developments and thus adopt a cautious stance. In the long run, when other non-price factors come into play, the aggregate effect overrides the short run response bringing about a net reversal in adjustments. The adjustments for the local variety were, however, very slow due to its dependence on rainfall and shortage of labour, most crucially during the sowing season. Moreover, local *Aus* and jute are competing crops and, often, there is a trade-off between the two as far as acreage allocation is concerned.

The High Yielding Variety of *Aus* crop seems to have reached a saturation in terms of yields; perhaps the technical efficacy of the existing varieties has run out its full cycle and a decline in yield may already be under way. Price increases in the second period have brought about an increase in acreage while yields have remained more or less the same. Accordingly, the long run acreage elasticity with respect to yield increased to register a positive figure in the post-1978 period from the negative relation that it exhibited for the total period i.e. 1972/73 and 1998/99.

The high yielding variety of *Boro* rice showed a high and positive degree of responsiveness to changes in the price of this crop. With the introduction of new agricultural technology, there was a spurt in the production of this dry season crop. From a relatively unimportant crop, *Boro* production has increased to reach
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approximately 53 per cent of the total rice production in 1998/99. Unlike Aman and Aus, farmers depend much less on Boro for subsistence and are, thus, more price- and revenue-conscious in making production decisions for this crop. Earlier, they were unsure of their course of action since the risk factor for Boro rice was very high but, with government intervention in foodgrain prices, their confidence seems to have been restored, if not augmented. For achieving substantial increase in total rice production the scope for price policy interventions is, thus, considerably higher for Boro rice compared to Aman and Aus rice.

Unlike Boro, the other rabi crop that was studied, namely, wheat, did not reveal a high degree of price responsiveness on the part of the farmers. This is surprising considering the fact that wheat is becoming quite a popular cereal in Bangladesh. From less than 1 per cent in 1972/73, its production increased to almost 10 per cent of the total cereal production in 1998/99. Definitely, at the present stage of wheat crop expansion, non-price factors seem to be playing a more important role in determining farmers’ wheat supply response which could not be captured here in the study.

The analysis of the trends and variability of foodgrain prices in Bangladesh throws up a number of interesting results. Overall, the period of government intervention during 1979/80 to 1998/99 does mark a distinct departure from the pre-intervention period in terms of domestic price variability. The post-intervention phase reveals a marked decline in price variability. This observation generally holds good irrespective of the measure of variability adopted or the conceptual angle from which variability is looked at – be it intra-year or inter-year variability. Some of the broad conclusions on the changing nature and magnitude of price variability have been sketched out below.

Firstly, the seasonality pattern of rice seems to have undergone a change. June to October which used to be the months of high rice prices are now marked by much lower levels of prices. This is because of the dramatic increase in the cultivation of Boro rice crop which is harvested in the months of May and June. Moreover, the post-liberalisation phase seems to have had a salutary impact on the seasonal variability of foodgrain prices by ushering in an era of greater price stability compared to the pre-liberalisation period. The only exception was that of wheat. This is, perhaps,
attributable to the fact that bulk of the wheat available in Bangladesh is imported. Thus, it is natural for this crop to be susceptible to international price volatility.

Secondly, both nominal and real prices showed a decline in their variability following public intervention measures. In the pre-intervention phase, (i.e. 1972/73 to 1978/79) the year to year fluctuations in wholesale prices were abnormally large. This was because the early 1970s witnessed massive floods and severe droughts causing a famine-like situation in the country. The consequent production shortfalls at home and meagre foreign exchange reserves that facilitated only limited quantities of imports, threw the demand-supply balance out of gear. The later years witnessed a phenomenal increase in Boro cultivation and the multiplicity of crop harvests in each year ensured a more stable production regime which resulted in a less skewed distribution of market arrivals and a marked improvement on the price front.

Thirdly, a comparison of the variability in domestic prices with that of Thai and Indian rice prices reveals that the domestic price regime was more unstable in period I compared with the year to year fluctuations in world prices. However, period II was marked by a substantial switch-over to a more stable price regime so much so that it became as much stable as the regime of world prices as such. The border price of Indian rice was the least unstable; possibly, it was the outcome of heavy government intervention.

Lastly, a comparison of domestic wheat prices with the border prices reveals that the latter was much more stable during the pre-1978 period. In the post-1978 period, domestic prices registered a lower variability than that observed with the world prices.

Coming to the implementation of the various price stabilisation measures, the basic tools used by the government in restraining fluctuations in foodgrain prices in Bangladesh have been a set of inter-related instruments, namely, public procurement, public distribution, open market sales (OMS) and imports. Our analysis regarding the effectiveness of these tools in achieving their goals show that their success has been rather limited with the exception of imports.
Procurement prices announced so far have shown wide discrepancies vis-à-vis the harvest price as well as the market price. The limited amount of procurement has been unable to prevent a fall in the harvest prices below the procurement price. As a result, in Bangladesh, procurement prices have failed to work as an incentive to the farmers, thus defeating one of its very basic objectives. Moreover, procurement targets were decided much more to replenish the public stock of grains rather than achieving the target of price stabilisation. Furthermore, the procurement system itself suffers from several drawbacks in the form of paucity of procurement centres, delayed payments to farmers, long drawn out procedures, including the usual bureaucratic hassles etc. which hold back the farmers from selling to the government. Rather, they are forced to sell off their produce to private traders, often at a much lower price.

With regard to public distribution, a nominal offtake of foodgrains (rice and wheat) was observed; for the total period of our analysis (i.e. 27 years between 1972/73 and 1998/99), the ratio of offtake to net availability never exceeded 17 per cent and, in some years, it went down as low as 6 per cent. However, OMS as an instrument of price control is gradually gathering importance. Non-monetised distribution programmes like Food for Work (FFW), Food for Education (FFE) and Vulnerable Group Development (VGD) seem to have performed better. However, if the leakages from these can be checked, their performance rating would go up still further.

Imports, particularly private imports, in the post-liberalisation period have played a very important role in restraining price fluctuations in Bangladesh. The coincidence in the timing of trade liberalisation for Bangladesh and India, coupled with several other favourable factors, set in a stream of imports of Indian rice to Bangladesh. These imports have been instrumental in restraining the import parity price as the ceiling price. Prior to liberalisation, when rice was effectively a non-traded commodity, the domestic prices had been moving between the import and export parity with a wide gap between the two. A simple model using a dummy variable shows a structural change in the impact of imports on prices; it comes up clearly that imports in the post-liberalisation period bring about a lesser increase in price variability compared to the one witnessed in pre-liberalisation phase.
Policy Implications for Bangladesh

From the standpoint of price policy, a positive and significant price elasticity would be desirable; it is, in fact, a functional necessity for ensuring incentives to the farmers and a steady expansion of output. However, too large an elasticity would bring about instability problems. Our analysis shows that Bangladeshi farmers are fairly responsive to price changes. However, negative elasticities for a number of crops imply that changes in price bring about either an increase in yield or a shift to more lucrative crops, given the severe pressure on land in Bangladesh. It must be kept in mind that price is not the only form of economic incentive for increasing the supply response. Non-price factors, especially those routed through technology augmentation, do also matter, if not take precedence over prices, in effecting acreage and output response. It is important to identify these factors and constraints that enhance or dampen the degree of responsiveness to price. As Krishna (1967) puts it:

The transformation of traditional agriculture is primarily a techno-organisational episode; the transformation cannot be brought about by only or mainly price movements. However, the techno-organisational effort can be retarded or accelerated by price movements. Favourable price movements can speed up the diffusion of innovations, the absorption of new inputs, the utilisation of idle capacity, and even institutional adjustments. Unfavourable price movements can slow down or arrest all these processes.²

In the same vein, Mellor too underlines the heightened importance of prices and price incentives when better technologies are already on ground than before; many studies testify that the complementarity between technology, prices and orderly marketing is, indeed, the hallmark of agricultural development, on an enduring basis (Mellor, 1968; Shigemochi, 1978).

One of the important non-price factors which policy makers need to focus on is, perhaps, input subsidies. These would increase the use of subsidised inputs and might eliminate the need for higher product prices as production incentives. This would be particularly relevant for the rabi crops of Boro and wheat.

Irrigation has an important influence on productivity and output increase. Unfortunately in our study, the variable could not be inducted as comparable information could not be obtained for the total period of our study. Nonetheless, the need to develop quantitative relationships between irrigation and supply response for an operationally meaningful price policy needs hardly to be emphasised. Perhaps another study on the pattern of irrigation development in Bangladesh and its impact on crop production, food surpluses and price milieu is called for.

Price policy may provide a stimulus for further expansion in developing economies where infrastructure and technology is well in place. However, countries such as Bangladesh, which are still under formidable structural constraints, most severely in terms of agricultural and rural infrastructure, may witness only a limited play of price incentives, at least in the short-run. Clearly, therefore, not only an agricultural price package need to be chiselled out but the extreme significance of the facilitating role of infrastructural support must be thoroughly grasped by policy/ resource administrators.

The trends in the variability of foodgrain prices clearly demonstrate the gains accruing to farmers in the presence of price stabilisation measures and what might possibly have been expected in the absence of any price intervention measures. It goes without saying that prices determine the farmer’s net income and, hence, welfare for his family. The lower coefficient of variation of prices obtained in the post-intervention period implies that the government has successfully managed to insulate the farmer from the hitherto unwanted year to year up- and/or down-swings in prices. However, the government needs to gear up its ability to ward off the effects of excessively bad production years, inter alia, on agricultural price fluctuations. Our analysis suggests that government intervention measures do dampen the impact, yet it is not completely absorbed. A corollary to the above finding is that although pricing policy is an important tool in the hands of the policy makers, by itself, it is not often successful, as said earlier, in curbing excessive price fluctuations unless accompanied by a complementary package of other factors including infrastructural and institutional support especially for mounting a viable procurement system and an efficient delivery service.
For the procurement programme to be successful, it is important to fix support prices at levels, which, *inter alia*, could provide due incentive to farmers. An incentive price should not be regarded as a disaster price at which the government will buy after prices fall drastically following a good harvest. It must be forward price which is established and widely publicised well in advance of preparations for planting a new crop. The purpose would be to provide an advance guarantee against the risk of disaster prices.\(^3\)

The quantity of procurement should be sufficient enough to influence market price in a direction which will bring about a more stable price regime which itself works as an incentive for planning acreage and output expansion. Moreover, if procurement at the announced incentive prices was duly linked with credit facilities, carried through co-operative societies, it would enable the government to procure adequate stocks in the market. Since the government would offer the producer a remunerative price at harvest time through co-operative societies, it is expected to ensure greater success of the procurement programme than otherwise.

The success of the government in reducing the range of fluctuation in prices, or keeping them within defined limits, would depend on its strength in the market. In order to command a position of strength in the market, the government would have to maintain a sizeable stock of grains which would enable it to regulate the market. The gap between floor price (support price) and the ceiling price (ration price or the OMS price) determines the amount of subsidy that has to be incurred by the government. It also determines the role that private trade pays in foodgrain distribution, i.e. the extent to which private stocks complement or supplant public stocks. A wide margin between the floor price and the ceiling price would more than cover the cost of private storage. This would encourage private stock holding, thereby, reducing the cost incurred by the government on account of holding stocks. The larger the margin between the floor price and the ceiling price, the greater the degree of price fluctuation that can be tolerated as a matter of policy. A low ceiling price would mean that the floor price should also be kept low. From the point of view of the farmers, it

\(^3\) Humphrey, Don. 'The Price of Food' in A. M. Khusro, (1968), *op. cit.*, pp.360.
would, perhaps, be a disincentive. On the other hand, a high floor price would mean a high ceiling price which would work against the consumers. So, a fine balance has to be struck between the floor and ceiling prices in order to ensure the effectiveness of the public stocks policy.

Most of the non-monetised programmes in Bangladesh like FFW, FFE and VGD are routed practically through wheat channels only. Keeping in mind the dampening effect that these disbursements of wheat have had on wheat prices, it is important to ensure that such disbursements do not take place at inopportune times. Distribution of foodgrains in periods preceding harvests or immediately succeeding harvests depresses harvest prices much to the detriment of the farmer. For example, most of the wheat distributed through FFW occurs between January and April (when construction work is at a brisk pace). Since wheat is harvested during the months of March and April, these disbursements serve to dampen prices to unremunerative levels.

In addition to the above recommendations, an efficient Public Food Distribution System can be ensured through effective supervision and close monitoring. Moreover, policy makers should concentrate more on OMS as a means of stabilising prices. This is because the experience with private imports is too new to admit of any complacency. In all likelihood a poor harvest of Indian rice would necessitate that Bangladesh turns to Thailand which is the next best option for the country to import from, in terms of cost effectiveness. This would automatically raise the import parity price and consequently reduce the number of importers participating in the trade. In that case, government support of private imports, though necessary, may not be as much forthcoming.

Moreover, too much dependence on private imports and food aid in stabilising foodgrain prices might, sometimes, work to the detriment of the economy, most ostensibly, by stifling domestic production. A stagnant agriculture would jeopardise the livelihood of millions of poor masses. Domestic production through appropriate price incentives, accompanied by public investments in infrastructure, and agricultural extension, must be encouraged to maintain the dynamism of the agricultural sector.
It must also be noted that though import parity price of rice has managed to provide a ceiling for domestic rice prices, the export parity price has failed to work as a floor. This is because Bangladesh has not been able to export its rice in good harvest years. A couple of reasons account for this. Firstly, Bangladesh has no established trade links with the rest of the world as far as trade in rice is concerned. Moreover, the domestically produced rice does not conform to international quality standards. Yet again, rice surpluses on a sustained basis have never been a reality of Bangladesh’s agriculture. Also the country has not been able to generate surpluses at internationally competitive prices. Understandably, disposing of occasional surpluses is not the same as developing an export market for continuously increasing trade surpluses. In any case, all the above points need to be seriously considered if Bangladesh is to dream of exporting its rice one day. Price stabilisation in exceptionally good rice harvest years, in the absence of exports would, indeed, become difficult. On the contrary, price instability is likely to increase if excessive coarse varieties of rice are produced, which will merely depress prices in the domestic market. An option could be to invest in crop research to produce high yielding aromatic rice in the country which would widen the choice of farmers.

Another phenomenon that has been observed is that increasing wheat imports in the form of aid have had the effect of depressing wheat prices below import parity. This has the effect of dampening farmers’ incentives and entails a set-back to government’s efforts to augment the production of this crop. It is in the interest of the nation to regulate and streamline the amount of wheat food aid to levels that may be imported by the private sector under free trade, without prejudice to domestic production regime and price milieu.

Finally, it may be said that a successful price programme that takes into account not only the correct objectives but also pays adequate attention to the method of implementation would go a long way in stabilising foodgrain prices in the country. Since the general condition of stability in an economy is crucially dependent on food prices, stabilisation of these prices would help in maintaining economic and social stability in the economy. Once this is achieved, the government can turn to other, more pressing, problems that afflict Bangladesh’s economy.