




FIG Working Week
17 - 21 May, Bulgaria
From the wisdom of the ages
to the challenges of modern world



FIG **SOFIA 2015**

**AN EVALUATION ON CURRENT TURKISH
CADASTRAL SYSTEMS IN ACCORDANCE WITH
FIG CADASTRE 2014 STATEMENTS**

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**CADASTRE 2014
VISION REPORT**

**A BRIEF HISTORY
AND CONTENT**

- The 20th FIG Congress in 1994 –Melbourne
- FIG Commission 7 which concentrates on Cadastre and Land Management decided to develop a vision for the purpose of improving worldwide cadastral systems for following 20 years
- Thus, this commission set up three working groups that would study on defined purpose for 4 years.
- The head of the 1st Working Group, Jürg Kaufmann and the secretariat Daniel Steudler, primarily prepared a questionnaire form in order to define the trends related with the topic. The form contained questions related with legal and institutional characteristics of cadastre, planning facilities and control systems, multi-purpose cadastre, responsibilities of public and private sector, future trends and ongoing reforms.

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CADASTRE 2014 VISION REPORT

**A BRIEF HISTORY
AND CONTENT**

- The evaluations on questionnaire forms forwarded to six main statements on which comprehensive discussions were done in 1995 Delft, 1996 Budapest, 1997 Penang FIG Working Weeks.
- Finally, an eventual report called “Cadastrre 2014” that presented a new vision, was published in 1998. In the report, not only the cadastral vision of the future, but also current situation of cadastral systems, reform projects and surveyors’ role for Cadastre 2014 Vision were well-described.

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SIX STATEMENTS OF CADASTRE 2014

1st Statement of Cadastre 2014 Vision

The first statement of Cadastre 2014, in parallel with a thorough definition of “land object”, foresees that future cadastres should be more comprehensive and show all legal status of land, including restrictions.

2nd Statement of Cadastre 2014 Vision

The statement foresees that the future cadastres will not only be limited to mapping purposes, but also will contain more land-object oriented components; therefore, responsibilities of surveyors that are interested in technical concept (cadastre) and notaries/lawyers that are interested in legal concept (land records) will significantly change. Considering the fact that both disciplines will be run together, the separation between maps and records will be eliminated in Cadastre 2014 Vision.

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**SIX STATEMENTS
OF CADASTRE
2014**

3rd Statement of Cadastre 2014 Vision

Third statement of Cadastre 2014 Vision states that in the process of classical mapping production; the measurement of land details and creating maps based on these measurements need notably effort, capability and time; correspondingly these maps can be archived in defined scales.

4th Statement of Cadastre 2014 Vision

The fourth statement of Cadastre 2014 Vision goes parallel with the third statement and claims that spatial datasets of objects that are obtained with classical cadastral facilities will be digitized in order to be a base for data processing models because of increased technology supply. All works that are done with pencil and paper (manually) will evolve to automated computer systems for implementing more user-friendly, efficient and cost-effective cadastral system.

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**SIX STATEMENTS
OF CADASTRE
2014**

5th Statement of Cadastre 2014 Vision

The fifth statement of Cadastre 2014 helps us to understand that public sector is the only responsible for the purpose of maintaining the security of land registration system by setting up and sustain a cadastral system, although these systems that are driven by public sector have not elasticity and they are stricter in customer-based facilities than private sector.

6th Statement of Cadastre 2014 Vision

Obviously, there is a noteworthy need for financial resources to set up and maintain such cadastral systems. The sixth statement of Cadastre 2014 Vision focused on this issue. Land taxes enable public sector to run cadastre and land registration operations; besides, private sector runs its operations with the help of payments of business owners.

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GENERAL VIEW ON TURKISH CADASTRAL SYSTEM

OTTOMAN EMPIRE PERIOD (TILL 1922)

- In Ottoman property system, almost all land was possessed by the empire and land tenure was given to people who were helpful for the wars in order to create financial support for the military organization.
- The government set up a land registration system based on a legislation (titles) and administrative network in a more westernized concept.
- On 21st of May, 1847, “Defterhane-i Amire Kalemî” which was the foundation of today’s “The General Directorate of Land Registry and Cadastre” and land registration were adopted.
- The first cadastral work was set up in a westernized way with a law that came in force on 5th of February, 1912. With this law, the aim was to survey boundaries, estimate values and incomes of all lands but it was not successful because of WW1.

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GENERAL VIEW ON TURKISH CADASTRAL SYSTEM

TURKISH REPUBLIC PERIOD (AFTER 1923)

- After the renewal of old registers, a new law that set up a governmental guarantee (#658 Cadastre Law) entered into force in 1925, generally focusing on the Turkish-Greek Interchange and including ‘value’ factor of the land.
- In parallel, in year of 1926, Turkish Civil Law (#743) entered into law which presents “private property concept” differently than Ottoman period. Its judgments related with private property significantly changed the understanding of cadastral concept in Turkey. Turkish Civil Law indicates two important issues: The Treasury became responsible for any inconvenient and wrong land registration and the cadastre is the main tool for the boundary definitions.

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**GENERAL VIEW
ON TURKISH
CADASTRAL
SYSTEM**

TURKISH REPUBLIC PERIOD (AFTER 1923)

- In 1987, a new definition of cadastre was spelled in new Cadastre Law (#3402) as “the aim of this law is to define real estates’ legal status based on country’s cadastral topographical map with demonstrating their boundaries both on land and on maps and setting up land registration that is foreseen by Turkish Civil Law”. By this law, the methodological difference between cadastral works in urban and rural areas was removed and a single method was adopted for all country.

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**GENERAL VIEW
ON TURKISH
CADASTRAL
SYSTEM**

TURKISH REPUBLIC PERIOD (AFTER 1923)

- After the foundation of Turkish Republic, with several of methods and laws, the cadastral applications had been completed in 39.319 units out of 52.439 units till 2002. In 2003, The General Directorate of Land Registry and Cadastre decided to put forward “Completion of Cadastre Project” and took a support from private sector. Until 2013, the directorate has completed the cadastre in 12.740 units more (totally it has been reached up to 99.3% of all units) and there were only incomplete 380 units because of refusal for cadastral work or disputed boundaries. In parallel with “Completion of Cadastre Project”, Cadastre Law (#3402) had updated statements in 2005 in order to get rid of technical deficiency of cadastral maps, to complete forestry cadastre in desired standards and for all kinds of utility services.

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GENERAL VIEW ON TURKISH CADASTRAL SYSTEM

Coordinate System (CS)	Number of Maps	Percentage
ITRF	26,942	5.2 %
Local	110,817	21.2 %
ED-50	286,624	55.0 %
Without any CS	97,942	18.6 %
TOTAL	521,537	100.0 %

Measurement Method	Number of Maps	Percentage
Numerical	154,008	29.5 %
Orthogonal	127,118	24.4 %
Graphical	91,804	17.6 %
Photogrammetric	81,334	15.6 %
Prismatic	61,271	11.7 %
Photo plan	1,782	0.3 %
Other	4,220	0.8 %
TOTAL	521,537	100.0 %

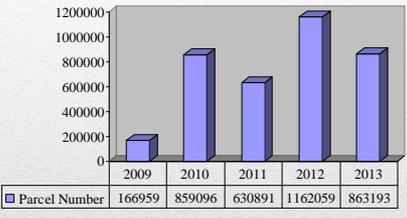
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GENERAL VIEW ON TURKISH CADASTRAL SYSTEM



Year	Parcel Number
2009	166959
2010	859096
2011	630891
2012	1162059
2013	863193

Cadastral Renewal after New Statements in Cadastre Law

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**LAND
REGISTRATION
AND CADASTRE
MODERNIZATION
PROJECT**

“Land Registration and Cadastre Modernization Project” was implemented on 13th August 2008 with the help of World Bank funds and it contains five fundamental components whose aims are to improve the quality of land registration and cadastral services, to regenerate and update cadastral maps standing by registration information and numerical cadastre, supplying institutional improvement and human resources, developing institutional policies for real estate valuation and project management with capacity improvement.

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**LAND
REGISTRATION
AND CADASTRE
MODERNIZATION
PROJECT**

1ST COMPONENT

In the first component, titled as “Regenerating / Updating Cadastre and Land Registration”, of the project, it was aimed to update not only the maps and technical archive datasets in computerized environment with a transformation to international coordinate system (ITRF), but also related land registry information. In this context, as aforementioned, regeneration and updating were carried out for 3,682,195 parcels between 2009 and 2013 with the support of private sector.

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LAND REGISTRATION AND CADASTRE MODERNIZATION PROJECT

2ND COMPONENT

The second component is called as “Refinement of Services”. In this context, all data were transformed into suitable digital format that can be used in a central CAD-based system (Land Registry and Cadastre Information System – TAKBIS in Turkish), then these data were matched with land registry information and eventual information were shared among stakeholder institutions, foundations, municipalities and became accessible by public in international standards through e-Government (this system is called “Spatial Real Estate System” – MEGSIS in Turkish). On the other hand, Turkish National Permanent GNSS Network (TUSAGA AKTIF / CORS-TR in Turkish) with a model office design and Map Databank (Harita Bilgi Bankası in Turkish) have been developed.

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LAND REGISTRATION AND CADASTRE MODERNIZATION PROJECT

LAND REGISTRY AND CADASTRAL INFORMATION SYSTEM (TAKBIS)

The main aim was to transform all graphical and textual data, which had been collected by General Directorate of Land Registry and Cadastre since the foundation of the Republic of Turkey, into a multi-purpose land information system with a Geographical Information System (GIS) context, which enables interior and exterior user to access the data straightforwardly.

It was possible to use land registration information containing textual data among 957 Land Registry Offices in an automatized way; but it was not possible to have the same success in land registration information containing graphical data, since collecting all cadastral maps that have been produced so far with different coordinate system, into a database with unique coordinate system, was high-cost.

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LAND REGISTRATION AND CADASTRE MODERNIZATION PROJECT

SPATIAL REAL ESTATE SYSTEM (MEGSIS)

Spatial Real Estate System (MEGSIS) Project started in the aim of setting up the infrastructure of spatial information system and creating a geographical information system from which public and private sector benefit.

MEGSIS is an open-access application which collects CAD-based data from local computers in Cadastre Offices into a central system, matches them with land registry information and shares these data with other stakeholders through e-Government.

- Web-based application software
- Map services in international standards
- E-Government map services

Finally, approximately 58 million parcels have been processed in the project between 2011 and 2013. With the help of qualified human resources, it was an important project for Turkey, which desires to develop more open-source technologies.

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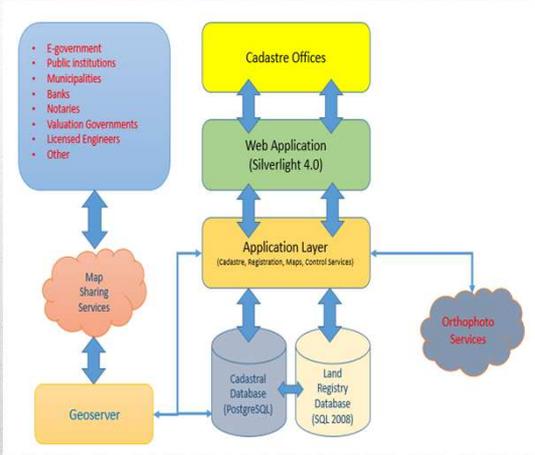
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LAND REGISTRATION AND CADASTRE MODERNIZATION PROJECT

SPATIAL REAL ESTATE SYSTEM (MEGSIS)



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graph TD
    Users["E-government, Public institutions, Municipalities, Banks, Notaries, Valuation Governments, Licensed Engineers, Other"] <--> WebApp["Web Application (Silverlight 4.0)"]
    WebApp <--> AppLayer["Application Layer (Cadastral, Registration, Maps, Control Services)"]
    AppLayer <--> CadastreOffices["Cadastral Offices"]
    AppLayer <--> GeoServer["Geoserver"]
    AppLayer <--> OrthoPhoto["Orthophoto Services"]
    AppLayer <--> CadastreDB["Cadastral Database (PostgreSQL)"]
    AppLayer <--> LandRegistryDB["Land Registry Database (SQL 2008)"]
    GeoServer <--> MapSharing["Map Sharing Services"]
    
```

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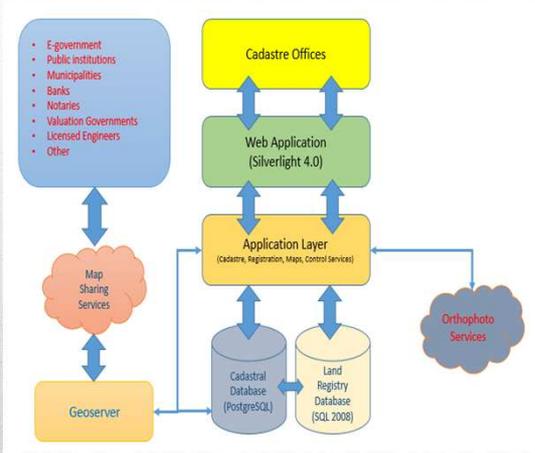
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LAND REGISTRATION AND CADASTRE MODERNIZATION PROJECT

SPATIAL REAL ESTATE SYSTEM (MEGSIS)



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LAND REGISTRATION AND CADASTRE MODERNIZATION PROJECT

MAP DATABANK (HBB)

In the aim of setting up a high-scale spatial information system, metadata related with all kinds of map documents and information that have been produced by several institutions, has been integrated in a databank through internet; therefore duplications of maps and wasteful expenditure are avoided. ISO 19115 Metadata Standard has been used to design this information system.

Map Databank Portal aimed to collect all information related with maps under one umbrella and to integrate in a portal structure to be accessed by all users.

Service Type	Responded Demands	Non Responded Demands	Total Demand Number	Success Rate
WMS (Web Map Services)	727,503	14,869	742,372	98.00 %
WFS (Web Feature Services)	3,274,579	192,706	3,467,285	94.44 %
TOTAL	4,002,082	207,575	4,209,657	95.07 %

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LAND REGISTRATION AND CADASTRE MODERNIZATION PROJECT

3RD COMPONENT

In context of 3rd component of the project, The General Directorate of Land Registry and Cadastre has focused on seminars by means of human resources strategies, institutional strategies and development of business plans.

Name of the Seminar	Participant Number
2 nd Project Management Seminar	45
Education and Evaluation Meeting	1250
TOTAL (World Bank Resources)	1295
Seminar with Candidate Officers	268
Adaptation Seminar	35
Legislation Seminar	192
Services Seminar	4648
TOTAL (Institutional Resources)	5143
GENERAL TOTAL	6438

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LAND REGISTRATION AND CADASTRE MODERNIZATION PROJECT

4TH COMPONENT

There has been an enormous need for scientific, reliable and up-to-dated land valuation methods and archiving land values in order to have social justice in public sector, because of the fact that housing credits, expropriations, development applications, urban regeneration, capital market applications, and determination of current values based on taxation become widespread in Turkey. Therefore, "Land Valuation" became the title of fourth component of the Land Registry and Cadastre Modernization Project.

The sub-components of this theme are:

- Policy design
- Pilot application
- Institutional Capacity Assessment

After this application, all factors that can influence on land valuations were estimated, hence, a "Real Estate Valuation Information System" was targeted that can be updated, analyzed, shared across the country and containing matching algorithms itself.

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LAND REGISTRATION AND CADASTRE MODERNIZATION PROJECT

5TH COMPONENT

The fifth component of the modernization project is called as “Project Management” and it aims to organize planning, resource use, accounting, finance and coordination facilities in optimum time, cost and desired quality.

For this purpose, private sector is desired to take a part in cadastral activities since public sector is stricter for customer-based tasks. General Assembly of Turkey put a concept in force which is called “Licensed Surveying and Cadastre Engineering Offices (LIHKAB)” whose responsibilities are cadastral applications, land use changes, parceling, easement establishment, and independent unit determination after cadastral surveying.

In Turkey, all kinds of land registry and cadastre applications are liable for a tax or duty depending on the kind of the application and value of the real estate. When one takes taxation income into consideration between 2002 and 2013, the total income is ten times more than the total expenditure of modernization projects.

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ANALYSIS ON CURRENT TURKISH CADASTRAL SYSTEMS IN ACCORDANCE WITH FIG CADASTRE 2014 STATEMENTS

IN ACCORDANCE WITH 1ST STATEMENT

Our national cadastral systems contain processes for determination of real estate boundaries, boundary measurements and producing related maps and respond to “Where?, How Much?” questions. It consists of a land registration system in which defined property rights and changes related with these property rights are recorded in titles, and responds to “Whose?, “How?” questions.

This system has a legal base in Turkish Civil Law (#4721) which states that “Acquisition of ownership of real estate is subject to several legal and contractual limitation. **Ownership of real estate can be established by purchase, gift, appropriation, inheritance, expropriation, execution and court decisions.** The Land Register is of decisive importance for the ability to prove ownership of real estate, as it – like the possession of a movable – serves to publicize the existing legal circumstances.” **Article 705 deals with the prerequisite of registration in Land Register (the so-called Registration Principle), while Articles 706-714 contain the rules for different forms of acquisition. Article 719 deals with the case when a disagreement in boundary and rules that the boundary on cadastral map is always valid than land markers (except landslide zones).**

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ANALYSIS ON CURRENT TURKISH CADASTRAL SYSTEMS IN ACCORDANCE WITH FIG CADASTRE 2014 STATEMENTS

IN ACCORDANCE WITH 1ST STATEMENT

On the other hand, Article 35 of Turkish Constitution rules the conditions when the government can end the property law. These conditions are generally called “commonweal” and various institution can put restrictions (informally “touch”) on property rights for a commonweal purpose through their plans.

However, the restrictions on private property rights by means of plans and laws that are described above, are not currently “registered” in Land Registration System. Usually these kind of restrictions are not seen in registration archives. The first statement of FIG 2014 Cadastre Vision suggests that not only private property rights but also foreseen public rights and responsibilities should be indicated in land registration, even though our current system should fill this gap with the help of TAKBIS and Turkish National GIS projects. For example; legally all institutions that put restrictions on private property rights should remark these changes through TAKBIS for each parcel ID. Therefore, public would be able to follow these restrictions and their content via e-Governance. It would be possible to guarantee all kinds of rights and restrictions by government.

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ANALYSIS ON CURRENT TURKISH CADASTRAL SYSTEMS IN ACCORDANCE WITH FIG CADASTRE 2014 STATEMENTS

IN ACCORDANCE WITH 2ND STATEMENT

Both legal component (land registry) and mapping component (cadastre) of land registration system are organized by a unique institution (The General Directorate of Land Registry and Cadastre) in Turkey. Cadastre and mapping facilities are performed by Cadastre Offices, while land registry facilities are performed by Land Registry Offices. Therefore, current structure is suitable with the 2nd statement of FIG 2014 Cadastre Vision which states that both disciplines should be run together and the separation between maps and records should be eliminated.

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ANALYSIS ON
CURRENT
TURKISH
CADASTRAL
SYSTEMS IN
ACCORDANCE
WITH FIG
CADASTRE 2014
STATEMENTS

IN ACCORDANCE WITH 3RD STATEMENT

Several methods have been used to produce cadastral maps since 1925 in Turkey. While production of maps, archiving and presenting these maps were used to be done manually in the past; especially by the help of TAKBIS and MEBSIS projects, data models take place instead of graphical productions. Even though TAKBIS was not successful so much, since collecting all cadastral maps with different coordinate systems and transforming them into a unique coordinate system caused high cost expenses and a long duration; MEGSIS was successful to collect all kinds of CAD-based numerical-cadastral data from all offices in a unique coordinate system (ITRF96) and in an integrated mutual database.

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ANALYSIS ON
CURRENT
TURKISH
CADASTRAL
SYSTEMS IN
ACCORDANCE
WITH FIG
CADASTRE 2014
STATEMENTS

IN ACCORDANCE WITH 4TH STATEMENT

Turkish cadastral system has a harmony with the 4th statement, as indicated also in the 3rd statement. **Because of IT and technological developments, detailed measurements are accomplished utilizing GPS and electronic tachometers, modelled with data models, archived and shared digitally. As a result, paper and pen usage in cadastral activities was eliminated.**

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ANALYSIS ON
CURRENT
TURKISH
CADASTRAL
SYSTEMS IN
ACCORDANCE
WITH FIG
CADASTRE 2014
STATEMENTS

IN ACCORDANCE WITH 5TH STATEMENT

The latest Cadastre Law (#3402) enforces to supply private sector support besides public institution opportunities during modernization projects. **Generally, the General Directorate of Land Registry and Cadastre opens bids for purchasing private sector services. Licensed Surveying and Cadastre Engineers are responsible to accomplish several tasks with their own regulations.**

However, there has not been any co-operation between public sector and private sector for land registration activities since decision makers have a doubt and fear, considering that the security of registration could be in danger in case of any private sector partnership; even though in many countries there are successful and secured systems without any danger (with the help of notaries and lawyers). Turkish Civil Law has a guaranteeing article and it states that "Government is the only responsible in case of any erroneous registration".

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ANALYSIS ON
CURRENT
TURKISH
CADASTRAL
SYSTEMS IN
ACCORDANCE
WITH FIG
CADASTRE 2014
STATEMENTS

IN ACCORDANCE WITH 6TH STATEMENT

Duties and taxes are collected for all kinds of land registration and cadastral task. The property right holder should pay this amount depending on his/her land value and area, otherwise any process would not be executed.

A general budget of 750 million Turkish Lira (300 million US Dollar) was expensed in 2013 by the General Directorate of Land Registry and Cadastre for the modernization projects, even though the income from taxation reached up to 6.8 billion Turkish Lira (2.72 billion US dollar).

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ANALYSIS ON CURRENT TURKISH CADASTRAL SYSTEMS IN ACCORDANCE WITH FIG CADASTRE 2014 STATEMENTS

IN ACCORDANCE WITH 6TH STATEMENT

On the other hand, technical applications that are not to be registered are performed by Licensed Surveying and Cadastre Engineers and they collect duties in the name of "Service Costs". Service costs are determined by the directorate annually for each type of task.

In Turkey, taxation of land is calculated with 'Current Registered Price' of the real estate. These prices can be out-of-dated and wrong, hence, it is not possible to calculate an "up-to-dated and correct" tax amount for individuals. Therefore, there should be some refinements in Real Estate Valuation Law and Tax Procedure Law.

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CONCLUSIONS

Turkey Land Registry and Cadastre System does not have any legal or technical problems as regards the determination of the bare ownership and property rights, registration, safety and protection. However, the perspective of the ownership and its use is problematic. Our Constitution defines the property right and its use in terms of a rural perspective and falls short of resolving the urban problems and lags behind realizing urban activities.

Existence of a "Land Management" system in Turkey that ensures certainty and continuity in the entire process from the registration to the general land use.

In this issue, land management paradigm is being adopted for all renovation and modernization projects both technically and legally. Especially our team is concentrated on improving a new point of view, for example, Ulger's model of Land Management Paradigm (Ulger N., 2014)

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