Chapter – 7

SUMMARY, CONCLUSION AND FINDINGS
Indian agriculture recorded a significant acceleration in growth and productivity after independence as compared with the pre-independence period. The main factors which were instrumental in accelerating agricultural growth after independence included implementation of land reforms and large planned investments in irrigation and other rural infrastructure. The introduction of the Borlaug seed-fertiliser technology during the mid-sixties which resulted in notable increases in yield and output levels of major cereals in many parts of the country was a major technological breakthrough and marked a new chapter in the history of agricultural development in India. But the gains of new technology were not equitably distributed across various regions.

A review of agricultural development in India during the post-green revolution period beginning in the mid-sixties brings out, firstly, that the introduction of new seed-fertiliser technology during the mid-sixties resulted in significant increases in the yield and output of wheat and later rice thereby promoting growth of agricultural output and raising agricultural worker productivity in most of the states and regions that had adopted the new technology. But during the initial period of the 1960’s and 1970’s, the spread of new technology was rather slow and was confined to wheat and rice in the irrigated states in the north-western region of India.
The proliferation of new technology gathered momentum during 1980-83 to 1990-93 when it spread to more areas in the eastern, southern and central states and encompassed more crops. Yet another important improvement during 1980-83 to 1990-93 was significant changes in the cropping pattern with a visible increase in crop diversification away from low value and low yield coarse cereals towards more valuable oilseeds crops in the rainfed states of central India, and towards rice and wheat in the north western and eastern states. Crop diversification towards oilseeds and rice and wheat helped in raising the productivity levels of many low yield districts in the country thereby promoting growth and making it more widespread. The result was that during 1980-83 to 1990-93, crop output recorded an unprecedented annual growth rate of 3.40 per cent compared with a growth rate of 2.24 per cent during 1962-65 to 1980-83. There was a decelerating in growth rate of output and yield during the post-reform period 1990-93 to 2003-06, but despite this many low yield districts were able to climb up to higher levels of productivity.

The initiation of economic reforms in India in 1991 which consisted of trade liberalisation and exchange rate adjustments was expected to end discrimination against agriculture and thereby promote agricultural growth and foster exports.
Anantapur is the southern-most district of the Rayalseema region of Andhra Pradesh. While agriculture remains the most important economic activity of the district, it is characterised by high levels of instability and uncertainty. Being located in the rain-shadow region of Andhra Pradesh, the district is drought-prone. By now, it is well established that while a generalised rural crisis is prevalent across the country, a disproportionate burden has fallen on its drier tracts. In 2006, Anantapur was one of the thirty-one districts identified by the Government of India as being prone to agriculture-related suicides. A few committees have been set up by the Government of Andhra Pradesh to study the agricultural crisis as well as the problem of farmers' suicides in the state. While these committees have looked at a whole gamut of issues underlying the agricultural crisis of Andhra Pradesh, our study of Anantapur district focuses specifically on the technological dimension of the crisis. Our study addresses such factors that have a bearing on agricultural production and productivity, namely, the physical environment; the extent and nature of agricultural inputs used; the nature of crop protection practices followed; the overall management practices adopted in cultivation including irrigation practices and aspects of technology delivery.

The rapid increase in bore-well irrigation resulted in depletion of ground water levels as well as drying up of open wells in the district. As mentioned earlier, only twelve out of sixty-three mandals in Anantapur
district are in the ‘safe’ category with regard to groundwater utilisation. This calls for stringent regulation on (a) indiscriminate drilling of bore wells and (b) cultivation of water-intensive crops such as citrus and paddy and instead promotes less water-intensive crops such as ragi.

Findings

The major findings of the study are as follows.

1. The importance of a particular sector can be measured by its contribution to total GDP of the nation. The contribution of the agriculture and allied sectors to total GDP appears gradually decreasing. The contribution of the agriculture and allied sectors to total GDP at current prices in 2000-2001 is 23.35 percent and it gradually reduced and stood at 17.1 percent by the year 2009-10.

2. The share of agriculture and allied sector in total GCF is also not constant and showing downward trends over ten years period of study. During 2000-2001 and 2001-2002 the share of agriculture and allied sector in total GCF slightly increased. Thereafter the percentage of agriculture GCF to GCF gradually declined with some variations.

3. The percentage of agricultural imports to total national imports is less than the percentage of agricultural exports to total national imports. It denotes that in good number of agricultural products India is self-sufficient and is also having surpluses to export. But the percentage
of agricultural exports to total national imports is showing declining trend. On the other hand the percentage of agricultural imports to total national imports is sharply declining, which is welcome development to note.

4. The study reveals that at national level that the area under food grains in Kharif is gradually decreased from 75.22 million hectares in 2000-01 to 69.49 by 2009-10, except in 2003-04. But in case of Rabi there is gradual increase in the area of food grains except 2004-05. With regard to production, in Kharif season has more production is registered during 2000-01 to 2008-09. But in 2009-10 the Rabi season registered more production than the Kharif season. The total production of food grains is 196.81 million tonnes in 2000-01 and it increased to 212.85 million tonnes in 2001-02. But it sharply declined to 174.77 million tonnes in 2002-03. The yield of food grains is higher in Rabi season than Kharif season during 10 years of study.

5. The area under pulses at national level in 2000-01 is 20.35 million hectares and it increased to 22.01 million hectares in 2001-02. But it declined to 20.50 million hectares in 2002-03. It sharply increased to 23.46 million hectares and again it declined to 22.76 million hectares and in 2004-05, it further declined to 22.39 million hectares in 2005-06. In 2006-07 and 2007-08 it increased to 23.19 and 23.63 million hectares respectively. In 2008-09 it once again declined to 22.09
million hectares. During the last year of study the area under pulses stood at 23.35 million hectares. The yield per hectare is 544 Kgs per hectare in 2000-01 and it increased highest productivity of 659 Kgs per hectare in 2008-09.

6. With regard to major oil seed production at national level the study reveals that the area under oilseeds in the country is highest (27.86 million hectares) in 2005-06. But highest production of 29.76 million tonnes was registered in 2007-08. On the other hand highest yield rate of 1115 kilograms per hectare is registered in 2007-08. The lowest area, production and yield were registered in the year 2002-03.

7. In Andhra Pradesh the area under food grains is estimated at 66.67 lakh hectares during 2009-10 as against 74.68 lakh hectares in 2008-2009. This decrease of 10.4 per cent was attributed to decrease in area under Cereals and Millets during 2009-2010.

8. With regard to pulses the study makes it clear that out of 14.32 lakh tonnes of production of pulses in the State during 2009-2010, Redgram, Bengalgram, Greengram and Blackgram accounted for 2.03, 8.47, 0.63 and 2.69 lakh tonnes respectively and they have contributed 96.5 per cent of the total pulses production. The production of pulses was 14.32 lakh tonnes during 2009-2010 as against 14.48 lakh tonnes in 2008-2009, showing a decrease of 1.1
per cent. The decrease in production is due to decrease in the average yield per hectare.

9. The area under oil seeds during 2009-2010 was 21.19 lakh hectares which constituted 16.9 per cent of the total cropped area in the state. The area under Groundnut alone accounted for 61.4 per cent of the total area under oil seeds during 2009-2010. Out of 24.18 lakh tonnes of production of oil seeds, Groundnut, Sunflower and Castor accounted for production of 55.4 per cent of the total oil seed production in the state.

10. In case of Anantapur district the area and production of rice during Kharif season is higher than Rabi season. The area in Kharif season ranges from 48,000 hectares to 16,000 hectares is to Kharif season and it is 9000 to 28000 hectares in Rabi season. The production of paddy during Kharif season is more than 1 lakh tonnes in 2001-02 and 2009-10. In 2003-04 only 38,000 tonnes of paddy was produced in the district. In the Rabi season the highest production of 98,000 tonnes was recorded in 2001-02. The yield per hectare is higher in Kharif season during 7 out of 10 years of study.

11. The study shows that the area under Jowar cultivation is higher in Rabi season except in 2009-10. In Kharif season Jowar is generally cultivated as inter crop. But in Rabi season it is cultivated separately. Jowar is mostly cultivated in the black soils regions of the district. In Kharif season Jowar is cultivated in 41,000 hectares which is the
highest area cropped by Jowar in the district. The lowest area 3000 hectares under Jowar during Kharif season in the district is registered in 2002-03. In Rabi season 25,000 hectares was registered in 2006-07, which is highest during 10 years of study. The highest production in Kharif seasons is registered in 2009-10. In Rabi season highest production of 15,000 tonnes was registered in 2001-02 and 2006-07. In both seasons lowest production is registered in 2008-09. The yield per hectare is high in Kharif season in 8 out 10 years of study.

12. Bajra is cultivated in Anantapur district only during Kharif season. The area under Bajra in the district ranges from 1000 hectares to 2000 hectares. 3 out of 10 years of study the area under Bajra cultivation is 2000 hectares in the remaining 7 years the area is only 1000 hectares. The production in 2006-07 is less than 1000 tonnes. During first five years of study and in 2008-09 the production is nearly 1000 tonnes. In 2007-08 and 2009-10 the production is nearly 3000 tonnes and in 2005-06 the production is 2000 tonnes. There are wider fluctuations in the yielding of Bajra in the district.

13. Ragi is the major food crop in the district after Rice. It is important to note that the area as well as production of Ragi in both seasons is gradually declining except in 2009-10. The area under Ragi crop is 5000 hectares in 2000-01, 2001-02 and 2003-04. The area under Ragi reduced to 1000 hectare by 2008-09. In Rabi season the area
under Ragi is 1000 hectares during first three years of study. There it is less than 1000 hectares upto 2008-09. But 2009-10 it sharply increased to 3000 hectares. The yield per hectare is higher in Rabi season during first 5 years of study. But from 2005-06 to 2008-09 the yield is higher in Rabi season.

14. Wheat is a cultivated only during Rabi season in the district. The area as well as production is negligible in the district.

15. It is clear from the study that in Anantapur district the area under maize is gradually increasing with some variations. During first five years the area under maize is higher in Rabi season than Kharif season. From sixth year (2005-06) onwards the area in Kharif season is outnumbering the Rabi season. During 7 out of 10 years of study the production in Rabi season is higher than Kharif season. In 2007-08 Rabi season the production reached 48,000 tonnes, which is highest in both seasons during 10 years of study.

16. Bengal gram is the important pulse cultivated in Anantapur district. In terms of area as well production it occupies first place among pulses. It is a Rabi crop shown in black soils of the district. During first four years of study the area is not evenly distributed. From 2004-05 the area gradually increased and reached to 93,000 hectares. Wider fluctuations are noticeable in case of production of Bengal gram. It ranges 10000 tonnes to 1,07,000 tonnes. The last year of
study registered highest area, production and yield. The yield of Bengal gram per hectare is 5 times less than highest yield rate.

17. The area under cow gram in the district is 1000 hectares to 2000 hectares. On the other hand the production never reached 1000 tonnes during 10 years of study. The yield per hectare is 40000 tonnes in 2002-03, which is lowest during 10 years of study.

18. The area under black gram in Anantapur district is less than 1000 hectares except 2000-01 Rabi season under Black Gram in the district in both seasons. The production is also less than 1000 tonnes in two seasons during 10 years of study. The yield per hectare is highest in Rabi season except in 2004-05. In Kharif season the highest yield rate of 482 kgs per hectare was registered in 2004-05 and Rabi season highest yield rate of 782 kgs was registered in 2006-07. The growth rate in total production is zero during 10 years of study.

19. In Anantapur district that the area under Horse Gram is highest in 2009-10 in both seasons. In Kharif season the area under Horse Gram is less than 1000 hectares in 2007-08 and 2008-09. In Rabi season the area under Horse Gram is less than 1000 hectares in 5 out of 10 years study. The production in Kharif and Rabi season in 2009-10 is 4000 tonnes, which is highest in both the seasons. The production is less than 1000 tonnes during 2004-05 to 2008-09 in Kharif season. Whereas in Rabi season the production is less than
1000 tonnes during 8 out of 10 years of study. The yield per hectare is high 6 out of 10 years of study in Kharif season.

20. The area under green gram in Anantapur district is 1000 hectares during 8 out of 10 years of study in Kharif season. In 2001-02 the area cultivated is 2000 hectares in Kharif season. During the last year of study the area is less than 1000 hectares even in Kharif season. In 2001-02 highest production of 3000 tonnes was registered during Kharif season. 4 out of 10 years registered 1000 tonnes production. In the remaining 5 out of 10 years the production is less than 1000 tonnes. The yield per hectare is high in Kharif season except in 2006-07. The highest yield of 693 kgs per hectare was registered in 2005-06 in Kharif season. In case of Rabi season highest yield is registered in 2001-02.

21. The area under red gram in the district is not evenly districted over the years. It ranges from 41,000 hectares (2003-04) to 20,000 hectares (2009-10). The production of red gram in 2008-09 is 39,000 tonnes, which is highest during 10 years of study. On the other hand in 2006-07 the production is only 4,000 tonnes. The fluctuations in the production of red grams can be attributed to uneven distribution of rainfall in the district. The yield per hectare is 677 kgs per hectare in 2005-06, which is the highest during 10 years of study.

22. The area under food grains in Anantapur district is higher in Kharif season during first five years of study. From 2005-06 the area under
food grains in Rabi season higher than Kharif season. The production of total food grains in the district is higher in Kharif season during first 6 years of study.

23. Groundnut is the major commercial crop sown in the district. In terms area as well as production groundnut is the major non-food crop source in Anantapur district. During 2001-02 to 2003-04 Kharif season the area source under groundnut is gradually declined. In the next two years it increased and in 2006-07 it again declined. From 2007-08 the area is gradually declining year by year. In case of production in Kharif season highest production of 1,102,000 tonnes was produced in the district due to favourable rainfall. In Kharif season lowest production of 43,000 tonnes was registered in 2006-07. With regard to Rabi season the area is not evenly distributed over the years. It ranges from 24,000 hectares to 13,000 hectares.

24. Sunflower is sown in the district mostly in Kharif season than Rabi season. In Kharif season the highest area 57,000 hectares under sunflower in the district is registered in 2003-04. But in case of production equal production of 27,000 tonnes was registered in 2003-04 and 2001-02. Lowest production of 2000 tonnes was registered in 2005-06 in Kharif season. Coming of Rabi season highest area of 34,000 hectares was registered in 2006-07 and least area of 21,000 hectares in 2000-01.
25. Castor is sown only during Kharif season in the district. The area under the castor in the district shows downward trends with minor variations. The area under the castor is 3,000 hectares in 2000-01 and 2001-02. In the next four years 2002-03 to 2005-06 the area under castor reduced to 2,000 hectares. In 2006-07 it further reduced to 1000 hectares and again raised 2000 hectares in 2009-10. The production of castor in the district is highest (2000 tonnes) in 2005-06. The production in the following year (2006-07) is less than 1,000 tonnes. In the remaining 8 years the production is around 1,000 tonnes. The yield per hectare is 751kgs in 2008-09, which is the highest of all ten years of study.

26. Sugarcane in Anantapur district is a Kharif crop. But the area under the sugarcane in the district is less than 1,000 hectares during eight years out of ten years (except 2002-03 and 2004-05). But the production of sugarcane in the district ranges from 10,000 tonnes to 34,000 tonnes. In 2004-05 highest production of 34,000 was registered and lowest production of 10,000 tonnes was registered in 2009-10.

27. Like castor, tobacco in the district is also sown only during Kharif season. The area under tobacco never crossed 1,000 hectares in the district. During 2002-03 to 2008-09 the area under tobacco in the district is less than 1,000 hectares. At the same the production during this period (2002-03 to 2008-09) the production is also less than 1,000 tonnes. In 2 out of 10 years the production is nearly 1000
tonnes. During the last year of study the production is 2 thousand tonnes.

28. In Anantapur district chillies are shown mostly in Kharif season compared to Rabi season. In Kharif season the area under chillies is 4000 to 2000 hectares. Whereas, in Rabi season the area under chillies is less than 1000 hectares in 7 out of 10 years of study more over even single hectare was allotted for chillies in Rabi season during last two years study. The production of chillies during Kharif season in 11,000 tonnes in 2004-05, which is highest of all 10 years of study.

29. It is clear from the study that the area and production under onions in the districts is high in Kharif season than the Rabi season. But the yield per hectare is higher in Rabi season compared to Kharif season. The area under onions in the district during Kharif season is 2000 to 1000 hectares. In Rabi season the area never reached 1000 hectares. In Kharif season, 2007-08 registered highest production of 38,000 tonnes.

30. The cotton in Anantapur district is cultivated only during Kharif season. The area as well as production of cotton is showing downward trends except 2004-05. In 2001-02 and 2004-05 the area under cotton crop in the district is 9000 hectares. Whereas in 2006-07, 2008-09 and 2009-10 the area under crop is only 2000 hectares. The production of cotton is more sharply declining compared to area in the district.
Policy Implications

Since most of the increase in the non-foodgrains production in the economic reforms period over the post green revolution periods has come through increase in mean area, the analysis underscores the importance of shift of cropping pattern of income generated commercial crops in raising area levels and thereby boosting non-foodgrains production in the district.

1. The policy option for the policy makers is that to increase the foodgrains production in the district, it needs minimum support price, extent and establishment of irrigation facilities.

2. The other policy option is that there is need for substantial increase in the subsidies to the farmers to develop the micro irrigation activities. In turn, this leads to increase the agricultural production in the district. On the other hand it reduces the instability.

3. The other policy option is to strengthen the existing agricultural training programs with participatory approach at village level and mandal levels. This will helps the farmer (most of the farmers are illiterates in the district) to escape from the using of fake hybrid seeds, fake pesticides, fake fertilizers, money lenders, mediators, brokers etc. Due to these activities the agricultural extension officers can create awareness through participatory approach about the
public programs and facilities which have been offered by the government. As a result the local farmers are able to take a suitable decision making towards their sustainable agricultural development. In turn, it leads to reduce the instability, increase the self-reliance, to adopt the income generated cash crops, to specialize the exportable products. Perhaps, these policies may enable the farmers towards golden era.

4. It is becoming increasingly important for the initiation of policy measures for reversing the trend towards deceleration of agricultural growth and rejuvenating agriculture in different regions of India. Although there is a need for devising region specific policies, but it would be important to increase public investment in irrigation and other rural infrastructure in particular in agricultural research and extension in all parts of India.

5. For reversing the deceleration in growth in the high productivity north-western region, it is important to heavily invest in agricultural and bio-technology research with a view to developing cost reducing and water saving technology for wheat and particularly rice. The trend towards decline in input use efficiency needs to be reversed as soon as possible with a view to increasing profitability. Simultaneously urgent steps are needed for reducing environmental damage.
6. In the dry regions of the India, large investments in infrastructure like irrigation and particularly in rain water harvesting are essential to enable the farmers to improve their productivity though adoption of new technology. Specific measures should be taken for closing the high yield gap between the north-western and south-eastern states.

7. The policy makers ought to devise appropriate region specific policy packages for reversing the trend of deceleration in agricultural growth registered in the post-reform period with a view to making a large proportion of workforce in agriculture share the benefits of high growth achieved by the economy after economic liberalisation and make the growth process more inclusive. This can only be done through according higher priority to agriculture and undertaking large public and private investments in rural infrastructure like power, roads and communications and above all in research and extension.

8. This is likely not only to raise productivity and income in agriculture but also in generating more income and employment in the non-farm sector through input-output and consumption linkages. This in turn, is likely to counteract the tendency of increasing inter-regional inequality in per agricultural worker productivity.

9. Increase the outreach of the formal financial institutions, especially to the small and marginal farmers. Continuation of credit targeting for ensuring adequacy of credit in the agricultural sector.
10. Enhance the coverage of agricultural insurance scheme to the entire production process including post-harvest storage and processing. Integration of agricultural insurance with credit institutions. Encourage private participation in crop insurance.

11. Safety nets are needed to protect the interests of crops, people and regions which are likely to be affected by globalization. Precautions on imports in view of the removal of quantitative restrictions. Agricultural export policies need to be synchronised with the import policies to avoid price fluctuations. There is a need for sequencing of measures. In view of the removal of quantitative restriction in the coming days, tariffication process needs to be done judiciously.

12. Development of a sound and enduring non-farm sector for creation of employment in the rural sector.

13. Broad based agricultural growth and diversification would stimulate value-adding activities like processing and preparing specialist items with large demand. There would be growth in productive employment opportunities but the workers in agriculture would have to be trained for the new skills and occupations.

14. Capital formation in the public sector should be augmented. Money saved from the reduction in subsidy for agricultural inputs should be utilized for this purpose. In view of the resource constraints, capital formation requirements need to be prioritized.