AN EXPERIMENTAL STUDY OF GIS - AIDED CONSERVATION DEVELOPMENT PLAN; THE CASE OF SiLLE- KONYA

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ABSTRACT:

In accordance with the rapid improvements in technology, especially in the applications of engineering field, "Geographical Information Systems" (GIS) has many advantages in terms of speed, period, and cost. As it is known, Conservation aimed development plans require more detailed and numerous surveying works in various quality rather than all sorts of planning works, to be carried out. The use of GIS has an important role in digitizing the base and land surveying maps used for Conservation Aimed Development Plans, preparing database and query and analysis of buildings. In this study, it is aimed to provide the base maps to be more accurate, reliable right and up-to-date by the help of GIS in the investigations of conservation aimed development plans.

Sille, the case study area, is an ancient settlement, leaning on the two slopes of a valley located in the 12km of the Northwest of Konya. Today the whole area of historical pattern which is 33 ha, is under a conservation scheme as "Urban Conservation Area". During this study, the characteristics and potentialities, the plans with big scales and conservation decisions that Sille has, have been evaluated; and at the stage of the production of planning decisions, the usage possibility of GIS programme has been tested.

INTRODUCTION

Due to various reasons, the rapid changes and/or developments of the cities cause the problems requiring solution gradually more complex. The establishment of what sorts of precautions would be taken for the entire problems faced is required properly. The precautions which is necessary in the planning process of urban planning and especially conservation aimed planning would be as following (Zeren 1990):

- At the stages of information collection, evaulation and synthesis the techniques in the sensibility required by conservation phenomenon should be used.
- Formation and conservation factors for each plot peculiar to the plot and building block plot by plot.

Decision making/planning process must be faster than this development and change. Thus, especially there is a necessity the collection/updating and evaluation of planning data fast, i.e. an information system.

Expectations from the information systems must be well defined when solving problems observed in urban planning, in the framework of information system (Yiğiter, 1998). These expectations are;

- Establishing of data standardisation
- Sharing data
- Updating data
- Providing coordination between different units playing role in planning process and its sustaining
- Providing necessary controls
- Providing immediate intervention to any kind of problem.
- Providing to make effective queries according to plan type and aim.
- Providing efficiency by getting high quality products after the queries
- Realization of applications without any political pressure

In this study, ArcView3.3 which is a GIS software possessing a world and nationwide usage, which could give answer to the expectation, was used.

1. CHOOSING STUDY AREA

It has been tried to establish in the case area chosen how much respond was given to the expectations from an information system in the conservation aimed planning with so-called GIS programme. With this aim, Sille, which has historical and cultural assets, was chosen by considering also accessibility and receivable of data of the area and suitability for the works to be done.

Sille, administratively, belongs to the Province of Konya, the District of Selçuklu located on 33ha of land and having a population of 1500 is a neighbourhood which is disconnected from the city physically by topographic thresholds. Most part of the area is composed of bare spaces with slope where the foundation ruins of the uninhabited houses exist.

Sille, the case study area, is an ancient settlement, leaning on the two slopes of a valley located in the 12km of the Northwest of Konya. In this area there are many monumental works such as a church dated to 327 BC, rock churches remaining from earlier periods, and baths and mosques from the Ottoman period. Besides, the most of the historical settlement is

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composed of civil architectural monuments. Today the whole area of historical pattern which is 33 ha, is under a conservation scheme as "Urban Conservation Area".

Sille was announced as an Archaeological Conservation Area of Urban and 1st Grade approved by the Konya Conservation Council of Cultural and Natural Assets with a decision dated of 19.06.1995 and registered of no.2292. The area was kept out of the urban development in the Master Development Plan of Konya with the scale of 1/25 000 (Konplan 2020) and defined as "Urban Conservation Area".

During this study, the characteristics and potentialities, the plans with big scales and conservation decisions that Sille has, have been evaluated; and at the stage of the production of planning decisions, the usage possibility of GIS programme mentioned has been tested.

2. COLLECTING AND INPUTTING OF DATA

Being a base for the GIS activities in producing the Conservation Aimed Development Plans of Sille, it has been moved to the procedures of data collection, by examining what the spatial and non-spatial data of the study area will be. Some of these data taken from the studies named as "Investigations of Sille" which had been carried out within the curriculum of the lecture of "Urban Conservation" during the Fall Semester of 1999-2000 under the supervision of Assist. Prof. Dr Rahmi Erdem, have contributed significant data to this study. Furthermore, the Conservation Aimed Development Plan of Sille and also its additional works, which had been prepared by the authors themselves and had been approved by the Konya Council of Cultural and Natural Assets with the decision dated of 19.11.2001 and registered of No.4328, has been the reference for this study. For this study, these data have also been used by updating and modification.

2.1. Inputting of Spatial Data

For the collection of spatial data of the study area, firstly the map bases have been achieved. The cadastral map of the area, which was prepared in the scale of 1/1000, has been obtained from Regional Directory of Title Deed and Cadastre. The digital values of the study area have been acquired by means of digitizing the cadastral map in the NetCad media (Figure 1).

As a result of the preliminary studies carried out on the site of study area of Sille, it has been established that the cadastral situation did not fit to the site completely and rectification works on the site must be fulfilled. Therefore, some studies have been performed for the ascertaining the existing situation by taking into account the building elements, such as buildings, additional building structures, wall and gardens which would be considered as a cultural value; and the numeric values which had been acquired proper to the "Regulations of Large-Scale Mapping" have been drawn (application of the data) to the cadastral base (Figure 2).

2.2. Inputting of Non-spatial Data

By making observations and examinations in the whole area, as an addition to the base map of 1/1000 in scale and carried out in the 1977 (Figure 3), the answers of the questionnaire, which had been given previously to the residents of the area who are either owner or tenant, aimed at getting the non-spatial data such as ownership, usage and conservation, have been collected (Figure 4-5).

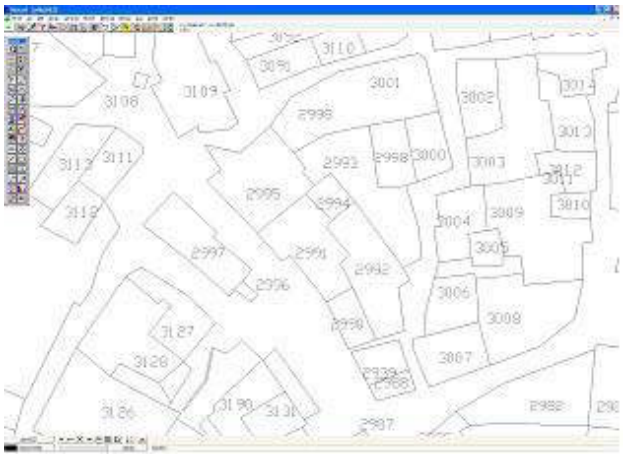

Figure1. The digital cadastral map of the study area, Sille

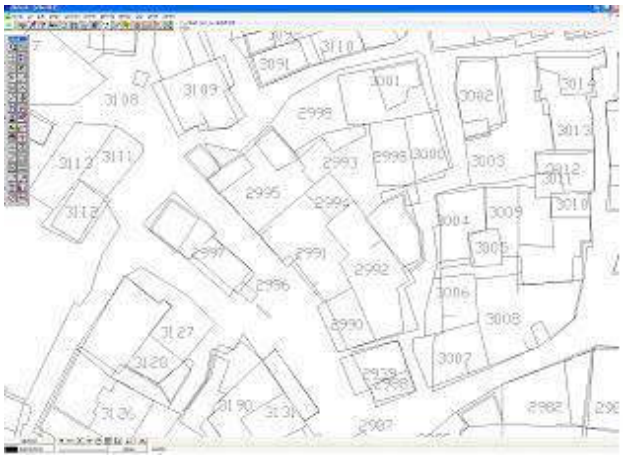

Figure 2. After the rectification, the cadastral situation of the study area

Figure 3. The base map of the study area

Figure 4. An Example of Surveying Card for Non-Spatial Data/1

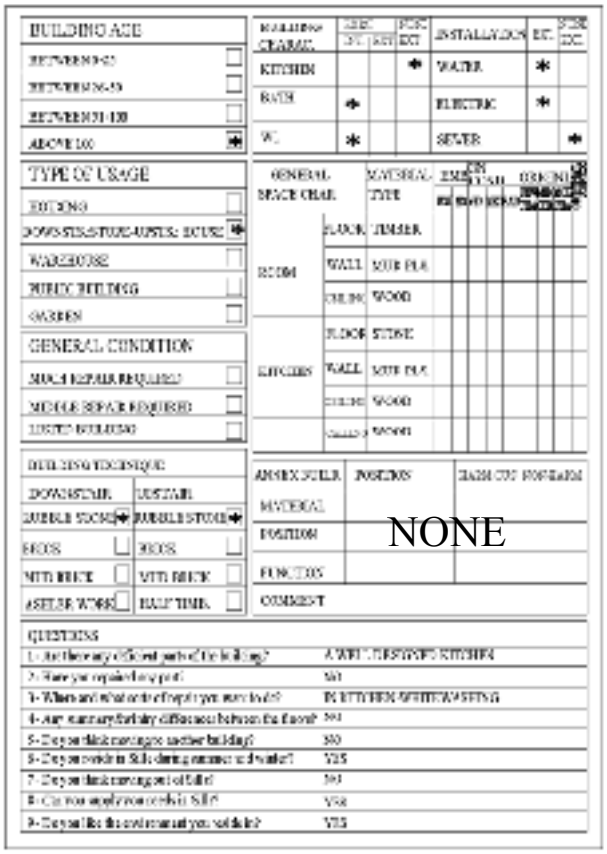

Figure 5. An Example of Surveying Card for Non-Spatial Data/2

3. TRANSFORMATION OF COLLECTED DATA INTO GIS SOFTWARE

Having been collected the spatial and non-spatial data for the development plan aimed with conservation, which will be undertaken in the study area, the procedures of transforming these data, which have been prepared in the format of numeric (xyz) and alfa-numeric (txt) from the NetCad media to ArcView3.3 which is a GIS software.

The transformation of the data in NetCad media to ArchView3.3 programme, which is used in worldwide and concern various professional disciplines, establishing relations between the spatial and non-spatial data on its own database, has been accepted. Because NetCad is a local software, it is necessary that a file in *.ncz format must be transformed firstly to *.dxf format in AutoCad media, and from here to *.apr file in the format of ArcView3.3 of GIS software. (Figure 6). Furthermore, in the engineering works carried out with the CAD base, generally data transformation is made by using Data Exchange Format (DXF), which is accepted as a common data format.

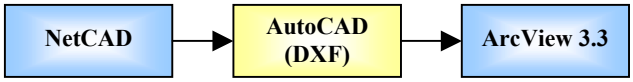

Figure 6. The transformation from NetCad media to GIS software

The procedures of the transformation of data, on which wall buildings drawn on the cadastral map of the study area, are also seen together with, from NetCad to AutoCad media and then to ArcView3.3 programme, have been carried out. The condition, which is related to ArcView3.3 programme, of the general border of cadastral building block of the study area and the walls built later are seen on Figure 7.

The rectification works carried out in the study area, which are the procedures of getting known the position of the buildings either constructed in recent years or existed before in the cadastral building block, and ascertaining the positions of the bare spaces occurred later such as garden, wall and courtyard, has provided easiness to the development plan in the drawing of data to be applied (Figure 8).

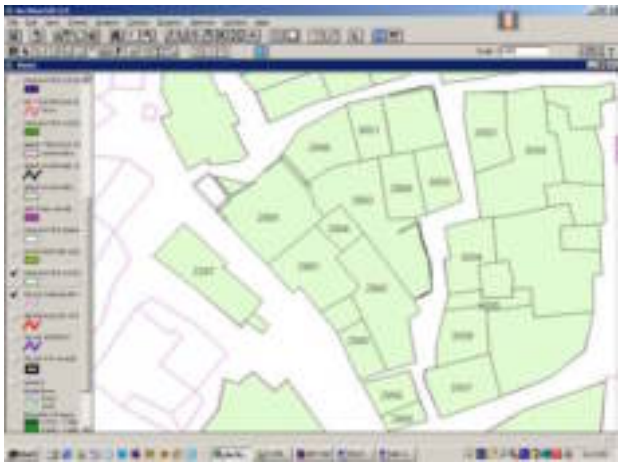

Figure 7. Cadastral map of the study area

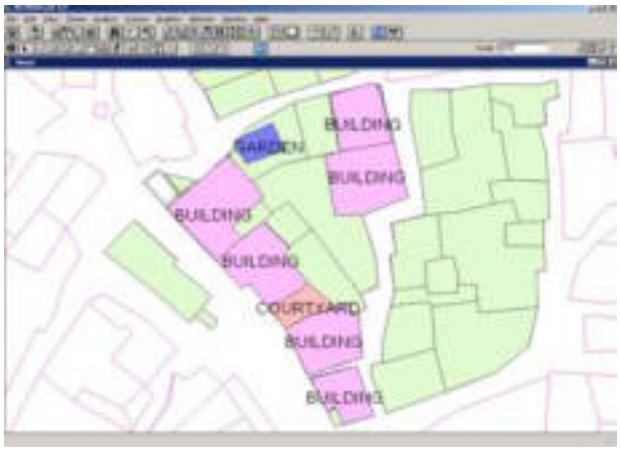

Figure 8. The positions of the buildings in the study area

The works which determine the position of a listed building and its plot in the area have been performed and shown in ArchView3.3 media (Figure 9).

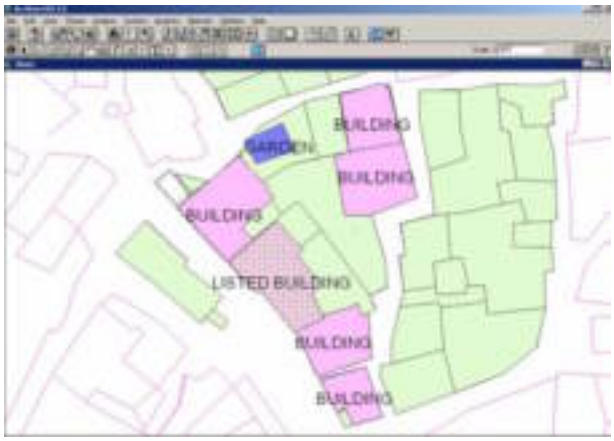

Figure 9. The position of listed building and its plot

4. LINKING THE SPATIAL AND NON-SPATIAL DATA AND MAKING QUERIES

As it is known, the linking and querying of the spatial and non-spatial data each other used to be done by passing at difficult stages with the support of a few different software in 1990s (Yomralıoğlu, 2000).

The last stage which has been reached in the related software packages today, has become the materialisation of the works mentioned above with the support of single software yet. As its resembling ones do, the programme, which was used in this study, also provides the integration of the spatial and non-spatial data of the study area together and possibility of all sorts of making query and analysis. When the cursor comes on the plot, the information provided as a text and picture increased the capacity of giving any kind of decision of a planner for the works to be done.

In Figure 10, the questionnaire evaluations carried out on the site of the cadastral plot with No.2992 and the pictured appearance of the building located on the plot are seen. In Figure 11, also the querying of building age/ number of storey together; and also in the Figure 12, the ratio of mass/space building of the plots are seen. Here, it is also possible to get the elevation appearances of the building on a plot individually, together with the buildings located in a street as silhouette and/or photogrammetric. However, these facilities have been left from the content of this study. All these details are important factors which provide easiness in planning works and ease the feed-back in production of planning decisions.

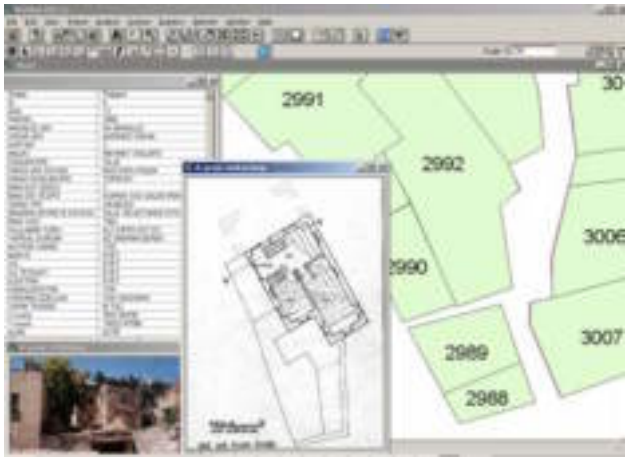

Figure 10. The spatial and non spatial information of the cadastral plot with No. 2992

In spatial planning, the 3.dimension of the existing environment must provide an input to design. In other words, urban plans form spaces to be lived rather than being two dimensional drawings. In the course of time, i.e. it is necessary to be able to imagine how the spaces which would be formed in 4. Dimension, reflect effects.

Figure 11. The view of the buildings with storey of less than 2 and age between 50 and 100

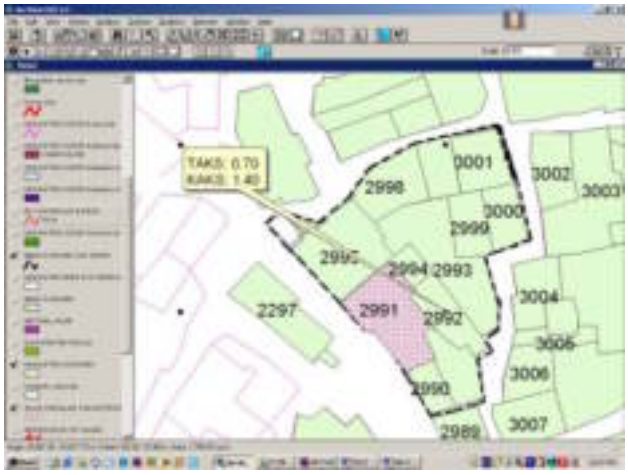

Figure 12. The ratio of mass/space building of the plots

With this aim, by the help of the contour lines passing in the area (Figure 13), the Digital Elevation Model (DEM) of the study area has been achieved (Figure 14). By the help of contour lines that are obtained from z values of each point in the study area, more comprehensive information about the buildings located on the sloppy structure of land has been collected.

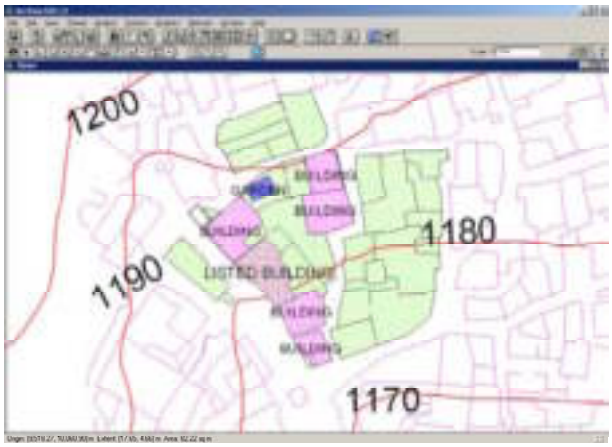

Figure 13. Contour lines passing on the study area

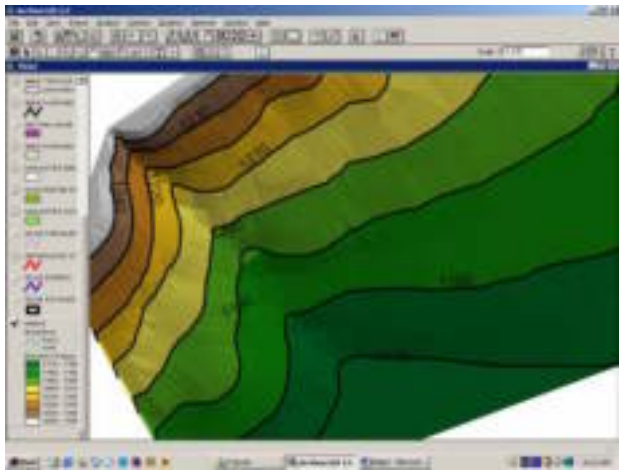

Figure 14. Digital Elevation Model of the study area

In addition to the works mentioned above, 3-Dimensional Modelling Studies would also ease perception and decision making (Figure 15-16). With this intention, the general view the Digital Terrain Model (DTM) which is occurred by drawing the 3-Dimensional (3D) views occurred from the drawing of the building on the cadastral building block in the study area, on the Digital Elevation Model (DEM), is shown on the Figure 16.

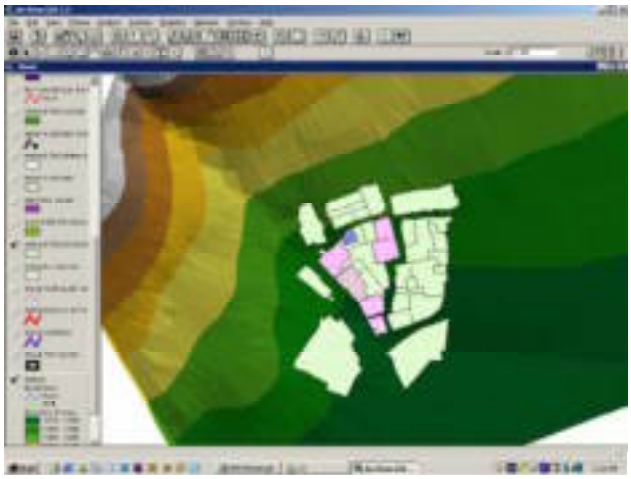

Figure 15. The 3-Dimensional (3D) view of the study area (bird's-eye view)

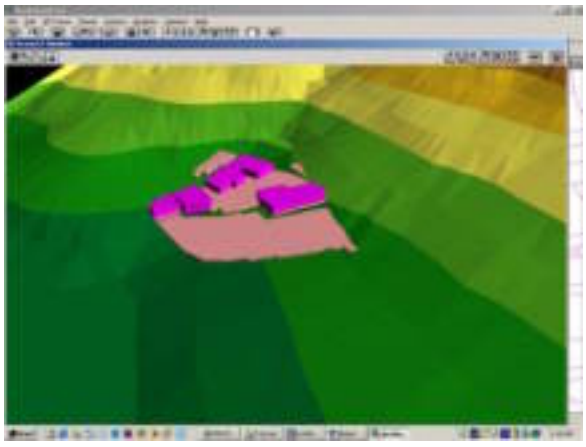

Figure 16. The 3-Dimensional (3D) view of the study area

5. CONCLUSION

As it is known, Conservation aimed development plans require more detailed and numerous surveying works in various quality rather than all sorts of planning works, to be carried out. As it is seen at this very point, additional new information can be obtained by collecting, drawing (application of the data), evaluating and analysing of all spatial and non-spatial data in GIS area. In addition to this, the very complicated data obtained can be controlled by means of the queries which are provided by GIS. Having obtained the updating of the stored information, GIS also ease the applications of conservation aimed planning decisions clearly, according to traditional labour-intensive evaluation methods.

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