THE NEW ROLE OF CADASTER FOR THE REPUBLIC OF KOREA GOVERNMENT

Dekkie Tcha

TCHA, General Manager of Korea Cadastral Survey Corp.
tech@lx.or.kr

ABSTRACT

The R.O.K(Republic of Korea) Government 3.0 leads and open of public information and share policy creative economy and respects new paradigm. The public information and with geo-spatial and cadastral information where the citizen is various amalgamates and the possibility of making a new chance in order to be happy. The nation will be able to provide geospatial information of good quality geo and cadastral data in order, real estate information amalgamates and with the service box not only spatial information construction attribute also big-data by open platform which is V-World. The basic information of geospatial database is cadastral parcel information, which is homogeneous quality by the PAI (Positional Accuracy Improvement) project and world geodetic system's coordinate. A conclusively with opening to the public cadastral information gives more chance in the citizen and the possibility of buying the solution, which is various geo-application was a new role of cadaster.

**Full paper is not submitted.*

AN OVERVIEW OF THE CADASTRAL SYSTEM IN TANZANIA

Joseph Mango

HEMA Geosurvey Consultant Ltd, P.o. Box 10329 Dar Es Salaam - Tanzania
hemageosurvey@gmail.com - ilvjosem02@gmail.com

ABSTRACT

In Tanzania cadastral survey is done in both urban and rural areas. The approach and methodology are quiet similar with slight exceptions where in urban areas the execution of cadastral survey requires a prepared physical Town Plan (TP) drawing(s). The Land Survey Act permits only licenced surveyor to carry out cadastral survey and their certification is done by the National Council of the Profession Surveyor (NCPS) established in 1977. The origin of cadastral survey in Tanzania is traced back in the 1890's years under the German Colonial Administration. After the First World War, the British followed the footsteps of the German administration until 1961 when Tanganyika got her independence. From the start up today, cadastral survey have been used to produce important information's for supporting land ownership system. Tanzania uses title registrations system with two forms of occupancy which are; granted right of occupancy which is given to the general and the customary right of occupancy which is given to the village lands. The cadastral surveying is administered by the government under the Ministry of Lands, Housing and Human Settlements Development (MLHHD). This paper presents an overview of cadastral system and its historical development in Tanzania Mainland. Also, it provides an overview of the land ownership system and the institutional structure that deals with land surveying, planning and the administration system. Finally it presents some findings on the cadastral strengths and weakness/challenges with their suggested improvements, threats and opportunities.

Key words: Cadastre, Cadastral survey system, Land ownership, Legal arrangements, Tanzania

HISTORICAL BACKGROUND

Tanzania is located on the east coast of Africa between longitude 29º - 41º east and latitude 1º - 12º south of the equator. It frontiers to Kenya and Uganda to the North, Rwanda, Burundi and Democratic Republic of Congo to the West, Zambia and Malawi to the Southwest, Mozambique at the South, and the Indian Ocean to the East (NBS[1], 2013). Tanzania has an area of 933,611 km^2 of which 886,000 km^2 is occupied by land and the rest is water bodies including rivers, lakes and the Indian Ocean (Silayo 2003). The 2012 Population and Housing Census (PHC) which was the fifth Census after the Union of Tanganyika and Zanzibar in 1964 shows that, Tanzania has a population of 44,928,923 of which 43,625,354 is in Tanzania Mainland (Tanganyika) and 1,303,569 is in Tanzania Zanzibar (island). It also records 29.6% live in urban and 70.4% live in rural areas (NBS[2], 2013).

The history of cadastral survey in Tanzania is grouped into two phases; that is before and after independence in 1961. Before independence during the colonial rule, Tanganyika was under the German in the years between 1890 and 1914 and after the 1st World War was under the British in the years between 1919 and 1961. In 1893 the department of surveying and agriculture led by Dr. Franz Stuhlman (URL-1) conducted the first mainland survey for the European farmers, mainly the Germans who lived in Pangani, Usambara,Tanga-Mombo, Kilimanjaro, Meru, Meru,Kilosa and Morogoro. The survey conducted was based on the isolated triangulated networks that initially were established for the purpose of boundary survey.

There were a number of triangulation networks established in different time. For example in the years between 1894 and 1911, the 1st triangulation network near Lushoto in Tanga with a local astronomical origin was established to cover Usambara Mountains and later on was extended to Pare areas, Moshi, Arusha. The 2nd triangulation network was established in 1898 with a local latitude origin covering Mbeya and Rukwa region. Another triangulation network was established in the years between 1902 and 1906 with the geodetic longitude origin of Zanzibar. Also in 1907 a triangulation network with a local astronomical origin was established in the south west of the country (Mbamba bay). In the years between 1912 and 1914 a triangulation network in Morogoro area was established purely for cadastral purposes of the Europeans plantation (Caillard, 2003).

In 1919, British administration took over from German and established the Surveying Department under the Ministry of Land and Mine in 1920. Among others, the British decided to unify and coordinate all the survey of the past which were sporadic and unrelated. They used a triangulation network along the Arc of 30th Meridian: From North Cape in Norway to the Cape of Good Hope in South Africa to establish and connect all existing isolated networks. It should be noted that, this network system had already been done in the other nearby countries like the southern Rhodesia now Zimbabwe and Uganda. In 1933 Tanganyika had three main east-west chains attached to the 30th Arc and four north – south chains between the others (Smith, 2006; Rowe, 1933). In 1944, the colonial survey and geophysical committee put forward the argument that a geodetic survey was essentially a matter that had to be planned for the whole geographical region. This made the Arc and its attached networks of triangulation to be the foundation of whole mapping system in the whole East and Central Africa.

In 1961 after independence, the Native Administration System (NAS) started by adopting the same existing survey system and kept changing by time so as to meet the current national and people's demands. As it has been observed before independence cadastral survey was done for the purpose of alienating land to colonial settlers (Lugoe, 2008). After independence the primary objective was to provide geometric descriptions, size and the location of the land parcels for equitable access of land and the registration of land rights. Recently, cadastral surveys have evolved into economical business (fiscal purposes) such as collection of land rent, property tax and the collateral property. Also is used in property valuation, land allocation and many others to support land market (Silayo, 2003).

CADASTRAL SYSTEM IN TANZANIA

A basic unit of cadastral survey is a land parcel. Surveying and mapping of land parcel provides the basic foundation of the cadastral survey system. The chapter 324 of the Land Survey Act of Tanzania, Part I (2) states "cadastral survey means any survey the purpose of which is to obtain information for recording the position of the boundaries of lands in separate ownership or intended to be the subject of any disposition or partition, or re-establishing such boundaries on the ground or setting out new boundaries on the ground". The survey description can be in textual, numerical and graphical forms if not in combination of these. The basic information provided by cadastral survey is the geometric descriptions for the measured land which are the spatial location, size and shape. Such information is prerequisite to successful land registration in Tanzania (URT, 1999).

Boundary lines for the adjacent parcels are defined by a set of beacons or Iron Pins in Concrete (IPC). Also general boundaries comprising physical features such as hedges, walls and streams on the ground may be used subject to written permission from the Director of Surveys and Mapping. Cadastral surveys in Tanzania are based on two existing situations;

- For the urban areas where approved Town Plan (TP) Drawing are prepared, surveyor obtains and set out parcels in according to those TP Drawing information.
- For all the areas found in rural or informal urban settlements, surveyor sets out parcels from the sketch plans that show approximate locations and sizes of the land earmarked for survey (Silayo, 2005).

There are several mandatory steps to be followed when conducting cadastral survey in Tanzania. The steps can be examined in three major groups of; 1.When requesting to conduct the survey, 2. Executing the survey and 3. The submission of the cadastral survey work for the recognition of approval at Survey and Mapping Division. Details of these steps together with the Survey Registration System (SRS) and the Cadastral Legal Arrangements (CLA) are explained as follows;

Request of Cadastral Survey

Request of the cadastral survey is done after some initial steps are taken. These prerequisites are intended to check and determine the existence of TP drawing(s) that will guide survey execution and the need for the survey. A satisfaction for these requirements leads to the request of survey to the District or Municipal/Urban authority as section 9 of the Government Notice No. 72 of 2001 directs (URT, 2001). Successful requests will be issued ***survey instructions*** and ***data access*** by the Director of Surveys and Mapping Division.

Cadastral Survey Execution

These are the medium steps for actual execution of cadastral surveys. They include; methods, techniques and the logistics on how to conduct the survey. Key functions in this step consider; Reconnaissance, planning and costing, establishment of the control network to be used, demarcation and coordination of the block, subdivisions of parcels, taking survey details, signing the boundary certificates, processing, preparing a draft cadastral plan and compiling the cadastral file ready the submission for approval. As the fact of project based, it is clear for

how long it will take to complete these tasks contrary to the others that are dependent to unpredictable factors.

Submission of the Cadastral Survey Work

Compiled cadastral file and the draft of the cadastral plan in hardcopy format are to be checked by a licenced surveyor and once it passes, it will be submitted to the office of the Director of Surveys and Mapping (SMD) for further scrutiny and approval. Figure 1 shows an example of a cadastral plan and table 1 is the cadastral file contents to be submitted for approval.

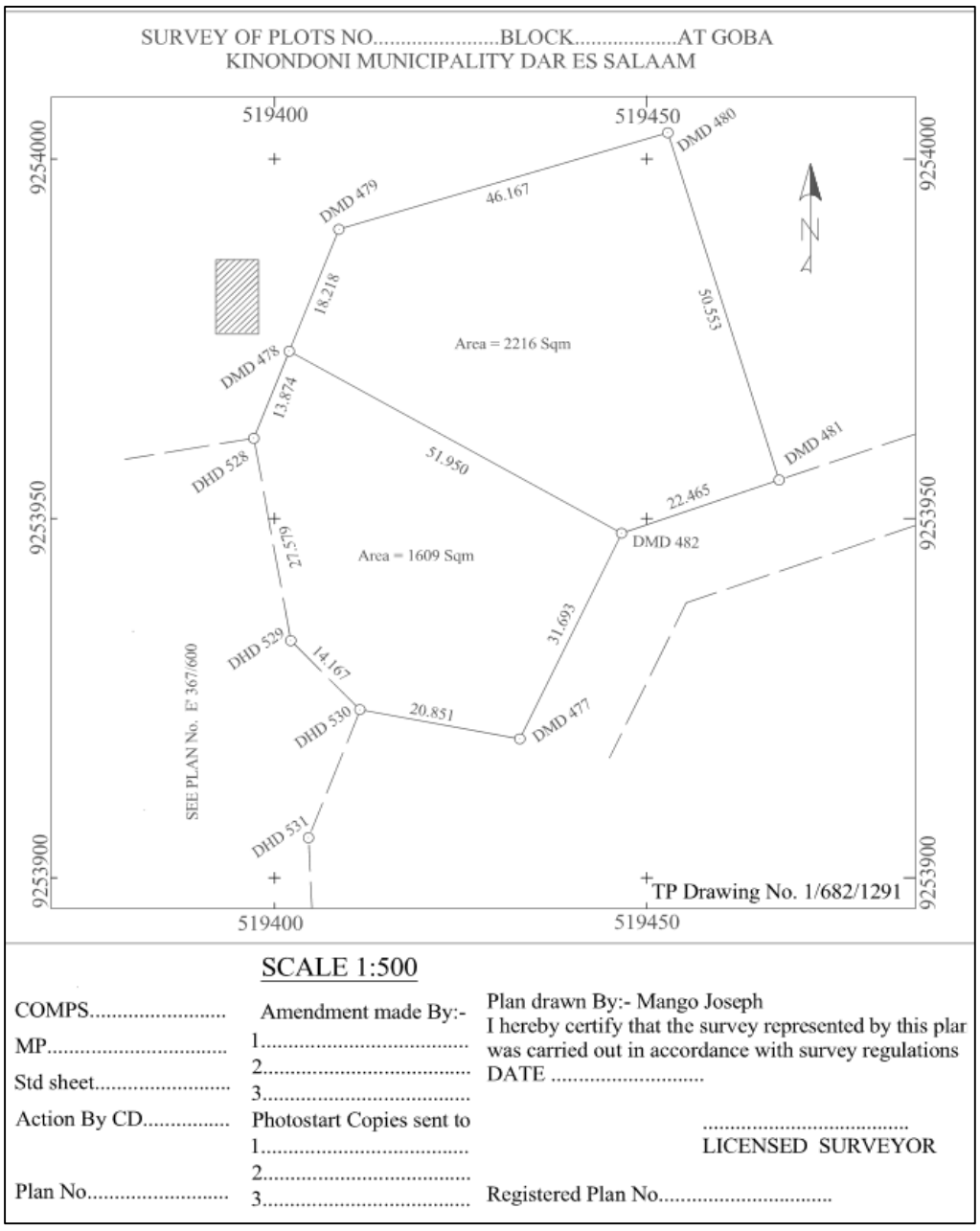

Fig. 1. Cadastral survey draft plan for approval

Table 1. Cadastral file contents

Contents	Explanation
SF 37	Survey form No 37 this is signed by authorized land officer and authorized land surveyor to instruct surveyor who will do the work
SF 92	Survey form No. 92 is the form that shows signatures of neighbours to prove that there is no land conflicts in the surveyed area
SF 93	Survey form No. 93 this form is filled and signed by regional land surveyor to prove that the survey done have been checked by government surveyor to so that if any case arise it will be easily to solve
Covering letter	This letter is either written by regional/municipal land surveyor for the government project or licensed surveyor for private projects this introduces the survey done and all computation that have been done.
Survey instruction	A permit to conduct survey
TP drawing	Town Plan Drawing
Report (SF 16)	Survey report which show demarcations process and coordination methods
BC 1	Beacons certificates for signed by land surveyor
BC 2	Beacons certificates signed by Authorized land officer after inspect that all beacons and Iron pin have been erected for each plot
Coordinate list	List of all coordinated points for the survey
Area computation sheet	Computed area sheet for the plots/parcels surveyed.
Traverse computation sheet	Shows computation for all point coordinated by travers method
Double bearing and distances sheet	Coordinated points done by double bearing and distances
Single bearing and distances sheet	Coordinated points done by single bearing and distances
Online sheet computation	Coordinated points done by Online method
Working diagram	A diagram showing the way survey point has been coordinated
Field diagram	A diagram showing how survey methods has been used.
Join computation & check distance (datum)	Check reliability for the control/tied survey between that compared measured and computed distances
Other field sheets if applicable includes; Summary sheet (SF4), Details sheet (DS1), Measuring sheet (MS1) and angle sheets (AS1)	

Cadastral Survey Registration System

Complete cadastral survey work is submitted at SMD where a re-check is done and thereafter the process of survey approval and registration begins. Survey Registration System (SRS) is used for approving and registering all surveys in Tanzania. As a system programs, SRS include; 1). Cad- pro software for Survey Computations. 2) Survey-info for Survey data storage, (3) SR- Manager for processing approval of new surveys and Data entry and (4) Smart Deeds for drawing deed plans and retrieval of scanned survey plans images. Among other specific activities during the examination and approval of new surveys are: Plot and block numbering, Locating a new survey on TP drawing or Topographic Map, Retrieving a drawing in GIS software and Importing survey data from other programs (Katambi, 2009). The approved records of cadastral surveys contained into survey-info of the SRS are; scanned survey plans, scanned town planning layout plans, coordinates, geodetic control points and street names.

Cadastral Survey Legal Arrangements

Cadastral survey in Tanzania is carried out under the legal arrangements that are specified in various documents. “The first land survey and surveyors ordinance was enacted into law in 1923 to control the state of affairs at that time. In 1957 it was reviewed and the current Land Survey Ordinance (Cap 390) was signed into law to regulate all survey work in the country. This Ordinance is in consonance with the Land Registration Ordinance, Cap 334 of 1953, of which Section 88(1) states: ‘No estate shall be registered except in accordance with an approved cadastral survey plan’” (Lugoe 2008). Apart from it, the Land Act No. 4 of 1999 section 22(1c) which states that a granted right of occupancy shall be issued on land that has been surveyed (URT, 1999).

In addition to the above, the Land Survey Act of 1977 establishes the National Council of Professional Surveyors (NCPS) whose main tasks include, the certification of the competence of practising surveyors and enforcement of professional code of conduct and ethics, regulating standards of conduct and the activities of professional surveyors, regulating the practice of the professions of land surveying & land economy surveying and promoting the profession of surveying. The law provides that both government and private licensed surveyors to can carry out cadastral surveys in Tanzania (URT, 1977).

LAND OWNERSHIP SYSTEM

Land tenure describes land ownership system in Tanzania. As derived from a Latin term tenure stands for “holding” or “possessing,” land tenure means the terms on which something is held: the rights and obligations of the holder. It is a legal term that means the right to hold land rather than the simple fact of holding land and therefore, one may have tenure but may not have taken possession (Bruce, 1998). In Tanzania, the Land Ordinance Act, Cap 113, of 1923 (Revised in 1957), all land, whether occupied or unoccupied, belongs to the Republic of Tanzania and is Public Land. This means that land is under the control of the President and is held and administered "for the use and for the common benefit, direct or indirect, of the natives of Tanzania (Kauzeni, Kikula, Mohamed, Lyimo, & Dalal-Clayton, 1993).

The National Land Policy (NLP) of 1995 revised in 1997 promotes land tenure system to encourage the optimal use of land resources and to facilitate transport based social economic development. The policy led to the enactment of the Land and Village Land Act in 1999 which establishes three categories of land; ***Reserve Land*** as land set aside for special purposes, such as forest reserves, games parks, and land reserved as a land set for public utilities. ***General Land*** is the land which is outside the reserved and the ***Village land***. The Village Land constitutes 70% of the total land in Tanzania followed by the reserved land that accounts for 28% and 2% for general land (Dinh & Monga, 2013).

Tanzania uses title registration system as the occupancy rights on land. Citizens can obtain occupancy rights on land issued by the President. Occupancy right is defined as a title to the use and occupation of land and includes the title of a native community lawfully using or occupying land in accordance with native law and custom (Tenga, 1992). The right of occupancy has two forms namely: the Granted Right and the Customary Right of Occupancy.

- Granted right of occupancy is held outside village lands and it may be granted for up to 99 years. Land has to be surveyed before a certificate of occupancy issued.
- Customary right of occupancy is held in rural areas indefinitely. The relevant certificates are issued to village councils after the land has being surveyed.

INSTITUTIONAL STRUCTURE

The Ministry of Lands, Housing and Human Settlements Development (MLHHS) administers all concerns about land. It has four divisions; Survey and Mapping, Physical Planning, Land Administration and the Housing Division. All divisions are headed by a director except the Land Administration Division (LAD) which is led by the commissioner.

Survey and Mapping Division (SMD) is responsible for conducting and overseeing all surveys of the country and to provide expertise and services in the provision of survey charts, plans and maps. Out of five sections at SMD two are the Urban and Rural Cadastral Surveys sections. Figure 2 illustrates an organisation structure of the MLHHS.

SWOT ANALYSIS

Cadastral surveys in Tanzania as one component of the other systems such as valuation system, settlement system, tax collection system and many more has various strengths, weakness/challenges, opportunities and threats. Here, a SWOT analysis is used to examine internal strengths and weaknesses, external opportunities and threats faced in cadastral surveys. SWOT stands for strengths, weaknesses, opportunities, and threats.

Cadastral Survey Strengths

a) **Datum:** Cadastral survey in Tanzania uses a standard three dimensional Euclidean coordinate system with a metric unit of measurements. Arc Datum 1960 of a modified Clarke 1880 ellipsoid is used as a local datum. The National Coordinate System (NCS) is based on the Universal Transverse Mercator system.

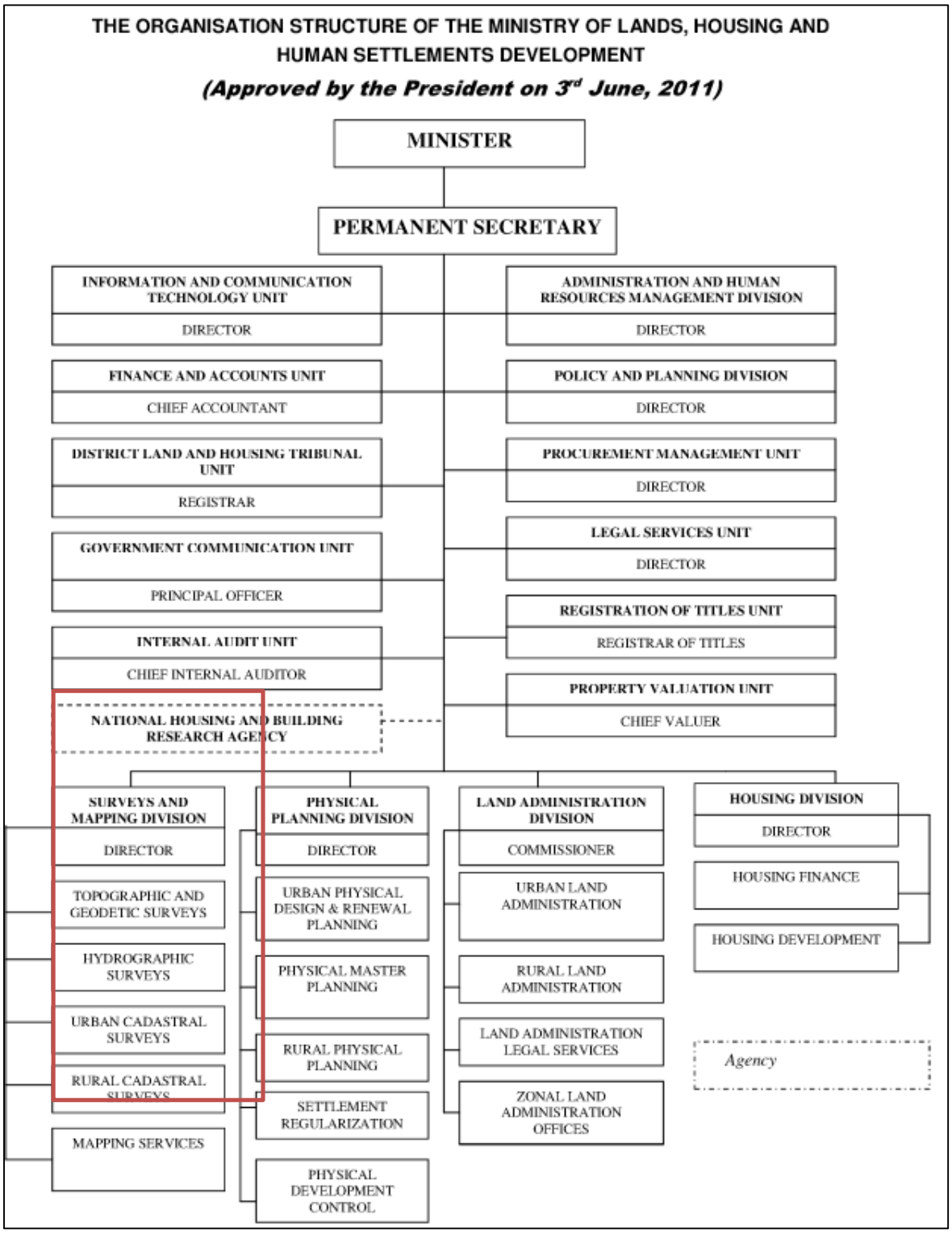

Fig 2. Organisational structure of the MLHHS (URL-2)

b) **Control points**: Classification of the control points is based on their overall positional accuracy and the derived method. Primary control points which were established by triangulation methods have positional accuracies of 1:20,000 or better and secondary

control points which were established by traverse with positional accuracies between 1: 10,000 and 1: 20,000. In the implementation of African Reference Frame (AFREF) agenda and strengthening its old installed network, Tanzania has established a new geodetic control consisting of zero order, first order and second order control Points. The network is tied to ITRF reference frame with WGS 1984 as Datum. Tanzania has five CORS that have been installed in Dar Es Salaam, Moshi, Tukuyu, Morogoro and Dodoma (Mayunga, 2011). Figure 3 shows CORS, zero and first order control points in Tanzania.

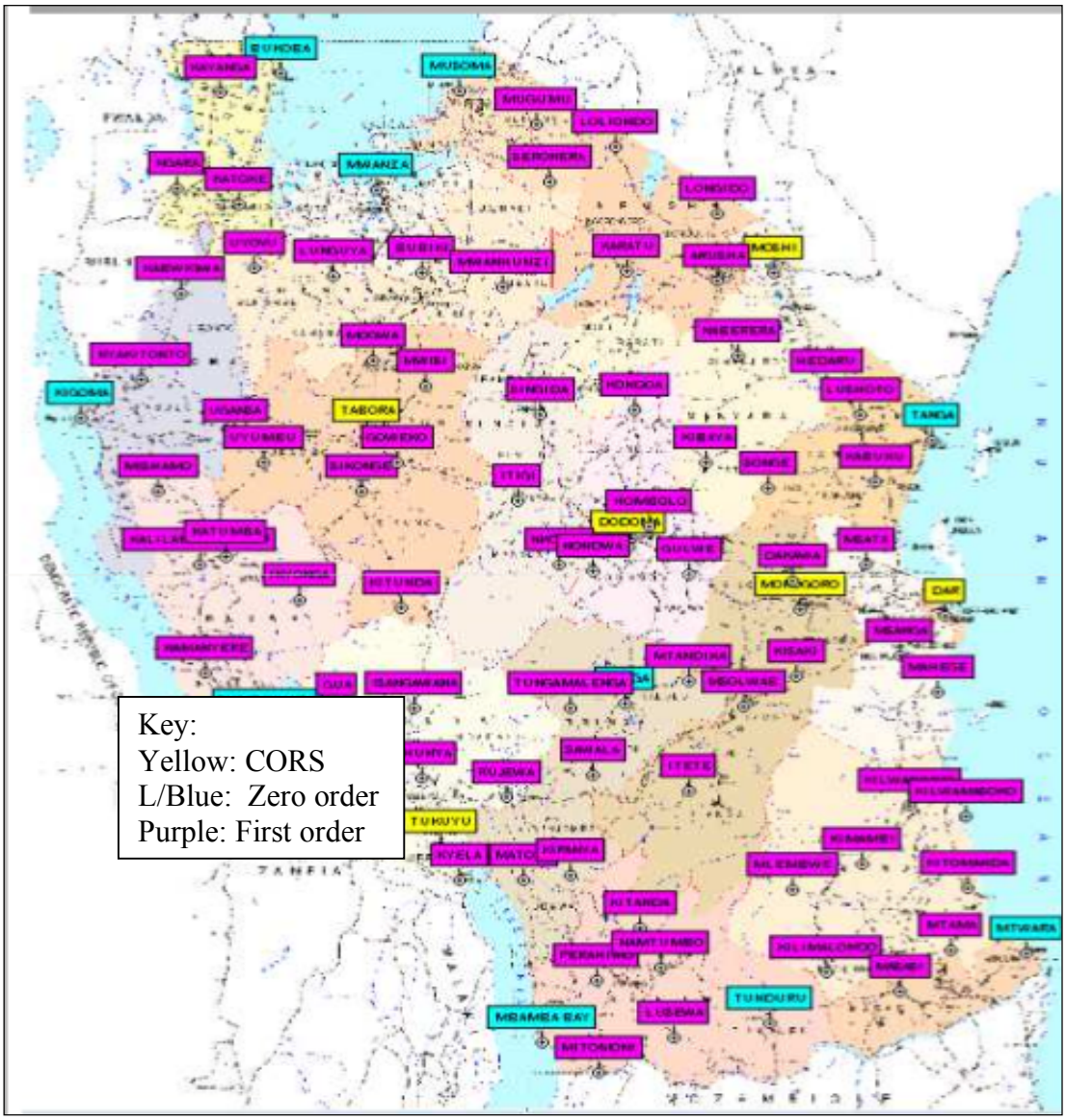

Fig. 3. Control networks in Tanzania (Mayunga, 2011)

c) **Cadastral survey accuracy**: Cadastral survey in Tanzania is done with a given set of accuracy standards. In general, the cadastral surveys in urban areas are done with the acceptable linear misclosure 1: 6000 or better. For the individual parcels of the sizes less than 400 square metres linier misclosure may be lessened to 1:1000.

Cadastral Weakness/Challenges and the Suggested Improvements

An appropriate cadastral survey management system should provide for: easy access to cadastral reference information, a predictable delivery period, transparent quality control system, well defined standards and guidelines, competitiveness, clearly defined professional development path, and adaptability to technological advancement and public needs (Chileshe & Shamaoma, 2014). However, the management of cadastral surveying in Tanzania has been criticised by various authors for being inefficient, expensive, stagnant and also not commissioned in a transparent manner (Magigi & Majani, 2006; Huber, Mithöfer et al 2008). This could be partly attributed to the following weakness and challenges discussed below.

Cadastral weaknesses/Challenges

a) *Absence of the physical plans and the TP drawings*. It is the fact that, many cadastral surveys are done in urban than in rural areas (Msuya, 2009). Some of the areas either physical plans and/or TP Drawings are not yet prepared. In this circumstances, individuals who wants to survey land has to incur some extra costs for the preparation of TP drawing or has to wait until the District / Municipal of authority prepares them. This is a challenge that makes cadastral survey to be lavish and slowly undertaking.
b) *Local coordinate system and the changes made on the cadastral survey.* Existence of surveys made on local coordinate system and the changes made on old cadastral survey plans gives challenges in juxtaposing them into one system such an Environmental Management Information System (EMIS) and Land Information System (LIS). Transformation of these coordinates are too difficult and some of the existing paper are not in good condition for digitization. These separate coordinates systems confers unnecessary data redundancies and overlaps with other plans in the neighbourhood (Mugerezi, 2002).
c) *Decentralization of Cadastral Survey Works for Approval.* In line with the existing regulations and standards all cadastral records are lodged at the SMD in hard copy format. In spite of the digital or electronic execution of the works, land surveyors still have to produce hard copies for the examination and approval of the survey. This process increases survey's costs in terms of time and finance. With the opened up land market, cadastral surveys should be executed quickly but also efficiently.
d) *Absence of a Well-functioning Digital Cadastral Survey Registration System*. SMD is missing a well-defined digital cadastral survey registration system that could speed up an examination and approval of the cadastral works (Katambi, 2009). A well-defined digital system helps to provide for instance plot and block numbering system, data storage and retrieval and henceforward to ensure the availability of reliable cadastral data to users on time. The system avoids the possibilities of having overlaps and repetitions with the earlier survey.
e) *Unpredictable cadastral delivery period.* When a surveyor receives an assignment of doing cadastral survey, it is difficult to give the client a guarantee on delivery period because it is dependent on a number of unpredictable factors such as: how long it will take to find reference cadastral survey information, how long it will take to receive instructions to survey a property and how long the survey examination process for both check and re-check will be done. This challenge causes dissatisfaction of clients

who apply for cadastral survey services. The quality of the work process should not only be focused on the accuracy or certainty of results but also on the delivery period

Suggested improvements

The outlined **a** and **b** weaknesses/challenges require the government plans to allocate enough funds henceforward to make sure all urban areas have physical plans and TP drawings to support not only a good pace of cadastral survey but also the proliferation of informal settlements. Local coordinate systems require some field observations in UTM system in order to transform coordinates to enable harmonization of surveys into a unified system.

Decentralization of the cadastral survey works for approval could be solved through delegation of power to all Regional Land Surveyors. According to the Land Survey Act CAP 324 part I, Section 3, The Director of Surveys and Mapping can delegate powers to any government Surveyor in writing (URT, 1977). Therefore, the regional Land Surveyors in Regional Administrative Secretaries Offices (RAS) and their Assistant RAS title can be empowered to approve survey jobs in their areas of authority. This will minimize time cost of all surveys having to be sent at SMD in Dar es Salaam.

Absence of a well-functioning Digital Cadastral Survey Registration Systems (DC-SRS) starts from the beginning by lacking digital lodgement of data flow from the survey process into the SMD. It is logical that, a compiled complete cadastral work should be submitted in both hardcopy and softcopy to allow digital flow of data and its preservation. In addition to this, the proposed approaches and methodology presented at FIG Working Week 2009, "Development of the New Cadastral Survey System in Tanzania" can provide a useful guidance to enhance DC-SRS in Tanzania (Katambi, 2009).

Cadastral Survey Threats

Due to the fact that cadastral survey is one among the sources of land and resource property rights, it is supposed to be simple, quick and affordable to speed up official access to secure land tenure by many citizens and thus propel motivation for equitable land allocation and purposeful urban land development. In Tanzania as it has been argued by (Silayo, 2005) for the quotation of Kironde (2000), that "The cost of surveying is very high and the productivity of land surveyors, in terms of plots surveyed, especially in public services is low.' Also the regulatory framework, technical standards, and methods as well as the administrative procedures that go with operations of cadastral surveys have often been cited as culprits of high costs and delays in the delivery of land to the needy. These facts threaten many especially poorer to have no legal rights in possessing land and consequently incapable to use land as a collateral property in land market (Kironde, 1995).

Cadastral Opportunities

Cadastral survey as the source of land registry and title registration in Tanzania gives a true and exact description of the land parcel at any moment. The process of surveying land parcels cannot be done without assurance of the neighbour to recognise the owner and the land to be surveyed hence it resolves some minor conflicts in the society as also argued by (McEwen,

2001). Registered land provides adequate protection to all classes of right holder, including absentees, persons with reversionary or pre-emptive rights, or those with dormant rights of any kind. Connection of the land ownership with the law property has given cadastral surveys great roles in various applications such as property valuation, collection of land rent, property tax, land allocation and the collateral property.

CONCLUSION AND RECOMMENDATION

Cadastral survey system before and after the 1stWW established the basic control infrastructures that has been developed, improved and strengthened at this latter. The statistics at the time when Tanzania Mainland got her independence showed that, a total of 14,448 land titles were registered. By 2011 when celebrating 50 years of independence a total of 379,000 land titles were registered. The surveyed farms and land parcels were 20,883 and 900,000 respectively. The active numbers of professional Land Surveyors were 225 (MLHHD Minister's speech, 2011). However across the country, there are many non-cadastral areas, which are mostly found in rural areas. Furthermore, the population rate in urban areas has increased from 6.4 percent in 1967 to 30 percent in 2012 (NBS[1], 2013) whereas the corresponding figures for the cadastral survey are not certain because of being sporadic in nature. Currently, it is approximated 11% of Tanzania's land is surveyed (Dinh & Monga, 2013). This figure shows that, Tanzania has a long way to go to ensure cadastral survey is done for the majority to have equitable access of lands, the registration of land rights and other fiscal purposes. A serious financial backup is required to overhaul the cadastral system which is facing a lot of problem such as lack of skilled personnel particularly at the district levels and the modern equipment's that changes with technology.

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CADASTRE OR LAND ADMINISTRATION: A CASE STUDY OF TURKEY

Tahsin Yomralioglu[1], Mehmet Cete[2]

[1]Department of Geomatics Engineering, Istanbul Technical University, Maslak, 34469, Istanbul, Turkey - tahsin@itu.edu.tr
[2]Department of Geomatics Engineering, Izmir Katip Celebi University, Balatcik, 35620, Cigli, Izmir, Turkey - mehmet.cete@ikc.edu.tr

ABSTRACT

Cadastral systems have evolved over time primarily based on the changes in humankind to land relationship and technology. Land had been regarded as a sign of wealth, a commodity, and a scarce resource during feudalism, industrial revolution, and post-war reconstruction, respectively. Fiscal, legal, and managerial cadastres served to the societies in those periods. Land has become a community scarce resource after 1980s, and cadastre has played a multi-purpose role to support sustainable use of that crucial resource. Cadastral systems has been evolved through land administration systems, and its scope has been extended to include not only determining boundaries of land parcels and protecting land ownership but also administering land value and land use data. This paper targets to discuss importance of evolvement of cadastres into land administration systems under the case study of Turkey. In this context, it begins with a brief overview of cadastral developments in the world in general and in Turkey. Then it proposes a new land administration system approach for Turkey in legal, organizational and technical means both to eliminate existing issues and to fill current gaps in the system. A framework land administration law, an organizational structure having a leading land administration institution, and a land information management tool are the core components of the proposed approach for the Turkish cadastral system.

Key words: Land registration; Cadastre; Land valuation; Land use; Land administration

INTRODUCTION

Cadastral systems have evolved over time primarily based on the changes in humankind to land relationship and technology. Land was regarded as a main symbol of wealth during the agricultural revolution and feudal system, and the cadastre recorded land ownership in this period. Cadastre became a tool to support land transfer and land markets during the Industrial Revolution when a process of strong physical ties to the land began. The post-World War II period with population boom generated awareness that land was a scarce resource. Countries preferred to address the scarcity with better planning in this period, and cadastre supported the planning process. Finally, in the 1980s, the focus was on wider issues of environmental degradation, sustainable development and social equity, and thus, land became a 'scarce community resource'. This forced the extension of cadastres into land administration systems

(Ting and Williamson, 1999; Williamson, 2001a; Bogaerts et al., 2002; Steudler et al., 2004; Bennett et al., 2013; Cete and Yomralioglu, 2013).

Land Administration System (LAS) is defined as "the processes of determining, recording and disseminating information about the tenure, value and use of land when implementing land management policies" (UNECE, 1996). It means a LAS administers not only land tenure and ownership but also land value and land use data (Williamson, 2001b; Enemark, 2001; Bogaerts et al., 2002; Bandeira et al., 2010). This requires carrying out re-engineering processes in traditional cadastral systems which target to secure tenure and ownership to include land value and land use components, and their focus are needed to be evolved from market to an additional facilitative role for multipurpose spatial information infrastructures in order to support the implementation of sustainable development objectives (UN-FIG, 1999; Enemark, 2001; Wiliamson, 2001a; Bogaerts et al., 2002; Wallace and Williamson, 2006; Rajabifard et al., 2007; Bennett et al., 2008). In this context, the evaluation of national LASs has become more and more of an issue of concern over the last few decades worldwide (Williamson, 2001b; Steudler et al., 2004; Robertson, 2002; Wallace and Williamson, 2006; Rajabifard et al., 2007; Mitchell et al., 2008). Turkey, having experience about 170 years in cadastre, is one of the countries carrying out reform projects to provide improvement in the system, and to address the current and future needs of cadastre (Cete and Yomralioglu, 2013) However, there is a need for a more comprehensive reforms in the country to upgrade the current system from cadastre to land administration.

This paper, firstly, provides an overview of the current cadastre, topographic mapping and real estate valuation systems of Turkey, and then, proposes an approach to upgrade the cadastre to land administration.

CURRENT LAND ADMINISTRATION SYSTEM IN TURKEY

LASs determine, record and disseminate information about land tenure, land value and land use. Since Turkey does not have a unified system of land administration, this chapter evaluates land registration and cadastre, topographical mapping and real estate valuation systems in the country under the subtitles below.

Land Registration and Cadastre

Land Registration and Cadastre (LRC) is the core engine of spatially enabled land administration (Enemark, 2012). Therefore, LRC data has a special importance in the LASs. Turkey is an experienced country in the LRC domain. The first cadastral organization was founded in 1847 in the country. The organization carried out land registration works until foundation of the Republic of Turkey. In 1924, firstly, the General Directorate of Land Registry was founded. Then, cadastre unit was attached to the General Directorate, and cadastral surveys were initiated. The current General Directorate of Land Registry and Cadastre (GDLRC) was established with a re-engineering process in LRC in 1936.

Main legislations regulating LRC services are the Land Registration Law and the Cadastre Law. The GDLRC and the District Directorates of LRC organizes cadastral works throughout the country (Fig. 1). Directorates of Land Registry and Directorates of Cadastre are the

responsible organizations from the services provided in the local level. In 2005, the Licensed Offices of Surveying and Cadastre (LOSC) were also introduced into the cadastre (Official Gazette, 2005). During design of the LOSC, sub-districts of cadastre throughout the country were determined by taking workloads of the existing cadastre directorates into consideration. The LOSC have been authorized to carry out the cadastre works. Application of the cadastre maps into the field and showing boundaries of parcels in the relevant area are performed by the LOSC. These works are not subject to supervision by the cadastre administration. However, the LOSC works for use type change of a parcel, establishment and removal of easement rights and consolidation of parcels are supervised by the Province Directorates of Cadastre (Circular Letter, 2010).

Except a few problematic units, establishment of land registration and cadastre has been almost completed in the country. However, cadastral surveys cover about 62% of the surface of the country. Active involvement of private surveyors into cadastral surveys after 2004 speeded up the cadastral works and played an important role in completion of the cadastre. Establishment of the Turkish Land Registry and Cadastre Information System (LRCIS) work which was initiated at the beginning of the 2000's is still in progress. Almost all land registry data transferred into digital environment as a part of the project. However, transferring paper based cadastre maps into computer environment with high accuracies through digitization is not easy since most of the old cadastre maps have accuracy problems. These maps are transferred into digital environment with renovation projects and it takes time.

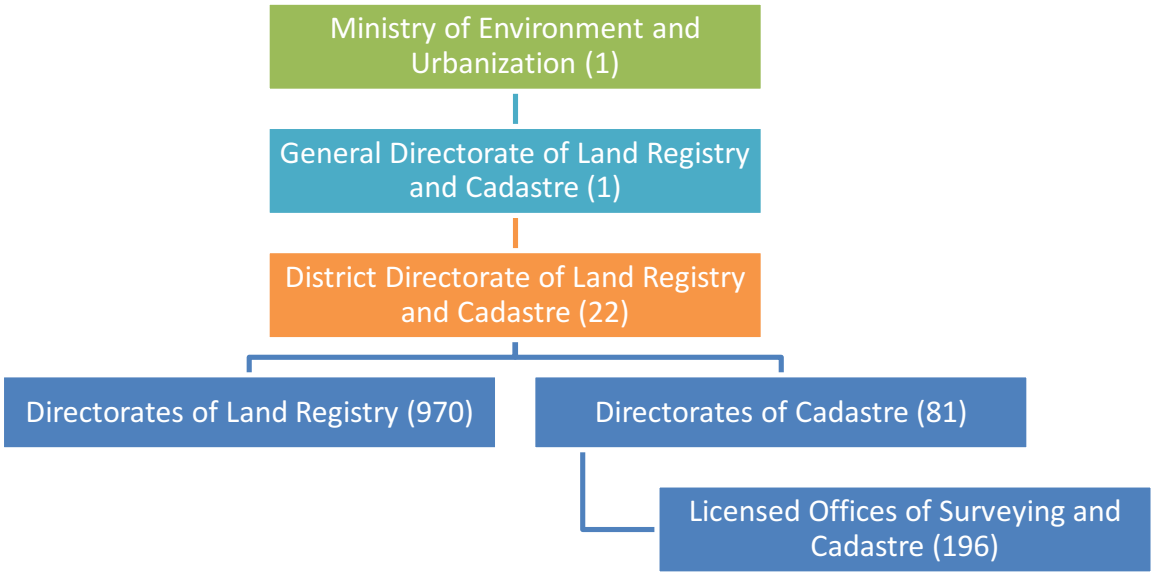

Fig. 1. Organizational structure of the Turkish land registration and cadastre system (TKGM, 2015)

Turkey has a well-functioning LRC system but still there is a need for a reform project to increase data quality and to extend the content of the LRC. Sales prices of real estates are recorded in the land registry but those prices are not real market values. Owners of some real estates in the land registry are dead people since transfer of a real estate to heirs when a landowner dies is not compulsory (Cete et al., 2006). Use types of some parcels in the registry are not up-to-date. Roads and buildings are part of the cadastral maps but there is no a

dynamic or periodic process to update these data (Cete and Yomralioglu, 2013). In addition, content of the Turkish cadastre still covers only data to secure the property. Public rights and restrictions and land use data are not represented in the cadastre.

Topographical Mapping

Maps in different scales are produced by different organizations in Turkey. The authorization for the maps scaled between 1:25,000 and 1:1,000,000 is designated to the Turkish General Commandership of Mapping (GCM). 1:5,000 scaled maps are produced by the General Directorate of Land Registry and Cadastre (GDLRC) and GCM in cooperation. The scale of the cadastral maps produced under the responsibility of the GDLRC is 1:1,000. Other technical and topographical maps with the scale of 1:1,000 are produced by many public and private organizations. Majority of the organizations producing 1:1,000 scaled technical and topographical maps has caused some duplications in the production. The project called as "Information Bank of Maps" developed by the GDLRC in 2008 has reduced the duplications through providing a data bank about available maps. In the context of the project, institutions entered the metadata of the maps they produced into the web based system of the Information Bank of Maps. Currently, an organization can enter the system and query if a map for a specific area is available in another institution's hand or not. Nevertheless, there is still need for a national organization to organize production of maps and spatial information in all scales.

Real Estate Valuation

Turkey does not have a law on real estate valuation. Principles of the valuations are described in different laws and regulations like the Expropriation Law and the Taxation Law. Licensing procedures in real estate valuation are organized in the official notifications of the Capital Markets Board of Turkey (CMBT).

Turkey does not have a strong and well-functioning real estate valuation system in organizational means. Number of the public institutions carrying out real estate valuations are more than twenty. Except for the CMBT, all the institutions work through real estate valuation commissions. A commission is made up of selected officials from the institution that needs real estate values for such purposes as taxation, expropriation, nationalization, etc. The officials do not have to have a license to take part in the commissions. Only in valuations for expropriation, a certificate is needed. This certificate is given by the relevant chambers attached to the Union of Chambers of Turkish Engineers and Architects. CMBT carries out valuations for capital market activities, and asks for a license from the appraisers. The only institution authorized to license real estate appraisers in the country is the CMBT (Cete, 2008; Cete and Yomralioglu, 2013). All faculty graduates can enter the license exams and become an expert on real estate valuation. It means, there is no professional restrictions to get the license in the country.

It is clear that real estate characteristics and sales prices data are two of the most crucial inputs in real estate valuation works. However, neither a systematic real estate characteristics nor sales prices databases are available in Turkey.

AN APPROACH FOR TURKISH LAND ADMINISTRATION SYSTEM

According to the Law on Organization and Duties of the General Directorate of Land Registry and Cadastre enacted in 1936, the main duty of the GDLRC is the determination, recording and sustaining of the legal and geometrical situations of real estates. Since then, the GDLRC has worked to fulfill this duty but the issues experienced in the data quality today in both land registry and cadastre shows that the General Directorate couldn't achieve this duty in the proper sense. Furthermore, modern trends of the cadastre urges countries to evolve their traditional cadastral systems towards land administration. This requires content of the traditional cadastres are extended to include land value and land use data. In addition, cadastre should show the complete legal situation of land including public rights and restrictions. It is clear that accomplishment of all these duties with current legislation, organizational structure and technical tools of the GDLRC is almost impossible in Turkey. Therefore there is need for re-engineering in the Turkish cadastral system.

The overall principle of re-engineering processes is that land policy drives legislative reform which in turn results in institutional reform and finally the implementation with all its technical requirements (Williamson, 2001b). This study proposes an approach for re-engineering of the Turkish Land Administration System (LAS) by considering this principle. The vision is composed of three main components: (1) legal arrangements; (2) organizational structure; and (3) technical organization (Fig. 2).

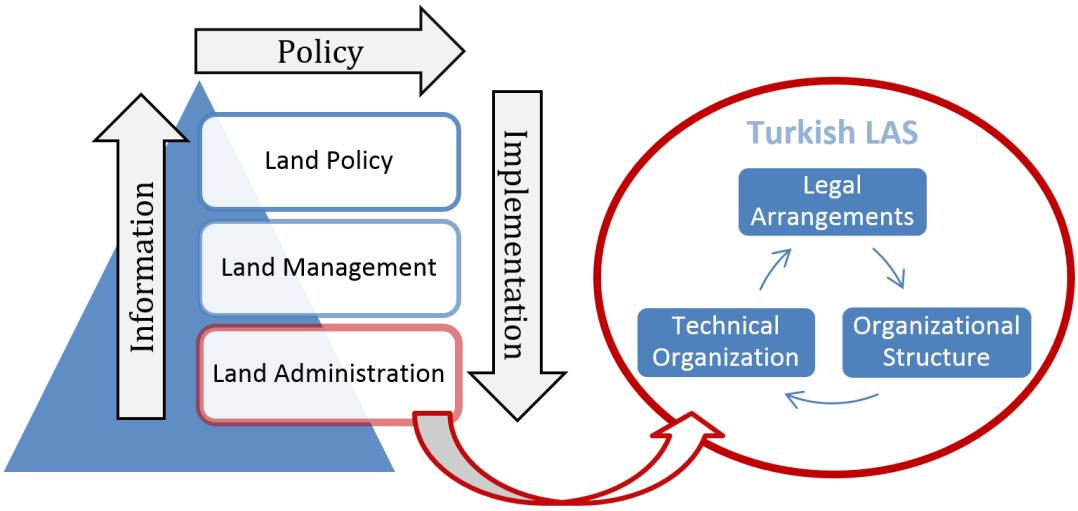

Fig. 2. Functionality of the proposed Turkish LAS approach (Cete, 2008)

Legal Arrangements

Turkey needs for a 'Land Law' reorganizing existing scattered land related laws, eliminating duplications and gaps in the current laws, and providing an appropriate legal basis for a well-functioning LAS. The Land Law should mainly include regulations on land registration, cadastre, real estate appraisal, geographical information management, and land development. The law should be built on appropriate land policies and sustainable development objectives.

Therefore, current land policies, and gaps in policies need to be revised first. Active participation of the relevant experts in the preparation of the law, which are generally disregarded aspect in Turkey, is other important point in this process (Cete, 2008; Cete and Yomralioglu, 2013). After preparation of the law, regulations and guiding documents also need to be prepared for each domain in the law, otherwise, implementation of the rules defined in the law appropriately and providing unities in the land-related works throughout the country would not be easy.

Organizational Structure

Turkey needs a 'leading institution' in the land administration to eliminate current gaps and duplications, and to provide effective coordination in the domain. Someone may think that the General Directorate of Land Registry and Cadastre may be a suitable administration to become the leading institution. Considering that the General Directorate has some difficulties in fulfilling the existing duties assigned to it and the modern cadastre requirements, it is difficult to make the General Directorate the leading institution responsible for the land administration in its current organizational structure. The leading institution will be responsible not only for land registry and cadastre but also for topographical mapping and real estate valuation. Therefore, the institution should be placed on a higher level than a general directorate in the Turkish administrative hierarchy. The leading institution is advised to be established as an undersecretariat of the prime ministry.

Carrying out all functions of a LAS goes beyond the capabilities of a single organization because requests in land administration are mostly delivered through business processes that run across multiple organizations (Chimhamhiwa et al., 2009). Therefore, this study proposes establishment of a leading institution of Turkish LAS named as the Undersecreteriat of the Turkish Prime Ministry for Land Administration (UPMLA) and composed of the General Directorates of (1) Land Registry and Cadastre; (2) Mapping; (3) Real Estate Valuation; and (4) Land Information Management (Fig. 3). The district directorates and local offices of the General Directorates can be built in case of need. This structure will ensure the operation of land administration in an integrated way, and each component will be carried out by its own expert administrations (Cete, 2008; Cete and Yomralioglu, 2013).

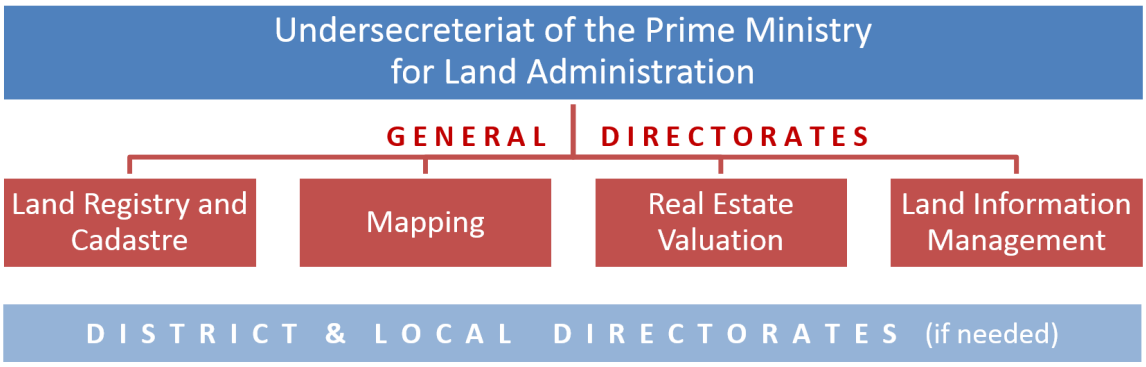

Fig. 3. Organizational structure of the proposed Turkish LAS

Technical Organization

LASs target to effectively handle land information through efficient and effective land information infrastructures (Thellufsen, 2009; Bennett et al., 2012). Therefore, LASs are increasingly evolving into a broader land information infrastructure which supports economic development, environmental management and social stability in both developed and developing countries (Williamson, 2001b). Holistic treatment of land information is no longer arguable; it is essential (Bennett et al., 2008; Bennett et al., 2012). However, the organizational framework that many public organizations are placed in often makes difficult the development of efficient and effective land information infrastructures. Due to historical reasons LASs typically consist of various governmental organizations located in separate ministries in many countries. This fragmentized structure leads to issues concerning inter-organizational collaboration, which are critical for the function of the systems (Thellufsen, 2009). The proposed Turkish LAS will provide an infrastructure for building up and sustaining an efficient Land Information System (LIS). The Undersecreteriat of the Turkish Prime Ministry for Land Administration (UPMLA) will make land related data available for governmental organizations and private corporations through the LIS. This will minimize duplication of data and provide efficiency. The LIS will organize not only the data produced by the UPMLA but also the land related data produced by other organizations. This study proposes that management of the LIS is carried out by the General Directorate of Land Information Management by taking international standards into consideration (Cete, 2008; Cete and Yomralioglu, 2013). During technical development of the proposed Turkish LAS, some emerging and important issues such as Land Administration Domain Model (Lemmen et al., 2015), 3D/4D cadastres (Van Oosterom et al., 2006; Döner et al., 2010) and registration of the Rights, Responsibilities and Restrictions (Kaufmann and Steudler, 1998; Lemmen et al., 2010) should also be taken into consideration by the UPMLA.

CONCLUSION

Cadastral systems have a dynamic nature. Initially designed to assist in land taxation and real estate conveyancing, cadastres have been extended to land administration systems. This situation forces cadastral systems to be re-engineered over time to meet the change. This paper provides a brief overview of cadastral developments and proposes a new land administration system approach for Turkey in legal, organizational and technical means both to eliminate existing issues and to fill current gaps in the existing system. The approach proposes the establishment of a Turkish Land Law in a participatory way to bring together the existing scattered laws, to eliminate duplications and gaps in the current regulations, and to provide an appropriate legal basis for well-functioning land administration system. In organizational means, a leading institution named the Turkish Prime Ministry for Land Administration are advised to be established, and all land administration works are organized and supervised by this institution. A Land Information System managed by the proposed General Directorate of Land Information Management is the technical component of the approach. The approach provided in this paper is recommended to be implemented in incremental steps since implementation at once could lead to some disruption and malfunctions in services during the re-engineering and subsequent processes.

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İRAN KADASTROSUNUN ÇOK AMAÇLI KADASTROYA DÖNÜŞTÜRÜLMESI İHTIYACI

Ali Heydarzadehyenkikand, Maryam Nikuoray

Iran - a.heydarzadeh@gmail.com -

ÖZET

Genel anlamda kadastro, taşınmazların sınırlarının tespiti, ölçümü ve arazi sahiplerinin belirlenerek kayıt altına alınması işlemlerinin bütünü olarak tanımlanmaktadır. İran'da kadastro çalışmaları iki farklı faaliyetlerle gerçekleştirilmektedir.Kadastronun bir kısmını mahkemeler ölçme ve kayıt bürolarına yaptırmaktadırlar. Kadastro çalışmaları iki boyutta gerçekleşmektedir. Kadastroda özellikle taşınmazların değerlemesine esas veriler yoktur. 3 boyuttan yoksun bir kadastro vardır. Bütün bu özelliklerinden dolayı çok amaçlı kadastro için yapılması gereken teknik ve yasal düzenlemeler söz konusudur. Öncelikle mevcut kadastro altlıklarının iyileştirilerek 3. Boyuta kavuşturularak sisteme aktarımı yapılmalı ve yeni kadastro çalışmalarında çok amaçlı kadastro veri tiplerine göre bir kadastro içeriği geliştirilmelidir. Bunun için kurumlar arası koordinasyon önemli olacaktır. Özellikle e-devlet kapsamında istenilen standartlarda kadastral veriler üretilerek veri tabanlarına aktarılmalı ve her türlü taşınmaz tabanlı sorgulamalara imkan tanınmalıdır. Bu amaca yönelik ülkemizde teknik ve hukuki altyapıların kurulmasına ihtiyaç vardır. Bu bildiride İran Kadastrosunun mevcut durumu ve modern kadastroya dönüşümü için yapılması gerekenler izah edilecektir.

AnahtarKelimeler: Kadastro, İran Kadastrosu, Sayısallaştırma

ABSTRACT

In general cadastre is defined as the determination of the boundaries of property, determining the measure and totality of the landowners to record transactions**.** Cadastral surveys are carried out with two different activities in Iran. These are there measurements and registration with verbal identification of thedataheld in databases. Courts are make on a portion of the cadastral surveying and registration office. Cadastral works are performed in two dimensions. Especially the valuation of real estate is not essential data in cadastral. There is a lack of 3D cadaster. Because of all these features technical and legal arrangements is required for multipurpose cadaster. Firstly, the current cadastral base should be improved and 3D Dimension transfer the system. New cadastral surveys should be developed according to the multidisiplinary cadastral data types. It will be important for coordination between institutions. In particular, e-government within the scope of the required standards produced cadastral data should be transferred to the database and should be given every opportunity to real property based queries. In our country, there is necessary for the establishment of technical and legal infrastructure. This paper will be explained to be done to transform the current situation and what needs to be done to transform modern cadastral survey of Iran.

Key words: Cadastre, Iran Cadastre, Digitizing

GİRİŞ

Yaşam ve insan faaliyetlerinin sürdürülmesinde arazi/taşınmaz tüm toplumlarda insanların en önemli varlıklarındandır. Taşınmaz varlıkların; sınırlı, ikame edilmez ve üretilmez olması eşsiz özelliklerindendir. Bu duruma göre, koruma, sermayenin operasyonu ve dağıtımı, sermayenin dağılımı, çeşitli sosyal sınıflar ve farklı nesiller tarafından iyi kullanılması ve yönetilmesi yöneticilerin ve planlayıcılarının önemli hedeflerindendir. Ekonomik literatürde, konut piyasasında ve diğer üretim sektörlerinde arazinin rolü önemlidir. Arazi fiyatları, konut fiyatlarının payını belirler ve ortalama konut maliyetinin 50-80% sini arazi maliyetleri belirler. Bu nedenle konut ve arazi fiyatlarını kontrol etmek için arazi politikaları ve bununla ilgili birimler tarafından vergi politikalarının uygulaması, konut piyasasının istikrarında da bir rol oynayabilmektedir.

Taşınmazların belli bir sistem içinde yönetilmesi için gerekli olan Arazi Bilgi Sistemleri (ABS), arazi yönetim politikalarının temel aracı olarak çok önemlidir. Arazi ve konut piyasasında doğru ve şeffaf bilgi eksikliği, kontrol programlarını zayıflamasına, eski ve çöküntü alanlarındaki konutların gelişmesine neden olur.

Arazi Bilgi sisteminin en temel bileşenlerinden biri kadastrodur. Kadastro ile zenginleştirilmiş bir ABS, ülke arazi yönetiminde ve makro planlamasında önemli bir araç olabilir. ABS'yi zorunlu kılan Arazi yönetiminin fonksiyonları şunlardır;

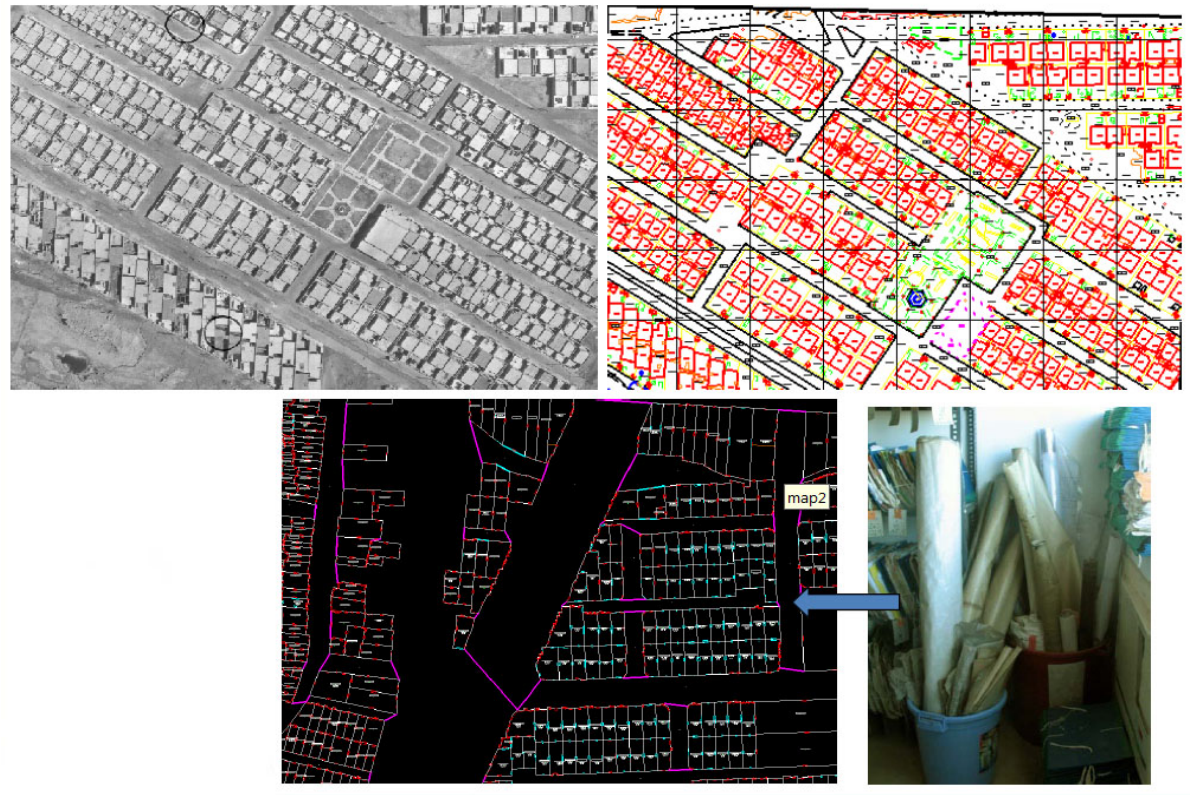
1. Mülkiyet (Arazinin mülkiyetini ve kaydınıizleme ve kontrol)
2. Değer(Arazinin piyasası ve vergilendirmesinin denetimi vekontrolü)
3. Kullanıcı (arazininuygundağılımı)

İRAN KADASTROSU

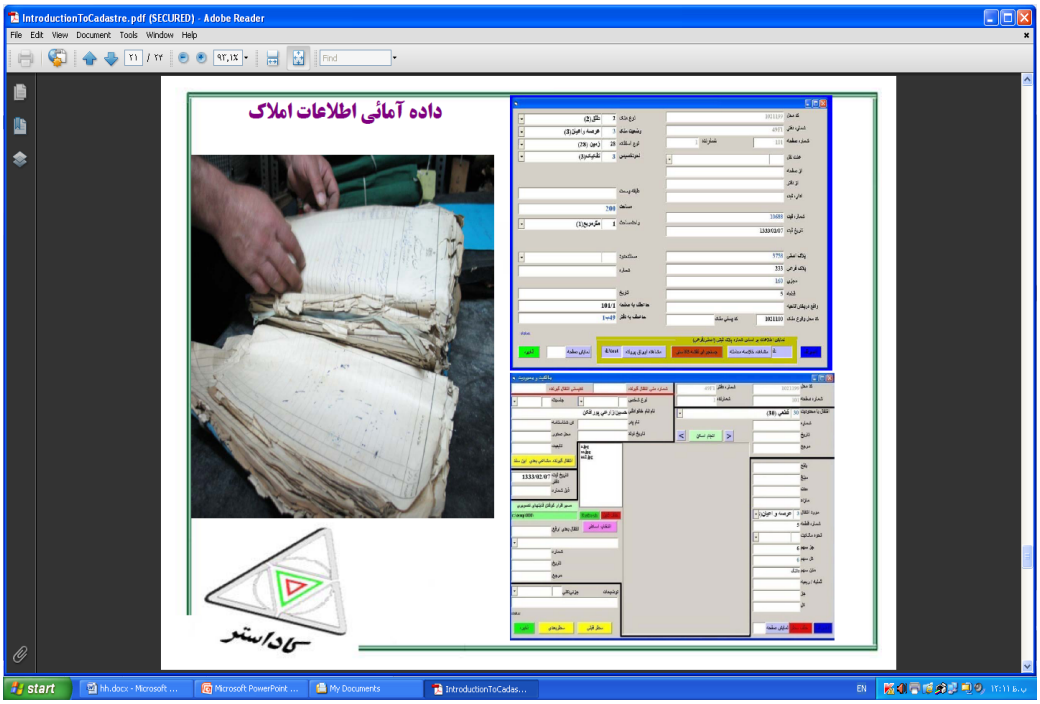
1990 yılında (1369 hicri şamsi yılında) İran ülkesinde kadastro planı (kadastronun bitirilmesi çalışmaları) 20 yılık bir dönemde (beş yıllık kalkınma döneminden oluşan) İslam Konsey Parlamentosu tarafından onaylandı. Yaklaşık beş yıllık bir planlama çalışmasının sonucunda 1995 yıllında (1374 hicri şamsi yılında) hazırlık çalışmalarının ardından uygulanmaya başlandı.

Kadastro uygulamalarının adımları

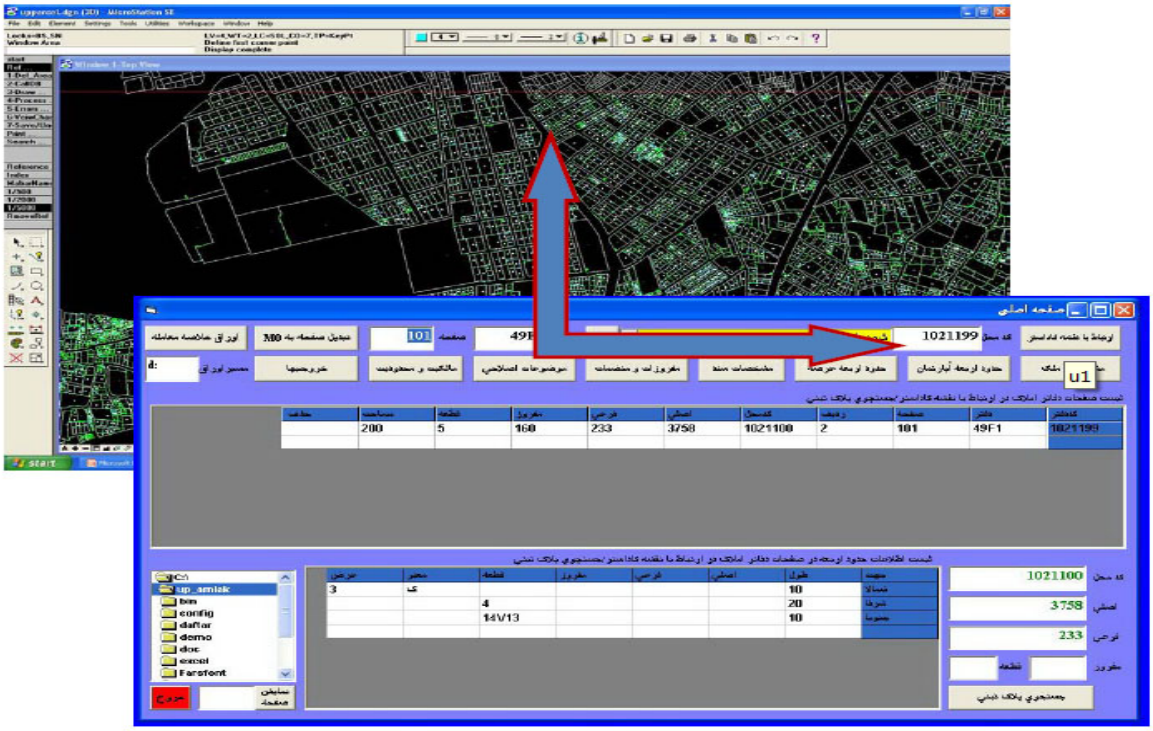
a-Karasal haritalama yoluyla arazinin mevcut durumunun ve küçük belediyeler için 1/500 ve fotogrametrik yöntem ile büyük şehirler için 1/2000 ölçekte haritalarının hazırlaması
b-Mevcut haritaların üzerinde parçalarda mülkiyet belgeleri olanlara kayıt kodunu eklenmesi
c-Mülkiyet bilgilerinin çıkarılması ve onların bilgisayara girişleri ve ayrıca emlak defterlerinin taranması
d-Taşınmaz malın geometrik ve açıklayıcı bilgilerinin birleştirilmesi
e-Son adım olarak kadastro haritalarının oluşturması



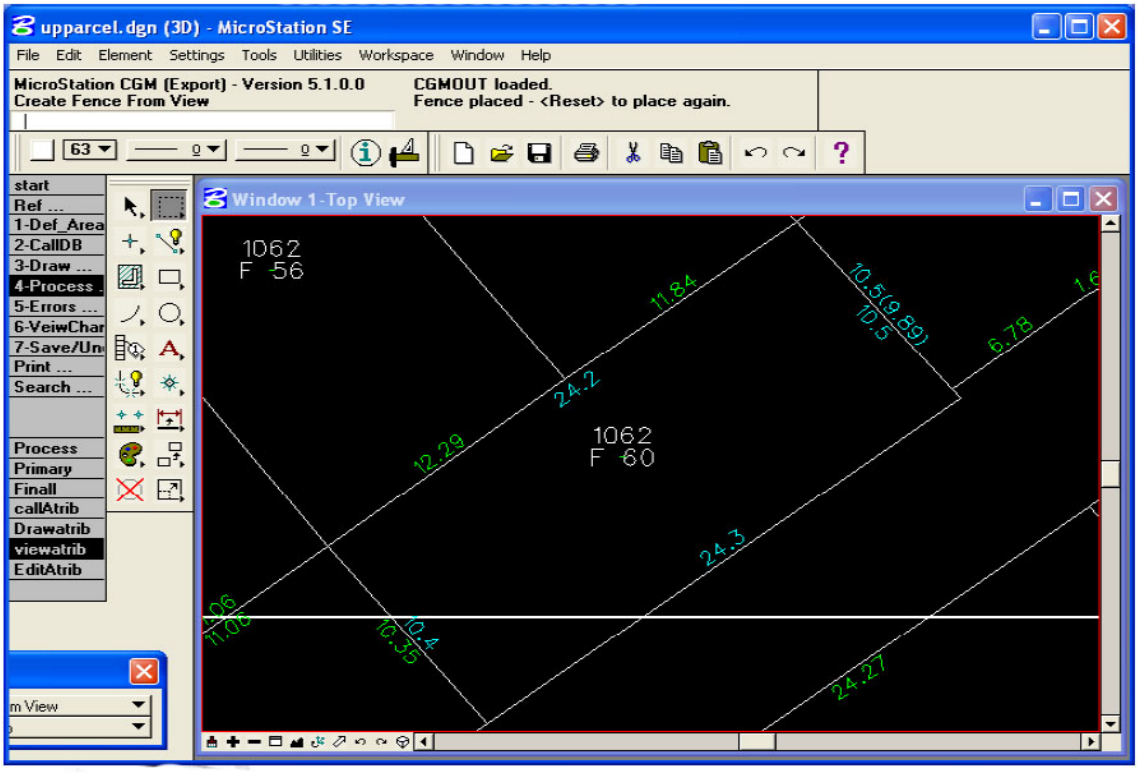
Şekil 1: Mevcut durum haritaları



Şekil 2: Emlak defteri tarama ve kayıt kodu ekleme



Şekil 3: Geometrik ve öznitelik birleştirme



Şekil 4: Sonuç çıktı kadastro haritaları

İran kadastronun bitirilmesine yönelik yapılan yasal düzenlemenin temel hedefleri ise şunlardır;

a) Nicel hedefler: Bireylerin/özel araziler ile Devlete ait arazilerin yasal mülkiyetini belirleme (120000 hektarlık alan).
b) Nitel hedefler:Detaylılık – basitlilik - zihinsellik- eminlilik - güvenilirlilik ve zamanla değişebilirlilik oluşturulması ve sonuçta geleneksel kayıtları yeni kayıta veya kadastroya dönüştürmek.

Geçmişe bakıldığında, onaylanan kadastro kanunu'nun 25yıllık döneminin tamamlanmasıyla kadastrodan hedeflenen amaçlar elde edilmiş ve kentsel arazilerinin haritalarının hazırlamasının yanı sıra, geniş bir arazi ve kırsal mülkiyetini - doğal kaynakları – çevre alanları ve nehir yataklarını – demir yollarını ve araç yollarının alternatif olarak, kadastral haritasına ilave edilmiştir. Kadastro belgelerinin dağıtımı tamamıyla bilgisayar sistemi üzerinden gerçekleştirilmektedir. Hem eski mülkiyet belgelerinin büyük bir kısmını bilgisayar ortamına aktarılarak modern anlamda kadastrodan beklentileri karşılayacak şekilde düzenlenerek sisteme aktarılmıştır. Bunun neticesinde Kadastro sistemi mülkiyetten kaynaklı arazi spekülasyonlarını kontrol etmek için yüksek verimliğe sahip hale dönüştürülmüştür. Sonuçta kadastral sistem adalet sektörü ve resmi belgeler(transferler- noterler) ile on line olarak iletişimde çalışmaktadır.

İran Kadastrosunun güçlü ve zayıf yönlerinin Analizi

Şu anda İran'da kadastro sisteminin taşınmaz kayıt bölümünün bir kısmı mahkemelerin yetkisi altında arazilerin tespiti, ölçümü, sahiplerinin belirlenmesi ve kayıt altına alınması mevcut kayıt büroları tarafından gerçekleştirilmektedir ve bu özelliğinden dolayı İran kadastrosu yasal niteliğe sahiptir.

İran kadastrosunda arazi sahipliliğini gösterir mülkiyet haritalarının büyük oranda olmasına rağmen arazi değerlerinin tespit edildiği maliye kadastrosuna esas veriler mevcut değildir. Bundan dolayı mevcut kadastro sistemi çok amaçlı kadastro için yetersiz kabul edilmektedir. Emlak vergilerinin belirlenmesi ve toplanmasında belediyeler yetkili olup bunun için emlak bilgi sistemine sahiptirler ve buna yönelik arazi kullanım durumunun kırsal ya da kentsel amaçlı kullanımına göre arazilerin emlak değerleri tespit edilerek taşınmaz mallardan vergi alınır. Örneğin arazi ile ilgili kentsel gelişme planları üzerinden belirlenen sokaklara isabet eden parseller üzerinden emlak değerleri belirlenerek taşınmaz mallardan vergi alınması sağlanır.

SONUÇLAR

İran'da Kadastro, kayıt kurumunun alt kümesidir ve taşınmazların ölçülüp kaydedilmesi kadastronun sadece küçük bir kısmıdır ve öyle görünüyor ki tapu ve kadastronun aynı çatı altında birleştirilmesi modern kadastro altyapısı için gereklidir. Kadastro sistemi iki farklı faaliyet kısmını kapsamaktadır. Bunlar: haritalama ve mekansal verilerden veri tabanı oluşturmaktır. Farklı iki faaliyetin tek çatı altında toplanması ve buna yönelik hükümetin yeni düzenlemeler yapması kaçınılmazdır.

İran kadastrosunun çok amaçlı kadastroya dönüştürülmesi için ilgililerin bir araya gelmesi ve konuyu sürekli gündeme taşımaları gerekmektedir. Bunun için ilgili kurum ya da kuruluşların çok amaçlı kadastronun kapsam ve içeriğini ve bunun için gerekli teknik ve teknolojik araç ve gereçleri sağlamak ve bunun uygulanması için gerekli altyapıların hazırlanması adına adımlar atarak modern kadastro uygulamasını ülke genelinde gerçekleştirmelidir.

E devletin amaçlarına ulaşmak için gerekli alt ve üst yapıların düzenlenmesi ve buna yönelik kurumlar arası veri paylaşımı için standartların belirlenmesi, platform tasarımı ve uygulaması önemli olacaktır. İki boyutlu üretilmiş tescilli kadastro altlıklarının 3 boyutlu hale dönüştürülmesi çalışmalarının bir an önce başlatılması gerekmektedir.

KAYNAKLAR

FIG [1995] *Statement on the Cadastre,* International Federation of Surveyors, FIG Bureau, Canberra, Australia.

Larsson, G. [1991] *Land Registration and Cadastral Systems: Tools for land information and management.* Longman Scientific and Technical, Essex, England, ISBN 0-582-08952-2