CHAPTER – V

Summary and Conclusions
5.1 Introduction

The concluding chapter gives a summary of the findings of the present study and the policy implications emerging from it. Agriculture forms the backbone of the Indian economy and despite concerted industrialization in the last five decades; agriculture continues to dominate the national economy. At the time of independence, 75 per cent of the population was dependent on agriculture. Now it is about 67 per cent, which is still substantial. Hence, a robust growth in agriculture is essential to tackle agricultural problems in the country.

Agriculture in India is predominantly rain fed. Agricultural production fluctuates with the vagaries of rainfall in addition to the socio-economic factors. Some of the reasons for the low agricultural productivity in our country are (i) lack of sufficient irrigation facilities in major parts of the cultivated land; and (ii) lack of timely availability of quality seeds, fertilizers for the major crops in many parts of the country. Productivity of Indian agriculture is low as compared to the productivity at the global level. Estimates of yield of rice as of April 2011 in India was 3.2 tonnes per hectare as against 7.5 tonnes per hectare in the United States, 6.7 tonnes per hectare in China and an average of 4.3 tonnes per hectare for the World. Also many studies revealed that there is wide variation in productivity of major crops across the States/Regions in India.

During the Eleventh Plan period, food grains production in the country recorded an increasing trend, except in 2009-10 when total food grains production declined to 218.1 million tonnes due to severe drought experienced in various parts of the country. During 2011-12, total food grains production reached an all-time high of 259.32 million tonnes. The overall area coverage at 665.0 lakh ha under food grains during kharif 2012-13 shows a decline of 55.8 lakh ha compared to 720.86 lakh ha during kharif 2011-12. As a result the output also declined in all major crops.

International trade widens the market and increases the inducement to invest income and saving through more efficient allocation. Thus international trade helps to augment the economic development of the nation. India has comparative advantage in agriculture, so that there is considerable scope for raising farm income and
employment by stepping up agro based exports. Economic integration and trade liberalization will have great impact on the national economy in general and agricultural sector in particular. With the implementation of the Agreement on Agriculture (AoA) by the members of WTO, the international trade opportunities are expected to change as trade barriers are reduced and free trade took place. These changes will also ensure that competitiveness of countries will play a major role in the international trade. Therefore, there is a need to find out the extent to which we are export competitive once the agreement is implemented and whether India can protect its major agricultural commodity sectors.

A large proportion of the cultivated area in Andhra Pradesh state is devoted to the production of its principal crops namely paddy, maize, groundnut and cotton. These crops account for 40 per cent of the cultivated area in the state.

With agriculture now having been brought under the realm of GATT and the WTO, freedom of government to support agriculture sector beyond a point is limited. Production pattern will be dictated by considerations of comparative advantage of crops and these needs to be studied. It is in this context the present study has been undertaken.

5.2. Objectives of the Study

The specific objectives of the present study are:

1. to examine the trends in area, production and yield of selected crops,
2. to study the direction of trade and structural change in exports of selected crops,
3. to examine the relationship between domestic and international market prices of selected crops of Andhra Pradesh,
4. to analyze the global competitiveness of selected crops of Andhra Pradesh,
5. to quantify the welfare gains and losses due to liberalization of agricultural trade, and
6. to examine the implications of WTO provisions for Agriculture in the state of Andhra Pradesh.
5.3. Data and Methodology

The study is based on secondary data covering a period of 14 years from 1996-97 to 2009-10 for the calculation of transitional probability matrix. Compound growth rates of area, yield and production of selected crops were calculated for Andhra Pradesh as well as for India for two sub periods, namely, pre-WTO period (1976-77 to 1994-95) and post-WTO period (1995-96 to 2012-2013) as well as for the overall period (1976-77 to 2012-13). To assess the integration of markets in the state with international markets, the wholesale prices were collected for the period from 1986-87 to 2009-10 have been used.

The secondary data relating to area, yield and production of selected crops (rice, maize, groundnut and cotton) were collected from publications of Center for Monitoring Indian Economy (CMIE) pvt Ltd, Mumbai. Data on destination wise exports in terms of quantity and value were obtained from “Monthly statistics of foreign trade of India”, published by Directorate General Commercial Intelligence and Statistics, Kolkata. International reference prices of the crops under study were collected from various issues of FAO production year book. The maritime freight rates of were obtained from FAO trade year book (2010). Information on domestic prices of selected crops and other agricultural statistics were compiled from various issues of Season and Crop report and Statistical abstract of A.P. published by Directorate of Economics and Statistics, Hyderabad. Data on cost of cultivation of selected crops were obtained from Cost of Cultivation scheme, Hyderabad.

In order to assess integration of markets in the state with international markets, monthly wholesale prices were collected for the period from 1986-87 to 2009-10. The markets selected for the study are as follows. For rice, Nizamabad is selected as the local market and Thailand for the international market. For groundnut, Nandyal is selected as local market and Rotterdam as international market. For cotton, Guntur and Liverpool are selected as local and international markets respectively. For maize the markets selected were Warangal for local market and US gulf as international market.
Destination wise exports were collected to study the structural change in exports. The major importing countries considered for analysis of trade in rice were Kuwait, Saudi Arabia, U.K, USA, Yemen and UAE. For cotton, the importing countries selected were China, Bangladesh, Belgium, Italy and Japan. The major importers considered for groundnut were Indonesia, Malaysia, Philippines and U.K.

The growth in area, production, productivity were analyzed by using the exponential growth function. In order to study the variability in the area, production, productivity an index of instability was used as a measure of variability. The structural change in exports was examined using the Markov chain model. To examine the price relation between domestic and international markets for selected crops, the co-integration test was employed. In order to assess the competitiveness of the crops, various measures of trade competitiveness have been computed based on Policy Analysis Matrix (PAM) approach. The welfare gains or losses both to the producers and consumers were estimated using the partial equilibrium method.

5.4. Summary of Results and Conclusions

5.4.1. Trends in area, production and yield of selected crops

The growth in area, production and yield of selected crops are summarized below:

Rice

In Andhra Pradesh the area under rice crop had increased from 35.65 lakh hectares (1976-77) to 36.28 lakh hectares (2012-13). For the same period, the production increased from 49.30 lakh tonnes to 115.10 lakh tonnes at a compound growth rate of 2 per cent with a higher instability of 25.11 per cent. Whereas the yield of rice has increased at the rate of 1.9 per cent with instability of 20.02 per cent per annum during the above said period.

The area of rice in India has increased from 38.51 million hectares to 42.75 million hectares with a compound growth rate of 0.3 per cent. Production had increased from 76.98 million tonnes to 105.24 million tonnes at a rate of 2.2 per cent
and productivity increased from 1088 kilograms to 2462 kilograms per hectare at the rate of 1.9 per cent per annum.

Thus, a slightly increasing trend in the growth in area in Andhra Pradesh and India is observed during the overall study period. A decreasing growth in production and productivity has been noticed in the post-WTO period as compared to the pre-WTO period for both India and Andhra Pradesh.

Maize

The area of maize in Andhra Pradesh increased by two and half times from 2.95 lakh hectares in 1976-77 to 9.72 lakh hectares in 2012-13. The area had grown at the rate of 3.3 per cent during the reference period. Production of maize recorded an impressive growth of 7.1 per cent per annum during the reference period. Production increased from 3.02 lakh tones in 1976-77 to 48.55 lakh tones in 2012-13. Yield increase was also quite substantial from 1023 kilograms per hectare in 1976-77 to 4995 kilograms per hectare in 2012-13. Growth in area and production was quite high in the post-WTO period (6.1 and 9.3 respectively). Increase in yield was high in pre-WTO period, which had grown at 3.6 per cent. But, in the post-WTO period the growth in yield was 3.2 per cent only.

For India, growth of area under maize crop was quiet high in post-WTO period. Production increased from 6.36 million tonnes in 1976-77 to 22.26 million tonnes in 2012-13 at a compound growth rate of 3.6 per cent. Yield increased at 2.4 per cent per annum. Instability was quite high in production and yield which was 43.37 per cent and 27.61 per cent respectively.

Thus, in Andhra Pradesh, Maize has registered an impressive growth in area, production and productivity, but growth in productivity showed slightly decreasing trend in the post-WTO period. The overall growth scenario of maize production in India revealed a positive trend. Its increase in production was almost doubled in the post-WTO period than in the pre-WTO period. This could be attributed to the gradual increase in area under cultivation and accelerated productivity during the period.
Groundnut

The area of groundnut in Andhra Pradesh augmented from 10.51 lakh hectares in 1976-77 to 13.45 lakh hectares in 2012-13 with a marginal growth of 0.3 per cent per annum during the entire period. But the performance of production was not encouraging. It was 5.83 lakh tones in 1976-77 and increased only to 11.15 lakh tonnes in 2012-13 at a growth rate of 0.2 per cent with 37.12 per cent of instability in its production. Productivity increased from 555 kilograms per hectare in 1976-77 to 829 kilograms per hectare in 2012-13. The performance of the crop in terms of growth in area, production and productivity in the post-WTO period was dismal with negative trends. But in pre-WTO period, area and production grew at a high rate of 4.7 per cent and 5.8 per cent respectively, whereas yield grew only at 1.0 per cent.

In India, the area under groundnut crop showed stagnant growth. Trends in production also showed the similar nature. It was 52.64 million tonnes in 1976-77 and decreased to 47.21 million tonnes in 2012-13. There was almost stagnation with regard to yield during the period. It was 747 kilograms per hectare in 1976-77 and increased to 995 kilograms per hectare in 2012-12. Between the two periods, the performance of groundnut was encouraging in pre-WTO period with positive growth rates, but after implementation of WTO growth in area and production declined at compound growth rates of 2.1 percent and 0.8 percent respectively.

The overall performance of groundnut crop in the country as well as in the state was not satisfactory. A relatively better performance was observed in the pre-WTO period. But the production started declining after WTO era due to decrease in area under cultivation, which could be attributed import of edible oils and relatively stagnant real prices of groundnut.

Cotton

The growth rates of production and area of cotton were quite impressive with 7 per cent and 4.4 per cent respectively. Growth rate of yield was also satisfactory with 2.6 per cent. The performance of area and production was almost similar in both the periods. Growth in yield was also satisfactory in post-WTO period than in pre-WTO period.
In India the area under cotton seems to have reached a plateau except for a few fluctuations in some years (0.95%). Production and yield grew at the rate of 4.1 per cent and 3.1 per cent respectively. At all India level, performance of cotton crop with respect to production and yield was better in post-WTO period than in pre-WTO period. They grew at a rate of 7.4 per cent and 5.8 per cent respectively.

Cotton is a principal commercial crop and it contributes significantly to the national economy. India has the largest area under cotton in the world but occupies third position in production. The overall growth of production of cotton in India exhibited a positive trend, particularly in the post-WTO period.

5.4.2. Direction of trade and Structural change in exports

The analysis on the direction of trade was studied only for the period 1996-97 to 2009-10 as the exports of the commodities to different countries were almost nil or meager except for rice. Further due to non-availability of continuous exports data on maize, the study has been restricted to only three crops, viz., rice, groundnut and cotton.

From the analysis it is observed that

(i) Saudi Arabia is the major growing market for Indian basmati rice. The UAE and Yamen are not stable markets for Indian basmati rice export as revealed by very poor retention rates. It should be noted that India is loosing Kuwait, USA and UAE markets. Hence, proper steps need to be taken to strengthen our exports to these countries.

(ii) The Indian exports of groundnut to Indonesia, Malaysia, UK and ‘others’ were stable maintaining a major share of exports to these countries. Indonesia has emerged as the major market for Indian groundnut exports with retention of 92 per cent, followed by U K (70 per cent), Malaysia (64 percent) and other (59 percent). Philippines is found to be a poor market for India’s groundnut exports.

(iii) There is a growing concern that India is losing its markets share for cotton from most of the importing countries. Only Italy and Bangladesh are found to be moderately stable markets for Indian cotton exports.
5.4.3. Relationship between domestic and international market prices of selected crops

The results of the cointegration tests showed integration between domestic and world prices of selected four crops (Rice, Maize, Groundnut, cotton) of Andhra Pradesh in both pre and post-WTO periods. From the results of the Augmented Dickey Fuller (ADF) test, it is concluded that there is a long run equilibrium relationship between domestic and world market prices.

5.4.4. Trade competitiveness of selected crops

Rice

The results revealed that the Domestic Resource Cost (DRC) is less than one for the study period implying that the value of domestic resources used up in producing a unit of rice is less than what it would cost to import. When average DRC is considered between the two periods, DRC was more in pre-WTO period than in post-WTO period. It was 0.76 in pre-WTO period and 0.53 in post-WTO period. This shows that Andhra Pradesh has higher comparative advantage in rice production in the post-WTO period.

Effective Protection Coefficients (EPC) also indicated that Andhra Pradesh is an efficient producer of rice. EPC was 0.84 in pre-WTO period and decreased to 0.67 in post-WTO period which is an indication that rice production was not protected by the government. The results of NPC are contrary to that of EPC. NPC is more than one over the study period. It has increased from 1.32 in pre-WTO period to 1.50 in post-WTO period. The NPC values for rice indicate that the state has poor competitiveness in the export of rice.

Maize

The production of maize in the state was non-competitive in both the periods. The DRC of 1.37 in pre-WTO period connotes that the value of domestic resources used up in producing a unit output of this crop was more than what it would cost to import from other countries. Even after WTO, this ratio has increased slightly to 1.39 implying that competitiveness has still decreased over the years. SRP was less than
one in both the periods implying that maize production was fairly protected by the government.

The estimated values of NPC and EPC are all greater than one in the study period. This indicates that the state does not have any advantage in the export of maize crop. In other words, maize does not represent an efficient export crop for Andhra Pradesh.

**Groundnut**

For groundnut, the results revealed that DRC is less than one in both periods. This demonstrates that the value of domestic resources used in producing groundnut is less than what it would cost to import. The average value of DRC in post-WTO period (0.44) is less than the average value in pre-WTO period (0.83). This indicates further competitiveness in groundnut production.

EPC was more than one in pre-WTO period. This indicates that the state is not an efficient producer of groundnut. In pre-WTO period positive SRP showed that groundnut production was protected by state which started declining in post-WTO period as revealed by negative SRP. NPC values are greater than one in pre-WTO period and they are all less than one in post-WTO period. This implies that the groundnut is an efficient export crop for Andhra Pradesh after WTO.

**Cotton**

The results pertaining to cotton revealed that for both the periods cotton crop had clear cut competitive advantage. Average values of NPC and EPC were remained below one for both the periods. The levels of both NPC and EPC showed that the state has not protected the cotton crop. This is also evident from the levels of SRP coefficients.

**5.4.5. Impact of economic liberalization on trade and welfare gains and losses**

From the results it is concluded that the net social losses in production and consumption critically depend on the extent of protection and on the elasticities. The loss to society due to liberalization in terms of consumption of rice was Rs. 3259.8 lakhs. For maize it was Rs. 783.2 lakhs. The loss to society due to inefficiency in
production resulting from a rise in the price was Rs. 16572.6 lakhs from rice, Rs. 7396.5 lakhs from maize, Rs. 69272.5 lakhs from groundnut and Rs. 452913.62 from cotton.

For, Andhra Pradesh, the liberalization of agriculture would result in change in production due to the change in prices. International prices adjusted for transport cost are higher to the extent of 47 per cent for rice, 69 per cent for maize, 182 per cent for groundnut and 271 per cent for cotton compared to the domestic prices during the study period. Higher international prices would have a negative impact on consumption levels, which would result in a decrease in the consumption of rice by 0.68 lakh tones and maize by 0.44 lakh tonnes.

The results also revealed that the welfare gains to producers would be very high in the case of cotton at 343.40 per cent (Rs. 2389804.2 lakhs) of total value of production. The producers gain from maize was at 74.52 per cent (Rs. 98562.6 lakhs). It would be 46.34 per cent (Rs. 796124.5 lakhs) in case of rice and 174.85 per cent (Rs. 585672.8 lakhs) in case of groundnut. Analogously, consumers in the state incur substantial welfare loss due to rise in prices in rice to the extent of 37.58 percent (Rs. 776292.1 lakhs) and 38.18 percent in case of maize (Rs. 90383.9 lakhs). Thus, the net effect to the economy of the state due to liberalization was substantial amounting to Rs. 19832.4 lakhs for rice and Rs. 8178.7 lakhs for maize during the study period.

5.5. Recommendations

Based on the results of the study the following recommendations are made:

There is a vast scope for augmenting exports of superfine quality rice (non-basmati), particularly to the countries where Indian ethnic groups are in large numbers. However, the Indian exports are bagged down by quality problems and inadequate efforts to clear doubts about the quality of Indian superfine rice. Further, efforts may be directed to increase the production of superfine especially for exports. However, the area under rice in Andhra Pradesh is being gradually replaced by less water intensive crops such as chickpea, maize and sunflower as reflected in the acreage under these crops, probably due to shrinking water resources. In order to gain from the growth and to sustain the same, more public investment is needed for
developing the markets, storage and processing facilities. There is also a need to link the farmers with the national and international markets.

The area under groundnut in the state is declining due to stagnant real prices of groundnut and imports of cheap edible oils. Results of the study suggest that groundnut production in the state suffers due to negative incentives evidenced by an adverse SRP. Hence, to increase production and exports, there is need to extend production and income enhancing support from the state. Irrigation is a policy variable, and there is a large scope to increase groundnut production and yield in the state and the entire country by improving irrigational facilities to groundnut crop.

In view of dismantling of quantitative restrictions on textile exports, India stands to gain substantially. In order to be competitive in the world market, it is imperative to ensure domestically the high quality long staple cotton, which is currently being sourced from other countries. Hence, efforts need to be directed towards the production of high quality long staple cotton, which will also overcome the present quality problems in the form of short staple and other quality problem, which are coming in the way of enhancing Indian cotton exports. Efforts should also be made to reduce the cost of production of cotton to sustain the competitive edge of Indian cotton on a long-term basis.

5.6. Suggestions

1. Andhra Pradesh has export competitiveness in rice, groundnut and cotton. Hence all efforts should be made to increase the production and productivity of these crops. State should encourage enhancing the exports of these commodities. Government should encourage farmers to extend area under these crops through supportive measures like announcement of a remunerative Minimum Support price (MSP).

2. There is stagnation in the productivity of crops due to lack of update technology and lack of new improved varieties. So, necessary steps should be made to improve the same.
3. Suitable marketing information systems should be created. There can be two ways of organizing the marketing: firstly through commodity marketing boards, secondly by providing a common marketing centre. Already there are commodity marketing boards for certain commodities. Under this scheme almost all important crops must be covered. Proper financing, planning management of these boards must be strengthened. Secondly for marketing vegetables and other miscellaneous commodities common market centre’s are to be established with all basic infrastructural facilities. These centers must be organized at mandal level and if possible in one or two places in mandal area.