

RENOVATION STUDIES IN TURKEY CADASTRE; REASONS AND PROJECTS RESULTS

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EXISTING SITUATION OF TURKEY CADASTRE

- ▶ Turkey has started to cadastre studies with 05.02.1912 dated Emvali Gayrimenkullerin Tahdit ve Tahriri Hakkındaki Kanunu Muvakkat Law.
- ▶ Soon after the establishment of the Republic, studies have started again in 1925 with 658 numbered Cadastre Law; and later on it is maintained with 1934 dated 2613 numbered Tapu Tahrir Law. Cadastre studies are still conducted according to the 5304 numbered law, different 3402 numbered Cadastre Law decisions.

- ▶ Turkey cadastre wants to reach level of contemporary cadastres regarding the FIG's definition of "Cadastre is a public service, which consist of registers and big scaled maps, real estates which are divided as administrative units; conducted by cadastre organisation, shows in the way that judge, public management, economy and statistics desire." And Turkey wants to integrate existing cadastre system with "Cadastre 2014 Outline Programme" (Erkan2001).

Realization of the studies in Turkey's Cadastre

Total Avenue Amount	17 994	
Finished Avenue Amount	17 831	(%99,1)
Number of on-going village	59	(% 0,3)
Number of remaining problematic villages	104	(% 0,6)
Total Village Quantity	34 601	
Finished Village Quantity	33 193	(%95,9)
Number of on-going village	513	(% 1,5)
Number of remaining problematic villages	895	(% 2,6)
Total Area	417 000 km ²	Realization Rate 97%
Finished Area	404 490 km ²	
Remaining Area	12 510 km ²	

▶ **General specifications of the cadastre maps in our country are like at the below (Köktürk 2002, İnam 1999):**

- ▶ They are produced in different coordination systems and are not connected to country's triangulation network.
- ▶ They do not include height information
- ▶ Maps are opened according to "cadastre map" basic, more than screw plate system and there is not a standards in classification systems and screw plate dimensions.
- ▶ Land control points like triangulation, polygon, which cadastre maps are importantly sourced, are not take place in area considerably.
- ▶ Lineal map is a static document; it is difficult to follow changes and keep updated.
- ▶ There is doubts if the cadastre maps are drawn truly or not; their control is difficult.
- ▶ Parcel square measures are generally calculated with values taken from cadastre maps and planimeters instead of measurement

- ▶ There has been important developments in the technique and technology since the day that cadastre maps and measurement values are required. There could not done a study in according specifications of these information and cadastral renovation.
- ▶ With the linealy produced cadastre maps which have the above qualifications ;
- ▶ a lot of details are missed and lost.
- ▶ It is not easy and cheap to get back data for relating it with other three dimension datas, after it is put in a map.
- ▶ As they are produced in different scale, base plate type, producing technique and in coordinate system, their communication both between them and in other usage areas is weak.

- ▶ In Turkey until 2010, around 325000 cadastre maps are produced. In cadastre studies, there is 10 different scale and 5 different producing chart technique is used starting from 1/200 to 1/10000 and it is obtained that these maps are drawn to 9 different base plate.

Situation of the cadastral maps according to the producing method (Sari 2010).

Item No	Producing Method	Quantity	%
1	Graphical Technique	113.499	34.92
2	Polar Technique	63.733	19.61
3	Prismatic Technique	62.846	19.34
4	Photogrammetric Technique	46.191	14.21
5	Numerical Technique	38.731	11.92
Total 5 different producing technique		325000	100,00

Distribution of the produced maps according to their scales (Sari 2010)

Item No	Scale	Quantity	%
1	1/200	206	0.07
2	1/250	7	-
3	1/500	26.688	8.20
4	1/1000	95.648	29.43
5	1/2000	106.584	32.80
6	1/2500	17.890	5.50
7	1/3000	30	0.01
8	1/4000	397	0.12
9	1/5000	76576	23.56
10	1/10000	974	0.30
Totally 10 different scales		325000	100,00

- ▶ It is foreseen that after the first facility cadastre, the changes occur on the floor can only be reflected to the registration by the demand of relevant people. And there is not a juridical must which compels relevant people for doing an operation about registering the changes occurred on the floor. (border change, newly constructed buildings and facilities, new roads etc.) So, "land-cadastre plan" relation is disrupted by time and cadastre plan have been unable to reflect the area.

2.1 Need for renovation of cadastre

- ▶ Map producing techniques do not supply the required sensitivity
- ▶ Cadastral base plates are rub off and lost the currency.
- ▶ Limitation in the areas which renovation with the aim of updating, digitising etc. processes.
- ▶ That existing cadastral datas' being lack of qualification, proportion and currency which will be base plate for spatial information systems.
- ▶ Old cadastral maps do not have required positional accuracy as being prepared by scaling techniques far from today's technology.
- ▶ Cadastral data base reference system is in ED-50 system, in another project MERLIS (Earthquake Terrestrial Information System) reference system ITFR (International Terrestrial Reference System) defines the system, so using more than one database together.

- ▶ The existence of cadastre parcels edging, spaces between parcels and embarking.
 - ▶ Having matching problems in land registry and cadastre parcels because of insufficient and deficient data.
 - ▶ Unable to define the topology rules which are necessary to be in database for the usage as base plate in the spacial information systems. (for example rule of edging of parcels, not to have embarking rule, not to have space rule)
 - ▶ All datas are produced in CAD (Computer Aided Design) formats but they are not produced in information system logic.
- These problems should be overcome. For these reasons there is necessity for the renovation of the cadastre.

3. STUDIES ABOUT RENOVATION OF CADASTRE

▶ 3.1 Studies within the scope of renovation law

- ▶ In Turkey 23.06.1983 dated and 2859 accorded “Law About Renewal of Land Registry and Cadastre” and relatedly “ Regulation About Renewal of Land Registry and Cadastre” studies are conducted by TKGM. It is foreseen to renew the maps which are insufficient because of technical reasons, lost applicability, default or unreal with borders of the area. But facility cadastre studies and inadequacy in the renovation statute, left these studies in a confined space.

▶ 3.3 Necessity of Renovation Studies in Turkey Cadastre, Existing Renewal Statute’s Application Indexed Analysis

- ▶ Renovation concept in Turkey could not move forward as reproducing of the cadastre maps which are inadequate because of technical reasons, correction of technical mistakes on facility cadastre and foreseeing that lineal screw plates should be digitized; so in a meaning it could not be more than cadastral correcting.

▶

- ▶ As seen on Figure, until 2005, renovation of 2.134.853.000m² area is done. Renovated parcel number is 435.639, and it compromise %1.3 of land registered 32.500, 000 parcels in our country by the end of 2004.

Chart Renovation studies regarding years (Sarı 2010)

	Applied Area in extent of renovation law	
	Parcel Number	Square mea. (m ²)
1985-1989	30813	155 214 000
1990-1994	36617	272 313 000
1995-1999	154877	715 005 000
2000-2005	213332	992 321 000
Total	435639	2 134 853 000

Main aims of the existing Cadastre Renovation System are;

- ▶ computer supported studies and **base** for automation,
- ▶ **standardization** for a better change of the datas,
- ▶ **connected** wit applications of the users,
- ▶ and it must be more **economical** (Köktürk 1996).

▶ **3.3.1 Problems faced in renovation of the Cadastre**

▶ **a) Technical problems**

- ▶ Losing facility which are belong to land control points like triangulation and polygon, unable to have application qualification even for the borders which are not changed.
- ▶ Incompatibilities between the land and screw plates which happens as a result of measure and drawing mistakes which are done during the cadastre studies and not to have application ability even for static borders.
- ▶ Corrosion of the used screw plates, their becoming unusable because of their bad quality, causing rough mistakes if used.
- ▶ Inadequacy of screw plates which are produced in graphical system, except for daily needs.
- ▶ Incompabilities between screw plates and lands.
- ▶ Inadequacy of some screw plates as they are produced by photoplan method.
- ▶ Unability of plan scales to the necessities, and occurrence of rough mistakes in case of zooming out of mistake limit.
- ▶ Inadequacy of educated staff and equipment in the times that cadastre started.
- ▶ Increasing of plan sensivity regarding the increasing value of the real estates for the development of the cities and application of contruction plan.
- ▶ Unable to update the changes after the preparation of cadastre, unable to increase sensivity of the previous screw plates, unable to transfer these datas to computer media.
- ▶ Limitation of application ability because of the very narrow frame of 2859 numbered Land registry and Cadastre screw plates law that is promulgated for the solution of technical problems.

▶ **b) Socio-Economic Problems**

- ▶ Fast growing of cities because of the immigrations from rural area to cities, urbanisation, construction plan applications and increasing value of real estates based upon this, there has been a need for more sensitive measurements. This necessity which happens in urbanisation, will also be valid for rural areas.
- ▶ Cadaster renovation process to solve these problems ;
- ▶ it must be considered with process of producing big scaled base map series.
- ▶ scale, base plate, screw plate classification and standardization in coordinate system and providing coordination
- ▶ All users should be enabled to add personal information to the base maps.
- ▶ Updating of all information by the producing of maps, the institutions which include in producing process should be able to join this process as much as they spend from their own resources.
- ▶ In this sense, all studies to be done, will reach their aims as long as there is coordination and cooperation between the managements (Köktürk 1996).

4. SURVEY AND APPLICATION

- ▶ There has been the attendance of TKGM dependent 48 cadastre management and 37 university lecturer . Below question are asked to attendant;
- ▶ a) Do you think that it is necessary to make renovation studies for Turkey's facility cadastre?
- ▶ b) If yes, do you think is it possible to get efficient results with existing 2859 numbered Law and regulation?
- ▶ c) If your answer is "yes, it is possible" for the 2nd question, what do you think that what is the reason for passive use of the 2859 numbered Law till now?
- ▶ d) If your answer is "no it is not possible" for the 2nd question what is the proper solution, and what do you offer ?
- ▶ e) What is your possible offer for overcoming the existing problems in cadastre?
- ▶ f) Is it possible to use a screw plate, which has lost its currency, oriented with base or technically lost its ability of application, without putting it to renovation studies?
- ▶ g) What are the problems in registration based studies in general, how can it be overcome?

▶ 4.1 Application

- ▶ The place which is chosen as "application area" consists of 48 parcels, has a cadastre map which is produced in cartoon base and tacheometric method, free from coordinate and produced by cadastre management in 1952 as a result of a cadastre study in 1500 scale. (Figure 4.1)

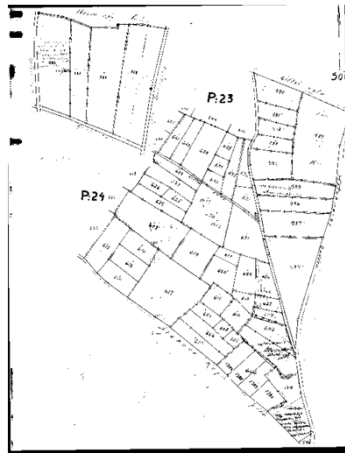


Figure 4.1 Cadastre map which shows the application area

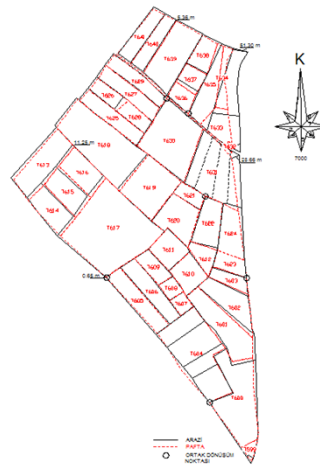


Figure 4.2 Land-numerical map associating.

- ▶ **4.2 Evaluation of the survey and results**
- ▶ *a) In respect to legal regulations;*
 - ▶ – Making regulations in Turkish Civil Code and Cadastre Law, and creating a legal basis should be created named second cadastre or renovation cadastre.
 - ▶ – No matter whatever the name, a system which is proper for the today's system should be designed for supplying all technical and property rights.
 - ▶ – In order to prevent the spaces which will be occur during the period until creating this system, there must be legal regulations for the renovation cadastrel change of the screw plates.
 - ▶ – The legal arrangements must be done for providing coordination and data transfer between the map producer institutes.

- ▶ *b) In respect to institutive regulations;*
- ▶ – Information system bases which are provided by institutions must support each other.
- ▶ – Personal individualisms must be put away, repetitions must be avoided.
- ▶ – Coordination must be provided for data usage and change between the institutes.
- ▶ – In house professional orientation must be provided.
- ▶ – TKGM must be reconstituted regarding the necessities of today.
- ▶ – Private sector must be used more for service procurement

- ▶ *c) In respect to regulations about technique and equipment;*
- ▶ – Facility cadastre must be completed urgently.
- ▶ – Country's geodesic network must be widened, condensations must be done throughout the country and control point problem must be minimised.
- ▶ – Information technologies base must be widened in every institute, in house education must be concentrated.
- ▶ – In the institutes, "database which uses national database information system" must be concentrated.
- ▶ – Dispersion of technological devices like GPS, electronic total station, etc. to the institutes must be done.
- ▶ – Educated staff employment must be done, "efficient usage of the human sources" in the institutes must be provided
- ▶ – Professional inadequacy of the existing staff must be compensated by in house educations.

▶ *d) In respect to social and economical regulations;*

- ▶ – Lack of fund, which is the biggest obstacle in front of the institution studies, must be overcome by financial regulations.
- ▶ – Personal benefits of the staff must be enhanced.
- ▶ – Briefings must be given for creating "continuity in cadastre" in the mind of public; negative effects in social communication should be put away.

▶ **5. Suggestions**

- ▶ – There must a new cadaster law which will be constant, compatible with needs, assesment of all datas according to the parcel based Land Information System.
- ▶ – Country cadastre must be assessed in the concept of land management; completing the studies about planning of urban and rural land use and solution of environment problem, making the necessary contribution to the economy, healing of social structure, must be connected with a master plan.
- ▶ – Changing of cadastre regulation is supplied according to the information change, but legal regulations could not be done about renovation caadstre. Legal changes about the charging Renovation Law must be assessed.
- ▶ – information system studies about property based must be fastened; dynamical maps, which are the data plate of the system, must be prepared for the usage of the system; cadastre regulation, must be reconsidered according to the second cadastre studies.
- ▶ – Basing of numerical maps for other systems should be supplied, institutional cooperation must be done for the determination of datas related with property.

- ▶ – Necessary base should be provided for the usage of satellite geodesic in cadastral map producing.
- ▶ – Passing in to country coordinate system must be fastened, existing and newly produced maps should be provided to take place in a common system.
- ▶ – Duties of numerical map data producer institutions should be reconstructed.
- ▶ – University, nongovernmental organizations, private sector and juridical assessments should be done and solutions must be produced for the deficiencies of the existing system.
- ▶ – a fourth dimension, concept of value, must be added to existing three dimensions in cadastre; and it must be provided to serve assesment of real estates.
- ▶ – Archive and otomation system must be powered for stocking of required information of system and usage of it.
- ▶ As a result, it is clear that in Turkey the studies for "renovation of the cadastre" is indispensable for land consolidation and serving cadastre datas to the service of public in an updated and true way for being base for any kind development projects

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