

## **Konya Example of Cadastre Renovation Work in Turkey**

**Hasan CAGLA, Sabahattin AKKUS, Erhan CIVCIK and İbrahim OZUGUR, Turkey**

**Key words:** Cadastre, Renovation, Spatial Information System

### **SUMMARY**

Cadastral work has been done in Turkey since the first years of the republic, for about 80 years. Up to now, 50.964 units in 52.617 (villages and neighbourhoods) cadastre work was completed. The work in remaining 1.255 units has continued.

However, nearly half of the cadastral maps are insufficient to respond today's needs. Important problems are encountered during implementation of these technically inadequate maps. Within the scope of the cadastre modernization Project of Turkey; renewal and updating of numeric cadastre and registry information of Cadastre maps, the development of policies and capacities for adopting the best international practices of real estate valuation in Turkey, renovation of the whole technical archives, constitution of modern registry reports according to the Turkish Civil Code, application of the Cadastre Law Article 22-A (Renewal cadastre) in places where the first cadastre was completed to create standard data base which are needed for spatial information systems were started.

In this study, the cadastre renovation work in Konya province will be evaluated.

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## 1. INTRODUCTION

Law no 2613 dated 1934 the Cadastre and Land Registry Composing Law came into force in to establish the register the cadastral work which started in Turkey within the Turkish Civil Code in 1926. Comprehensive cadastral survey could be started after this date. At first, Law No. 2613 was initially implemented in both urban and rural lands till law no 5602 dated 1950 was came into force for the lands outside the city centres.

In 1966 law no 766 took place of law no 5602. In this way, separate laws were used in cadastral work in urban and rural areas until 1987 (**Şişman et al, 2008**). After Law No. 3402 came into force in 1987, the method of working in urban and rural areas separately was given up. The formation of cadastral work completed in 2005 and remained as it is today by making some changes on law no. 5304 and Law no. 3402.

Since the cadastre is one of the services affected from technological developments most intensively, some of the projects have been carried out in order to adapt to the cadastre reform while the first establishment cadastre work has been continuing our country. The application of the National Geographic System Project was aimed by transferring the graphic and features of data into computer environment. However, it is observed that the general state of our country is not sufficient to form a layout for this kind of data. The technically inefficient maps brought significant problems with them in the stage of application.

Our country where second cadastre is impossible, the article 22 of Law no. 3402 was changed to transform, renovate and update the structure to provide integration of the cadastral layout to information systems. While there is not any decision on renovation in the Law no 3402 Cadastre Law, a rule was brought by Law no 5304 the Law Amending the Law on Cadastre No. ile3402 that was came into force after the law published in the Official Gazette No. 25744 dated 03/03/2005. Today, the work of cadastre renovation has been carried out according to the article 22-a of the Cadastre Law.

## 2. GENERAL SITUATION OF THE CADASTRE OF TURKEY

Turkey's first cadastral work is spread over a time of 80 years that all of the cadastral work today is not be possibly considered in same quality and it is very difficult to say that the maps and information are up to date. Naturally, the Cadastre Organization was aimed to benefit from every innovation and they benefited. For example, the first measurements were started with a compass and steel tape, and then the tools changed in time like prism, tachometer, reduction tachometer, electromagnetic measuring instruments, electronic tachometer, total station and GPS measuring instruments. However, calculation and drawing tools mentioned before were also used. The former applied methods were changed to the new ones. The most important of all, digital cadastre application including the third dimension was begun to be

used in national coordinate system. Therefore, every development and application forced people to revise the preceding applications. In addition, the number of fixed ground control points established in the field gradually decreased and was unavailable in time (Adibelli, 2006).

Different legal bases, different production techniques, different technical equipment and different measurement methods have been used in the cadastral work done by the General Directorate of Land Registry since the first years of the Republic. Thus, the products occurred from the cadastre work for a long time include different features.

Cadastral maps produced in different regulation, scale, layout, measurement method, the coordinate and plot opening system up to now are seen in Table 1 and Table 2 (URL 1).

**Table 1:** Cadastral Maps According to Production Methods

Rank No	Production Technique	Number	%
1	Digital Method	154008	29.5
2	Polarization Method	127118	24.4
3	Graphical Method	91804	17.6
4	Photogrammetric Method	81314	15.6
5	Prismatic Method	61271	11.7
6	Photoplan	1782	0.3
7	Other	220	0.8
Total		521537	100.00

**Table 2:** Cadastral Maps According to Coordinate System

Rank No	Coordinate System	Number of Plot	%
1	ITRF	26942	5.2
2	ED-50	286624	55.0
3	LOCAL	110817	21.2
4	NON-COORDINATE	97154	18.6
Total		521537	100.00

Because of the evaluation made at the end of 2003, the cadastre work of nearly 13,000 units (village/ neighbourhood) of which cadastral work hasn't been done before aimed to be completed and "The Completion Property Cadastre Project" was put into practice. While the average of annual production in cadastre work is 350, the production is increased about ten times by changing the working method and buying service from the private sector moreover, costs were decreased and better quality results appropriate to information systems in digital format were obtained.

Whereas the cadastre of 39,823 in 52,595 total units was completed by the end of 2003 in Turkey, the cadastre of 12,366 units was completed after 2004 and the whole cadastre work was completed in except 406 problematic units (*forest, border disputes, no cadastre wanted, etc.*).

Cadastral information formed 40-50 years ago cannot perform the function determined as “state’s giving assurance to ownership”, and they cannot response the needs and the expectations of investments and projects. 14% of the cadastral work is in graphics system. It is known that the existing information and documents need updating in rate of 60 %. **(Cagla, 2007)**

Cadastral work in our country was only done for providing the border security of real estates of the citizens, solving the problem of having no land register according to the Turkish Civil Code, and it came today with this basic intention. The present state of our cadastre is lack of the information that other engineering fields and various investment areas require. However, the cadastre was planned to serve multi-purposes in its establishment **(Sari, 2006)**.

Produced cadastral layouts should be renewed because of the following reasons:

- **Technically inadequateness:** Since the production technique of the sheet, required accuracy cannot be obtained.
- **Loss of application quality:** The lack of ability to apply the information and documents of sheet or basis to floor.
- **Lack of information:** Illegibility of the in formation in sheet or impossibility of getting the information from the original documents.
- **Showing the boundaries of the ground as its original:** the difference of the borders between the Real Estate sheet and the borders identified during the cadastral work on the ground **(Dogan, 1999)**.

Especially the type changes occurred from the construction in municipality lands with the rapid urbanization were not written on the sheets. Although the land values increased, map scales and plot accuracy remained stable. In short, it is obvious that the cadastral work needs to be completed, revised and renewed.

### **3. LAND REGISTRY AND CADASTRE MODERNIZATION PROJECT (TKMP)**

Land Registry and Cadastre Modernization Project (TKMP) entered into force on 13 August 2008 and published in Official Gazette No. 2008 / 13886 in order to increase the effectiveness and quality of services of Land Registry and Cadastre with the credit from a World Bank **(URL 1)**.

Objectives of the project are to update and renovate the cadastre maps that produced years ago and very insufficient today for the needs of digital information that supports digital cadastre and TAKSIS information, to introduce the digital land registry and cadastre information to the service of public and private sector, to improve the services which was carried out in Land Registry and Cadastre Directorates, to investigate the international applications on valuation of real property and registration, to choose the most suitable model, to prepare a framework report with related participants from public institutions, private sector, university in order to determine the policies for this purpose.

Within the project, performing the following issues was decided:

To update the Land Registry-Cadastre-map information that is far from answering today's needs in a digital and legal form, to create a layout to "Spatial Information System" by transferring the Sheet, Technical and Archive information to computer, to transform the information into international coordinate system, to produce Basic Map (1 / 5000 and larger-scale colourful ortho-photo map production), to update the land registry information and renovation of land registry files, to develop the legislation for the needs within the 22-a applications.

### **3.1 Things to do within the scope of Updating the Information of Cadastre and Map**

#### **3.1.1 Data Transfer to the Computer and Transformation**

Data Transfer to the Computer and Transformation includes the following issues:  
Scanning the cadastre technical archive and saving it as raster in computer,  
Scanning the sheets and saving it as raster in computer,  
Controlled vectorization from the Measurement values and sheets,  
Taking the print out and control of sheet index and the scale,  
Measuring the fixed common points by CORS and GPS,  
Calculation of the transformation parameters and transformation with suitable model,  
Creation of a part for new sheet in ITRF system, and storage drawings and new values,  
The creation of document management system.

#### **3.1.2 Renovation of Required Priority Areas within 22-a**

The renovation of required areas within 22-a includes:  
The renovation areas and the areas of forest, pasture and the site, which would be the subject to objections, should not be taken in the first step of application in Reconstruction Implementation, Consolidation etc.  
Applying renovation process under 22-a  
Control on the island, completion of records and reaching the step of announcing,  
Preparing the hanging notices and assuring  
Delivery of new sheets in Digital Cadastre values and ITRF system  
Printing and distribution of new land registers.

#### **3.1.3 Elimination of Structural Errors in Land Registry Files and Transferring to Computer**

Elimination of Structural Errors in Land Registry Files and Transferring to Computer includes:  
Identification and elimination and of Structural Errors like share errors, registration errors, writing errors in Land Registry Files,  
Supplying the Citizen ID numbers and entering and comparing it to the cadastre plot and integration,  
Creating the new records in computer, announcement and printing new file,  
Delivering the records as a result of announcement to the Directorate of Land Registry,

As a result of the collecting data from 22 Regional Directorate, it is determined that 8,010,583 plots need renewal work as soon as possible,

Within the project;

In 2009, 167.000 parcels,

In 2010, 2.098.000 parcels,

In 2011, 1.425.000 parcels,

In 2012, 410.000 parcels, totally 4.100.000 parcels are planned to be renewed (3402/22-a application).

#### **4. CADASTRAL WORK IN KONYA REGION**

The first cadastral work in Turkey was started in Konya Çumra in 1912, but it couldn't be continued because of the Balkan, First World and Independence Wars. Systematic cadastral work was started in 1934. It is still going on within the Cadastre Law no 3402 dated 1987. **(Cagla, 2007).**

5<sup>th</sup> Regional Directorate of Land Registry and Cadastre contains the provinces of Konya, Karaman and Aksaray and their districts,  
44 Land Registry Directorates,  
17 Cadastre Directorates,  
1 Cadastral Chieftaincy.

Konya in the responsibility area of the 5<sup>th</sup> Regional Directorate the cadastre work is carried out in 31 districts with 14 Cadastre Directorates, In Karaman with 2 Cadastre Directorates in 5 districts, and in Aksaray with 1 Cadastre Directorate in 6 districts. The cadastre of 1537 units in Konya, 303 units in Karaman, and 366 units in Aksaray, totally 2206 units under the responsibility of 5<sup>th</sup> Regional Directorate was completed. The general state of the plots where the cadastral work will be performed by 5<sup>th</sup> Regional Directorate of Land Registry and Cadastre within the law article 22-a is given in Table3 **(URL 2).**

**Table 3:** The general state of the plots where the renovation work will be performed by Konya Regional Directorate.

Group	Cadastre Directorate	Number of Units	Number of Plots	Area (Acre)
1	Selçuklu	20	15375	302173
	Kulu	4	2878	103950
2	Meram	19	11535	60213
3	Karatay	26	12618	468295
4	Karaman	13	12636	261109
5	Aksaray	16	22825	587950
6	Aksaray	11	26400	329800
7	Aksaray	17	24300	324250
8	Akşehir	4	26500	83394
9	Beyşehir	7	15736	73060
	Seydişehir	2	1739	15325
10	Bozkır	6	19107	61102
11	Bozkır	4	13397	22736
	<b>Total</b>	<b>149</b>	<b>205046</b>	<b>2693357</b>

The work of renovation of which auction was done within the article 22-a of Cadastre Law no 3402 in the units in the area of Regional Directorate of Konya where cadastre work is completed and renovation and updating is needed in time was started and it has been continuing in August 2009 in 54 units ( village and neighbourhood) (29.935 plots and 633.218 acres) in districts of Meram, Karatay, Selcuklu of Konya Province; 20 units ( village and neighbourhood) (19.650 plots and 370.800 acres) in districts of Centre, Ağaçören, Sarıyahşi , Ortakoy of Aksaray Province, totally in 74 units and 1.004.018 acres land.

A coordinated operation has been performed in the auctioned work within article 22-a of Cadastre Law No. 3402 that the technical measurements have been performed by the contractor firm and the measurements have been controlled by Cadastre Directorates.

Cadastre renovation work is planned to perform in 11 packets with auction method by private sector, and the auction of the 1<sup>st</sup> and 2<sup>nd</sup> packet group places was done. Renovation work of the auctioned places was completed and they are in the stage of registration in Land Registry.

## 5. SAMPLE APPLICATION AREA OF CADASTRAL RENOVATION

Hamidiye neighbourhood in the district of Selcuklu in the province of Konya is located in the city centre which had the highest urban rant. The first cadastre work was done in graphical method in scale of 1/500 without benefiting a coordinate system in 4 sheets, 157 plots and 45 Map sheet sample produced by using the graphical method in first cadastre work is seen Figure 1.



**Figure 1:** The copy of 1<sup>st</sup> Cadastre Map Sheet of Cadastre Study Area (Example Map Sheet no: 28)

Construction in this area where establishment Cadastre was completed was developed according to the state of existing cadastre. Since the urban rent is too high and the construction is very intensive the application of the development method could not be applied.

The present time map of the working area produced by Konya Metropolitan Municipality using ortho photo mapping method in 2007 is given in Figure 2.





**Figure 2:** The Present Time Map produced by Ortho-Photo Mapping Method

Hamidiye neighbourhood which is in the responsibility field of Selcuklu Cadastral Directorate was auctioned as 1<sup>st</sup> group stage in renovation area of Konya Regional directorate. It is one of the 25 units taken by the auction method by Çığır-Aydınlar Engineering joint. Land survey was done depending on the state's triangulation network coordinate system in ITRF coordinate system, based GRS 80 ellipsoid of 2005 Epoch. For application and exposure, triangulation and polygon in enough closeness were established. Surveys were performed by using RTK method of GPS and electronic tachometers. The cadastre renovation was completed and digital data was obtained.

Information announcement (hanging notice) was done in the region where cadastre renovation work took place for 15 days beginning on 08.12.2009. The objections were evaluated after the hanging notice and required corrections were done. Certain hanging notices were announced between the dates 31.12.2009 and 30.01.2010. After the cadastre process becomes absolute, title deed registration was completed. The Situation map of working area after finishing the registration of title deed is seen in Figure 4. The state of developing plan of the area is seen in Figure 5.



## 6. CONCLUSION AND PROPOSALS

Turkey is a country which has the purpose and effort of planned and rapid development. Planning activities usually need a lot of data related to soil. These data can only be served in the size of venue and in update way by Mapping and Cadastre sector.

The cadastral data in our country are not sufficient enough to response the needs since they are insufficient in technical aspect and they are not up to date. In order to answer the needs, both urban and rural cadastre data should be up to date and qualified. The cadastre of Turkey in urban and rural lands should be renovated to gain modern identity according to their urgency.

As a result;

Increase in users' satisfaction from cadastral services,

Concluding cadastral proceedings in the courts as soon as possible (reducing the number of cases),

Creating layout of Spatial Information Systems,

Increasing the access of Public and private sector organizations to data related to land,

Reducing the service time cadastre data given to public institutions and the private sector,

Renovation of 4.1 million parcels will be provided.

Using computer in planning and projecting stage with the aid of digital land models will enable producing the projects very quickly.

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