1.1 Concept of Region

Regional Planning has emerged as distinct discipline in recent past but the concept of region is a field of investigation that has still long way to go before the same could effectively be employed for planning purposes. Regions have been considered differently by different researchers belonging to various disciplines. And while doing so these researchers tended to conceive regions in context to concepts pertaining to their own disciplines. An idea of this variation in thinking and conceptualisation of regions can be had by looking at what a sample of thinkers have to say in this regard.

Jeorg (24) defines region: "any portion of the earth's surface where physical conditions are homogeneous, is considered as region".

Aronvici (3) defines region as "a geographical area or areas which a given civilization standard of a people seems to require for the fulfilment of its aspirations through material resources".

Herbertson (21) opines a region as "a complex of land, water, air, plant, animal, and man, regarded in the spatial relationship as together constituting
a definite portion of the earth's surface).

Brown (9) suggests that, "a region may be composed of areas or locational entities which in some specified respect are homogeneous. It is further stated that such areas or locational entities need to be contiguous to each other and the variables upon which the region is defined are attributes of the areas being grouped. Such regions are termed as uniformed regions".

Amadeo (1) defined, "a region as a set of location units homogeneous with respect to their values on a particular set of characteristics".

No matter which concept of region is considered for discussion in general, one has to define a definite physical boundary in each case. In practice the whole problem of regionalization boils down to determination of boundary of the region. This task of determination of boundary in a given situation is called regional delineation. Empirical exercises related to regional delineation would get more and more complicated as region under consideration involves more and more number of factors in relation to which the concept of region is to be finalised. Of all the regions that have been studied and delineated so far, urban regions involves rather the
largest number of variables that need to be considered in regional delineation.

The concept of urban region began initially with a region co-terminus with the municipal boundaries of the urban areas. As more and more experience got accumulated in planning for various activities relating to residents in urban settlements, the planners realised with increased degree of conviction that any urban settlement is in fact an integral part of the broader region to which it belongs. Accordingly, any planning exercise by treating the urban settlement to be independent unit, or an isolated conglomeration of structures, could suffer from certain kind of partiality bias to the extent that its multifarious dependence with its hinterland is not taken into account while determining its activity mix. The planner's treatment of a city to be independent entity would not prevent the inter-dependence of the above kind not to exist and gain strength and this in the long run would generate the very problems, which in fact urban planners wish to tackle in the beginning itself.

If one examines the process of evolution of cities and towns over time one finds that in most cases, towns and such settlements emerged and grew
owing to certain socio-economic factors. These factors could be identified to be centres of administration, centres of religion and learning, centres of industrial activity or commercial preponderance, existence of port facilities, etc. Starting with one major function in the beginning towns and cities exhibited a tendency of acquiring some kind of balanced mix of various activities and in each case they have tended to serve more and more the people residing not only within the boundary of city but also belonging to far and near places, outside its boundary.

In general urban settlements provide certain facilities and amenities to the people belonging to its hinterland and in return receive such essential supplies as manpower, agricultural commodities, industrial inputs, etc. In this way, any urban settlement can be seen to be integral part of its hinterland and its relationship with hinterland could be interpreted as a convenient and essential give and take phenomenon in the absence of which both urban settlement as well as hinterland would suffer in various ways. Any planning exercise in context to urban settlement, therefore, must consider its relationship with its hinterland. This amounts to say that a large number of variables pertaining to urban
settlement and its hinterland will have to be considered while attempting to delineate a broader region for urban settlement within which it can expand over time and acquire the mix of activities that are most congenial to well being of the people involved.

This idea of urban region is a natural extension of the concept of central business district (CBD), which is in fact one of the initial concepts of town planning and continues to be still popular in town planning efforts.

We propose to concentrate in this study on the concept of urban region. The nature of urban region as hinted earlier is not strictly same as homogeneous region. Certain degree of complimentarity in respect of technical relationship between various variables involved is essential in determination of proper mix of activities within an urban region.

The task of planning for such a region could involve the entire problem of socio-economic planning together with relationship with space as defined by the urban region. In this sense the concept of a region gets extended to what we would like to call as planning region in context to an urban settlement and its hinterland.
1.1.1 Types of Regions

It will be convenient to begin with a brief description of various types of regions that have been thought of in available literature on this subject. These can be grouped as below:

(1) Homogeneous regions
(2) Nodal regions
(3) Functional regions
(4) Programming regions
(5) Administrative regions
(6) Urban regions

These regions have been defined in past by authors in this field but the definitions are not all alike. Some of these definitions are reported below for illustration.

Homogeneous Region

Bouge and Beale (5) attempted to draw up homogeneous regions on the basis of broad geographical areas of specialization. They have conceived homogeneity of region primarily in terms of agriculture. Botkin (6) considered homogeneous regions on the basis of per capita income levels. This criteria may be empirically appropriate, if applied dynamically, rather than statistically. In context to Ahmedabad
Urban Planning Region data on per capita income is not easily accessible, so also in case of many urban regions. D.C. North (34) has suggested that unifying cohesive force behind a region is dominance of its economy by an export base. Gajda R.T (13) opines that complete homogeneity is unworkable, theoretically undesirable, and in fact unobtainable except in reference to large homogeneous regions. This is so when large urban centres always tend to introduce heterogeneity.

**Nodal Region**

The second category of regions considered for regional analysis is 'Nodal or Polarised', regions. The nodal region is a system working within the region itself containing its sensitive variables. Nodal regions emphasise the interdependence of different components within the region rather than inter-regional relationships between homogeneous regions. Since the functional linkages between spatial units are limited by space, nodal regions usually take explicit account of the distance factor as revealed, in gravity potential models.

The nodal region is determined by the distance factor and time scale parameters. To this extent, they are more realistic, and some analysts, have argued that nodal regions are the real regions of the
earth, to be contrasted with the more stereotyped subjective maps of homogeneous regions.

The nodal regions theory has certain limitations and few gaps unexplained. For instance, it is very difficult to assume a regional system where outside force could be considered as given or neutral. Moreover the supply of investment goods in less developed regions will tend to be inelastic and the theory requires modifications in such cases to take account of the import of investment of goods. In working out nodal regions, Nystuen J D and M F Daay* used telephone calls and shopping trips, as basic data. Data on telephone calls and shopping trips indicate indirect linkages of flows, within a given region.

Functional Regions

Functional regions are associated with its basic economic activity. The handbook of census categorises towns and cities into various functional regions. They include service centres, industrial centres and commercial centres. One may classify towns and cities in India into one of the above categories, if one is interested to make a categorisation of functional regions. Functional regions can be further sub-divided into sub-functional

* A Graph Theory Interpretation of Nodal Regions, Regional Science Association
regions and sub-sub functional regions as one desires in context to regional planning. We have attempted to show few functional sub-regions in case of Ahmedabad Urban Planning Region (AUPR) in Section (4.13).

One approach to delineating functional regions is represented by the work of Coats and Hunt (12). They mapped all journey to-work interactions using arrows to indicate the strength and directions of flows; then subjectively set functional region boundaries on the criterion of minimising interactions taking place across boundaries.

Russett recommended (40) factor analysis to matrix containing standardised measures of the flow on association between places, functional groupings being indicated by the resulting factor loading pattern. A different approach to similar data as mentioned above is presented in the work of Brams (8). A functional region, therefore may be identified by assigning apriori, the characteristic feature, such as, commercial, industrial and service classes of workers. The functional regions are the basis to identify growth centres in Gujarat and elsewhere.

Programming Regions

Programme or policy regions include backward
areas, tribal areas in case of regions in India. One may even think of certain areas to declare as no industry district and thereby Government policy or programmes can be enforced for the development of entire region. In certain cases, health campaign, credit campaign are instrumental in determining programme or policy region.

Administrative Regions
This includes, all such administrative areas that has been decided by Indian Union by the Act of legislature. The administrative regions refer to States, Districts, Talukas, Blocks and Villages. In the recent past area development authorities have been set up in case of these administrative regions. At state level, State Planning Boards are made operative which take care of both the spatial and economic planning. At district level, district planning boards are set up, who have been entrusted with the task of performing district level implementation of schemes that are even related to land use plan. At taluka level, area development authorities are established for promoting talukas.

Urban Region
An urban region can be thought to exist around
the urban settlement under consideration. Any city or town provides certain facilities and amenities that normally do not exist in that scale in the rural settlements around it. The rural settlements in turn provide certain goods and service to their urban areas. These bilateral relations bind both the urban area and the rural settlements surrounding it in the form of mutual interdependence for the benefit of either group. Intensity of such interdependence is not same everywhere around the city. This is a question as to how far should one go in different directions from the city or town to define an urban region for planning purposes. This raises the issue of delineating an urban region and this has been further explained in the concluding part of the II Chapter. The delineation of any region cannot said to be all independent. Planning Commission(36) felt that the city development plans were to be linked with State Five Year Plans on suggested lines.

The Census of India (11) authorities defined a place as 'urban' if it has an urban local body functioning in it. Other criteria used were a minimum population of 5,000, a minimum density of 600 persons per square mile and atleast three
fourths of 'workers' in non-agricultural occupations. Today the quantum of urban issues are not a minimal in India, where Urban local bodies covered a total population of 69.2 million or about 88% of India's total urban population (23). These urban local bodies may have to be planned efficiently, in such a way that, their dependency on large urban bodies shall not hamper severely.

We propose to discuss concept of regional planning in section 1.2 before we attempt to discuss issues of regional delineation in Chapter-II.

1.2 Concept of Regional Planning

The concept of regional planning involved in almost as diversified manner as the concept of region itself. We will begin with a sample of opinions of authors in this field.

Musil J, Edward C. Banfield and James Q. Wilson (33) pointed out that "All regional planning has... the weakness and strengths of confederation. It is almost always advisory.

Wentworth (49) pointed out that, in light of our industrial society with its intricate network of large scale spatial interdependencies, the need for regional planning is
becoming increasingly apparent. Even the most skeptical critics of planning would agree that regional management is needed on the ground of economic efficiency alone.

Clearly regional planning would be so justified in order to limit the external diseconomies between units generated by our complex social and economic process such as the migration of rural poor families to already overcrowded metropolitan centres, environmental pollution, the provision of fragmented and inadequate public facilities and services and the national economic drag of depressed rural areas (39).

Conference on Economic Analysis (15) emphasised that the regional planning could be directed towards non-efficiency purpose as well. In the absence of a viable negative income tax or major family income supplement programme, public investment with regional implications may be one of the most effective means of redistributing income in many societies.

Arthur Mass (4) opined that the regional planning management, could be used legitimately for other goals such as historic and natural conservation and wild life preservation (4).

Amitai Etzioni (2) opined that in societies with large regional differences in terms of
development, ethnicity and history, regional institutions could be justified also for socio-cultural reasons. Although it has been argued that regional institutions could retard national social integration by reinforcing regional cultural difference.

Some of the opinions expressed a more essential and humanitarian approach while considering the qualifications of a region. According to P. Geddes (19), place studies without work or folk is a matter of atlas and maps. Folk without place and work are dead, hence anthropological collections and books contain too much of mere skulls and weapons. So too for economies, the study of work apart from definite place and definite folk, comes down to mere abstraction.

Similarly, the Le Play Formula adopted by Geddes expresses a life process which has regional dimensions. "Place-Work-Folk" are synonymous with environment, economy, and society. These three constitute the interdependent elements of a single process, acting, reacting and interacting.

According to Prof VLS Prakasa Rao (38), the systems of a region is well explained. Maybe in one region, say a river delta, the laws of the
environment demand intimate adaptation of landuse, while in another, a metropolitan or an industrial region, work and folk transform the environment to meet their specific demands... In a region for regional planning, the different regional factors interact and operate in mutual actions and reactions, any change in one normally leads to changes in others, thus setting up a chain reaction. In fact there is a two-way chain reaction, one internal, within the region, and the other external, with the neighbouring or farther regions.

J.Friendmann and W.Alonso (16) viewed the region to encompass, the decision-making and planning process systems, therefore, regional planning is made synonymous with regional development policy at the national level (balanced integration) with a process of decision making and design in the elaboration of investment projects at the regional level and with economic development programmes for sub-national areas. There is, in addition, an intimation that regional planning has something to do with metropolitan development, resource management and agricultural and community improvement.

The views expressed by J.Friendmann and W.Alonso (17) is more pragmatic, wherein they could identify
the extent of political system involved in regional configuration has been well explained above. In other words, according to Friedmann, one may say that regional planning is concerned with the ordering of human activities in supra-local space. It aims simultaneously at economic development, social justice, and environmental quality.

Merriam (27) opined that, each region, small or big, forms a system "there is a just and efficient division of labour among different contributing and constituent units. This, however, does not mean complete decentralisation. To decentralise everything is anarchy. To centralise everything spells both despotism and anarchy.

Hansen N.M stated that no policy could be more uneconomic than one designed to make each region a self-sufficient economy. Nevertheless, every region should develop as broad a base of economic activities, as its natural resources can economically sustain.

Prakasa Rao (37) opined that, planning, thus, should be seen as a means to so organise human society that it can adjust itself to the changing socio-technical environment and can use this environment to maximise the welfare of its members.
According to OECD (35), attention to problems on a regional scale provides a means of countering centripetal forces inherent in economic and technological development which tend to widen the existing disparities between one part of a country and others.

All such approaches to regional planning need to be examined in context to reality as it may exist in case of any given region. The contradiction wherever they exist in these approaches and one can easily overcome by taking systematic view of regional planning where all aspects of the society are considered simultaneously, along with their intrinsic interrelation and the resource mix and the available resource mix. In the countries where some kind of planned development is already going on, the task of regional planning has to be largely guided by the broader goals and objectives adopted by the country as a whole. In that sense, the problem of choice of objective for regional planning get resolved to great extent because one has to evolve an appropriate activity mix for the region so that a collective result of implementation of such a plan could lead not only to alignment of the national objectives but also could lead to achievement of several unstated objectives that may be relevant to the real situation.
prevailing within the region under consideration.

In general one has to define the objectives very clearly before beginning with the task of regional planning. In fact the type of region has to be got settle down even earlier than the objective that can be associated with that. For illustration let us assume that we are interested in planning for an urban region as spelled out earlier, and let this region be a part of Indian Union. In that case the planning objectives for India as a whole are also be the objective of urban region in question. The objective of growth, employment, economic justice, etc, which constitute National objectives of India have to be achieved through any planning exercise that one may like to make for an urban region belonging to India. The first task involved in planning for such a region is to determine the boundary of the region. The boundary in turn has to be determined by considering all the variables pertaining to interdependence between variables and its hinterland resource position, strength and weakness of various kinds, social preference of community in question, geographical constraint in terms of topography, soil, variety, altitude of the terrain, climatic condition, etc. No general description of these variables can be made in terms of specific variables. This has to
be done separately in case of the urban settlement under consideration. Having decided such variables one has to use the facts relating to these variables and arrive at an accessible boundary of the urban region. This can be done in a number of ways. The methods involved in each case have their own strength. In fact appropriateness of method need to be judged in relation to nature of problem at hand. The question of choice of method for this purpose has not yet finally settled. This problem needs to be examined both in its theoretical and empirical appropriateness.

The next task involved in planning the urban region is to decide as to which piece of land in region should be used for what purpose and with what ultimate results. This task essentially involves determining land use plan of the entire area, lying within regional boundary. The land use emerging in this way should ensure apriori consideration, that the objectives of regional planning are met as a result of such a land use planning. In this manner each one of the activities, social or economic or any other variety gets located on land in a manner that each one gets the size of land as required and the whole configuration of the emerging activities leads to maximisation of such
desired achievement as maximisation of functional friction, maximisation of overall accessibility, etc. In this case, again no set methodology or no objective methodology is available so far, as far as the author is aware of, which helps in objective determination of land use mix. This problem deserves adequate attention.

Even after successfully determining the land use mix, the task of regional planning is only half way. Thereafter next issue that arises in actual situation relates to phasing the development of land falling within the urban region. If funds are not the constraining factor, though it is not true in most cases, one could have started with the development of entire area within the delineated region.

While this approach could prove financially undesirable, it may also cause temporal mismatch in demand and supply of various kinds of developed land. Therefore, the problems relating to phasing of development, matching of demand and supply of land over time or over the various segments of entire planning period, maximisation of funds requirement in beginning of plan, generation of desirable funds flow during years to follow, etc, have to be examined
with the same degree of thoroughness as regional planning and land use planning. Though available methodology for this purpose is thought to be satisfactory and has been illustrated in the literature in various contexts, it is, however, not popular enough with financial executives in public corporation and authorities that are supposed to be handling urban and regional planning. This problem needs to be illustrated with empirical details so that it could provide some kind of guiding help to the people, who may like to do the small exercises for regional planning.

If all these components of planning, as briefly explained above were done with enough thoroughness, one would come out with action plan that could be implemented in accordance with the steps outlined in each case. For such an action plan emerging in context to a given city or region one could require an appropriate organisation to implement the plan as envisaged. This task of choice of appropriate organisational set up to carry out plan is thought equally important and deserve appropriate attention. Though this task is essentially a task related to implementation of any regional planning blue print but it should find due place in the National planning
blue print itself for the sake of successful implementation.

These task components of regional planning could prove much more effective and provide a clearer/guiding help to the users if theoretical discussion and analysis were supplemented with enough empirical details corresponding to a major urban region. In this way not only why to follow a particular component of planning but also how to follow the same concept of planning in relation to a given situation could be made explicit with enough illustrative reinforcement.

1.3 Plan of the Present Study

The plan of the present study is similar to the order in which various issues relating to regional planning have been briefly stated in the preceding lines. Chapter-II of this volume deals with various methods of regional delineation along with their merits, demerits and applicational details.

Empirical delineation of the urban planning region has been conducted for Ahmedabad City. This city has been selected for empirical study in this volume and details in this regard are given in Chapter III.
The problem of determining land use mix on the basis of available data in accordance with the situation as it prevails in reality is discussed in chapter IV of the volume. This chapter not only provides a meaningful approach, theoretical basis for determination of land use mix, but also incorporates the empirically determined magnitudes of land sizes for different types of urban and regional activities.

Last chapter of this volume includes discussion relating to phasing of actual development of land within the region. The same chapter also includes the financial implication of alternative developmental approaches. The issue of determination of relevant organization for implementing the urban region planning blueprint, emerging in accordance with what has been stated above, has been kept out of the purview of this volume owing to two considerations. Firstly, this is an implementational issue and does not fall within the planning part of the problem. Secondly, not much attention appears to have been given in relation to economic aspects of organizational structure and if one wants to do justice to this problem, one has to devote a separate volume to this important problem alone.
CHAPTER 2 METHODS OF REGIONAL DELINEATION

2.1 Introduction

In this Chapter, we attempt to explain briefly but clearly the analytical methods dealing with regional delineation. The methods of delineation are discussed in context to empirical problem considered in this study. These methods have also been used wherever feasible for actual delineation of Ahmedabad Urban Region. In fact, different techniques may or may not yield the same result. The final selection of technique to be used for regional analysis will largely depend upon its compatibility to situation as it prevails in empirical sense in the present study. This approach may not be very objective one but this is the best that can be done in the absence of any satisfactory criterion to evaluate the appropriateness of various methods to be discussed in this chapter.

2.2 Survey of Approaches to Regional Delineation

The concept of regional delineation was discussed in the previous Chapter. Problem of Regional Delineation was defined as determination of boundary around an urban area such that interdependence of the urban area and the region
around it is maximised in the sense of meeting each other's needs. This problem has been attempted in the past by various researchers in regional science with varying degree of success. We shall describe them briefly in what follows.

2.2.1 Single Criterion Maps

This method found its origin in the works of geographers. The regional delineation based on single criterion maps is as old as regional science itself. The method is very simple in actual practice and uses data on a single variable. Suppose that one is interested in depicting the area around Ahmedabad that supplies milk for day to day consumption. In this case the required data consists of villages around Ahmedabad city supplying milk to it. One can use a bigger map of region around Ahmedabad and mark out the villages supplying milk. The boundary drawn by joining the village centres supplying milk will provide a region around Ahmedabad inclusive of the city. This region is based upon only one criterion, namely, milk supply and in that sense it is in fact a single criterion map. One can draw such maps for any other criterion of interest. Ultimately, one can draw as many maps as the number of criterion in question. The boundaries of all such maps are usually different from each other.