CHAPTER - I

A PERSPECTIVE OF THE RESEARCH THEME

Agriculture is one of the most complex and dynamic expressions of human primary economic activity performed and its structural, functional and developmental capacities depend upon the interaction of several attributes or elements. Obviously, this complex nature of agrarian system varies over both space and time. Hitherto, the recent agro-technologies have brought about a revolutionary change in the scenario of agriculture, especially in the developing countries like India. Above all, the present multi-dimensional and multi-variable agricultural spectrum has to be scientifically investigated for comprehensive understanding of the spatial organisation of agriculture. In this attempts, the most interesting research in the field of agricultural geography focuses on the systematic classification of agriculture by grouping the inter-related and inter-connected attributes of agriculture. In this
perspective, agricultural typology is being identified as one of the most recent methodological tools and hence, it is devised for better understanding of the composite nature of agrarian landscape as well as the tendencies in the changing spatial organisation of agriculture at different hierarchical levels.

The Conceptual Framework of Agricultural Typology:

In the field of agricultural geography, the theme of spatial variation has often found itself expressed in attempts to sub-divide some areas into a set of relatively homogeneous agricultural regions. The typology implicitly or explicitly aims at classifying the complex reality of agriculture, making it more comprehensible, a systematic or taxonomic concept. As far as typology is concerned, the agricultural type, is the end product of the summation, synthesization, integration and unification of mutually related distinctive inherent internal endogenous characteristic features of agriculture, namely, social, operational, production and structural attributes.

As far as typology is concerned, it is considered by some theories of classification as a special kind of classification, in which classes, i.e. types, are not established in advance, but identified in an aggregative way, by grouping individuals around certain cores or models, recognised as the most typical. Such groupings are not separated from one another by any tight limits, but their limits may overlap, making up various transitional forms" (Kostrowicki and Szyrmer, p.9-10, 1992). Therefore, as compared with the other kind of classifications, the typification is much closer to systematic or taxonomy, than to regionalisation. When comparing with the other systematics, typology is the closest to biological classification (Kostrowicki and
Szyrmer, 1992). The type of agriculture, understood as a supreme notion focusing all the important properties of a given agriculture.

Typology is a supreme and overall concept. It covers all other concepts of agricultural classification, including such partial classifications as systems of land tenure, landuse systems, orientations or combinations of crop growing and/or livestock breeding, farming systems, types of farming (Kostrowicki and Szyrmer, p.11, 1992). The scheme of typification has less theoretical frame and more taxonomic value since it is in full support of quantitative data at all scales i.e. from agricultural holding to global level.

Agricultural typology is a complex and dynamic concept, which involves the grouping of 28 variables of social, operational, production and structural attributes of agriculture and the changes that undergo therein. It is based on the assumption that “every agriculture as a whole is not a simple sum of activities or elements of which this notion consists, but a set of attributes interrelated with one another and with external natural and other conditions as well, in which a change of one component brings about a change in the remaining ones. The agriculture thus- understood may be recognised as a system complying with the system approach or the system theory (Kostrowicki, 1976). So far as the system approach is concerned, the concept of agricultural typology should be treated as a highly interrelated phenomena or a complex system (Mandal, P.186, 1982). Roman szczesny (1981) has stated that typological studies approached dynamically and spatially, the type of agriculture is treated as a systematic notion, applied in agricultural research as an entity, i.e., it is a synthesis of properties describing agriculture as a heterogeneous production complex.
An agricultural type is a dynamic notion because characteristics of agriculture change under the impact of transformations occurring in external conditions which initiate typological changes as an after-effect. Therefore, any change that occurs in physico-socio-economic and techno-organisational as well as political policies certainly initiates change in the formation of agricultural types.

Like biological classification, agricultural typology is hierarchical and aggregative (Kostrowicki and Szyrmer, P.10, 1992) in character. Because, agricultural types may be of various orders, ranging vertically from lower order to higher order (1st order, 2nd order and 3rd order types) and horizontally from the individual agricultural farm (agricultural holding), through several intermediate administrative units like villages, taluks, districts, states, provinces, countries, etc., to global agricultural types. Hill (P.89, 1986) has stated that typology implicitly aims to be universal, in that it is designed to be applied at differing scales, from the country to the local region, and possibly even to the individual farm. He has opined that the application of typology at the country level would be virtually meaningless, though having the great advantage that aggregate data could be used. At micro-regional scale an agricultural holding is considered as the basic unit in agricultural typology, as it is the only real unit of operation. At the same time, however, despite all its deficiencies, it is permissible to use other units (administrative or whatever convenient) in macro-scale studies, and particularly when dealing with a large number of small-scale holdings for which no separate data are available (Kostrowicki, P.17, 1970). In a vast country like India where the so-called village agriculture is witnessed with field plots belonging to too many number of small holdings, scattered and intermingled throughout a village territory. The aggregate data for agricultural holding are not available and also not being maintained in India. In such cases, some detailed sample studies are highly
recommended to examine the differences in the development of different agricultural forms at micro-regional scale.

The agricultural type is defined as an end product essentially based on similarities between individuals of inherent attributes of agriculture. It is an empirical model to illustrate the over-all picture of an agrarian landscape. The external conditions whether natural or exogenous, in which agriculture develops, could not be used as a basis of agricultural typology. The external or exogenous conditions, such as environment, location, transport and marketing, the effects of demand and supply on agricultural production, prices, political policies, etc., may certainly play an important role in the formation and development of agricultural types and their attributes, and hence, they are taken into account to explain why and how a particular type has emerged in a particular area and at a particular period. "Their study is therefore necessary for both understanding and interpreting the development and spatial distribution of various agricultural types" (Kostrowicki and Szyrmer, P.11, 1992).

In a series of studies on the spatial organisation of agriculture, typology is rather identified in the recent times as an innovative tool to understand the complex nature of agriculture. Because it being the end product of a long period of research and discussion, Roy (1986) has opined that "agricultural typology, being a recent field of investigation in geographical learning, tries to manifest the status of man-land participation projecting a composition and growth of an overall pictures of arable landscape and agricultural system through classifiable innovations". This empirical tool sometimes may be subjected to some inherent weaknesses mainly the reliability
of data. In some cases, it has been necessary to be subjective for lack of any published data. On the other hand, this recent methodological tool has to seek wide applicability and practical significance over the other studies of spatial organisation of agriculture.

**Relationship Between An Agricultural Type and An Agricultural Region:**

The term 'type of agriculture' is the most comprehensive one and which is accepted with supreme notion in agricultural typology rather than the term 'system of agriculture'. Both the concepts 'Agricultural type' and 'agricultural system' have had the common core of classifiable innovation which meant to classify a complicated reality of agriculture to make it more comprehensible. In this endeavour, both the words are understood as synonymous, but there is a clear difference in their conceptual statements and methodologies. The 'agricultural system' based on the Systems Theory is different from the agricultural type. According to Olmstead, (P.31 1970) the systems approach of agriculture emphasizes that "the geography of agriculture is more than the geography of the crop and livestock products that result from agriculture and the geography of agriculture is concerned with agricultural or farming systems, and with the elements, operating units, functions, characteristics and inter connections of those systems, etc., Whereas agricultural type is more or less an established form of crop growing or livestock breeding, characterised by a set or association of certain distinctive individuals and not all. Kostrowicki (P.19, 1970) has also opined that 'type' and 'system' should not be understood as synonymous. The term 'type of agriculture' is broader and if the term 'system of agriculture' is to be applied despite possible confusion, it should rather be used as a synthesizing notion of all functional aspects of agriculture, and understood as an assemblage of means
and practices aimed at achieving agricultural production and maintaining soil fertility, irrespective of the social and production aspects of agriculture. Of course, the place of agricultural types or systems in the general theory of systems should be always clarified.

Typology and regionalisation which are dominating and widely used concepts in agricultural geography are very often confused with each other. Bunge (1962) believes that classification (types) and regionalisation are synonymous and all sciences have them in their history of classification or taxonomic phase and hence geography is not exception at all. Though both the concepts are synthesized notions, they belong to two distinctive categories. A type is a systematic or taxonomic concept and its identification is essentially based on similarities between individuals. Since individuals characterised by similar attributes may occur repeatedly both in time and space, the same type can be identified in various territories and in various periods of time (Kostrowicki and Szyrmer, P.9 1992). The spatial distribution of agricultural types do not necessarily form any continuous areas but usually are dispersed and intermingled with other types. In contrast, a region is a spatial or territorial concept. It is delimited on the basis of differences between areas, rather than on similarities between individuals. Hence, region is a contiguous portion of the earth surface extending within defined and determined limits and is characterised by a particular set of phenomena which are really related to and distinguished from the neighbouring or bordering areas which impart its unique character. In the case of 'typology' agricultural holding is the real and basic unit of operation whereas in regionalisation that does not arise other than that of areal grouping of the agricultural phenomena.
Both type and region are hierarchical in character. Based on their similarities, individual types of lower order or grouped together into types of higher order, irrespective of their distribution on the earth's surface, while regions of lower order always form a territorial part of regions of higher order. (Kostrowicki, P.20, 1970). Irrespective of the differences and similarities in the concept and methodology of a 'type' and 'region' the typification of agriculture will constitute a good basis for agricultural regionalisation. Therefore, an agricultural typology is a complementary tool to agricultural regionalisation.

Scope and Significance of Typological Studies:

The IGU Commission on Agricultural Typology is intended to serve two purposes; first, to explore principles and criteria to develop techniques and methods of identifying types of agriculture; and second, to identify the types of agriculture as well as their transformation so as to identify the changes taking place in the spatial organisation of agriculture with a view to applying the obtained results to intelligent planning and/or for forecasting further agricultural developments (Jasbir Singh and Dhillon, P.248, 1984). Therefore, the identification of agricultural types in the diversified agrarian system of a country like India is considered to be of primary importance in agricultural planning and development. Shajaat Ali (P.158, 1986) has opined that not only from the academic point of view, but also from the point of economic development of a country, formulation of agricultural typology of both large and small countries, has tremendous implication in their economic and regional development planning.

Agricultural typology is treated as an important scientific tool for a better evaluation of the present use of natural resources and other inherent conditions of
agricultural development by various forms of agriculture and their future possible prospects as well. Identification of weaker, traditional and static regions on the basis of typification of agriculture is of paramount importance for the implementation of suitable and effective regional agricultural plans and programmes to achieve sustainable agricultural development. In a developing country like India where agriculture is the main source of economy, there is a tremendous urge for typological studies at micro-regional scale for regional agricultural development and economic planning. Kostrowicki (P.17, 1970) emphasized: "based on a better understanding of properties and achievements of the same or similar forms of agriculture - a better definition of directions of further agricultural development through the transformation of the present forms of agriculture into others, more effective ones".

The Review of Agricultural Typological Studies:

Studies on agricultural typology have gained considerable importance in the last two decades, as is evident from the volume of scintillating researches made by scholars of different countries, who sought to identify the agricultural types at different hierarchirial orders.

The Institute of Geography and Spatial Organisation of the Polish Academy of Sciences has done a marvelous and a commendable job in the field of agricultural typology. At the outset, realising the importance of typological studies for understanding the complex agricultural characteristics and the tendencies in the changing spatial organisation of agriculture, the Commission for Agricultural Typology under the Chairmanship of Jerzy Kostrowicki (Poland) was first established by the General Assembly of the International Geographical Union (IGU) at the meeting held
during the XX International Geographical Congress in London, in July 1964. The main tasks of the Commission were (i) to establish the principle, criteria, methods and techniques of agricultural typology, (ii) to initiate, promote and coordinate the regional studies aiming at identification of agricultural types of various orders based on criteria and methods recommended by the Commission, and (iii) to work out the typological and regional classification of world agriculture (Kostrowicki, P.11, 1970).

The preliminary scheme of World types of agriculture, based on a board classification of the principles, criteria, methods and techniques of agricultural typology (Kostrowicki and Tyszkiewicz, 1970, 1979; Vanzetti, 1972; Reed, 1975; and Kostrowicki, 1977) was presented by the IGU Commission on Agricultural Typology to the IGU Regional Conference, held in Hungary in 1971 (Kostrowicki, 1971), and then to the XXIII International Geographical Congress in Canada (Kostrowicki, 1972). A new, improved version of the scheme, in which the discussion at the 5th Commission meeting, held in Hamilton, Canada (Reed, 1975), was taken into account, was elaborated and published in 1974 (Kostrowicki, 1975). The discussion at the 7th Commission meeting at Frontenay-aux-Roses, France, led to the elaboration of further improved version of the scheme of world types of agriculture which was published in 1976 (Kostrowicki, 1976). The results of the application of that version in several countries were presented and discussed at the 8th and last meeting of the Commas held in Odessa in 1976 (Kostrowicki and Tyszkiewicz, 1979).

Based on the guidelines, principles and methods suggested by IGU Commission of Agricultural Typology, the Institute of Geography and Spatial Organisation, Polish Academy of Science conducted a series of typological studies
covering the whole of Poland and neighbouring countries (Kostrowicki, Szczesny, Tyszkiewicz, Szczensy Stola, Matusik, Biegajlo, Kulikowski Szyrmer etc.). In order to study the transformations of the types of agriculture of Poland, typological study is made in 1970-1975-1976-1983 on intensive level taking into account the individual farming.

The pioneering work in this direction has been done by Kostrowicki and his team in the preparation of typology of European agriculture based on the material collected for the types of agricultural map of Europe. The final draft of the map was finished in April 1983 and presented in 1984 to the XXV International Geographical Congress in Paris. Many scholars from various countries contributed to the elaboration of typological map of Europe. They are Jacqueline Bonnamour, Chantal Gillette (France); B. Dumortier (Ireland); A. Thormodsæther (Norway); of Janson (Sweden); K.M. Jensen (Denmark); Berado Cori (Italy); a. Gatzoyannis (Greece); G.I. Gorbunova (U.S.S.R); B. Galczynska, R. Kulikowski, W. Stola, R. Szczesny and W. Tyszkiewicz (Polish Geographers from the Institute of Geography).

Many other scholars have also made signal contributions to typological studies of different countries in the world. Szczesny (1986) has attempted to study the agricultural typology of the Alpine areas of Austria and Switzerland; Tyszkiewicz (1986) attempted typological study on Swedish agriculture; Hill (1986) on Malaysian Region; Shajaat Ali (1986) on typology of Bangladesh; Kampp (1986) on types of farming in Denmark; Agboola (1973) on typology of Nigeria, Enyedi (1964) on Hungarian agriculture; Galczynska (1984) on Bulgaria; Gregor (1975) attempted to study typology of different parts of U.S.A., Nordgard (1977) on types and regions of
Norwegian agriculture; Pulyarkin's (1979) typological study of agriculture in developing countries; Rikkinen (1983) on Finland; Scott's (1984) study of the typology of Australian agriculture and Troughton (1979) on typology of Canada are important. Reed's (1975) work on Agricultural Typology and Landuse; and Vanzetti's (1975) work on Agricultural Typology and Land Utilisation are praiseworthy publications on typological studies.

In India, substantial work has not been done on agricultural typology. Albeit, a few geographers have made signal contributions on typological studies. In this endeavour, Vijaya Ram Singh (1975), (1979) has attempted to study agricultural typology of India which yielded the general types of agriculture at State level. His edited volume "Perspectives in Agricultural Typology" (1986) is a commendable attempt towards typological studies. L.R. Singh (1975), Jasbir Singh (1983) and Roy (1986) have also attempted to study the typology of agriculture of India at macro-regional scale. The other geographers of India who have attempted to study the typology of agriculture are Sharma (1983) - typology of Rajasthan; Panda (1979) typology of Madhya Pradesh, Lai (1986) - typology of Central India and Khatri (1989) - typological analysis of the tribal region of Southern Rajasthan etc., From the above works, it is clear that most of the works have been done at macro-regional scale and subsequently awaiting a wide application of typological technique at micro-regional scale by taking individual farm holding as the basic unit of study in agricultural geography research in India. This vacuum has to be filled up in future investigations in the field of agricultural geography for the sake of scientific agricultural planning.

The Study Region:
The present area of study i.e. Chittoor district is situated in the southernmost part of the state of Andhra Pradesh. It is the sixth largest district in terms of both area (5.5%) and population (4.9 %) in the State. Administratively, the district is divided into 66 mandals and 3 revenue divisions.

For the present study, Chittoor district presents a highly diversified systems of agro-geographical base with a significant spatial variation in terrain, isohyetal, edaphic and hydrological conditions as well as in landuse, irrigation, cropping pattern, crop and livestock production which ultimately influence the development of different forms of agriculture. The annual normal rainfall of the district is 908 mm. About one-third of the geographical area of the district is under cultivation and about 40 per cent of the cultivated area is under irrigation. The district produces large quantities of groundnut, paddy, sugarcane, ragi, fruits and milk. The district is known for small-scale intensive agriculture and mixed farming. In addition, it is worthwhile to mention that about 73 per cent of the total working population of the district depends upon agriculture for their livelihood. It is obvious from the above facts that the economy of Chittoor district is predominantly agricultural and the growth of economy of the district lies in its agricultural growth. Hence this region is apply chosen for a scientific investigation and evaluation of agricultural base which would immensely help in designing regional agricultural planning.

Objectives of the study:

The present study is an attempt at a systematic account of the complex and diversified nature of regional agriculture through the process of classification and typification. The significant aspect of the study is to identify agricultural types in
Chittoor district at different hierarchical orders ranging from individual sample agricultural holdings through administrative units like sample villages, mandals, divisions and to the types of district agriculture. Since an agricultural holding is the basic and real unit of operation in agricultural typology, it is mainly intended to examine the differences and similarities in the development of different forms of agriculture among different farming communities. Another important objective of the present investigation is to identify the weaker and traditional areas and farming communities in terms of agricultural development based on typology of agriculture. Such a systematic and diagnostic study of synthesizing the distinguished inherent agricultural phenomena of the district may provide insight into the problems of the spatial organisation of agriculture of Chittoor district and provides the basis for intelligent planning and development.

Data Base:

The present study is based on both primary and secondary data. Both primary and secondary data are collected for the year 1991-92 pertaining to all the twenty eight diagnostic variables (social, operational, production and structural attributes) as suggested by the IGU Commission on Agricultural Typology. The secondary data is collected from different sources of Government records for the selected sample villages, for all the mandals, for revenue divisions and for the whole district. The selection of villages for the purpose of analysis is done on the basis of representative sampling. Considering the important aspects of agriculture of the district like terrain, rainfall, landuse, cropping pattern, irrigation development and mixed farming, etc., there are 12 sample villages selected for identification of agricultural types. The primary agricultural data is procured at agricultural holding level which is the real
operational unit of agricultural typology. From all the selected sample villages, 210 sample farmers are chosen on the basis of stratified random sampling. The sample farmers represent different farming communities like forward community, backward community and schedules caste/tribes.

Methodology:

The method and techniques of the typology of World agriculture as suggested by the IGU Commission on Agricultural Typology (Kostrowicki, 1977, 1980, 1988; Aitchison, 1986) have been employed in the present study to find out the agricultural types of Chittoor district. Since the method and techniques of Agricultural Typology prepared by the IGU Commission headed by Kostrowicki and others are widely available, the detailed description of the method need not be highlighted and furnished. In a nutshell, the identification of the type of agriculture is based solely on inherent characteristics of agriculture consisting of 28 variables representing the most important social, operational, production and structural attributes of agriculture.

By employing the method and techniques established by the IGU Commission on Agricultural Typology, the agricultural types of 1st order, 2nd order and 3rd order are identified for the 210 sample agricultural holdings, 12 sample villages, for all the 66 mandal administrative units, 3 revenue divisions and for the district as a whole. Since a greater number of investigating units are involved in the study, the computer analysis is made to compare the codes of real units with the model codes and to find out the taxonomic distances on which the identification of type is based upon. In view of the changes in the system of administrative units in the district, the identification of
agricultural types is confined to one point of time namely, for the year 1991-92. Both cartographic and statistical techniques are also applied to present the spatial distributional pattern of the agricultural phenomena of the district.

The Plan and Design of the Thesis:

A comprehensive plan and design of the study is detailed hereunder:

1. A Perspective of the Research Theme.

2. Locational and Spatial Aspects of the Study Region.

3. Social Attributes.

4. Operational Attributes.

5. Production Attributes.


7. Typification and Agriculture and Typological Regions.

9. Summary and Conclusion.

The first Chapter provides the necessary perspective to the concept, significance and objectives of the research theme.

The Second Chapter presents on appropriate geographical setting of the study area which includes a brief account of terrain, geology, drainage, climate, soil, vegetation and demographic aspects which have profound bearing on the geography of agriculture of the district.

The Third Chapter deals with the spatial pattern of social attributes consisting of seven variables. It highlights the nature of land ownership and land tenure as well as the size of the agricultural holdings.

In the Fourth Chapter, an analysis is made to delineate the seven variables of operational attributes which include the inputs of labour power, animal power, mechanical power, chemical fertilizers and irrigation.

The Fifth Chapter attempts to described the seven variables of production attributes. Here, the computation of land productivity, labour productivity, commercialisation and specialization of agriculture are significant.

The Sixth Chapter deals with the spatial analysis of structural attributes which consists of seven variables. It includes the distributional aspects of land under food
crops, industrial crops, grassland and perennial crops and also emphasizing the animal production.

In the Seventh Chapter, an attempt is made to identify the agricultural types by synthesizing all the 28 variables of social, operational, production and structural attributes with the help of the procedure established by the IGU Commission on Agricultural Typology. The agricultural types are identified for all the 66 mandals and 3 revenue divisions. The typological regions are delimited on the basis of types identified at mandal administrative unit level.

The Eighth Chapter deals with the identification of agricultural types at micro-level and examines the difference in the development of different forms of agriculture. For this purpose, 12 sample villages and 210 sample farmers belonging to different farming communities are selected for the purpose of analysis.

Finally, in the Ninth Chapter the results of the study and conclusions are summarized highlighting the salient features and characteristics of agricultural typology in Chittoor district.