



Second Cadastre Design For Turkey

Tayfun CAY, Selim ADIBELLI and Fatih ISCAN

University of Selcuk, Faculty of Engineering –Architecture
Department of Geodesy and Photogrammetry
42075 Konya, TURKEY

INTRODUCTION

Determining the locations, positions, areas and values of and all kinds of rights and liabilities on all lands and properties of a country on earth and putting them in a plan is called cadastre.

Article 1 of Cadastral Law no: 3402 which last was amended by Law no: 5304 defines cadastre as follows.

Article 1- "The objective of this law is to establish the title deed registry as proposed by the Turkish Civil Law no: 4721 and set up the infrastructure of its spatial information system by specifying the boundaries of properties on land and maps based on the cadastral and topographic cadastral map of the country according to the country's coordinate system."

Since it does not exist explicitly in today's laws and rules and regulations, it must be stated explicitly and in clear terms that the objective of cadastre must be taken outside of this definition and handled in the context of an information system whose geographical unit is parcel and in which all information regarding parcels can be found. In this framework, it has now become a necessity to make definitive and clear changes beginning with the definition of cadastre. Cadastre must undertake a mission in accordance with today's conditions.

In this study, the current state of Turkish cadastre, its shortcomings and problems and expectations from today's cadastre have been demonstrated. Furthermore, a framework has been prepared about what future cadastre must be like, how second cadastre, which has emerged today as an alternative solution in the transformation of the present cadastral system into a contemporary one, will be implemented, to what extent it will be feasible and what its scope must be. **The results of the second cadastral works conducted in the selected area of study have been assessed and suggestions have been made.**

THE PRESENT STATE OF TURKISH CADASTRE

Cadastral information established 40 to 50 years ago fail to fulfill its objective, which was specified as giving state guarantee to real property ownership and remains insufficient in the face of the multifaceted expectations and requirements of projects and investments. **14 %** of the cadastral activities conducted are of graphic system. It is also known that **60 %** of the existing information and documents need to be renewed.

Percentages of completed cadastre in Turkey, which reached **97 %** in cities and **77 %** in rural settlements as of 2006, are expected to reach the targets of **99 %** in cities and **82 %** in the country by the end of 2007 within the Agricultural Reform Application Project (ARIP Project).

SECOND CADASTRAL DESIGN IN TURKEY

As a result of the legal and institutional regulations, procedural steps in the second cadastral law will not be much different from the foundation cadastre. However, certain additions must be made to efforts of installation cadastre and certain operations must be removed in the second cadastral efforts in order to obtain accurate and sensitive data that conform to certain standards and will meet the needs in certain fields such as conditions of the day, advances in science and technology, population rise and urbanization, physical planning and projection, needs of local administrations, land management and evaluation of real estate.

Basic activities in the Second Cadastre may be the following:

- ❑ Determination of the area of study and its declaration
- ❑ Preliminary preparation study
- ❑ Establishment of point of triangulation, polygon and leveling
- ❑ Digitalization
- ❑ Preparation of cadastre record
- ❑ Operations of measurements, calculations, drawings and control
- ❑ Preparation to Geographic Information System of Cadastre and title deed register data
- ❑ Real estate

APPLICATION

Description of the Area of Study

The village of Asagipinarbasi in the Selcuklu district of Konya-Turkey was selected as the area of study. This village is located on the 25th kilometer of the Konya-Ankara highway. The population of the village is 500 according to the census taken in the year 2000. Although there are no health facilities in the village, there is an operational primary school. Tap water and a sewer system exist. Transportation is conducted via municipal buses.

Application on Farmland

The photoplan was drawn on an astrolon base on a scale of 1/5000. The activities were implemented on a block that covered more than half of the map sheet called Konya-Asagipinarbasi Map Sheet 12 (Figure 2).



Implementation of measurements, calculations and drawings

Measurements of the corners and broken points of the parcels on the area of study were made from the triangulations that existed on the ground and polygon points that were set up. Besides, measurements of details such as wells, pools and buildings in some parcels were made. Drawings of the parcels, which were obtained in entirely digital form, were performed in the state map sheet division system. Digital map sheets of scale 1:5000 (L29-d-23-a, L29-d-23-c, L29-d-23-d) were obtained.

Evaluation of the Real Estates

In the evaluation of the lands outside the village, income capitalization method was used. Evaluations in the lands outside the village were performed on the basis of criteria such as questionnaires, ownership, topography, nature of the soil, fertility, crops in the parcel and buying and selling. Since the crops cultivated in the area of study were barley, wheat and beets, their unit prices were used in the evaluation (Table 1).

Name of crop	Unit cost (YTL/kg)
Barley	0,280 – 0,300
Wheat	0,320 – 0,350
Beet	0,100 – 0,120

1 YTL=1,83 EURO

The annual net revenues collected in the area of study and **current values** were calculated on the basis of the unit prices given in Table 1. Using the 20 sampling groups, k (capitalization interest rate k: 0.226428719) was determined. The parcels seen in Table 2 were tested according to the k values obtained. It was observed that the calculated values came close to current values at a rate of 73 %.

Table 2. Current and calculated values of agricultural real estates

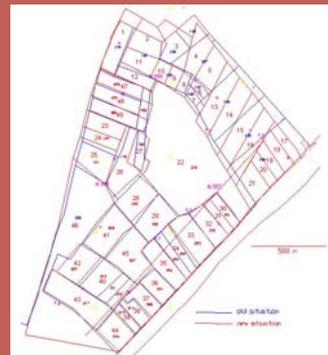
Parcel number	Current values (YTL.)	Calculated values (YTL.)
184(1)	7462,268	5520,501
185(2)	42717,848	34227,107
186(3)	16746,138	15678,223
187(4)	38893,649	24290,205
188(5)	340,932	441,640

A comparison of installation cadastre (1st cadastre) and current state (2nd cadastre)

The following can be said about the map sheet used in practice and the current state (Figure 3):

- ❏ A large portion of the topographic details such as roads that go through fields do not exist in the map sheet
- ❏ In the map sheet, curved parcel boundaries were used as linear boundaries on the ground and map sheet-ground relationship could not be established in broken points in some parcels,

Figure 3: Overlapping of the 1st and 2nd cadastral states on agricultural land



- ❏ The map sheet is not based on any coordinate system. It only displays scale (1:5000).
- ❏ Production was made with drawings.
- ❏ The map sheet was produced in a drawing other than city block, map sheet and standard map drawing techniques.
- ❏ Map sheet margin notes were not formed in accordance with their standards.
- ❏ There are ambiguities in the junctions of parcel boundaries.
- ❏ City block numbers were not given; only map sheet number was provided

When a comparison was made between the title deed surface areas (1st cadastral state) and the surface areas (2nd cadastral state) calculated using the coordinates obtained from land, it was seen differences among parcel area. These differences were given in Table 3.

Table 3. Comparison of 1st and 2nd cadastral states

Old Cadastre (1 st Cadastre)		Changes	New Cadastre (2 nd Cadastre)		Difference	Result	Limit of error
Parcel and Area			Parcel and Area				
		5	34966,87				0
188	10070,67	On site	6	10228,95	-158,28	ACCEPT	203,7267
189	8353,97	On site	7	11855,11	-3501,14	REJECT	185,3063
216	37825,70	On site	44	35195,52	2630,18	REJECT	400,3243
217	75296,78	On site	43	75530,41	-233,63	ACCEPT	571,3942
218	377254,24	On site	22	342718,14	34536,10	REJECT	1341,597
....						
....						

When Figure 3 is viewed, it is observed that the cadastre map sheet fails to represent the land accurately and some borders have changed completely. **188 and 217 parcels are in tolerable limit, others parcels are not in tolerable limit.** Since there are pasturing parcels adjacent to private property on land, there are excesses in areas. Areas of parcels that have borders with pasturing lands are calculated by offsetting on the basis of the parcel areas obtained as a result of digitalization. State parcels have been transgressed by neighboring parcels.



CONCLUSION

When no solution can be attained through existing methods, it is necessary to implement the second cadastre. In the second cadastral works that will be implemented for this purpose;

- ❑ The current proprietary state will be determined without violating the rights gained in the installation cadastre.
- ❑ Works of property evaluation will be taken as the basis of the second cadastre and the values of all property will be determined objectively.

- ❑ Various data will be collected in accordance with the objective of a multi-purpose cadastre.
- ❑ All parcels will be determined in the country coordinate system.
- ❑ The data obtained will be in the Title Deeds And Cadastral Information System (TAKBIS) format.

Unless layout problems experienced in the cadastral works implemented in Turkey and the activities in the existing structure are not corrected legally, the use of the updated cadastral map sheets can not be ensured judicially and in respect of TAKBIS. Making cadastral charts into layout compatible with TAKBIS and implementation of the second cadastre as an alternative method to the solution of the problems in Turkish cadastre will be useful.

THANK YOU FOR ATTENTION

FOR MORE INFORMATION

fiscan@selcuk.edu.tr

- ❑ Res.Assis.Fatih ISCAN
- ❑ University of Selcuk
- ❑ Faculty of Engineering –Architecture
- ❑ Department of Geodesy and Photogrammetry
- ❑ 42075 Konya
- ❑ TURKEY
- ❑ Tel. +90 332 223 19 87
- ❑ Fax +90 332 241 06 35
- ❑ Email:fiscan@selcuk.edu.tr