Human Settlements Planning
Lecture 1

Ekistics

We will start with the topic of 'Ekistics' which studies the subject of human settlements in detail. This term Ekistics was coined by C.A Doxiadis in 1942, this is basically the science of human settlements. This includes regional, city, community planning, as well as the design of dwelling units. This science is termed Ekistics and this will take into consideration; the principles that man takes into account when building his settlements, as well as the evolution of human settlements through history in terms of size and quality. The target is to build the city of optimum size, that is, a city which respects human dimensions. Since there is no point in resisting development, we should try to accommodate technological evolution and the needs of man within the same settlement. According to Doxiadis, In order to create the cities of the future, we need to systematically develop a science of human settlements. When we look at the subject of human settlements as such, it's no longer pertaining just different kinds of towns and cities. Over a period of time, there have been a lot of changes in population, change in technology, all of these have to be embraced and dealt upon. We should build cities in such a way that it takes into consideration all these changes and not leaving behind the needs of man. For instance; if you look at the industrial revolution, that brought in a lot of changes initially, with respect to the steam engine, the automobiles and now within the automobiles, we have so many different kinds of automobiles. Now, we have the railways within the city, the MRTS, so many other things. So, as technological advances happen. Our science that deals with the kind of settlements we deal with, also should advance simultaneously.

Ekistics aims to encompass all scales of human habitation and seeks to learn from the archeological and historical record by looking at not only great cities, but as much as possible, the total settlement pattern. **What are the parts of a composite human settlement? Homogenous part** - you have fields. **Central parts** you have built-up villages; **Circulatory parts** - you have roads and paths within these fields and **Special parts** - you have monasteries contained within these homogenous parts. So, a number of these elements actually make up the human settlement. Human settlements like we discussed doesn't deal only with cities, it's with towns, it's with different regions, it's even with rural settlements, because a kind of pattern emerges, the type of settlement, the pattern will gradually change but the basic components will continue to remain the same. If you look at the components of the settlement; Number one, we will discuss **Nature:** The biosphere and environment that provides the basic needs of man. **Man:** The next important component of why the settlement itself has come into place, makes a decision on what to do with the resources around them. **Society -** agglomeration of people that creates an interaction and relationships governed by social artifacts such as economic, cultural, political or spiritual. **Shells** - contain human activities and provide protection. **Networks -** these are basically channels through which people, energy and information flow. Basic examples of networks, you have roads, railways, skyways, bridges, pipelines, drainage and telecommunications. So networks are basically anything that needs to move from point A to point B. It could even be electricity, but it is the movement of any component. We just saw the units. We will just look at some examples. If you look at nature, the examples of **nature** you have; Geological resources, Topographical resources, Soil resources, Water resources, Plant life, Animal life and climate. Within **Man,** the components you have; Biological needs i.e space, air, temperature, sensation and perception i.e the five senses we

usually talk about. Their emotional needs i.e. human relations, security, aesthetic beauty and finally moral values. **Society encompasses;** Population composition and density population, Social stratification, Cultural patterns, Economic development, Education, Health and welfare, Law and administration. Now if you look at **Shell;** housing, community services which includes schools, hospitals etc. Shopping centres and markets, Recreational facilities, Civic and business centres which includes town halls, law courts, etc. Industry and Transportation centres. Finally, **Networks -** Water supply systems, Power supply systems, Transportation systems which encompass water, road, railway, as well as air, Communication systems which are telephones, radios, Television etc, Sewage and Drainage, Physical layout which is nothing but the Ekistic plan. The physical layout will talk of both of automobile movement, as well as pedestrian movement.

The basic principles of Ekistics. The first important principle; **Maximization of Human Potentials -** in a certain area, man will select the location which permits a maximum of potential contact. **Minimization of Efforts -** just a contrast of the first principle. A minimum of effort in terms of energy, time, as well as cost. Man selects the most convenient routes. **Optimization of Man's Protective space; Optimization of man's relationship with his environment and Optimization of the four previous principles.** Now, we will look at the first previous principles; **Maximization of Human potentials.** What we will basically talk about here is, what kind of contacts we have with the elements of nature like water, trees, the other people in the environment, with other works of man such as; buildings, roads. This, after all, amounts to an operational definition of personal human freedom. It is in accordance with this principle that man abandoned the Garden of Eden and is today attempting to conquer the cosmos. It is because of this

principle that man considers himself imprisoned, even if given the best type of environment and if he is surrounded by a wall without doors. In this, man differs from animals; we do not know of any species of animals that try to increase their potential contacts with the environment once they have reached the optimum number of contacts. Man alone always seeks to increase his contacts. When you talk about increasing contacts, it does not mean just talking to people, man is and has never been satisfied. Even if you take the current situation; we went to the moon, now we want to go to the mars. We want to explore what is beyond the realm of Earth.It is no more, shall I go to the next town, shall I go to the next city?, our sense of curiousity and our sense of helplessness in the sense, we are stuck over here what is there beyond this, exists only in man. This is the first main principle of Ekistics.

The second principle; Minimization of the Effort, this required for the achievement of man's actual and potential contacts. He always gives his structure the shape, or selects the route, that requires the minimum effort, no matter whether he is dealing with the floor of a room, which he tends to make horizontal or with the creation of a highway.

The third principle; Optimization of man's protective space, which means the selection of such a distance from other people, animals, objects, that he can keep his contact with them, such that the first principle is maintained without any kind of sensory or psychological discomfort. This has to be true at every moment and in every locality, whether it is temporary or permanent and whether man is alone or a part of this group. This has been demonstrated very well, lately for the single individual, by anthropologists such as E.T. Hall and psychiatrists such as Augustus F.Kinzel and by the clothes man designs for himself, and it may be explained not only as a psychological fact but also as a

physiological problem if we think of the layers of air that surround us or the energy that we represent. The walls of houses or fortification walls around cities are other expressions of this third principle. So, as an extension to the first principle, besides the stage of curiousity, man also has an insecure feeling in him. If you don't know who your neighbours are, you will have that sense of insecurity prolonging for a long period of time since you will be in complete comfort only when you are in your comfort zone or amongst people you trust and you know your surroundings and that is exactly why, man keeps trying to push his boundaries to make sure who is around him and what kind of things exist around him. So following the third principle, security is a very important issue, this could be security in terms of psychological, physical, as well as the type of security we want within our minds to be at rest.

The fourth principle; Optimization of the quality of man's relationship with his environment which consists of nature, society, shells - shells include buildings and houses of any kind which even includes your institutional buildings, your public buildings, everything and networks which range from roads to telecommunications. This is the principle that leads to order, physiological and aesthetic and that influences architecture and in many respects, even art.

The fifth the principle; Man organizes his settlements in an attempt to achieve an optimum synthesis of the other four principles and this optimization is dependent on time and space, on actual conditions and on man's ability to create a synthesis. When he has achieved this by creating a system of floors, walls, roofs, doors, and windows which allow him to maximize his potential contacts (first principle) while minimizing the energy expended (second principle) and at the same time

makes possible his separation from others (third principle) and the desirable relationship with his environment (fourth principle), we speak of "successful human settlements". What you mean here is, settlements that have achieved a balance between man and his man-made environment, by complying with all five principles. The idea that the small, romantic city of earlier times is appropriate to the era of contemporary man who developed science and technology is therefore a mistaken one. New, dynamic types of settlements interconnecting more and more smaller settlements are the types appropriate to this era. To stop this change from city (polis) to dynapolis, we would have to reverse the road created by science and technology for man's movement in terrestrial space. So, initially if you look at the garden city concept in all those cities, there was an idea of having a lot of movement, a lot of space, a large city with a lot of green space and then a centre which had all the commercial and trade activities. If you look at the current trend in this era, that is not going to be feasible with the expanding population. You need to have smaller, smaller units of settlements emerging which are interconnected by a very good transport system and that's the way to go with a new dynamic type of settlement.

Urban Structure

If you look at the main elements of urban structure, the urban form and its spatial structure are articulated by two elements; Nodes and Linkages. If you look at Nodes, these are reflected in the centrality of all urban activities, it can be related to the spatial accumulation of all economic activities or to the accessibility to the transport system. Terminals, such as ports, rail yards, and airports are important nodes around which activities agglomerate at the local or regional level. Nodes have a hierarchy related to their importance and this contributes to urban

functions, such as production, management, retailing and distribution. So, nodes prove to be the main spine of any economic activity which leads to movement of both goods as well as people. Linkages - These are the infrastructures supporting flows from, to and between nodes. The lowest level of linkages include streets, which are the defining elements of the urban spatial structure. There is a hierarchy of linkages moving up to regional roads and railways and international connections by air and maritime transport systems. So, now that you have your nodes in place and different parts across the globe, how do these nodes get connected? That's where the second important element of the urban structure comes in, which is the linkages. Linkages provide the link between every node that is there such that the entire economic activity can go to the next level, as well as goods, as well as transport of people, knowledge etc.

Now, we will discuss; Nodes, Linkages and their relationship to the Urban Form. First we have the economic nodes. This refers to locations that perform a function of economic significance. These functions are extremely varied and can include transformation, administration, education, retailing and leisure. Economic nodes tend to agglomerate or to cluster and are often dependent on access, if not close proximity to an accessibility node or a linkage. Such clusters often take the form of central business districts, commercial strips, industrial districts or logistical zones. Economic zones like we just spoke about are very important for any developing human settlement because without an economic node, for any transaction to take place, let it be a good transaction, via the road, via an airway or via the railways, everything needs to have an important economic node and related to this, surrounding buildings will also come up to support this kind of typology. The presence of nodes require linkages, which can be serviced by different transport nodes. Road and transit linkages are obviously

local in scope often taking the form of a grid that characterizes the form of many cities. Now the concept of the node is lost without the linkage and similarly linkage doesn't have any identity without the node. So, node and linkages can succeed successfully only if they are well constructed, such that they can support each other. While rail, maritime and air linkages integrate the city to a wider context of distribution and trade. The complex set of relationships between nodes and their linkages imply an urban form which is unique in each case.

Now, we will discuss the theories that explain the emergence of towns. The first theory we will be looking at is ; **The Central Place Theory.** Examples of this are the Polders of Netherlands, the Fens of East Anglia in the United Kingdom. This was developed by the German geographer Walter Christaller in 1933. This theory explains reasons behind the distribution patterns, size, and number of cities and towns that emerge. This was first tested in Southern Germany and it came to the conclusion that people gather around together in cities to share goods, ideas and the main assumptions made here in this Central Place Theory is; Humans will always purchase goods from the closest place; Unbounded Isotropic i.e. all flat, homogeneous, limitless surface, evenly distributed population; all settlements are equidistant and exist in a triangular lattice pattern and evenly distributed resources. So, these were the assumptions made by Christaller when this theory was placed. This is a typical example of what you would see. You will have a town, the red dot you see over here is the city and the green nodes are the villages. So, basically, even here it was clearly decided that even though the cities would have most importance, the villages were more in number because they are the ones that support the concept of agriculture. The market town is again important and proves to be the linkage between the agricultural node, the village to the main economic node, the city. The

towns, the market towns proved to be different concepts again, you will have all of these surrounded by rural segments and these rural segments are very important because even more they are more in number, in terms of population it will be much lesser and these are the basic boundaries that we will be discussing. So, as you can see, this is the main assumption that the land is extremely flat, homogeneous; there is no kind of terrain distribution or difference in terrain. So, this is the Central Place Theory.

The next theory is; The Public Choice Theory. This was advanced by Paul Peterson in his 1981 book, City limits, states that urban politicians and governing regimes, are subordinate to the overall economic principles that force cities to compete to capture new investment and capital. The competitive nature of cities encourages, the business elite and politicians to favour new development. So, like we first saw that the first theory was based completely on environment, this is completely based on the growing trend of economic principles and its completely dependent on that.

Extent of Human Settlements

Now, we look at the **Extent of Human Settlements.** We are actually not aware of the great importance of the five principles unless this is pointed out to us. We have been living all these years without the concept of Ekistics and these five principles have always governed our settlements since 5000 B.C. But now that it has been pointed out to us, we are still not able to understand its importance and in spite of coming up with these principles, we still make big mistakes while we create theories on human settlements. The main reason these mistakes happen is because we live in a transitional era and get confused about our subject, even

about the nature and extent of human settlements, confusing them with their physical structure. The physical structure of a human settlement is a 'built up area of the city', the institutional frame is the 'municipality of the city'. Human settlements have always been created by man moving in space and defining the boundaries of his territorial interest and therefore his settlements for which, he later created a physical and institutional structure. Throughout this evolution there is only one factor which defines the extent of human settlements: the distance man wants to go or can go in the course of his daily life. The shortest of the two distances defines the extent of the real human settlement, through definition of a "daily urban system". So, that is absolutely true even in today's context, the only difference being, now we have automobiles, we have railways and we even have airways to a certain extent. People are able to make the daily urban system shrink, that's exactly why we use the phrase, "the world is shrinking". What distance man could achieve by road, now he achieves the same distance in much lesser time. So, it's possible for a person working in Chennai to visit Coimbatore for a meeting and come back. If the airway was not possible and it had to be completely done by road, that wouldn't be a part of the daily urban system. As technological advancements are happening, our world has shrunk, the daily urban system too has shrunk. But as a majority scale, if you look at the settlement pattern, usual pattern will be taken to consideration; roadways, railways as in intercity railways, as well as pedestrian activity. Only these three will decide our daily urban system. In each specific case, the process starts with a circle whose radius is defined by man's willingness to walk daily, up to a certain distance and to spend a certain period of time in doing so. This leads to the conception of a circular city and of a city growing in concentric circles. When the machine i.e. the motor vehicle enters the picture, we come into the two speed system which is both automobile friendly - one speed and

pedestrian friendly which is the second speed. Then towards interconnected settlements; the roads lead towards larger systems, then you have the Universal city of Ecumenopolis which is inevitable. The idea that the small, romantic city of earlier times is appropriate is obviously not possible now. New dynamic types of settlements interconnecting more and more smaller settlements are the types appropriate to this era.

Human being and our relationship to settlements : The human centred approach emphasises that a central purpose of planning is to ensure that the developmental needs and activities of people living in settlements are catered for and in particular, that opportunities for people to achieve their full potential through their own efforts are maximised. This approach rather than being purely cost - or technologically driven is people driven and democratic. So that is most important. Most of our settlements end up being technologically driven which is not human friendly and eventually environmental friendly. Only when it is democratic and people friendly to a certain extent can we call it environmental friendly.

The Nature Centre Approach recognizes that natural systems interact in highly synergistic ways which must be respected if breakdowns in them are to be prevented and that is exactly what we just spoke about, the importance of environment and the ecosystem. Human actions on the landscape, such as settlement-making, must thus be sensitive to ecological processes. So, rather than imposing settlement development on the environment, this approach emphasises design with nature, thereby creating synergy between man-made and ecological systems. In terms of the human made environment, the quality of place recognizes that there are points where elements of structure particularly the

movement system come together to create places of high accessibility and special significance. These end up being meeting places of every settlement. It could be a plaza, a particular square, it could be a market area, it could be a bazaar. So, all of these end up having higher accessibility and overtime that gains special significance. Business and commercial activities, schools, clinics, libraries, community halls and other facilities and activities requiring exposure to large numbers of people are associated with these places. In the best cases, the importance of these places are recognised by the focus of public investment, aimed at making them attractive, user-friendly and comfortable to experience. They also become the places that accommodate symbolic statements such as objects of remembrance. These become memorable places which shape the impressions of a settlement. So, this could even be a tomb, it could be a memorial of a person, basic thing is this is something where people of a settlement are emotionally attached to, or could even socially congregate. If you look at the relationship between human beings and settlements, it has changed over a period of time, initially when man moved into a settlement, he did not recognize the importance of nature, he just took it for granted, it is only now, in recent periods of time, we have realized how much damage we have caused and we can actually create lasting impressions on the ecological aspects of it. So, when you look at the relationship between human beings and settlements, it is varied and it has transpired different relationship boundaries over a period of thousands of years.