CHAPTER V

Summary, Conclusions & Policy Implications
SUMMARY, CONCLUSIONS AND POLICY
RECOMMENDATIONS

5.1 INTRODUCTION

Cotton (*Gossypium* spp.) is an important fibre crop in India, contributing substantially to both agriculture and industry in terms of farm income, employment and export earnings. The cotton textile industry is the largest industry in India, accounting for five per cent of the total value of production in the organized manufacturing sector and for about 10 per cent of the country’s total export earnings. The cotton crop engages 60 million people in the country in various sectors including cultivation, trade and processing. India is the second largest exporter of cotton yarn, after Pakistan, in the world.

Though, India is a world leader in terms of area under cotton, the average cotton yield per hectare is one of the lowest among the 78 cotton growing nations. It ranks 58th in terms of productivity. Water is critical to enhance use of other inputs like fertilizer to elicit higher yield responses from any cultivable crop. In India only 34 per cent of the cotton cultivation is under assured irrigation and the extent under hybrids is 40 per cent. In consequence productivity is low.

In tune with the existing world trade regime, textile and cotton trade in India too has been restrictive. The contours of the trade process will change once quota free regime comes into operation from 1.1.2005.
There is not much empirical evidence to show that India is equipped to face the challenges in the wake of liberalized trade regime. If the challenge is to be converted into an opportunity, cost reduction, quality consciousness and efficient delivery mechanism will have to become the principles of cotton production, processing and conversion into fabrics and garments.

Karnataka is one of the important cotton producing states in the country. The extent of area under cotton is 5.5 lakh ha and the annual production is about 6 lakh quintals. It is an important input in the state's handloom as also the textile sector in general.

It is in such a context that the overall objectives of the study were set to analyse and examine the state's growth and instability in cotton production and the pattern of its prices in inter-market relationships both domestically and internationally.

5.2 REVIEW OF LITERATURE

Extensive review of literature including books, articles, reports and theses was done to conduct research and interpret the results appropriately to make useful policy recommendations.

5.3 METHODOLOGY

5.3.1: A well designed methodology is critical in any scientific study. It removes individual biases and brings in objectivity to uphold truth which
is fundamental to any science. This study adopted the principles of research in all its rigour.

The study depended on secondary and time series data on different aspects of cotton cultivation and marketing viz., area, productivity, production and wholesale prices in selected markets covering the period from 1970-71 to 1997-98. This was adequate to test the hypotheses defined for the study.

5.3.2: The study employed appropriate statistical techniques and mathematical models to analyse the data to compute growth rates, estimate sources of instability in production, determine structural changes in area allocation between cotton and other competing crop enterprises, examine price behaviour and marketing efficiency and test short run and long run market integrations at domestic and international levels.

In addition to averages, percentages and ratios, other techniques and models used are as follows.

Growth rate analysis: The compound growth rates for area, productivity and production of cotton were measured by adopting the exponential functional form of the growth model.

Sources of instability in cotton production: A method developed by Hazell (1984) was adopted for this purpose. This method uses statistical identities to provide an exact decomposition of the components that cause change in the variance of cotton production.
Structural change in area under production between cotton and competing crop enterprises: To understand the crop dynamics, the Markov chain analysis was carried out by estimating the probability of retention/loss of area by cotton vis-à-vis competing crop enterprises. A suitable 'one step Markov chain model' was developed for the purpose.

Price behaviour analysis: The seasonal indices were computed to examine the short-term price behaviour within the year and also to establish the relationship between arrivals and prices of cotton. Seasonal variation index is the simplest method of obtaining seasonal indices of arrivals and prices.

5.3.3 Market integration

Both short run and long run market integrations were examined for verifying the marketing efficiency of cotton markets in the state.

This was done by first fitting a mixed 'Auto-regressive Integrated Moving Average' (ARIMA) model to the time series data on wholesale prices collected from four selected markets of Karnataka and the New York international cotton market for the period 1970-1998. This is commonly known as Box-Jenkins method after the researchers who used it extensively.

In all the cases, 16 lag variables were identified and corresponding auto-correlation coefficients and standard errors as also the Box-Ljung test statistic value at different levels of probabilities were computed. The ARIMA model in each case was found to be a good fit.
This was followed by the actual process of estimating the correlation coefficients as reflections of short run and long run market integrations.

Market integration connotes the relationship between the prices for a commodity in two markets that are spatially separated.

The four selected markets were tested for spatial market integration between each other in different combinations for DCH and Jayadhar cotton prices. Lead and lag values were computed for 6 months and their significance tested at 5 per cent level of probability. Further the Box-Cox test statistic value was calculated in each case. The model brought out faithful results for an appropriate interpretation.

To assess the long run integration between domestic and international markets, Dickey-Fuller test for stationarity of the price series (1970-1998) was conducted. It was hypothesized that, the test statistic value should be negative and significant if the markets share a long run integration. The test yielded good results for interpretation.

5.4 RESULTS AND DISCUSSION

5.4.1 Production and growth rate scenario of cotton in karnataka

The pace of spread of technological innovations could be sustained by the diffusion of economic benefits in terms of growth in income and distribution and its multiplier effect on employment of factors of production in all sectors of the economy.
5.4.2 Changes in mean area, production and yield of cotton in Karnataka

Cotton yield in Karnataka, which was 6.12 quintals per acre in period I (1970-1985) increased by 88 per cent in period II (1986-1998) taking the average yield to 11.52 quintals per acre. This resulted from increased area under hybrids viz., Varalaxmi and DCH-32 which were released during period-I and also higher use of inputs like irrigation and fertilizer and better cultural practices. However, the cotton output of the state was higher in period I with a production level of 6,23,532 quintals compared to 6,00,105 quintals in period II recording change by -4 per cent. This was due to drastic reduction in area in period II by -49 per cent compared to period I. That, the total output reduced only marginally indicated the improved yield effect in period II.

Almost all the districts studied showed a similar pattern with some variations.

It was concluded that land released by cotton was allocated to competing crop enterprises indicating more efficient use of the scarce land resource.

5.4.3 Per cent contribution to change in output of Karnataka

With respect to per cent contribution of factors to cotton output in Karnataka, the results indicated that area effect (102 per cent) dominated the yield effect (3 per cent) on the total output of cotton in the state when
the study period as a whole (1970-1998) was considered. The results of
district-wise analysis also revealed a similar picture. The total output was
influenced by yield, area and their interaction effects.

Fluctuations in area was influenced by variations in output price
expectation, prices of competing crops, comparative advantage of cotton
and other crops, besides widely oscillating techno-economic factors. It
was summed up that changes in cotton production were largely
determined by high magnitude of change in area allocation.

5.4.4 District-wise compound growth rates in area and production of
cotton in Karnataka

For the state as a whole, declining trend in area under cotton was
discernible in both the periods. The rate of decline in acreage at -1.97 per
cent during second period was more than that recorded during first period
at -1.24 per cent. The results also showed that area shrinkage under
cotton was drastic in period II and the decelerating trend of growth in area
in this period was prominently identifiable. Instability in area allocation to
cotton was the main reason for the negative growth rate over period of
time. The production exhibited a negative growth in second period (-0.80)
on account of negative area effect (-1.97). But in period I production
growth rate was positive (0.79) despite negative growth rate in area
(-1.24).

The state as a whole recorded negative growth rates, both with
respect to area (-3.82) and production (-0.24) over the period 1970-1998.
Thus, it could be inferred that in most of the districts and the state, the rate of decline in area under cotton was more pronounced but change in growth rate of production though negative was not in the same proportion. This was on account of increased adoption of input responsive hybrids and HYVs which also fetched higher prices in the market.

Factors contributing to change in variance of cotton production

Ten components that contributed to the variation in cotton production were identified. For the state of Karnataka it was the residual effect that contributed 104 per cent, followed by area variance by 44 per cent and area-yield covariance by 24.44 per cent to the production variability between the two periods. High residual variability was due to factors such as weather conditions, input-output prices and prices of competing crop enterprises which showed high degree of uncertainty. Yield and area variances were factors that were driven technology and price, respectively.

On the whole, residual factor, area variance and yield variance were the major contributing factors for the instability in production of cotton across the districts of Karnataka and for the state as a whole.

5.4.5 Crop dynamics – direction and allocation of area to cotton production

Northern Dry Zone (NDZ)

Results of Markov analysis for this zone showed that cotton was the most unstable crop in retaining its share of area in the region as seen
from zero transitional retention probability. This was mainly due to high fluctuations in weather condition, relative profitability of competing crops, input-output prices, expectation in future prices and capital constraints for production and yield risks due to pests and diseases. However, in the transitional period cotton was able to gain in area from jowar and sunflower at a transfer probability level of 12 and 11 per cents, respectively.

**North Eastern Dry Zone (NEDZ)**

In this zone cotton did not retain its share in area over period of time and the probability of retention was zero. Though cotton happened to be one of the important cash crops, there were also many other competing crops capable of good returns. This caused high instability in area allocation to cotton influenced by technological and economic factors prevalent during the period. However, the probability that jowar could lose its area to cotton was 9 per cent and in case of sunflower it was 11 per cent. It emerged, therefore, that jowar and sunflower were the least competing crop enterprises vis-à-vis cotton in this region.

**Northern Transitional Zone (NTZ)**

Results of Markov chain analysis revealed that the probability of retention of area allocation to cotton in the zone was 23 per cent over period of time. In all, cotton was able to gain in area at probability transfer of 17.34 per cent from jowar and 14.46 per cent from other crop
types. This demonstrated that cotton could be profitability produced in the region as it enjoyed favourable yield stabilizing factors.

**North Eastern Transitional Zone (NETZ)**

The results of Markov chain analysis showed that the retention probability of the area by cotton in the zone was zero. The probabilities that cotton could gain in area allocation from rice, sunflower and jowar were 6.76, 3.81 and 1.21 per cents, respectively. This indicated that jowar was least likely to lose any area to cotton. In this region, substantive area was allocated to jowar, tur, rice, groundnut and sunflower while cotton occupied only a minor status.

**Central Dry Zone (CDZ)**

The probability of retention of area by cotton in the zone was zero confirming that there was high degree of instability in cotton production. Cotton is not a traditional crop of the zone. It occupied the area along with other competing crop enterprises due to high income realised by farmers with high yields and favorable prices over period of time. However, these were not sufficient influences to counter the high risks of yield and uncertainty in price. The transfer probabilities in favour of cotton from ragi, groundnut and other crops were 20.2, 1.5 and 3.43 per cents, respectively. This was on account of inter-crop comparative advantages of production and marketing in the zone.
Southern Dry Zone (SDZ)

This zone exhibited high degree of crop diversification inclusive of commercial crops, foodgrains and oilseeds. Among the cash crops, groundnut covered the highest area followed by cotton, maize and tur. The analysis showed high degree of instability in sharing the area with other competing crops. The transitional probability of retention of area was found to be zero.

Southern Transitional Zone (STZ)

The transfer probability of shifting acreage allocation to cotton was 75 per cent from jowar, 4.3 per cent from ragi, 2.8 per cent from groundnut and 36.34 per cent from sunflower. It was thus seen that though cotton did not retain its share of acreage in the cropping pattern over period of time, it could gain area from the competing enterprises based on the farmers decisions expecting favourable technological and economic influences.

Karnataka state

The results of Markov chain analysis for the state as a whole showed clearly that, transitional probability of retention of cotton acreage in the long run was zero. Cotton competed most effectively with jowar and sunflower at their cost. The probability of sharing acreage by cotton at the cost of jowar was 24 per cent and 13 per cent at the cost of sunflower.
Thus, it could be concluded that cotton production in Karnataka is most unstable of the various crop production enterprises.

5.4.6 Price behaviour of cotton

Product price behaviour in the market is conditioned by arrivals of commodity in the market.

Price behaviour analysis revealed clear seasonalities of peak and lean periods in respect of both arrivals and prices. However, DCH and Jayadhar cottons exhibited some variation as regards law of demand supply.

In case of DCH cotton, peak arrival period also coincided with peak price indices. Of all the DCH markets, performance of Bailhongal was seen to be the best.

In contrast, Jayadhar prices revealed that peak arrivals coincide with lean price indices and vice versa in tune with the law of demand and supply.

5.4.7 Market integration

5.4.7.1 Integration over short term

Auto regressive moving average (ARIMA) model

This model was fitted to the time series of wholesale prices of hybrids and HYVs of cotton to ascertain whether error term was random or systematic. The randomness of the time series was computed from the
fitted model and then subjected to randomness test, i.e., Box-Ljung test statistic.

The model was fitted to the wholesale price data of Bailhongal DCH, Gadag DCH, Gadag Jayadhar, Bailhongal Jayadhar and Raichur Jayadhar cottons. In all cases, the Box-Cox test statistic values showed that the model was a good fit and can be used to examine the market integration.

**Spatial market integration**

**Spatial market integration between Bailhongal and Gadag markets for DCH cotton**

Though Bailhongal and Gadag markets are 150 kms away from each other, the phenomenon of one leading the other was evident. This was indicated by the Box-Cox coefficient value of 20.99 which was high and significant at 1 per cent level of probability. It was, therefore, concluded that Bailhongal and Gadag markets are highly integrated and that over the period the DCH price movement in one market had a discernible influence on the prices of DCH cotton in the other market. As the pricing efficiency of DCH cotton existed in these two markets, it ruled out the possibility of abnormal profits through trade.

**Spatial market integration between Bailhongal DCH and Gadag Jayadhar cotton prices**

The Box-Cox coefficient of 17.52 indicated that the two markets are efficient and closely related in respect of DCH and Jayadhar cotton prices,
respectively. In the first and second months, slow response was visible in influencing either DCH prices or Jayadhar prices as seen from the market coefficients which are as low as 0.085 and 0.094 in the lead market (Bailhongal) and 0.061 and 0.006 in the lag market (Gadag).

The markets provided no opportunity to the traders to make abnormal profits as both were closely integrated in many of the lag and lead months. The two markets could be considered as inter-dependent and efficient.

**Spatial market integration between Bailhongal and Haveri markets through DCH prices**

The Box-Cox coefficient at 13.64 is low though significant at 80 per cent level of probability. This indicated that the two markets were less inter-dependent and their ability to influence price formation mutually was weak. This was further confirmed by low values of error correlation coefficients. Haveri market could lead over Bailhongal market in the third and fifth months. In rest of the months, relation was found to be weak. Further the spot market error correlation coefficient was as low as 0.078 pointing out that the two markets lacked spontaneous response to each other in price formation.

**Market integration between Bailhongal and Raichur markets through DCH prices**

The value of Box-Cox coefficient was low at 12.99 though significant. It showed that, the two markets tended to be less inter-
dependent. This gained additional credence from the fact that the two markets are separated from each other by 400 kms.

No spontaneity in the prevalence of uniform price was noticed in the spot market of both as seen from the low value coefficient of 0.066. Further the value being non-significant indicated lack of bi-directional influence on each other.

**Market integration through DCH prices in Bailhongal and Jayadhar prices in Raichur market**

The Box-Cox coefficient was of the order of 12.71 which was low indicating weak inter-dependence between the two markets for the above cotton products. This reflected that Bailhongal and Raichur markets tended to act independently for most of the seasonal period. No uniform price ruled in the spot market as its market correlation coefficient was not very high.

**Spatial market integration in Gadag market through DCH cotton and Jayadhar cotton prices**

The value of Box-Cox coefficient was 20.85 and significant depicting high order of inter-dependence of the two cotton products through the prices.

High Jayadhar cotton prices induced the DCH prices to sustain high even in the late season and vice-versa. In the third, fifth and sixth
months the DCH cotton prices showed significance and therefore ability to influence the Jayadhar prices. The influence on each other was found to be bi-directional in the months 3 and 6 and unidirectional in the other months.

**Spatial market integration between Gadag and Haveri markets through DCH prices**

The Box-Cox test statistic was 17.31 indicating that both the markets were spatially integrated as far as price formation was concerned. A fall or rise in the price of DCH in Haveri market was spontaneously communicated to Gadag market and vice-versa as seen from the spot market correlation coefficient of 0.174. In the second, fifth and sixth months of the lag period Haveri market was able to lead the Gadag market in price formation i.e. DCH cotton prices in Haveri market dictated DCH prices in Gadag market.

**Spatial market integration between Gadag and Raichur markets through DCH prices**

The value of Box-Cox test coefficient was low at 14.84 indicating lower degree of inter-dependence between the above two markets. Therefore the markets were considered to exhibit independence from each other as neither of the two could influence DCH price formation in the other market. Most of the market correlation coefficients were low and non-significant confirming weak inter-dependence.
Spatial market integration between DCH prices in Gadag market and Jayadhar prices in Raichur market

The Box-Cox test statistic was high at 18.13 indicating interdependence between the two markets. But low and mostly non-significant values of correlation coefficients for most of the lag and lead months coupled with low value in the spot market lead to the conclusion that the inter-dependence was weak, probably because the markets are spatially separated by 250 kms.

Spatial market integration between Gadag Jayadhar prices and Haveri DCH prices

In this case the price movements for the above two kinds of cotton were found to be bi-directional. The Box-Cox test statistic value was high at 24.05 showing high inter-dependence. The markets tended to be efficient and none of the traders in both the markets had any chance of making arbitrage profits in case of either Jayadhar cotton or DCH cotton.

Spatial market integration between Gadag and Raichur markets through Jayadhar prices

The Box-Cox test statistic was low at 9.242 and non-significant proving that these two markets were independent of each other.

The market correlation coefficients were neither high nor significant in both lead and lag periods except for the fifth month in which case Gadag might lead the Raichur market in Jayadhar price formation.
The farmers in Jayadhar cotton trade were likely to be exploited by traders by quoting low prices in the market. In sum, the two markets were concluded to be inefficient.

**Spatial market integration between Haveri and Raichur markets through DCH prices**

The Box-Cox test statistic was low at 12.09 showing weak interdependence between the two.

The price transmission mechanism between Raichur and Haveri was poor due to weak market intelligence for DCH cotton. Further the spot market correlation coefficient was 0.065 revealing non-spontaneity in the prevalence of uniform price in these markets. Haveri and Raichur were both dominant markets for DCH cotton. There was poor response in Haveri market to the changes that occurred in Raichur market. Wide variations were noticed in DCH prices in these markets that lead to inefficiency in market mechanism.

**Spatial market integration in Haveri DCH prices and Raichur Jayadhar prices**

Reasonably high value of 16.78 of Box-Cox test statistic indicated inter-dependence between the two. Here, price leadership was bi-directional and efficient. There was also spontaneity of response in the spot market. It was thus concluded that there was no possibility of earning arbitrage profits by traders in dealing with the above kinds of
cotton in both the markets. Farmers were likely to benefit by the prevalence of high price due to the rising trend of both DCH and Jayadhar cottons.

**Spatial market integration between DCH and Jayadhar cotton prices in Raichur market**

High value of Box-Cox test statistic at 27.12 indicated that there is high integration between the prices of DCH and Jayadhar cotton in Raichur market. In sum, bi-directional influence over the lead and lag period was visible. The market for these cottons could be considered as efficient.

**Spatial market integration between Gadag Jayadhar prices and Raichur DCH prices**

These two markets were seen to be independent of each other as revealed from non-significant Box-Cox test statistic whose value was as low as 5.447. Any rise or fall in the DCH price in Raichur in the season had no impact on the price of Jayadhar in Gadag. There existed scope for trade exploitation.

**5.4.7.2 Long-run market integration between domestic markets and international market**

**Market wise analysis for co-integration**

The study employed co-integration analysis to examine whether the Indian cotton markets are integrated with the international cotton market
i.e., New York cotton market. The integration of these markets was studied by testing whether the law of one price (LOP) holds good between them.

It was hypothesized that, for the test to be significant, the test statistic value should be negative and significant.

In case of all the markets under study the price series were differenced at one and tested for their order of integration using Dickey-Fuller test. All the domestic markets under study revealed negative and non-significant test statistic values. This showed that the price series were integrated at order one. The New York cotton market was also found to have an order of integration of one in all the cases. It was, therefore, concluded that the domestic cotton markets are well integrated with the international cotton market in the long run.

6. POLICY RECOMMENDATIONS

The suggestions have been made under two broad categories, namely, production and marketing sectors.

6.1 Production of cotton

1. The total cotton output of the State has declined largely on account of loss of area under cotton to other competing crop enterprises. Though there is a consolation that the output reduction is not proportionate to the drastic fall in the area, there is cause for concern in the context of
enhanced market opportunities for cotton and textiles with ‘quota free regime’ coming into operation from 01-01-2005. Both research and extension activities will need to be redesigned to enhance the cotton output of the State. Since, the land resource is inelastic, the route to higher output will have to be through higher per unit yield. This necessitates evolution of new hybrids and high yielding varieties (HYVs) that will address the following issues.

- suit different agro climatic zones of the State;
- possess long and extra long staple length;
- superior quality in terms of fineness, colour, fibre strength, micronaire value, ginning percentage etc.; and
- high resistance to pests and diseases.

By the decade of 1990’s, the genetic purity of hybrids and HYVs declined but no alternatives to Varalaxmi and DCH-32 introduced in the 1970’s have been offered to the cotton cultivators thereafter.

2. Increasing intensity of pests and diseases, rising cost of pesticides and fertilizers as also of labour have contributed to the increase in cost of production. The policy intervention needed in this context are:

- release of pests and disease resistant hybrids and HYVs;
- integrated pest management package centred around biological control mechanism;
the State Agriculture Department should develop a crop plan based on the principle of competitive advantage of different crop enterprises for various agro climatic zones;

while the total area under cotton itself should increase, greater proportion should be brought under assured sources of irrigation;

water itself being a critical and scarce input, its use efficiency should be increased by efficient irrigation management practices;

and

since, Karnataka is predominantly a dry area and with various crop enterprises competing for the limited irrigation command areas, extension of cotton cultivation under rainfed condition is inevitable. This calls for:

- release of appropriate varieties to suit dry land regions; and
- adoption of watershed management principles to sustain cotton, which is a high water demanding crop.

introduce cotton crop insurance and support policies to provide confidence to the cultivators against fluctuations in yield and prices.

4. The Department of Agriculture should educate and encourage the farmers:

to produce only selected hybrids and varieties of cotton based on market demand. The department should emphasize on availability of certified cotton seeds for this purpose; and
➢ to improve methods of cotton picking and collection in order to reduce contamination of cotton. Market yard and storage facilities will also have to improve to support this need.

5. There will be scope for natural colour cotton in the international market. Production of various coloured cottons should be stabilized through appropriate research to capture the export demand. Many people particularly in the western world are increasingly demanding organically and naturally grown raw materials in preference to artificial and synthetic based ones. Therefore, naturally coloured cotton will be preferred to synthetic colours.

6. Stability of area under cotton cultivation is necessary if the farmer is expected to make long term capital investments and also use the recommended package of practices, which too has financial implications. Instability arising from any source is not conducive to exploitation of the genetic vigour of a given crop including that of cotton.

6.2 Marketing

1. In the liberalised environment the law of demand and supply will determine resource allocation decisions among the competing enterprises within and across the sectors. In such a situation, the government needs to guide the farmers to plan their cropping pattern based on demand and supply positions both at domestic and international levels. This assumes greater importance in case of
agricultural sector, wherein the production is inelastic. It is therefore, suggested that, government should assess the demand and supply status at state, national and international levels for the succeeding year as also over a period of 10 to 20 years. There should be a mechanism to transmit annual forecast of supply and demand position to the farmers at least one season in advance. This will facilitate more rational decisions by the farmers with respect to area allocation.

Constitution of a ‘State Cotton Advisory Board’ is suggested under the State Textile department with representatives drawn from the departments of Agriculture and Agricultural Marketing, Agricultural Universities, Cotton Growers’ Associations, Ginning and Pressing Units, Textile Mills and Cotton Trade.

2. In addition to estimating the demand and supply position of the cotton, estimates of price behavior for cotton also need to be made over both short term and long term and the same transmitted to the cotton growers. The study has shown that area under cotton is price-determined to a larger extent.

3. The study of selected markets in Karnataka has shown that efficiency of marketing in the State has not as yet reached an optimal level. While the markets are independently efficient as seen from the price behavior, they are not spatially well integrated with one another in all the cases. The coefficient of integration between the two spatially
separated markets is high when the distance is not very high. The study has shown that when the markets are separated by longer distance, for instance, in the case of Raichur and Haveri markets, the coefficient of co-relation of integration between the two is weak. The reasons for this are poor market intelligence, absence of facility to transmit the information between the two markets instantaneously and poor physical infrastructure. The policy intervention calls for:

- strengthening market intelligence wing in all the markets;
- establishing of online marketing system through computerization and net working;
- generating greater awareness among the producers, so that they make rational decision on sale of their produce;
- setting up Rural Information Kiosks and development of software packages in Kannada;
- most markets under study have shown absence of slow/feeble spontaneity to changes in market prices in one another. This suggests for greater marketing efficiency and market integration among one another across the State;
- improving the market yard infrastructure in terms of transport, storage, trading facilities etc. Simultaneously upgrade road, transport and communication infrastructure that will enhance inter-market accessibility; and
➤ liberalising policies relating to barriers of phytosanitary measures to encourage growth in export and marketing across state and district borders.

4. The demand for cotton will be determined by the domestic industry consisting of ginning, pressing, spinning and fabric units. Most of the spinning mills in the State today are either sick or closed. The spinning mills mostly under cooperative sector are not able to produce yarn at rates that can compete in the open market. Many of the spinning mills are closed adversely influencing the cotton cultivation. The chain of cotton industry beginning from production through ginning and spinning to fabric making has many links, each of which is critical in the comprehensive need for maintaining cost effectiveness. This therefore, calls for a policy intervention consisting of:

➤ upgradation and modernisation of existing ginning and pressing units. Encourage private investments in new units where there is need. Phase out obsolete spindlage and replace with modern spindlage through technology upgradation;

➤ restructuring and modernisation of the mill sector. Revive the technologically efficient and financially weak mills. South India Textile Research Association (SITRA) has suggested through a recent study that atleast 15 mills in the state can be revived. It is also suggested that non-viable ones be closed down; and

➤ expansion of the capacities of the industry and setting up composite units for cost effectiveness by taking advantage of the scales of economy.
5. Encourage contract farming of cotton based on agreement between farmers and cotton and textile industry as an intervention mechanism between production and marketing systems.

6. Formulate export and import policies for cotton and textiles in consonance with quota free trade regime that will operate as per the Agreement on Textiles and Clothing. Though the free trade regime will open up opportunities to the state cotton growers and textile industry to export their produce to markets outside India, it also contains threats of domestic market capture by foreign countries. Exports of cotton and cotton based garments, will warrant adoption of facilitative ‘Textile Policy’ by the State Government.

The state government should take advantage of the funds available under the ‘Technology Mission on Cotton’ (TMC) setup by Government of India in 1999. The mission has four mini missions with specific focus on improving the quality of cotton so that the Indian textile industry can compete globally. The respective focus of the mini missions is as follows.

**Mini mission I and II:** Research and Development and increasing the yield, reducing of cost of cultivation etc.

**Mini mission III and IV:** Improvement of infrastructure of the market yards and modernization of ginning and pressing factories.