ANALYZING AND MANAGEMENT OF TOURISM ACTIVITIES BY MEANS OF GIS TECHNIQUE

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This paper presents a GIS application to support planning activities for tourism in the Manavgat region located in southern coast of Turkey, focusing on the analysis, decisions making and management using GIS technique. The geographic information system integrates spatial database, statistical data and textual information, in order to develop a data model providing proper and complete information for analysis and planning. The system operates on a database containing the road network infrastructures of the area, and data about population, socio-economical and tourism activities in the villages and townships. The analysis has been carried out using some typical GIS functions. Importance and necessity of virtual tourism system on web.

1. INTRODUCTION

The success of tourism in any country depends on the ability of that country to sufficiently develop, manage and market the tourism facilities and activities in that country. Most developing countries depend mainly on tourism for economic growth and diversity. Turkey, a developing country between Asia and Europe, is one such country. In Turkey, tourism is becoming the largest foreign currency earners. This paper gives discussion on an initiative for the development and the implementation of Geographic Information Systems in the organisation and the advantages it has to offer.

For a tourist, coming to a new resort can be both exciting and freighting. To get the most out of the visit, she/he needs different kind of information especially they need geographical information. She/he wants to know where the tourist agency is, where tourist attractions are, hotels, where sightseeing trips go and so on. With a GIS the tourist services is enable to show a large amount of tourist information in an easy to read key map. The benefits of using a GIS is obvious: The information is always up to date. The becomes dynamic till links to interesting tourist sites in cyberspace. The map can be published on the Internet and become available to a wide audience of potential visitors of the region. By incorporating functions for searching and printing the tourist easily can find what they look for and print a map the trip marked out.

With an implemented GIS, a local tourist information guide is created with powerful search and analysis functionality. Tourist data can be analysed such as which tourist resorts that are hot. Where should they place the next tourist attraction due to the geodemographic profiles in different areas? Are there enough transportation facilities to support the attraction? Several more example will be given in the following paragraphs.

In general, tourism activities around the coastlines have the least environmental effects among the others. On the other hand increasing density especially during the warm seasons and not-uniform structure of tourism in the year base indicates that these kinds of activities will bring lots of environmental problems together. It should not be forgotten that clean and safe environment is one of the main components of tourism. Because of these reasons, implementing a GIS, which supplies and show geographically and temporally the distribution and goings-on of environmental burdens, is essential. In this study, using different data types were used to analyze tourism effects in the

implemented GIS. After the forming GIS, different analysis and queries have been done and results have been presented.

Tourism activities on the coastal lines have accelerated and number of people participating coastal tourism has reached to several millions a year. All over the world, getting maximum benefits from coastal zones according to the concept of sustainable development is only possible by using management plans suitable for the characteristics of the area. Including partnership approach that is coming very common, effective, correct and fast decision-making is possible using a geographic information system.

Tourism and recreation are steadily increasing in importance in social and economic life. For many countries the tourism industry has been a simple and quick economic solution that many times drove to an uncontrolled growth of resources and facilities. Actually tourism is becoming a complicated phenomenon therefore is no more possible to carry out strategic and competitive tourism development supplies without planning tourism. Experiences learn that tourism planning has changed in the recent year, in such a sense that it involves many actions, participants, levels of decisions and implementation. Success is measured by the achievements of an interaction and collaborative actions, among public and private sectors effecting the tourism development. GIS can be an excellent tool not only to design and regulate the correct spatial development, but also to support and control the process of the realization of the plan.

This study is a case study, in study area virtually no existent tourism software package supports the use of hypermaps; such maps are highly interactive, live, and attractive in presenting hot links to intelligent information associated directly to a geographic feature. ArcView is used for this to produce number of layers of information. The layers are then imported into ArcView and appropriate links have been made between major tourist/historic sites and multimedia director applications that provide pictorial (audio and video connection is also possible) information about the site. The information is intelligent in the sense it fetches hotels/motels within a specified radius and lists all available information in addition to highlighting their locations on the map. Intelligence is added further in the ability to compute paths from a source point to any listed tourist site.

In this study, in addition to the base data, using different data types are intended only to analyze tourism effects in the implemented GIS. Several coverages (layers) are used in this study. Some of these layers are; coastal zone, tourism activities, population, urbanization, roads and transportation, resorts, water, recreation areas, accommodations etc. Using these layers some of the analyses such as provision of water for the tourism activities, production of wastewater and solid waste, indirect effects of increased in population, change detection of sand dune of the coastal line and green areas, therefore increasing urban areas, etc can be done.

1.1 GIS for Tourism Activities

Geographic Information Systems (GIS) is an organized collection of computer hardware, software, geographic data and personnel designed to efficiently capture, store, update, manipulate, analyze and display all forms of geographically referenced information. Certain complex spatial operations are possible with a GIS that would be very difficult, time consuming or impracticable otherwise (http//www.esri.com). A GIS offers the possibility of a structured data management and data access. In this way, efficient and objective analysis procedures can be applied to data. Within GIS, objects are being built by linking spatial data with semantic information. A GIS can be used to answer different queries depending on the data stored in it (Seker et al, 2001).

During the last few years, the number of tourist sites/organizations that are using a Geographical Information System (GIS) have increased significantly. There are now many companies that are producing software and support specific to this industry. The tourist industry is now using GIS in many applications: interactive web-based maps, information kiosks, 3-D hiking trail maps, analysis of current and potential customers, line of site analysis for new attractions and scenic bus routes, and much more. This only seems to be the tip of the iceberg for what the future holds in GIS technologies being implemented in the tourism industry. This paper will document some of the uses of GIS, and some of the trends for future applications in the tourism sector.

The following definition done by Semcor Company explains that how GIS can be used for the betterment of the tourism industry. "The concepts of time and place are ingrained in the tourism industry. Having an understanding of your customer base and where they come from, and knowing what they want to see and do and how to get them there are essential to the success of any tourism operation. Whether you are a hotel manager, a diving instructor, or a government official a GIS can provide you with the tools you need to better prospect, understand and serve the needs of your clients." (Semcor 2001)

There are two categories for the use of a GIS system in tourism, public use and management use. The public wants to find geographic information about a place before they go there. They want to know where things are located, what amenities are available, what the climate is like, and be able to do site specific searches to find information. This can be achieved through Web-based GIS, or Information Kiosks located in key tourist areas. The other user of the GIS is the Management side; management may be done by individual operators, a tourism group, or by the local municipality. Management users want to query the system for where customers are coming from, their socio-economic backgrounds, and good potential locations for new tourist sites etc. A list of general questions that public and management users may ask of a GIS system is given in Table 1.

Together with previous questions several more questions might be asked to system such as; which area affected because of the tourism activities, what was the weather quality in coastal zone and which season is better for tourism activities, what kind of environmental loads and what is the optimum tourism capacity of the coastal zone.

The benefits of using a GIS are obvious: The information is always up to date. Instead of just displaying a map to the user, the software can incorporate pictures, sound, ext, animations and video alongside. The combination of several media often results in a powerful and richer presentation of information and ideas to stimulate interest and enhance information retention. (Benabdallah et al 1996)

Table 1. List of questions

Public User Questions	Management User Questions
Where is the city, state or country located?	What are the areas that tourists are interested in
What is the climate? Does it have warm or cold weather? What is the best time of year to visit?	What are the physical-geographic characteristics of those areas?
What is the official language	What are the accommodations available? What is their classification and categorization?
Where are the accommodations in the city located? What is their classification? What are their rates?	Where are the stops/stations of public transport facilities located
What kinds of public transportation are available? Where are rental car agencies located?	What are the demographic and socio-economic characteristics of the local population of each tourist space?
Where are the cultural/natural amenities located? What is their operation schedule? What is the cost to attend?	What are some plans, programs and projects that would help stimulate tourist activity.
What attractive places are near my hotel?	What infrastructure services are in current and potential tourist areas? Which is the service quality?
Where are the banks? Where is the police station? Where is the hospital?	What is the tourist demand for attractive places, tourist equipment, and services?
Where are the shopping centers?	What public and private institutions are available that is competent in tourism planning?

(Caldera de Ugarte et al 1997)

Use of GIS technology for tourism planning offers a group of advantages in data documentation and processing (Hogan, 2001, SIGTUR, 1997). These advantages help in the simplification of processing of voluminous geographic-tourist information, referred to natural and cultural resources, tourist facilities, accessibility, transport, land uses among others. Also, they can drive spatial analyses necessary to generate thematic maps or statistical reports, as much for academic, institutional, enterprise interest as for own tourists requirements.

2 STUDY AREA

In this study Manavgat Township at the Mediterranean coast of Turkey has been selected as study area. This area is one of the most popular and important tourism areas of Turkey. The area is excellent for mountain biking, trekking and cliff parachuting. Obtained results not only show that the problems still existing in the study area can be determined easily and systematically using by exposed GIS but also proved that GIS can be applied to these kinds of studies.

There are lots of historical monuments and natural resorts in this area. Some of the natural resorts are; Manavgat Waterfall, Oymapinar and Manavgat Dams and Koprulu Kanyon National Park. The largest cypress forest of the Middle East is here. These rich vegetations support naturally, quiet a rich fauna. Another example of natural resorts is Titreyen Gol, it is an arm of the Manavgat stream swollen and spread to look like a lake, before it empties its waters to the sea. Study area is given in figure 1. (www.tourismturkey.org), (www.geocities.com/manavgateml/), (www.about-turkey.com/tourism)

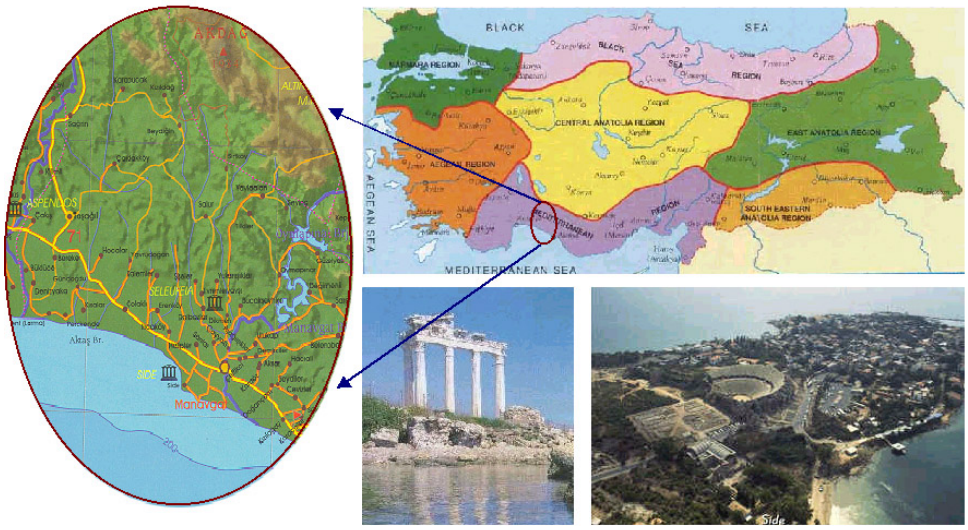

Figure 1: Study area

Some of historical areas are Etenna, Selge and Side. Etenna is located 31 km north of Manavgat near Sirtkoy there is the ruins of the ancient cith of Etenna. It dates from the Hellenistic period. You can have a bird's eye view of Etenna of the Mediterranean, the Manavgat plains and Side. Selge was a powerful city state in ancient times. It is quite difficult to imagine, considering the present powerty of the villagers, how a city prospered here which could support an affluent population of 20000.

The following major problems and issues were identified during the study:

- over-expansion of tourism activities resulting in overbuilding along the coastline and endangered natural environment and cultural heritage;
- economic structure: monoculture of tourism, initial signs of decline of the present tourism project, new plans for further intensive tourism expansion in relatively virgin areas;
- infrastructure problems: waste management, water resource management and supply, dependence on external sources of energy; and
- needs for capacity building at local and prefecture levels.

There are also several holiday resorts lie around this town. East of Side, tucked in pine forests the holiday resorts of Sorgun, Titreyen Gol (Blue Flag) and Kizilagac are both popular for their sandy beaches and sparkling sea. The atmosphere is relaxed, the accommodation plentiful and the activities endless. West of Side, the holiday centers of Kumkoy, Colakli and Kamelya also offer sun and sea, in close proximity to ancient sites. In the Pamphlyian Seleucia, 15km northeast of Side, are the remains (in good condition) of Roman baths, temples, churches, a mausoleum, theatre and agora. Observing effects of change detection on the coastal line because of tourism, water usage, wastewater and amount of solid waste should be taken as primary parameters. But in this study previously mentioned layers have been considered and queries were done using these layers.

2.1 System Structure, Data and Analysis

In this study ArcView 3.2 has been selected as the GIS software. This desktop GIS is a low cost desktop GIS widely used all over the world with different applications. It's extensions such as Spatial Analysis, Network Analysis and 3D Modules are convenient for monitoring environment and several

different applications. It also provides an easier way for data query and facilitates data distribution and use. This software also supports integration of different data sets such as CAD, Shape files, ArcInfo coverages, multimedia image, and link real-time events such as GPS.

Graphic data obtained via different ways. Some of them have been taken from Manavgat Township Authority and some of them obtained from hard copy maps by means of digitizing. Maps used in this study had been produced in different scales like 1:1000 and 1:5000. These maps in different scales have been brought together and then used in this study. Together with used layers preliminary studies about the different factors that participate on tourism planning have been carried out. This study is oriented to tourism activities. Two different groups of variables have been determined. These are functionality variables such as Political territories, natural resources, cultural - historical resources and facilities and touristy qualifications such as infrastructures, environmental quality, land use and economic activities.

Several different queries and analysis have been done after attributes are connected to graphic data. Approaching to data related each other is possible by means of GIS software. The easiest query is identifying an object. One of the similar query result is given in the Figure 2.

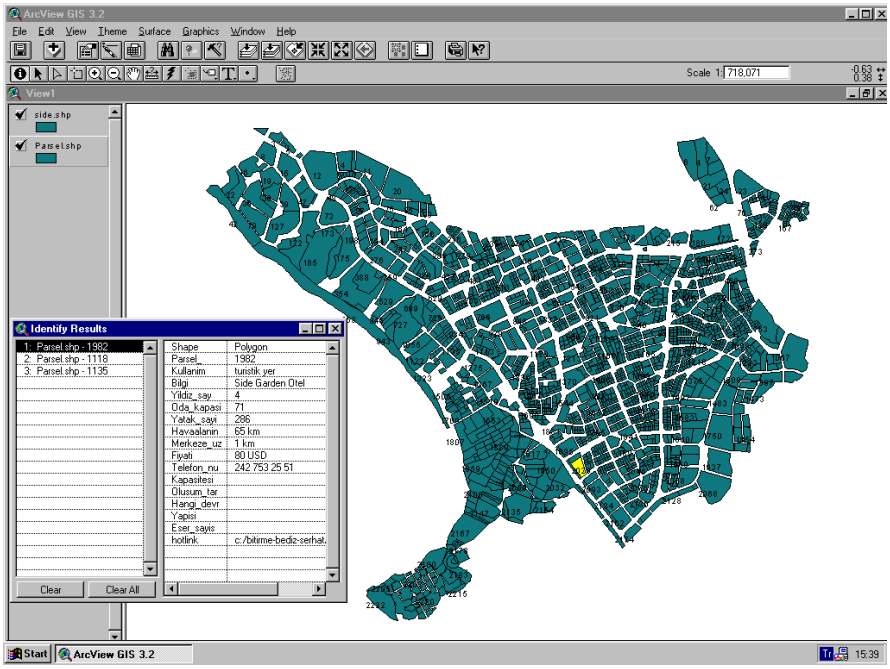

Figure 2: Identify Query

Another query is done to show types of buildings in Manavgat and result is given in Figure 3.

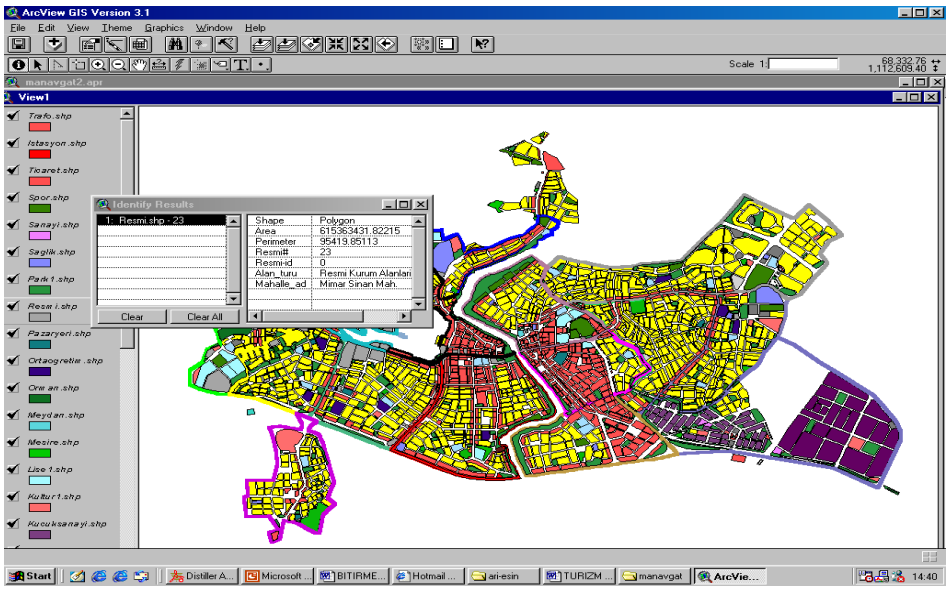

Figure 3: Query example done for Manavgat

Data stored in database is sufficient to make query and analysis about the capacity of places. This kind of query help for better organization. It is possible make an hotlink with the picture and can be directly seen with query result. In Figure 4, one of the query example done for historical monument is given.

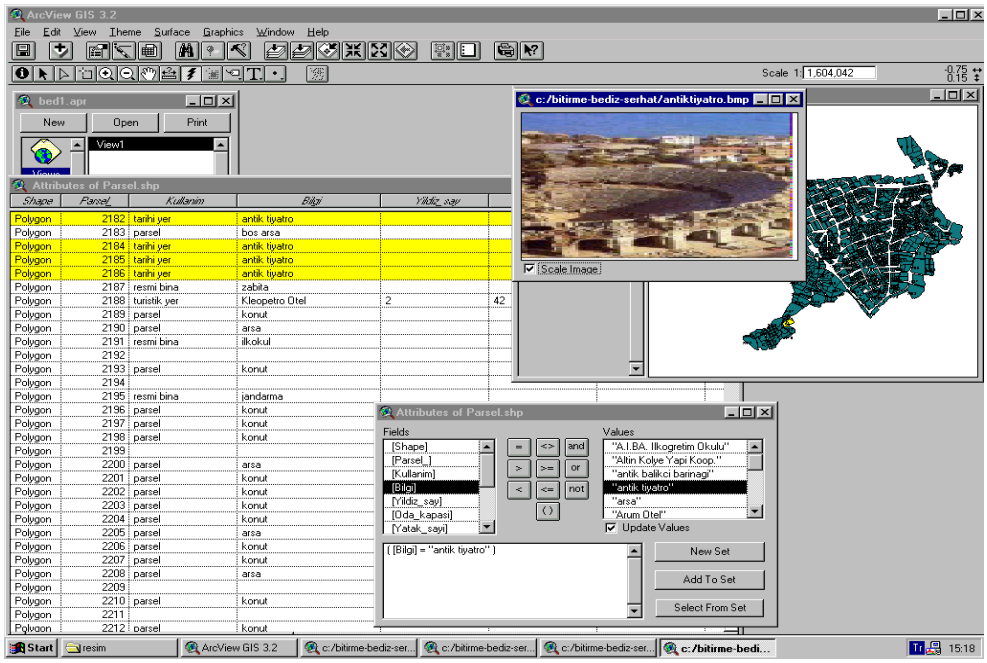

Figure 4: Result of query example and Picture of the hotel.

CONCLUSIONS

After the comparing figures 4 and 5, it has been shown there are great similarities between them. The tourism areas have the higher grade and higher population. Due to obtained results, the authorities should carefully protect this area. Together with obtained results from GIS and on the site study, were done by the authors several times, some severe environmental problems have been realized. These are; sand dunes are dismissed, the residential areas cover archeological sites, because of the solid waste problem haven't been solved yet and threat Side settlements with terrible smell especially in the warm seasons. Hotels located next to seaside, even though it is forbidden by low, closed the coast for public usage.

Forming a GIS for the tourism activities is highly necessary. Using this kind of system reduces cost and increases efficiency in tourism activities, increases management control, provides information for decision support and policy making and saves time, man power and time. The red tape, experienced during the data-collecting phase, should be minimized between institutions.

The Tourism Industry has seen many advances and potential for new opportunities with the introduction of Geographic Information Systems. It is also possible for tourist attraction operators, and tourism groups to find out where their customers are coming from, market to potential new clients, and perform analysis for new tourist sites. Data on the tourist activities of any given region become available, it is foreseeable that the uses for GIS software will continue to develop. In the future, a new type GIS, where data is centrally located, might be applied and all levels of Government and individuals can share information and resources.

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