Computer Environment for GIS

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Introduction:

There are various definitions of the environment in different disciplines. The variety in the definitions of the environment does not solely stem from different scientific approaches. It also stems from the qualitative and quantitative differences of the elements which constitute the environment (Gülay et al., 2011). The word environment is generally used for events out of organism (Ünder, 1996). Everything which an organism takes place in and excludes the organism constitutes the external environment of the organism. In a general definition, the environment is the whole physical, chemical, biologic and social effects during a certain period of time that can have a direct or indirect impact on human activities and the living immediately or within a long period ((Erol, 2005, Güllü, 2007, Özcan, 2008, Gülay et al., 2011).

Ecology, on the other hand, has a much narrower scope compared to environment. Derived from Greek words oikos (home or a place to live in) and logos (information), ecology can be defined as a science field which analyzes the living and their relationships with the environment (Muslu 2000). Therefore, the science of ecology investigates houses, living places and environments of the all living. The environment concept in this definition includes other animals, plants, climate and soil as well. In conceptual terms, the environment is the whole of non-living and living organisms including humanbeing as a fundamental element; physical, chemical, biologic and social factors that affect all species and the behaviors of the living; natural, economic and cultural values. The living and non-living organisms form a dynamic system called ecosystem based on a mutual matter exchange. As a living organism, humanbeing takes place among the elements of these systems. The survival of human being depends on the presence of suitable food, shelter and other environmental conditions. Population growth and industrial development bring adverse pressure on limited environmental means and lead to change in the environment and extinction of plant and animal communities. The extinction of a community due to adverse effects generally makes it impossible to renew. It is inevitable for some species to completely extinct in case of

decreases in population number and severe deteriorations. Since decreasing or lost species are the products of millions years of an evolutionary-ecology process, they should be reckoned as irrevocable values (Şişli 1996). For that reason of sustainable environment approach is important. Sustainability consists of ecologic, social and economic factors. These systems constitute fundamental pillars of society. The sustainability of these factors shapes the future of a society (Kumler, 2009).Sustainable development is defined as planning today's and future life without jeopardizing needs and development by fulfilling the needs of today's and future generations without consuming natural resources through a balance between human and nature. What is essential in sustainable development is to ensure economic development through a planning to protect human health and natural balance without harming or completely consuming resources (Ekici et al., 2009).

Geographical Information System:

In parallel with rapid developments in technology within last 30 years, innovations in computer technology have led to new study fields and changes in application area for many science branches. Geographical Information Systems (GIS) is a technology which resulted from this development and started to be used by many science branches (Kavzaoğlu et al., 2011). Geographical information systems (GIS) is an information system developed to collect, input, store, interrogate spatial information (graphics and feature) in computer environment, to conduct and scan spatial analyses and print them in various formats (Aronoff, 1991). GIS have a more common application opportunity thanks to advanced computer and satellite technologies today. However, technical maps designed by John Snav in 1854 to reveal the source of cholera epidemics in London were the first examples of GIS (Değerliyurt, 2015). Basic functioning principle of GIS is associating graphics (spatial) and feature (graphic, non-spatial) data for a certain geographical region and storing these data in various layers, conducting analyses by using these layers. It is possible to conduct data processing, interrogations, spatial analyses, scenario analyses and various presentations about them through GIS. It is possible to process, update and transfer data in various environments and add data to GIS from other

environments. Data production is also possible through various analyses by using data in GIS. Since all these processes are conducted in digital environment, data processes can be

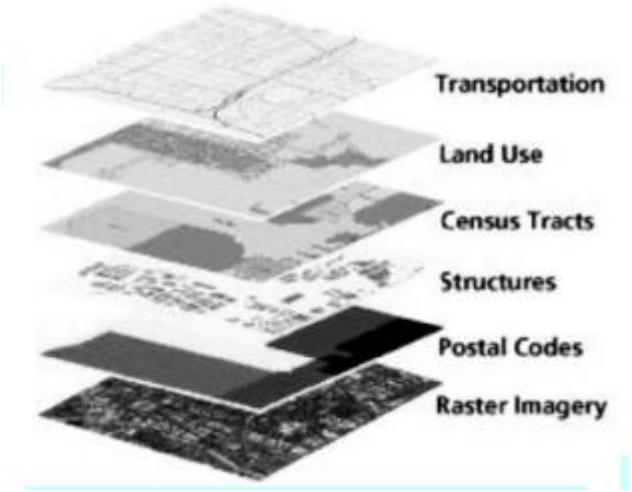

Figure: Layer Logic in the Geographical Information System (Dölek et.al., 2011)

carried out swiftly. A variety of spatial analyses can be conducted through GIS. Multiple spatial analysis functions of GIS ensure to design and analyze various scenarios by means of data structure. This feature of GIS makes it indispensable element of spatial decision-support systems. Scenario analyses are among very efficient methods in activities such as evaluation of especially natural disasters, environmental effect or observation of time-related changes in systems. GIS is a method having advantages for related subjects and a tool to fulfill a purpose. In terms of this approach, GIS applications are not the target of studies, but research methodology preferred to reach the real target. Natural environment analyses can be conducted with GIS. GIS methodology can be used to conduct projects on researching and analyzing features of natural environment including atmosphere, earth and subterranean, using natural environment and preventing risks derived from natural environment. Natural environment analyses can be used for modeling.