CHAPTER 5

SUMMARY, CONCLUSIONS AND POLICY

SUGGESTIONS

The theme of risk and uncertainty resulting into price volatility and eventually manifesting itself into variability in farm incomes with far-reaching socio-economic implications, has traversed in various directions, and, accordingly, has also attracted a great deal of attention of the academia and policymakers the world over. In consonance with this, it is generally contended that risk and uncertainty impact the economic fortunes of the peasantry in general and its more vulnerable segments such as the small and marginal farmers in particular, and, as such, call for the need of putting in place the appropriate remedial mechanisms to this effect. Hedging in respect of agricultural commodities, *inter alia*, is one such mechanism that has come to be growingly emphasized in this regard.

In the meanwhile, it is not unimportant to observe that the agricultural price policy, though important in ways more than one, is said to have failed in terms of reducing price volatility. Viewed from this standpoint, this policy, in vogue since mid-1960s, as such neither contributes to the farm incomes stability nor does it safeguard the farmers’ economic interests. In addition, it has also come to be observed in some academic quarters that the problem of poverty in the Indian countryside can be dealt with the standard market based economic perspective, which is expected to create opportunities and help in increasing farm incomes of those who have, by and large, remained deprived of the gains emanating from the ongoing process of agricultural modernization and other developments attendant to it. Moreover, in recent years, the futures and options have come to play an important role in the securities and money markets. It is against this very backdrop that the present study endeavors to examine the price and quantity volatilities in Indian agriculture and the role of the commodity exchanges in hedging mechanism under price oscillations of varying magnitudes. It seeks to look into the various aspects of the variability of farm income, factors responsible for price fluctuations that, *among other things*, cause this variability and the hedging mechanism that deals with it. To put the record straight, our study sets out to
examine the price discovery mechanism through spot and futures price dissemination process as also the scope of options in furthering the process of hedging for the purpose of improving the participation of the Indian peasantry in the commodity exchanges and ameliorating its economic lot by experiencing significant growth in the levels of farm incomes. The study also suggests a strategy for devising an efficient mechanism of risk management and price discovery.

The study has been developed into five chapters. Chapter 1 of the study has been devoted to critically evaluate the Indian agriculture with special reference to food security and improving the farm incomes in the context of the emerging scenario. Besides, this Chapter also focuses on the need for undertaking a study in its present mould, the issues for examination, its underlying objectives as also methodological framework as has been evolved for analytical purposes. The review of the existing literature on the theme under consideration and on other aspects related to it, as has carried out by us in Chapter 2, enables us to identify the research gaps, the need to fill them and delimit the scope of our study. In particular, our focus in this chapter is on the set body of research undertaken by various researchers in areas pertaining to agriculture, price volatility, risk management and hedging through commodity exchanges. Chapter 3 of our study, by using fundamental and technical techniques, makes a review of some of agricultural commodities that are being traded at the international and national level commodity exchanges with special reference to the National Commodity and Derivatives Exchange Limited (NCDEX). To be more precise, this Chapter endeavours to capture the effect of futures trading on price volatilities in case of the selected commodities included in the analysis. Chapter 4 of our study comprises six sections. While Section I encompasses in its fold various issues related to price volatility especially in the International scenario, an attempt has been made by us in section II to highlight the role of Indian commodity exchanges in changing scenario, internationally as well as domestically. It is pertinent to mention that agricultural risks in the Indian context have been exacerbated by the factors such as climate variability and change, frequent natural disasters, uncertainties in yields and prices, weak rural infrastructure, imperfect markets and lack of financial services. Needless to overemphasize, these factors not only endanger the farmers’ livelihood and incomes but also undermine the viability of the agriculture sector and its potential to
become a part of the solution to the problem of endemic poverty of the farmers and the agricultural labour. Again, while Section III of this Chapter covers the issues of managing these risks in Indian agriculture, we extend this discussion of ours further to Section IV to include hedging as a risk management tool. And finally, while Section V presents the results of our analysis, Section VI undertakes to conclude our discussion of the hedging mechanism through commodity markets. This, the Chapter 5, offers a summary of our study, the main conclusions emerging out of our analysis together with a few policy suggestions to make hedging mechanism more efficient and effective.

In the meanwhile, it is underlined that in spite of their long history of existence, the Indian Forwards Markets, by and large, function on the basis of mutual trust and closed group systems. Such markets, therefore, do not signify true competitive markets. On the other hand, the modern markets of futures trading have gained significant importance in the recent times due to the fact that they follow the rules and regulations and work on the principles of well-developed risk management mechanisms. Furthermore, these markets have been seen to be more transparent for entry and exit than ever before. It is thus not unimportant to point out that the futures markets provide a platform for risk mitigation, price discovery, arbitrage and clearing and settlement.

It has been observed that the stakeholders, namely, the farm producers, consumers, processors and traders hedge their positions in the commodity futures with the intention of protecting themselves from the risks of likely adverse price changes in agricultural commodities. It is through futures markets that the process of hedging helps the actual commodity users to transfer their risk to speculators who, in turn, are willing to assume the risk with a motive of profit-making. The commodity exchanges provide an environment for bringing demand and supply together in order to establish long-term benchmark prices. Such benchmarks facilitate the farmers to decide their respective volumes of production with adequate quality of the agricultural commodities. Thus, the futures markets can be viewed as a powerful tool for keeping the monopolistic traders under check and promote thereby the economic well-being of the peasantry as a whole.

It is not out of context to reiterate that the minimum support price (MSP) mechanism has been observed to remain ineffective in dovetailing national policies at the grass-root level. Rather, it has been pointed out that this policy has mainly benefited
the major cereals (such as wheat and paddy) growers and it has remained devoid of emulating the market behaviour of the agricultural produce. It is needless to supplement further that on many an occasion, such prices of agricultural commodities has been fixed on account of considerations other than the wellbeing of the farming community in general. In addition, it is pointed out that the objective of providing subsidies has not resulted in augmenting the yield rates of the various crops including that of foodgrains. In view of these considerations, it is important to conclude that the Indian agricultural price policy, despite achieving considerable success in terms of raising the output levels, has, in an overall sense, failed to tackle the major problems of poverty and food security at the household level.

Against this backdrop, the present study is an attempt to comprehend the nature and dynamics of the hedging mechanism in the emerging scenario characterized by risk and uncertainty. The study has been undertaken with the following main objectives:-

(i) To study the price and quantity volatility of selected agricultural commodities in Indian market and underline the factors responsible for such fluctuations;

(ii) To study the price instability and futures prices of selected agricultural commodities in Indian market;

(iii) To underline the factors responsible for price fluctuations in the spot and futures markets;

(iv) To examine the price discovery mechanism through regional exchanges and their correlation with their counterparts at the national level;

(v) To examine the role of commodity exchanges in hedging mechanism under price variations with special reference to the national level commodity exchanges in India; and

(vi) In the light of (i) through (v) above, to suggest a strategy for efficient mechanism of risk management and price discovery in respect of selected agricultural commodities.

It is not impertinent to mention that in consonance with the various objectives of our study, we have used data on futures closing prices and fair values of the spot
prices for the respective periods. These data have been obtained from the National Commodity and Derivatives Exchange Limited (NCDEX), which is a well-known national level Indian commodity exchange for the futures trading of agricultural commodities / agro-products. The spot prices used by us for computing the fair values are the closing daily prices on spots in the NCDEX. The data on spot prices in respect of four commodities, viz., barley, cottonseed oilcake, sugar M (200) and mustardseed were obtained from the agricultural markets of the respective delivery places (Jaipur for barley and mustardseed, Kolhapur for sugar M (200) and Akola for cottonseed oilcake). The data on spot prices from the primary sources of agricultural markets, mentioned earlier was compared with the spot prices for the respective periods of the selected futures contracts obtained from the National Commodity and Derivatives Exchange (NCDEX) in order to avoid ambiguity between the two. It was ensured in the process that largely varying values are not included in the analysis. The risk free rate of interest has been taken as the reasonable average rate of interest on government securities and other investment options like saving bank deposits prevalent during the respective periods of contracts. It is equally important to mention that although cost of carry has not been accounted for by us, the risk free rate of interest has, however, been taken uniformly at 5 per cent for analysis of different commodities. In order to measure the price volatility, statistical tools namely standard deviation, skewness and kurtosis of the futures prices and coefficients of variation of the futures and spot prices, regression analysis and $R^2$ values have been applied on the data. In addition, the Jarque-Bera test, an asymptotic Chi – Square distribution with two degrees of freedom was applied to test the level of significance. It is not out of context to mention that the Jarque-Bera test is simpler as compared to Chi –Square test and can be computed by the values of skewness and kurtosis. Hence, we have used this test in the present study to compute a goodness-of-fit measure to represent departure from normality, based on kurtosis and skewness. These tests have been conducted on four futures contracts in case of barley traded at Jaipur Centre and two futures contracts each for the three commodities, viz., cottonseed traded at Akola Centre, sugar at Kolhapur Centre and mustardseed at Jaipur Centre. In addition to these test, the optimal hedge ratios and hedge effectiveness were also computed for varying periods within the futures contracts. The results of this analysis have been presented in Section V of Chapter 4 of the present study.
It is also worthwhile pointing out that even though the prices of spots and futures in respect of most of the agricultural commodities tend to move in the same direction, their rate of change, nevertheless, is not found to be identical. Our estimates of optimal hedge ratio ($\hat{H}$) indicate the hedge positions that minimize the risk exposure and the losses attributable to under- as well as over-hedging. Besides, the hedging effectiveness ($\beta$) represents the proportion of the variance that is eliminated by hedging. The hedging effectiveness is defined by the minimum variance hedge ratio (MVHR), which is computed as the regression coefficient ($\beta$) of the Ordinary Least Square (OLS) regression model in which change in spot prices is regressed on change in futures prices. This estimate represents the relationship between the variance of the hedged portfolio and the variance of the un-hedged portfolio. It scarcely needs to be overemphasized that both of these estimates assume tremendous significance in the formulation of an efficient mechanism of risk management and price discovery in respect of selected agricultural commodities. In the present study, therefore, these estimates have been computed in respect of the afore-mentioned four commodities. Section V of Chapter 4 of our study presents the results to this effect.

In the meanwhile, it has also come to be contended that the significant improvements in human health and lifespan, as have been discernible over decades of the second half of the twentieth century, have led to notable increase in labour productivity and economic growth. These improvements in health have been largely attributed to better nutrition and to enhanced ability of the consumers to transform nutrition information into desired health states. However, it has also been pointed out that the efforts at improving employment levels in the secondary and tertiary sectors have not been able to reduce appreciably the dependence of Indian population for employment in agriculture and allied sector(s).

The available evidence shows that the prices of primary commodities produced by the Least Developed Countries (LDCs) have experienced a secular decline in relation to the prices of manufactured goods produced by the developed countries and thus face economic distress in the form of unequal exchange or a secular decline in terms of trade. This, in turn, has necessitated the primary commodities producers (i.e. the farmers) to produce and pay more in exchange for the given return. And, if the
agricultural commodities dependent countries and producers tend to escape the cycle of commodity dependence, the predictable incomes become still more critical.

Our attempt to review the existing body of literature concerning the theme under reference and its other related aspects in Chapter 2 offers us the following important insights:-

(i) Almost all the studies accept and emphasize the importance of examining the phenomenon of hedging mechanism more intensely;

(ii) All the studies attempt to correlate the phenomenon of hedging mechanism to the prevailing price volatility, which is caused by the inter-face among the sections of the various agents operating in the agricultural commodity markets;

(iii) The futures markets help in reducing inter-year price volatility and also play significant role in determining the inventory decisions in the cash markets;

(iv) It is obligatory for the effective working of the futures markets that the institutions involved in spot and derivatives markets of agricultural commodities strengthened by use of technology;

(v) In the event of extreme fluctuations in world prices or sudden import surges, it is warranted that the national policies should protect the domestic producers and farmers by invoking the special provision under the World Trade Organization;

(vi) A deeper understanding of the composition and characteristics of price risks may prove to be important for the politicians and non-governmental organizations in terms of decision-making concerning the investments in infrastructure, food aid and market surveillance;

(vii) The futures markets are considered to be informationally efficient;

(viii) The larger firms have lower inherent exposures in the commodity markets than their smaller counterparts due to their ability to hedge more efficiently owing to economies of scale in hedging activity. The institutional participation in derivative markets is therefore warranted;
The efficient functioning of future markets was possible only by the existence of efficient spot markets, which requires integration of spot markets through development of rural communication, transport and storage infrastructure so that the existing infirmities in the physical spot markets can be reduced to the minimum;

Not only that various studies cover different agricultural commodities, they also use various quantitative techniques for examining the phenomenon of price volatility and make a case for hedging in respect of these commodities.

In sum, our discussion in Chapter 2 makes it fairly obvious that the hedging mechanism in the case of agricultural commodities has attained considerable importance from the viewpoint of appropriate policy formulation. Nevertheless, the phenomenon of hedging mechanism needs to be examined more deeply in comparison to what has hitherto been the case.

With a view to have more meaningful insights into the process of volatility and the role of the commodity exchanges, it is necessary to study the trading of the agricultural commodities by using the fundamental information and by applying available technical techniques. With this objective in mind, Chapter 3 of our study takes up for discussion the price and quantity volatilities of the selected agricultural commodities. It is not impertinent to mention that in the matter of selection of the commodities for discussion, we were mainly guided by the fact that such commodities were being traded at the National Commodity and Derivatives Exchange Limited (NCDEX), and that sufficient data on futures contracts and spot prices about them were available. Our analysis in this Chapter that covered the 2006-09 period in respect of price and quantity fluctuations of these commodities points towards the following important conclusions:

(i) Our analysis in respect of barley suggests that its futures prices were more volatile during the months far-off the maturity dates than during the expiration months. Moreover, the futures and spot prices were found to be tending to converge.

(ii) The available evidence shows that rice futures point towards the existence of a yawning gap between the futures trading volumes on the
one hand, and its production on the other. Moreover, these gaps seem to be pronouncedly more marked in the case of developed countries than in India. To corroborate this fact, it has come to be maintained that while the futures trading of rice is normally ten times that of its production in the case of former set of countries, in India, on the other hand, only 50 per cent of the available quantity of basmati rice gets traded in the futures markets. Our study noted that the price dissemination and reduction in price volatility could be seen during the expiration periods of the basmati rice futures traded in Indian commodity markets. Our analysis in this regard implies two things. In the first instance, it underscores the usefulness of futures trading. And secondly, there existed ample scope for increasing the volumes of trading through futures markets in respect of this commodity in the country.

(iii) It is observed that the high instability as witnessed in India during the past several years in respect of cotton prices strongly emphasizes the need for participation of the cotton traders, importers and processors in the futures trading of the commodity to enable them to hedge their risks. Our results in respect of the futures trading of Shankar Kapas at the National Commodity and Derivatives Limited (NCDEX) found that there was high degree of positive correlation (correlation coefficient being 0.98) between the spot and futures prices of the commodity, besides the existence of co-integration in the price movements of the two series. This suggests that the futures trading in respect of cotton can help in price dissemination in the spot markets of the commodity.

(iv) Our study notes that in the event of price instability and the transportation and storage dynamics in the case of edible oils, a small change in prices, say, 2 to 5 per cent exerts an adverse impact on the economic fortunes of the farmers. It is possibly this very reason that explains the decline in area under the cultivation of the edible oilseeds from 173.33 lakh ha in 2008 Kharif season to 158.86 lakh ha in 2009 Kharif season (by 8.3 per cent). The decline in the area of oilseeds is indeed a matter of concern in that in the absence of any worthwhile
technology to make up for the loss of area in respects of oilseeds, it is bound to lead to low volumes of total output. This necessitates the further strengthening of the process of price risk management and futures trading in edible oils in the country.

(v) It is found that the futures trading in maize has helped in hedging the price risk in the case of well-developed spot markets like Sangli in Maharashtra, which is characterized by sufficient market depth and where the price volatility was observed to be more pronounced in comparison to other maize markets in the country.

(vi) It has come to be maintained that guided mainly by food security considerations, the agricultural price policy, together with its other correlates, has tended to tilt the production pattern of the agricultural sector in favour of the production of cereals. This has particularly been visible in the wake of the arrival of the green revolution, particularly from mid-1960s. This, according to some well-meaning observers of the agrarian reality in India, coupled with inadequate research and lack of technology in pulses, has, by and large, inhibited the increase in area under pulses and hence their production volumes in India. There is lot of evidence that suggests that the prices of pulses in the country fluctuate in tune with the domestic and international demand and supply forces. These prices normally decline during the post-harvest season and rise thereafter. In view of this, our study notes that the participation in the futures trading of pulses would enable the traders, importers and processors to hedge their price risks. The buffer stocks and carry-over stocks of pulses available in the country also assume significance in deciding the futures prices of the commodity.

(vii) Our analysis in respect of price behaviour of sugar takes note of its amenability to the market forces. It is observed that several factors such as organized and developed spot markets, large number of participants and active involvement of the traders in the Indian sugar industry account for the success of futures trading in the country in this case.
(viii) Focusing on the policies pursued by the Central Government in respect of wheat imports during 2006-07 and banning of its trading in the commodity markets, our analysis emphasizes that the futures trading of agricultural commodities should not get shadowed by the governmental interventions due to its political compulsions.

In a way, the recapitulation of the afore-mentioned conclusions of Chapter 3 of our study suggests that there existed price volatility, albeit of varying degree, in respect of several agricultural commodities such as barley, cotton, edible oils, wheat, sugar, basmati rice, maize, etc. before the setting-up of national level commodity exchanges. The volatility, fundamentally highly unpredictable, has now become somewhat estimable in the wake of the price discovery mechanism through the agricultural commodity markets.

Chapter 4 of the present study discusses various risk management tools which may be judiciously used to deal with the problem of price volatility. It is generally accepted that the changes in the magnitude of volatility, seen that the price volatility is increasing across a broad range of agricultural commodities, affect prices, production and inventories. Furthermore, the low commodity prices mean lower incomes for farmers and fewer jobs for workers. Besides, the volatile prices are reported to exert a negative effect on the livelihoods of the poor. Our analysis shows that the inherent uncertainty of stable prices tends to complicate financial planning and environmental management for commodity-dependent countries and producers, deepening commodity dependence and widening existing inequalities.

It is not unimportant to suggest that the commodity price risk management in India is at various levels of maturity, depending on the commodity and the strategic positioning of the players in the value chain. The Reserve Bank of India has recently relaxed its regulations on hedging in overseas markets by providing the companies with a wider range of options relating to price risk management. Besides, it has also permitted hedging on international exchanges in the case of certain commodities procured or sold locally.

Our analysis also highlights the role of the futures markets in integrating commodity prices horizontally over regions and across the national boundaries as well
as vertically for products lines. It further elaborates that the desirable shifts in cropping patterns may be facilitated through futures trade since the futures prices, based on the present market assessment of the anticipated supply and demand, to some extent act as the price forecasts. We also observe the futures markets to facilitate stocking and production planning for various market functionaries and, as such, the futures prices can be considered as reference prices for physical market transactions in cash and forward contracts entered either domestically or for overseas export-import business.

Our analysis of computing optimal hedge ratios and hedging effectiveness for four agricultural commodities, namely barley, cottonseed, sugar and mustardseed, being traded at the National Commodity and Derivatives Exchange Limited (NCDEX) indicates that the sowing and harvesting periods are very important for the price movements. This further corroborates that futures and spot prices in Indian commodity markets are going to be co-integrated in the long run. Our results also suggest that the Indian commodity markets provide a reasonably high level of hedging effectiveness and the derivatives markets provide useful risk management tool for hedging mechanism. Furthermore, the futures trade plays an important role in moderating the seasonal variations in farm prices by reducing short-term price volatility.

The findings emanating from our analysis in Chapter 4 are summarized as follows:

(i) To remind ourselves, in the case of barley, our analysis covered four futures contracts, viz., March 2007, September 2007, December 2007 and May 2008 traded at NCDEX with delivery at Jaipur. In the case of this commodity, our results indicate that the futures and spot prices seemed to co-integrate. Not only this, they displayed a tendency to converge with each other during the expiration month. What needs to be underlined in particular is that the futures and spot prices variations were observed to be higher during the periods far-off from the harvest month(s). As against this, the price volatility was found to be at its minimum level during the expiration weeks of the futures contracts. This apart, the traded volumes, on account of the non-availability of
stocks during the periods far-off from the harvesting month (February), were found to be low.

(ii) In the case of December 2007 and May 2008 futures contracts of barley, we note that the values of Coefficient of Determination ($R^2$) were 0.81 and 0.88 respectively. These high values signal towards the potential and attained hedging effectiveness. This apart, the value of $R^2$ was found to be 0.57 in the case of September 2007 futures contract of barley. This value read together with the high values of optimal hedge ratio (1.03) and hedging effectiveness (0.93) for the full contract period, $C(1)$, are indicative of the fact that in terms of risk reduction at the agricultural commodity exchanges, hedging plays an important role in the potential and attained effectiveness.

(iii) Our results indicate that the values of Jarque-Bera test in respect of all the afore-mentioned three contracts of the commodity under reference, viz., barley, were smaller in relation to Table value of 5.99 at 95 per cent of confidence interval. This signaled towards normality in the case of data distribution of December 2007 and May 2008 contracts of barley. Further, in the case of September 2008 contract of barley, the values for the first two periods, $C(1)$ and $C(2)$, were found to be higher than the Table value 5.99, revealing thereby the greater effectiveness of the hedging during the near months (less than six months) contracts.

(iv) In the case of September 2007, December 2008 and May 2008 contracts of barley, we have in the present study discerned the reducing values of the coefficient of variation at 10.11, 0.83, and 3.92 per cent respectively for the expiration months of the contracts. These reducing values indicate that the participants possibly square-off their position during the expiration months as a result of retaining very few futures till their respective dates of maturity.

(v) Taking cognizance of the fact that barley is normally sown in the month of October and harvested in the month of February, the sudden changes in expiration month of September 2007 futures contract of this particular commodity, as implied in the high value of Jarque-Bera
(7.38) test and negative value of kurtosis (-1.41), were possibly on account of stock-out position.

Our results in respect of the two futures contracts of cottonseed oilcake, viz., May 2008 and January 2009, traded at NCDEX with delivery at Akola, showed that the futures prices in an overall sense remained above the spot prices. Moreover, the volumes traded of the commodity in question were also observed to be considerably higher during the periods of high basis as compared to the other periods.

(i) Ineffectiveness of the futures trading of cottonseed oilcake for the May 2008 and January 2009 contracts comes out very neatly through the extremely low Coefficients of Determination ($R^2$) being only 0.179 and 0.135 respectively and very high computed values of Jarque-Bera test.

(ii) Our results indicated that the values of correlation coefficient were more than 0.77 for all the periods (except the expiration period in which case it was observed to be 0.38) of May 2008 futures contract. This together with the values of optimal hedge ratio (including those > 1) pointed towards the attained effectiveness in that the relative variance of the un-hedged position was higher in comparison to that seen in the case of hedged position. This also shows as a risk management tool in commodity derivatives, hedging assumes tremendous significance.

(iii) In the case of May 2008 and January 2009 futures contracts pertaining to cottonseed oilcake, it is found that the values of the standard deviation get reduced in case of near-month contracts, from 22.70 to 5.91 in respect of the former contract and from 24.69 to 12.21 in respect of the latter. This suggested that in the case of futures trading of cottonseed oilcake, the attained hedging effectiveness was quite important.

(iv) We observe that in respect of both the May 2008 and January 2009 futures contracts of cottonseed oilcake, the coefficients of variation seemed to decline from 5.31 to 1.47 and from 5.60 to 2.68 respectively. What this underlined with regard to both the contracts was that the price variability tended to get reduced during their respective expiration months.
Our discussion of the October 2008 and March 2009 contracts of M200 variety of sugar, traded at NCDEX with delivery at Kolhapur, reveals that the futures and spot prices moved in tandem and displayed a tendency towards convergence, particularly if the expiration period seemed to coincide with the harvesting period. We noted that the wide basis between futures and spot prices acted as a drag on the futures trading of the commodity, and the trading volumes of futures got influenced by the administered prices, particularly during the periods when the futures prices were below the spot prices.

(i) The extent of the volatility in respect of October 2008 and March 2009 contracts of M200 Sugar can be gauged in terms of the respective values of the Coefficients of Determination ($R^2$). These values were noted to be 0.548 and 0.648 respectively. In a sense, these values measure the proportion of the volatility that hedging can eliminate in the case of the said futures contracts concerning M200 sugar.

(ii) The high values of correlation coefficient for the October 2008 futures contract (between 0.70 and 0.91) as also, for March 2009 futures contract (between 0.70 and 0.85) in respect of Sugar M (200) commodity, signal towards the potential effectiveness of the hedging through futures trading in respect of the commodity under reference.

(iii) The reducing values of standard deviation from 95.16 for the longer period to 33.73 for the shorter period in the case of October 2008 futures contract and from 80.53 for the longer period to 69.34 for the shorter period in the case of March 2009 futures contract of the near months futures do provide us the basis to argue that the futures trading of the commodity can reduce the volatility importantly.

(iv) The coefficients of variation (ranging between 5.35 and 2.33 for the October 2008 futures contract) as also (ranging between 4.10 and 3.36 for the March 2009 futures contract) were noted to be less than those of the spot prices for the said contracts. In the light of these findings, one can plausibly argue that the combined position (both hedged and un-hedged) is capable of mitigating volatility to a considerable extent. Besides, one can
also assert that the anticipated as well as attained effectiveness can be realized through the futures trading in M200 sugar.

(v) Our findings indicate that the calculated values of Jarque-Bera test are much higher than the Table value of 5.99 at 95 per cent of confidence interval in the case of M200 sugar contracts. These values display the departure from the normal distribution of the data. From this, it can be inferred that the administered prices of the commodity under reference tend to regulate its spot prices and for this reason, the spot prices are at variance from the one which market forces of demand and supply seek to determine.

In the case of May 2008 and February 2009 futures contracts of mustardseed traded at NCDEX with delivery at Jaipur, our study noted the existence of high level of volatility. Our analysis also found that there appeared a tendency towards convergence between the futures and spot prices, particularly in the wake of rising trading volumes of the commodity owing to the existence of strong basis.

(i) The high value of Coefficient of Determination ($R^2$) was observed to be 0.61 in the case of February 2009 futures contract of mustardseed in comparison to the corresponding Coefficient Value of 0.36 in the case of May 2008 contract. This suggests more variation can be hedged through futures trading in the case of the former contract than in the latter.

(ii) The high values of correlation coefficients (in the range of 0.89 and 0.94) in respect of May 2008 futures contract of the commodity under reference imply that the potential and attained effectiveness can be achieved through hedging in the case of this very contract. The small values (including negative values) of correlation coefficient, as observed in the case of the February 2009 futures contract of mustardseed, in contrast, owe their explanation to the termination of the said contract in the harvesting month of the crop.

(iii) The reduction in volatility in the near-months contracts of mustardseed can be seen in terms of the decreasing values of standard deviation from 210
for longer periods to 24.79 for shorter periods in respect of May 2008, as also from 20.39 for longer periods to 12.53 for shorter periods in the case of February 2009 contracts.

(iv) In comparative terms, it was found that the coefficients of variation for both the afore-mentioned futures contracts were at a lower keel than those for the spot prices for the corresponding periods. On this basis, it is possible to maintain that the volatility of the spot price movements for the commodity under reference can be mitigated through hedging.

(v) The departure from normal distribution of data becomes abundantly clear from the computed high values of Jarque–Bera test in relation to the Table value (i.e. 5.99) at 95 per cent of confidence interval in respect of mustardseed. The commodity’s being largely available in the harvesting season, high carrying cost and lack of grading facilities in the spot markets seem to us to be the possible explanations underlying the observed behaviour in this case.

In addition to the above, our overall analysis in Chapter 4 also indicates that the futures trade may contribute towards increase in the price volatility, particularly when the futures and spot markets are informationally weak. Furthermore, the volatility in general may increase the risk of paying higher price for a specific commodity and may also be used as derivative instruments to hedge against price risk. It can be argued that the high support prices normally reduce the demand and lead to larger stocks, while in case of being lower than the market clearing price in a normal year, these prices would not benefit the farmers. Moreover, in the Indian context, the non-price measures such as providing basic infrastructure, support and extension services along with adequate credit for increasing agricultural output are far more important in relation to the minimum support prices and other incentives including subsidies. In our opinion, while the kitty of net return from the production of exportable commodities like maize and rice is likely to grow appreciably in the wake of emerging free trade scenario, the loss on this count, regardless its amount may occur in the case of importable commodities like rapeseed-mustard.

211
Policy Implications

What do afore-mentioned findings imply in terms of policy imperatives? In other words, what type of strategy needs to be put in place for effective risk management and price discovery? Obviously, this question assumes utmost significance in respect of a study such as the present one. In this regard, the available evidence points towards the fact that historically speaking many a time, our well-intended policies have, at times, been found wanting in terms of benefiting the peasantry appreciably due to other broader and political compulsions. Free trade in farm commodities is therefore likely to have sharp positive impact on net return from production of high value exportable commodities like maize and rice while it will have small negative impact on net returns from the importable commodities like rapeseed-mustard, etc.

The reality prevailing at the grassroots level also suggests that the government intervention in trade has led to inefficiencies, especially in situations characterized by appreciable piling up of the stocks with the government during the good harvest years following the introduction of improved technology in the farm sector together with the provision of heavy input subsidies, in terms of steep rise in inter carry-over costs. The commodity markets in India have, over the period of time, become expectedly more practical as compared to the minimum support price (MSP) and public distribution system (PDS) in terms of furtherance of economic welfare for the larger segment of the farming community. In the light of these developments, some measures need to be put in place so that besides strengthening the functioning of the agricultural commodity exchanges in the country in terms of improved transparency, competition, efficacy, etc. in the times to come, the sustainable growth of the farm sector as also the safeguarding of the interests of farmers on an enduring basis continue to remain prioritized.

First, in the emerging scenario, growing emphasis is required to be given to ‘Farmers-in-Partnership’ concept than to its counterpart ‘Farmers-as-Beneficiaries’. Enabling environment needs to be created where, as in the case of manufacturers of goods, the farmers too can exercise their rights to fix the sale prices of the commodities produced by them. In this envisaged process of promoting prosperity amongst the
Indian peasantry in general, the government needs to assume the responsibility of a facilitator rather than that of a regulator.

Second, farmers need to be encouraged to form producers’ co-operatives, who, in turn, will take upon them the task of fixing the sale prices of the agricultural commodities in consideration of the local conditions and price movements in the commodity exchanges. Farm produce may be permitted to be moved freely within and outside the states so that the price differentials may be controlled by promoting an effective price discovery and dissemination mechanism.

Third, community based assets such as farm mechanization equipments, mini-hydro electric power, solar energy agricultural and other equipments are required to be created in order to lower the cost of cultivation as also to make use of these assets at the optimum level.

Fourth, the government must rationalize the schemes of providing subsidies, loan waiver and credit at subsidized rates of interest to the farmers in consideration of area based conditions rather than as a national policy.

And finally, only the need-based procurement of foodgrains may be effected for the benefit of the vulnerable and the poorest of the poor segment of people. However, such stocks can be stacked at the market-based prices. Further, while fixating the minimum support price (MSP), the market price movements, among other things, should also be kept in mind so that the farmers at get the competitive price for their produce.

In sum, in view of the prevailing ground-level realities in the Indian countryside, the emerging trends therein, and the imperatives of much-hyped inclusive growth, the importance of realization of accelerated agricultural growth on an enduring basis can scarcely be overemphasized as ultimately it is in this very sector in which, India’s battle of poverty will be won or lost. Hedging mechanism with improved functioning of the futures markets in terms of growing transparency, and efficacy is likely to assume central importance in any future strategy to these effects in India. Accordingly, the focus of our future strategy must essentially be on ‘Farmers-in-Partnership’ rather than on ‘Farmers-as-Beneficiaries’. The creation of an environment