A Spatial Decision Support System Design for Land Consolidation Projects

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1. INTRODUCTION

Land consolidation can be described as rearranging and taking all precautions for a more fruitful working of land areas according to the developing agriculture technology of today.

Land degradation is a global problem, largely related to agricultural use.

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In the study of land consolidation, reallocation step is accepted as core of consolidation. This is a tool which rearranges proprietary rights. In the basis, wishes of the landholdings for the reallocation are asked and assessed in the beginning. In this step, wishes of the landholdings should be considered carefully and necessary studies should be done for convincing them.


Land consolidation, *is a planned readjustment and rearrangement of land parcels and their ownership.*

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we proposed a methodology about the land reallocation of the farm areas' parcels, along with a software which we have created. This system which is called as SDSS is a computer based system for the spatial reallocation decision problems, and gives great achievement in solving them. This system which we have created in GIS style will be able to analyse the data which we required from database and will help to fasten the process and fastening the decision making.

The created system data includes input, stocking, handling, analysing, calculating, reporting and geographically referenced datas visualition processes.
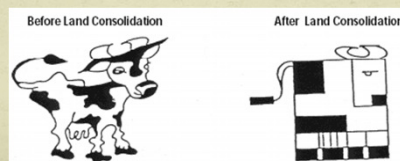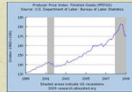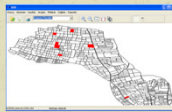

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1. Database management system

2. Analysis processes in a model based data management system.
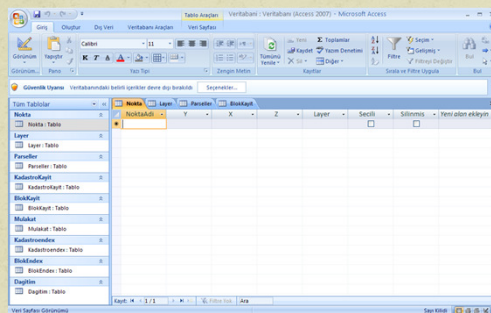
3. A graphic producer

4. A report producer

5. User interface

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2. A DATABASE MANAGEMENT SYSTEM DESIGN FOR LAND CONSOLIDATION

We have used MS Access 2007 for creating database in this study.

For using in land consolidation studies, cadastral parcels, block records, land degrees, application limitations, farmer choices, an easy to use database is designed.

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Most effective method of the spatial data management is to use layer. For this aim we have used a "layer table" in study.

KADASTRO_PARSEL (cadastral parcel),
KADASTRO_ADA (cadastral blocks),
BLOK_PARSEL (new parcels),
BLOK_ADA (new blocks),
TOPRAK_DERECESİ (soil degrees)
GENEL_SINIR (project border)

that shows limits of the study area are the basic layers that we use.

In the questionings about the figures SQL, which is a sublanguage used in database questionings, preferred instead of MS Access.
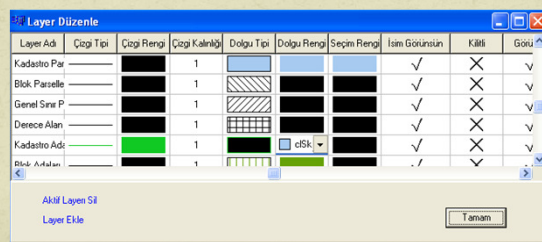
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3. ANALYSIS AND NUMERICAL CALCULATIONS IN A MODEL BASED DATA MANAGEMENT SYSTEM

In the system, graphical values of the cadastral datas about the related area, is required by a commercial CAD software called as NETCAD (Figure3). we will use our own software in this study, coordinate values of all datas are converted into required system with *.cks extended report files and transferred into MS Access database (Figure4).
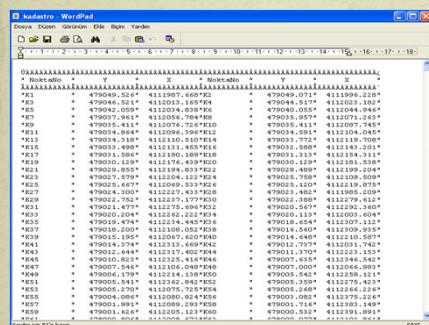

Figure 3. Coordinate report file presented by Netcad software.
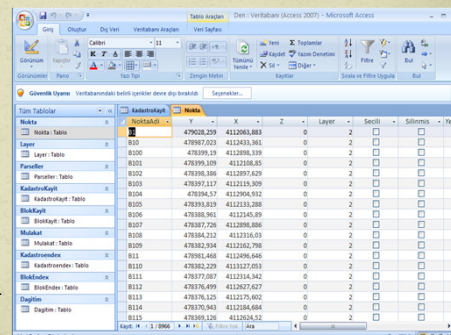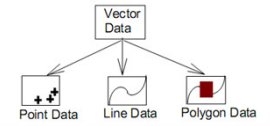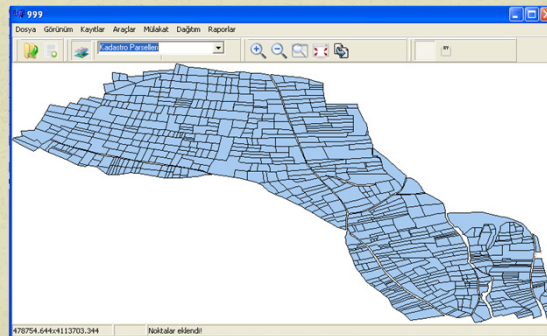
Figure 4. Transfer of converted coordinate values to the database.
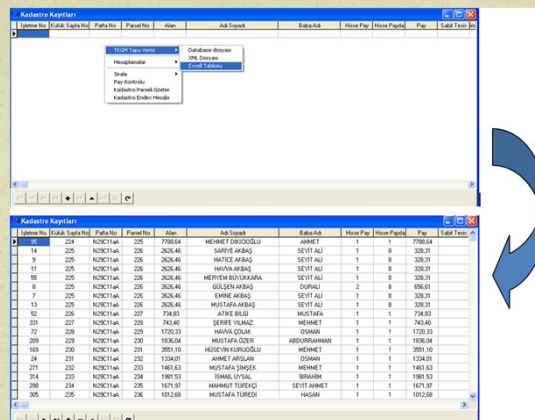
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The Hierarchy of Vector Data Classes

After the coordinates and parcels are transferred into database, parcels are drawn in vector data format as polygons .

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Non-spatial datas was provided from the cadastre foundation, process of transfering datas to the system is shown in following figure.

After obtaining the necessary values, we can progress to the reallocation process which is accepted as the most important step for the land consolidation projects.

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In the devoloped software, most important criteria for the
reallocation is the wishes of the landholdings. In this aim three
choices are asked to all landholdings and recorded in system.

Figure shows the system that we created for reallocation process.

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There is two options are given for the reallocation.

First technique is to make reallocation process manually. In this situation,
authorised person finished the process by following the wish of each landholding
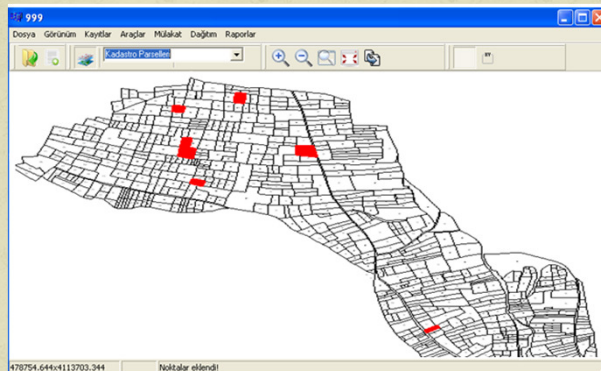on the screen and graphical situation of the blocks.
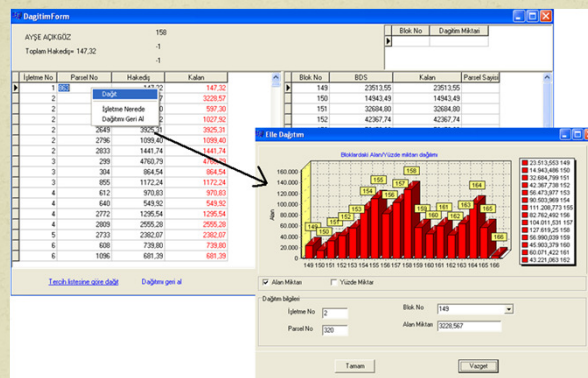
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Second technique is the main subject to be insisted. System makes the reallocation process automatically.

4. A GRAPHIC PRODUCER

By representing the results with a software that we created, there is no need for a commercial software. System also includes most questionings done by commercial softwares.

With the system we created, all reports and statistical results asked by the institute, which makes land consolidation, can be required as a print out by the system.

Questioning the cadastral parcels of number 2 landholding

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5. A USER INTERFACE

We have used an easy designed and extremely effective user interface in this study.

General view of the user interface
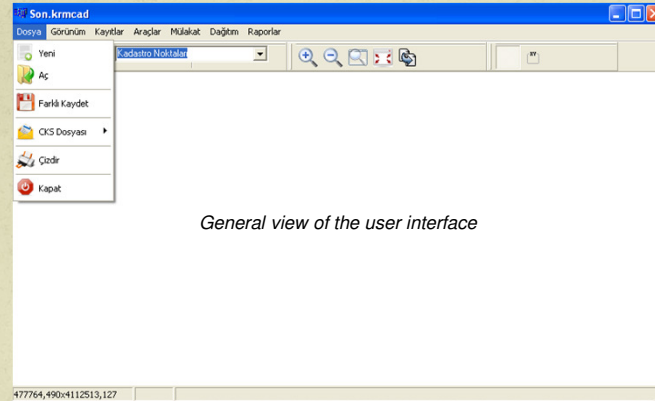
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6. COCLUSION

This study is proposed a methodology about the land reallocation of the farm areas' parcels, along with a software which we have created.

This system which is called as SDSS is a computer based system for the spatial reallocation decision problems, and gives great achievement in solving them.

Experts of the matter thinks that this software will ease and fasten the land consolidation studies.

SDSS software which we prepared with C++ programming language and includes a simple and easy interface with GIS functions, it will be a more economical solution for the usage instead of professional and commercial software packages.

In this study, we have planned to make a different study without necessity of any commercial software and with a design only for our study. Here, the aim is to automatisation of the distrubition studies and having an efficient and economical solution in the land regulation by obviating dependency for expensive systems like CAD and GIS.

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