CHAPTER 9

SUMMARY AND CONCLUSION
A systematic study of 'Agricultural Typology' is considered to be very vital in agricultural planning. Efforts were made to explore principles and criteria and also to develop appropriate techniques and methods with a view to identifying various types of agriculture and its transformation. This helps in identifying the changes that have been taking place in the spatial organization of agriculture and also provides a strong base for agricultural planning.

An understanding of the type of agriculture for scientific purposes should encompass the socio-economic, operational, production and structural features of agriculture of an area. The concept of agricultural typology is dynamic, systematic or taxonomic in character. The typification of agriculture serves as a good base for agricultural regionalization.

The present study throws light on the spatial structure of agriculture and the changes therein in Andhra Pradesh State. An attempt has been made to delimit, describe, analyse and interpret the spatial patterns of agriculture in Andhra Pradesh. It is
now worthwhile to take a brief look at the agro-geographical setting of the region under reference.

Andhra Pradesh lies between the latitudes 12° 37'N 19° 54'N and longitudes 76° 45'E and 84° 46'E. With a geographical area of 2,75,068 Sq. Km. and a population of 66.5 millions, Andhra Pradesh occupies the fifth place in the country in terms of both area and population as per the 1991 Census. Administratively, the State is divided into 23 districts comprising 1104 Revenue Mandalas.

The diversified terrain, climatic, edaphic and hydrological conditions coupled with varied socio-economic factors have given rise to the evolution of different farming systems, cropping patterns and productivity regions in the State. The State has 'Monsoon' type of tropical climate. The distribution of rainfall is uneven and the average annual rainfall of the State is 982 mm. Droughts are the common occurrences in the State especially in the western and southern parts. Approximately 22 per cent of the total geographical area is under forests. The net area sown constituted about 40.2 per cent of the total geographical area while 41 per cent of the gross cropped area is irrigated.

About 73 per cent of the total population in the State lives in rural areas and the density of population of the State is 242 persons per sq. km. Out of the total working population, 65.1 percent is engaged in agriculture. About 77.2 per cent of the land holdings are small and marginal in size operating in only 36.2 percent of the total agricultural land.
In regard to literacy 44 per cent of the total population are literates. The State has rich reserves of a variety of minerals and has a good network of transport and communication facilities. Despite a considerable dent in secondary and the tertiary sectors, agriculture still holds the key to economic development of the State. Various types of agriculture emerge as a consequence of both the external conditions and the internal features of agriculture itself. It is necessary to identify the regional patterns of agricultural types in Andhra Pradesh.

OBJECTIVES OF THE STUDY:

The main objective of the study has been to make an attempt to systematically assess the complex and diversified nature of regional agriculture through the process of classification and typification. The most significant aspect of the study is the identification of agricultural types in different districts/regions of Andhra Pradesh State at different hierarchical orders. It is a systematic and diagnostic study of synthesizing the distinguished inherent agricultural phenomena of different districts which provides the basis for agricultural planning and development.

The present study is based upon the secondary data covering three points of time namely, 1971, 1981 and 1991. All the twenty-eight variables comprising social, operational, production and structural attributes as suggested by the I.G.U. Commission on Agricultural Typology were collected, analysed and interpreted for the purpose of classification and typification of agriculture. The empirical findings
of the study have been orderly interpreted and summarised at various points.

**SOCIAL ATTRIBUTES:**

Social attributes are those indicating who is the producer, what is his relation to the land and to the others working in the land. The study considered seven variables as suggested by I.G.U. Commission on the typology of world agriculture.

It is found that the attributes such as percentage of agricultural land held in common, percentage of land in labour and share tenancy (share cropping) and the percentage rate of land operated by the consciously planned collective or State enterprise in the total agricultural land are negligible and insignificant in Andhra Pradesh. There has been a predominant proportion of private individual ownership in the entire State which is, indeed, an interesting pattern of land ownership. The size of agricultural holding both in terms of actively employed people in agricultural operations and in terms of agricultural land was found to be very low in the entire State. On an average 2 persons were actively employed in each agricultural holding while the average size of agricultural holding was found to be 2 hectares. The factors such as high density of agricultural population, large number of individual agricultural holdings and limited agricultural land resulted in small size of agricultural holdings both in terms of persons and agricultural land. It is obvious that an ever-increasing pressure of population on agriculture and a small increase of agricultural
land caused a declining trend in both the aspects. The agricultural output per agricultural holding is also very low which accounted for 28.12 c.u. in 1991. Relatively higher agricultural output per holding is noticed in the deltaic districts of the State.

It can be said that the pattern of all social variables found in Andhra Pradesh do reflect the farming which is traditional, small scale, peasant and intensive in its nature. This indicates the subsistence nature of the economy in general.

OPERATIONAL ATTRIBUTES:

The operational attributes do respond to the question of how a produce is obtained and, what means and practices are applied to achieve agricultural production. A total of seven operational attributes as listed by I.G.U. Commission have been considered.

The number of people actively employed in agriculture was found to be 109 in 1991 as against only 72 persons in 1971 which is, indeed, at a higher side. The number of people actively employed in agriculture is found to be relatively higher in agriculturally stable and prosperous areas of the Coastal plain rather than the plateau areas of Telangana and Rayalaseema. It is also found that the use of the animal power in agricultural operations is also considerably high which accounted for 26.8 c.u. Despite a slight decline in the use of animal power, many districts of Andhra Pradesh still do have moderate to very high use of animal power.
Barring four Coastal deltaic districts and one district (Chittoor) of Rayalaseema, the remaining districts of Andhra Pradesh do have low consumption of mechanical power per 100 hectares of cultivated land. The average consumption of chemical fertilizers per one hectare of cultivated land was found to be 122.7 Kgs in 1991 as against only 102.1 Kgs in 1971. The high consumption of chemical fertilizers is found in central and southern coastal districts and also a few districts in northern Telangana where canal irrigation is well developed. A low to moderate consumption of fertilizer is noticed in the rain-fed farming areas of western part of the State. In these districts which are drought prone areas, the fertilizer usage characterizes traditional agriculture which may be explained in terms of long established constraints imposed by standard farm practices. The irrigated area accounted for 40.6 per cent of the total cultivated land in 1991 as against 31.6 per cent in 1971 in the State. The State as a whole has moderate intensity of irrigation. It is observed that there has been a considerable disparity in the intensity of irrigation in the State. There are still large areas in the plateau region (Telangana and Rayalaseema) where scarcity of water has been jeopardising the agricultural economy of the State. The developments made so far in irrigation were confined to deltaic districts of the Coastal plain and a few other districts in major river basins. Hence, efforts should be made to tap the run-off of all the minor river basins most effectively through an integrated watershed management especially in chronic drought prone areas of the State.
The intensity of cropland use is moderate to very high in almost all the districts. The Coastal districts of Andhra Pradesh have favourable terrain, climatic, edaphic and irrigation facilities as well as a high density of agricultural settlements for the cultivation of all agricultural lands. In a majority of the plateau districts the spatial spread of fallow lands is significant. The intensity of livestock breeding is mostly moderate to very high in many districts. Though multi-purpose in nature, scientific management and breeding of the livestock has yet to go a long way throughout the length and breadth of the State.

It has been found that significant spatial variations in the distribution of operational attributes could be noticed due to varied physical and socio-economic conditions in different parts of Andhra Pradesh. Some major breakthroughs in operational attributes are needed which provide the catalyst to make agriculture take the leap forward.

**PRODUCTION ATTRIBUTES:**

Production attributes are those that respond to the question of how much and what for it is produced. In the present study, seven relevant production variables are analysed which throw some light on the various aspects of productivity of agriculture in the State. The average land productivity in Andhra Pradesh is found to be low to medium. This accounted for 14.4 c.u. per one hectare of agricultural land and 20.35 c.u. per one hectare of cultivated land. There have been significant spatial variations in the distribution
of land productivity levels. Many of the Coastal districts and the
districts in the northern Telangana and eastern Rayalaseema are
found to be having moderate to high land productivity. In contrast
to this, the land productivity is low in the drought prone districts
located in the western part of the State where the rain-fed agriculture
is predominant. It is interesting to mention that there has been
a significant increase in the levels of land productivity during 1971-1991.
This is more due to modernization of agriculture in the State in
general and the Coastal districts in particular.

The average labour productivity in the State was found to
be 13.39 c.u. per person in 1991 as against only 10.47 c.u. in
1971. It is, indeed, a very low labour productivity. It is more or
less evenly prevailed in all the districts of the State. It is also
not uncommon that the commercial labour productivity was also found
to be 6.3 c.u. per person in 1991 which is very low as against
3.65 c.u. in 1971. All the districts came under the category of
very low commercial labour productivity as per the classes of world
ranges for normalization of values. It is significant to state that
the whole of Andhra Pradesh indicates a distinctive regionilization
towards a very low level of labour productivity. The commercial
nature of agriculture is quite significant in Andhra Pradesh which is
evident from the fact that about 48 per cent of agricultural production
is commercial in nature in 1991 as against 35 per cent in 1971.
It is worthwhile to mention here that there has been a sign of
positive trend towards commercial farming. The commercialization
is found high in many of the Coastal districts. Hyderabad district
has registered very high degree of commercialization due to the extensive livestock breeding. The average commercial land production of the State was found to be 6.86 c.u. per one hectare of agricultural land in 1991 which is, indeed, low as against 2.64 in 1971. A majority of the districts in 1991 (18 districts), 1981 (19 districts) and in 1971 (20 districts) recorded very low and low commercial land productivity. The average degree of specialization is 0.2 in Andhra Pradesh in 1991 as against 0.19 in 1971. A high degree of specialization prevailed only in Hyderabad, but, low degree of specialization prevailed in as many as 13 districts in 1991.

From the above analysis it could be inferred that there has been distinct variations in the distribution of different productivity levels which are influenced by physico-socio-economic and technological factors.

A majority of the eastern districts do have moderate to very high land productivity, labour productivity, commercial land productivity and degree of specialization. But the northern, western and some parts of southern districts recorded low land/commercial land productivity, labour productivity and degree of commercialization and specialization. The presence of infertile soils, rain-fed cultivation, low level of technology, pressure of population on small land holdings etc., would have caused low land and labour productivity.

**STRUCTURAL ATTRIBUTES :**

The structural attributes deal with the leading elements of agricultural production. It consists of seven variables. The area
under perennial and semi-perennial crops in the State is 3.56 per cent of the total agricultural land in 1991 as against 2.87 per cent in 1971 which is indeed a very low proportion. The average proportion of permanent grass lands accounted for only 4.6 per cent of the total agricultural land in Andhra Pradesh in 1991 as against 6.21 per cent in 1971. Except Nellore district which had moderate percentage of grassland, the remaining districts belonged to either very low category or low category. The average proportion of the area under primary food crops accounted for 48.74 per cent of the total agricultural land in 1991 as against 58.9 per cent in 1971. This reveals a moderate level of primary food cropping as per the normalized values of typological classification. High and very high percentages of land under primary food crops could be noticed in as many as 10 districts. Out of these 7 districts are located in Coastal Andhra and 3 districts in Telangana. There is a gradual decline in the proportion of land under primary food crops since only 6 districts had very low and low percentages of land under primary food crops as against 15 districts in 1971. The spatial spread of food crops is being greatly reduced due to the preference of the farmers to grow commercial crops especially in southern and western parts of Andhra Pradesh. However, in the eastern coastal plains the conditions are most favourable for the cultivation of food crops, especially paddy.

The percentage of animal products in gross agricultural output was found to be very low and is accounted for 3.61 per cent in 1991 as against 4.97 per cent in 1971. All the districts except
Hyderabad had low to very low percentage of animal products in gross agricultural products. This reflects the predominant nature of crop production and less orientation towards animal husbandry. The commercial animal production in the total commercial output is also found to be very much insignificant in the entire State except Hyderabad district. It is significant to note that 34.06 per cent of the gross agricultural production was found to be industrial crop production in 1991 as against 23.46 per cent in 1971. The highest proportion of industrial crop production is noticed in Rayalaseema region (58.73 per cent) while the lowest was recorded in Coastal Andhra region. Anantapur district of Rayalaseema accounted for 65.20 per cent of the industrial production followed by Chittoor (63 per cent). The southern and western parts of the State recorded a larger share of industrial production.

In Andhra Pradesh herbivorous animal population accounted for 98 per cent of the total livestock population which is, indeed, a very high proportion.

**TYPIFICATION OF AGRICULTURE AND DELIMITATION OF TYPOLOGICAL REGIONS:**

An attempt was made to apply deviation technique for identifying the typology of agriculture in Andhra Pradesh. It is based upon the method as worked out by I.G.U. Commission on agricultural typology. The hierarchical orders of agricultural types in various districts of Andhra Pradesh have been identified on the basis of deviation procedure.
AGRICULTURAL TYPES OF FIRST ORDER:

Two different types of agriculture of first order have been identified. The State as a whole has traditional small scale (peasant) agriculture (T). The three regions as well as all the districts of Andhra Pradesh, barring Hyderabad, have had a similar (T) type of agriculture. Hyderabad district of Telangana is associated with 'A' type of agriculture where highly specialized livestock breeding exists.

AGRICULTURAL TYPES OF SECOND ORDER:

Four different types of agriculture of second order have been identified in 1991.

Tm type (Traditional, Small-scale, Mixed Agriculture) prevailed in the whole of Andhra Pradesh. At district level, six out of nine districts of Coastal Andhra, nine out of ten districts of Telangana and all the districts of Rayalaseema are found to be having Tm type of agriculture. In Telangana and Rayalaseema regions there has been a high degree of commercialization with low capital inputs in regard to Tm type of agriculture while in the coastal areas there have been high application of capital inputs, moderate to high land productivity and moderate commercialization.

Traditional small scale and labour intensive crop agriculture (Ti) is found in Visakhapatnam district only which is in the transitional stage (between Tm and Ti).
Traditional small scale (peasant) agriculture with tree crop growing (Tf) has prevailed in Guntur and East Godavari districts of Coastal Andhra. This type of agriculture is prevailing along with Tm type of agriculture.

Highly industrialized livestock breeding (Ad) is present only in Hyderabad district. It is characterized by very high labour and capital inputs, moderate to very high commercialization and specialization in breeding various species of animals. This type of agriculture prevails in Hyderabad due to a high degree of urbanization.

AGRICULTURAL TYPES OF THIRD ORDER:

Four different types of agriculture of third order have been identified in the State in 1991. The State as a whole has Tmy agricultural type which is characterized by traditional small scale labour intensive agriculture with considerable use of animal power, high density of animal population, low to medium capital inputs, low to medium land productivity, very low labour productivity, low commercialization with low to medium proportion of food crops as well as industrial crops. Seven districts each of the Coastal and Telangana regions and two Rayalaseema districts are associated with Tmy type of agriculture and had the taxonomic features of world agricultural type. Tmy type is slightly different in the deltaic districts namely East Godavari and West Godavari where there is moderate use of animal power, medium to high capital inputs, highly irrigated, medium land productivity, medium to high commercialization with a high proportion of food crops.
'Tir' type of agriculture which is semi-irrigated, low productive and semi-subsistence in nature is identified in as many as six districts namely, Srikakulam, Prakasam, Kurnool, Anantapur, Mohaboobnagar and Adilabad. It is in transitional form between Ti and Tm agriculture.

'Tis' agricultural type is found in Krishna district. It is characterized by high labour intensive, irrigated, medium-productive, semi-commercial and food crop agriculture.

'Add' type of agriculture is identified in Hyderabad district. 'Add' agriculture is market oriented, and highly industrialized livestock breeding in its nature. Almost all the social, production, operational and structural attributes which are present in Hyderabad coincided with the codes of world model type.

CHANGING SPATIAL DISTRIBUTION OF AGRICULTURAL TYPES:

Several factors such as the use of capital inputs, changes in the cropping pattern, high degree of commercialization and specialization etc., significantly contributed to bringing transformation in the agricultural typology of Andhra Pradesh State during the last two decades. It is evident from the fact that Tir type of agriculture which prevailed in the State as a whole in 1971 and 1981 has been transformed into Tm agricultural type in 1991. The number of districts having Tir type of agriculture fell from 19 districts in 1971 to 5 districts in 1991.
Tmy type of agriculture prevailed in five districts each in 1971 and 1981. Due to significant changes that were brought about in mostly operational and production attributes, agriculture has been transformed to Tmy type which prevailed in 16 districts in 1991.

Tis/Tir transitional type of agriculture is found in East Godavari district in 1971, West Godavari in 1981 and Krishna district in 1991.

Tir/Tme transitional form of agriculture prevailed in Karimnagar district in 1981. In this district Tir type of agriculture was found in 1971. Like many a district, this district also shifted to Tmy agriculture by 1991. 'Add' type of agriculture prevailed in Hyderabad both in 1981 and 1991. Market oriented and highly industrialized livestock breeding was prevailing in this metropolitan city.

The agricultural types of first order and second order remained the same (i.e. T and Tm) in the whole of Andhra Pradesh as well in the three regions during 1971, 1981 and 1991. However Tir, one of the agricultural types of third order, which prevailed in 1971 and 1981 has been shifted to Tmy agricultural type in 1991. It is more due to significant changes in operational, production and structural attributes. The dynamic nature of agriculture could be noticed in the deltaic districts as well as in the newly irrigated districts in the plateau region.

AGRICULTURAL WEAK LINKS:

Agricultural weak links are those which correspond to the low and very low values of the 28 variables arranged as per the classes
of the world ranges which are meant for normalization. Generally speaking, the low and very low values of an agricultural variable would indicate the poor performance in terms of agricultural development.

In 1991, a total of 16 agricultural weak links could be noticed in regard to all the attributes of agriculture in the State. A larger number of weak links are found in regard to social attributes (6 agricultural weak links) followed by structural attributes (5 weak links), production attributes (4 weak links) and operational attributes (1 weak link). It is obvious to have more agricultural weak links in respect of social attributes due to the deep rooted, age-old values of the social system governing agriculture. However, such weak links do not greatly damage the existing agrarian system.

Apart from this, the sizeable number of weak links in regard to production and structural attributes do emphasize the need for an improvement of the agricultural system on much more productive and diversified lines.

In Hyderabad, East Godavari, West Godavari, Krishna and Guntur districts, the agricultural weak links were found to be low. On the other hand the agricultural weak links were found to be more in Anantapur, Adilabad, Medak, Mahaboobnagar, Ranga Reddy, Nalgonda and Kurnool districts. The new agro-technology could bring in a revolutionary change in the practices, processes and production of agriculture in the Coastal districts. The factors such as scanty irrigational facilities, low application of modern agro-technology, environmental constraints, frequent occurrences of drought etc., are said to be responsible for more number of
agricultural weak links and the same have had a shattering effect on the agricultural productivity and performance.

The number of agricultural weak links which are found to be 19 in 1971 had declined to 18 in 1981 and 16 in 1991 in the State as a whole. A similar trend of decrease is found in both Coastal Andhra and Telangana regions. But in Rayalaseema this trend of decrease is not consistent. A significant decrease in the number of weak links (3-4 weak links) is found in East Godavari, West Godavari, Krishna, Guntur, Nellore, Chittoor, Nizamabad and Hyderabad districts. On the other hand only negligible decrease is noticed in many districts of Telangana and Rayalaseema. There has also been disturbing fluctuations in the number of weak links in these districts. In other words, the agricultural growth is not consistent but is subjected to fluctuations in many districts of plateau region.

CONCLUSION:

The changing pattern of agricultural formations and the factors which are contributing to such formations do reveal that the agriculture in Andhra Pradesh State is in the process of transition and is gradually shifting from traditional small scale labour-intensive, high animal input, low capital inputs, low land productivity, subsistence agriculture with predominant foodgrain orientation to traditional small scale labour intensive, moderate to high animal power input, moderate to high capital inputs, moderate land productivity, semi-commercial agriculture with mixed crop orientation comprising both food grains and industrial
crops. In a nutshell, it can be concluded that the shift in agriculture is from very low capital inputs, low irrigated, low productive and subsistence food grain oriented agriculture to medium capital inputs, semi-irrigated, medium productive and semi-commercial mixed agriculture comprising both food and commercial cropping systems. It is indeed a positive sign in the process of agricultural transformation in the State. However, there have been great regional and inter-district variations in the form, process, productivity and orientation of agriculture in the State especially between the plateau districts (Telangana and Rayalaseema) and the Coastal districts. The development of agriculture is at an accelerating pace in the Coastal districts especially the deltaic districts where the agriculture is characterized by labour intensive, moderate animal input, high capital inputs, highly irrigated, medium land productivity, moderate to high degree of commercialization with predominant orientation towards foodgrain farming. In contrast to this, the agriculture in many districts of Rayalaseema and Telangana is known for high labour and animal inputs, low capital inputs, low irrigated, low land productivity, semi-subsistence to semi-commercial mixed cropping which includes both food and industrial (especially oil seeds) crops.

The districts which are found to be having very large number of agricultural weak links are to be treated as the most backward areas in terms of agricultural development. These areas are mostly located in the western Rayalaseema and Telangana regions where unassured water supply, unfavourable environmental conditions and socio-economic conditions of farming community could not facilitate
the application of agro-technology. Consequently, the crop yield levels are not only low but also stagnating. The districts, having a larger number of agricultural weak links did have a more or less static cropland use, capital and production systems. This is a matter of serious concern for the planners and policy makers. This calls for strengthening vertical and horizontal linkages which ensures stabilized, productive and sustainable agriculture in the districts of Telangana and Rayalaseema regions which are agriculturally backward. There is an urgent need to harness the run-off of all the minor river basins most effectively in the districts which experience frequent and prolonged droughts. In addition, there should be optimum utilization of groundwater resources coupled with protective irrigation facilities. Hence, it is imperative to have an effective integrated watershed management and a good network of irrigation facilities in the drought prone districts of Rayalaseema and Telangana. The land productivity levels which are highly fluctuating, presenting disturbing trends, need to be enhanced and stabilized by adopting dry farming technology, soil and water management measures, ecologically sound cropping systems with special emphasis on inter-cropping and diversified cropping systems. The socio-economic conditions of the farmers whose landholdings are small need to be improved and strengthened. The factors such as farm education, institutional finance, marketing, farm research, healthy agrarian relations etc., need to be given special emphasis failing which the agricultural weak links remain unchanged and obstruct the agricultural development.
It is paradoxical to state that the agricultural production in Andhra Pradesh is predominantly crop-oriented with less emphasis on livestock development. The State has a significant livestock population. But they are mostly used as draught power instead of being employed in gainful agricultural production. There is, thus, an urgent need for the diversification of agriculture which also should lay equal emphasis on both crop husbandry and animal husbandry. The ecologically sound and diversified cropping systems need to be given utmost importance in agricultural planning failing which productive and sustainable agriculture is not possible. Our study suggests that in the coastal plains where agricultural development is very high and possibilities of further agricultural development are remote, there is a scope for livestock development on a large scale. The need of the hour is the optimum utilization of agricultural resources with a view to ensuring sustainable and productive agriculture which gives a special niche for gainful farm employment and also lessens environmental and socio-economic problems in the long run.

To sum up, rich and varied agricultural resources and potentialities which are available in Andhra Pradesh need to be utilized in an optimum manner. In the same manner the proven and appropriate agro-technologies also need to be evolved and utilized for making the State agriculturally very rich, productive and sustainable. This would also ensure balanced regional agricultural development and consequent upliftment of farming communities especially the small and marginal farmers.