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Research Article

Development of a Comprehensive Cadastral System: Examinations and Implications

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Abstract: The largest policies that are effective in the housing sector are "land management" policies, which express the distribution of missions throughout the country and, consequently, the distribution of population. These policies have been adopted at the macro level of the country and as an upstream policy, have a great impact on the housing sector. Marginalization problems around metropolitan areas are rooted in land management throughout the country. Establishing a real estate information system can be an effective aid to planning and implementing land management policies. Comprehensive cadaster or cadaster with dual military application that in addition to fulfilling the objectives of the definition of cadaster in a specific sense, meet the needs of other socio-economic development programs in which the division of land and their use are considered. On the other hand, government planning in the land and housing market in order to implement policies in the field of real estate, including housing, agriculture, industry and services requires transparent information in this market. In fact, governments need to organize and organize information in the land and housing market. Accordingly, the purpose of this study is to review the findings regarding the achievement of a comprehensive cadastral system. In this regard, advanced cadastral imagery, cadastral objectives, the need to implement the cadastral plan, explain the cadastral implementation strategy of the country, various operational steps to prepare a cadastral map and smart real estate identity card were studied descriptively.

Keywords: Advanced Cadaster Imaging, Intelligent Real Estate Identity, Property Violations

1. Introduction

For any planning, whether at the national, urban or rural level, a comprehensive process must be followed to achieve the desired outcome. The very first stage of this process is called cognition, in which any procrastination and shortcomings directly exposes the next stages to a plethora of deficiencies. It is in the same stage that the administrators can realize the various possibilities, opportunities, obstacles, and deficiencies among others, get more familiar with the study area, and offer different plans and solutions according to the goals that clarify best missions and horizons of the program. In the next stages, process including the determination of an optimal solution to the final implementation of the plan are undertaken. In the stage of cognition, a variety of issues in the region are examined. Topographic status, economic situation, and social, political, and cultural surveys are among issues that should be sought after in the cadaster as a collection of information about the region.

One of the legal duties of the State Property and Deeds Registration Organization is to gain a full comprehension on the real boundaries of properties and lands in the country so that it can provide the basis for establishing and maintaining legitimate property ownership and determine the volume of urban operational lands, barren lands, wastelands and endowments. For this purpose, a comprehensive system should be developed that has complete geometric information about the entire property of the country, the property map along with the ID of each property, the owner's details and the limits of the owner's rights in the property.

Accordingly, the State Property and Deeds Registration Organization has produced a cadastral plan for the creation and optimal management of the information system, and has updated the construction of urban maps at a scale of 1: 500, and has collected and updated the relevant information. The purpose of the cadastral plan is to create an accurate, simple, smooth, reliable and updateable system governing the affairs of real estate and properties in determining the legal boundaries of ownership of lands belonging to natural and legal persons, endowment of 1200,000 hectares of urban lands. The plan also seeks to review information and maps during the implementation and post-implementations phases of the plan in the registry offices and finally to update the existing registration system to a modern, smart registration.

Given the quality and accuracy devised for urban cadastral maps, they are often able to meet the needs of urban development plans, including housing, gas supply, electricity, telecommunications network, sewerage, subway and other urban development plans and projects, and are in line with their activities and projections. Since the cadastral plan is equipped with a huge source of economic information on real estate and properties, they can feed the databases of financial plans such as regional income tax plans and result in added value in employing of these databases.

On the other hand, the issue of land management has been constantly subject to alterations in various eras, and has therefore experienced a plethora of shifts and developments thus far, the most significant of which has been the influence on the management of individuals or governments. Accordingly, the purpose of this study is to review the implications of implementing a comprehensive cadastral system.

2. Research background

Cadastre system

overall, cadastral systems consist of the following three steps or sections:

A. Data collection, during which the necessary information is collected depending on the type of cadastre and the employed method.
B. Data processing, that is, organizing and maintaining the collected information
C. Provision of reports and information, in which part or all of the recorded information is provided to the user as needed.

The quantitative objectives of the national cadastral plan include determining the legal boundaries buildings and lands belongings to natural and legal persons, governmental agencies, and endowments, amassing to one million hectares of urban cadastre, reviewing information and maps during the program and finally moving from the Traditional registration systems to modern one.

Global stance on land management and corresponding assets further highlights the need to develop a cadastre and prioritize the development and improvement of cadastral systems over many other activities. Its inclusion in the list of the most important activities and strategies proposed by the UN General Assembly and the World Bank will confirms it significance.

The cadastre is deemed as an efficient platform for cooperation in the global management of lands and properties in an integrated manner. In 1994, the 7th Commission of the International Federation of Surveyors (FIG-7) outlined a vision for the modern application of mapping over the next twenty years, known as "Cadastre 2014". According to the report, the cadastre prepared in this commission seeks to alter the role of governments in society, the human-land relationship, the significant effect of navigation on cadastral reform, the shifting role of surveyors and the growing involvement of the private sector in cadastral operations. The Iranian Property and Deeds Registration Organization also intends to build an optimization plan for the Iranian cadastre system using the principles established in Cadastre 2014

Advanced cadastral imagery

Advanced imaging seeks solutions to record three-dimensional objects in the database with simple devices, and assignment of lot data in two-dimensional space. These space devices for mapping 3D objects in the database can be complex depending on the technology they use. In the next step, the methods of converting the three-dimensional model of the data are examined with the help of the relevant tools so that the data is not assumed to be separate from the original and the two-dimensional model of the data can be formed independently .There are two methods for this purpose.

In the two-dimensional and three-dimensional data method in a database, the initial designs are put together in such a way that data from the three-dimensional model of the database is recorded, and the shape geometry is preserved, allowing the reconstruction of three-dimensional objects. Here, different objects in nature (tunnels, apartments, cables) are distinguished to prevent the probable challenges arising during the reconstruction of a three-dimensional object. To perform the operation, an objective function is required, which is often inputted by the operator. The purpose of describing in detail the standard definition is to allow editing of the data on demand. The relationship between different objects is maintained through the function. The spatialization of the data relative to each other is done using the functions. Owing to the lack of linear existences related to fixed geometry, updating objects is not possible in this type of cadastre. The main functions of the database are presented in two-dimensional features. The three-dimensional cadastre solution is perceived to be the optimal solutions for addressing three-dimensional pieces, which is yet to be generated. Accordingly, providing the required data in three-dimensional space requires a lot of effort.

At present, due to the creation of more complex three-dimensional objects, they are looking for ways to deal with situations, but now the hybrid method is used to recreate three-dimensional space with the help of two-dimensional. This method is the result of cadastral needs in recent years and advances in technology.

Objectives of the cadastre

The objectives of the cadastre are of special structural importance, some of which can be summarized as follows.

1. Generating a smooth and reliable workflow in timely and accurate issuance or correction of documents
2. Creating trust and confidence in high-speed real estate transactions.
3. Significant reduction of property violations and related lawsuits in the courts and reduction of the volume of court cases.

4. Helping to establish a fair and real tax system and swiftness in related practice, as well as increasing taxes and reducing the effects of personal relationships and tastes by relying on the cadastral database.
5. Increasing the efficiency and improving the quality of the executive operations of development projects by employing the cadastral toolset such as maps, aerial photographs, technical information, and geographical coordinates among others
6. Increasing the capacity of claiming the rights of the government salaries in all real estate transfers by relying on reliable and smooth cadastral information.
7. Enhancing indirect government revenue indirectly.
8. Improving investment in land and enhancing its socio-economic and cultural effects
9. Creating a persistent source of income by providing a map for executive agencies, public and private institutions and organizations through concluding contracts or direct sale of maps and cadastral information.
10. The qualitative impact of the cadastre as a precondition for development and the required tools for policy-making and economic-social and cultural development plans real estate.
11. Increasing employment in a plethora of occupational fields related to the development of the cadastre
12. Upgrading the level of technical knowledge stemming from the application of modern technologies to the cadastre.

Necessity of implementing the cadastral plan

Economic experts emphasize the need for all sections of society to be able to benefit from urban land resources. Accordingly, availability of transparent information in the field of real estate leads to increased property security and the hence the ground for well-organized planning, itself allowing all sections of society to make use of this divine gift. Lack of information transparency in all markets is often directly attributed to fraudulent practices in that market. Moreover, information transparency is a prerequisite of government planning in the land and housing market, through which policies on real estate, including housing, agriculture, industry and services can be efficiently implemented. Experts often argue that governments need to organize information in the land and housing market, some reasons for which are discussed in the following

The existence of accurate, correct, timely and spatial statistics and information (strategic reference) is a vital factor for all economic, cultural, social and political planning and decisions at the national level. Strategic reference has long been considered as one of the important infrastructures for development in countries. Today, land management systems include cadastre, land registration, land valuation and land use, which are used with a main focus on cadastre for sustainable development. The State Property and Deeds Registration Organization, as the custodian of obtaining, processing and optimal management of the country's cadastral land registration system, seeks to optimize its information and operational processes by using the most advanced technologies available. In order to create and optimally manage the country's cadastral information system, this organization is currently producing and updating urban maps at a scale of 1: 500 and collecting and updating relevant information with the sole purpose of generating a cadastral spatial database. In this regard, the production and updating of registration information and cadastral maps (cadastral information systems) are currently among the main tasks of the State Property and Registration Organization.

The preparation of maps and forms of registration information and automation of cadastral information system processes are considered. The State Property and Deeds Registration Organization must seek help in updating digital maps and collecting, obtaining and updating registration information and mechanisms, education, and finally receiving consulting, supervisory and executive services on the optimization of the cadastre, so that it can be employed as the basic system for the development of national information infrastructure.

Mechanization of registry and forming the necessary platform for providing e-government services in the organization is of great importance, posing as a significant prerequisite for reforming the registration system with a new cadastral outlook. Today, in line with the development and application of information and communication technology (ICT), creation of spatial data infrastructures (SDIs), land use and application plans and other infrastructural plans, cadastral information are among the most significant basic information for optimal decision making, planning and outsourcing. With the implementation of the national cadastral plan, information registered on the system can be optimally retrieved, processed and displayed in the form of spatial databases and systems (namely, GIS / LIS). Moreover, the aforementioned contents can be exchanged in appropriate and standard formats. The above plan enables the State Property and Registration Organization to exchange information in interaction with local authorities and to offer more optimal solutions for the sake of next generations.

implementation of the national cadastre strategy

To enhance the quality of the current traditional registration operations and to apply the state-of-the-art rules, criteria and technical instructions, it is of utmost importance on the one hand to seek out the ultimate national cadastral goals with the purpose of reorganizing the country, and on the other hand, to avoid repeating traditional

operations to no avail, thereby avoiding budget overflows and deadline delays as well as prospective lawsuits and legal challenges. The main activities for realizing the main goals of the national cadastre follow two major plotlines, that is, preparing cadastral maps, and collecting geometric information and mechanizing the information of existing properties and documents. However, both phases of this renovative strategies requires the use of the most modern equipment along with most novel managerial methods.

Given the multi-folded economic and social effects of the cadastre on society, its executive policies are also limited to operational policies and guidelines in the public sector and must take advantage of the abilities and capacities of private players with appropriate rules and regulations. Considering various technical, educational and executive factors in the private sector, they can be efficiently employed for concluding consulting contracts with scientific and educational centers, the purpose of which would be in turn optimize the country's scientific strength on long-term cadastral policies of the country.

Operational steps to a cadastral map

various operational steps are required to implement a fully functional cadastre, some of the most prominent of which are as follows:

1. Main griding: includes the creation of a coordinate system with scale units of about 5 kilometers, which is intended to prepare a map of an area in an integrated way, such that it covers the entire region and is connected to the country coordinates.
2. Minor Griding: for coordinating the boundaries of the property in the mapping operation, stations with distances of 200 to 500 meters in the area of operation are based on the main grids and coordinates are given.
3. Aerial photography: To be used in areas where land surveying is very-time consuming and uneconomical owing to its large area

Intelligent Real Estate Identity

Transparency of information is considered as one of the most important prerequisites of well-organized and efficient planning in various social, cultural, and especially economic sectors, lack of which would certainly lead to economic rents and inequality in economic opportunities. Experts argue that the lack of accurate information in the land and housing market has been one of the main proponents of ill-organized and inefficient planning in this realm. Overall, the information essential to economic planning is divided into three categories, namely, personal, spatial and credit information.

Personal information

Personal information includes the ID information, health status, and educational level among other similar traits. It mostly pertains to life-long personal characteristics of individuals. For proper planning, providing policy makers with up-to-date information regarding the population and other census-related information is of paramount importance. The demographic information can receive and update the information on new births and deaths by connecting to the system of the Civil Registration Organization.

Spatial information

Spatial information pertains to the data on the residence and real estate of individuals. The physical and technical features of the building also fall into this category. Having access to the spatial information allows the government to employ them for economic and planning purposes when the time arrives.

Credit information

Credit information is information revealing the details of bank accounts, real estate, job, insurance and social security of individuals. This information assist government officials in proper occupational planning considering the needs of society. Currently, banks have their own account information system, through which the assets of individuals and their turnover are available. Moreover, insurance companies (social security insurance, medical services, …) have the job information of their clients.

3. Conclusion

A cadastre is a process in which real estate, including property, land, apartments, and buildings, among other., and in some countries even moveable assets, including cars and vehicles (such as the case in the Swiss cadastre) are registered. The significance of having cadastre in Iran has been more pronounced recently, as it was not seriously considered until several years ago, i.e., until 1999, while the history of cadastre in Europe dates back to more than 150 years ago, thus creating a sense of urgency as a result of this perceived underdevelopment, the influence of which is highly evident in various parts of Iranian society. Property violations and and severe property disputes, the high number of property-related cases in the judiciary, delays in processing registration cases, high levels of unnecessary physical referrals to the registry offices, lack of a comprehensive database for reviewing records, and consequently depriving a number of individuals of their unassailable rights all indicate the lack of a

comprehensive cadastral system in the country. The relevant managers were far too slow to respond to the call for reforming the registration mapping system a the castral plan. Yet, the lack of land and the urgent need to manage it, lack of housing and shelter for the new generation, disruption in administrative organization and inconsistency between government institutions and private institutions are all adverse consequences of failure in timely implantation of a cadastre.

Presently, the State Property and Deeds Registration Organization is in charge of issuing state property documents and has a fully enforceable legal duty and operates under the administration of the Judiciary branch. The highly unsuccessful experience of this organization in the implementation of the national cadastral project further confirms the fact that it is not properly equipped for the assigned tasks given the structures governing it, and hence the organization has not been able to fully perform its duties. Despite the fact that more than twenty years have passed since the establishment of the General Cadastre Office in the Registration Organization, only 7% progress has been achieved in urban lands.

Sustainable economic, legal, cultural and social development is one of the long-term implications of an accurate implementation of the cadastral plan. Lack of proper and efficient management and lack of modern planning are important reasons for not meeting this right expectation of Iranian society. Methods that have been subject to trial and error thus far were mere imitations of their counterparts from European countries or other countries with cadastral plan, yet genuine and original planning are perceived to be vital to prevent the underdevelopment in this sphere.

Therefore, considering the executive nature of the State Property and Deeds Registration Organization, it is suggested that it be strategically repositioned into the executive branch and be placed under a ministry with close affiliations with judiciary as to preserve its legal relevance. The Ministry of Justice could be a viable option owing to its close affiliation with the judiciary. Also, given that the Minister of Justice is also a member of the High Judicial Council, he can perform this repositioning with fewer unnecessary hindrances and more precision.

References

1. Abbasi Dakani, Kh. (2008). Document registration law, Tehran, Mizan, First edition.
2. Adabi, H. (2009). Specialized registration law. Tehran, Jangal, Second Edition.
3. Amid, H. ("n.d."). Amid Persian Culture, Tehran, Sepehr Printing House
4. Bazgir, Y. (2003). Evictive Disposal, Tehran, Ferdowsi, First Edition.
5. Bazgir, Y. (2005). Lands and water, Tehran, Ferdowsi, Third edition.
6. Eskafi, N. (2003). Registration culture. Tehran, Dadgostar, Second Edition.
7. Haghighat, A. (2002). Real estate registration in Iran, Tehran, Ganch Danesh.
8. Jafari Langroudi, M. J. (2007). Terminology of law, Tehran, Ganj-e-Danesh, 18th edition.
9. Journal of the Association of Registrars and Clerks, Year 46, Volume 2, Issue 44
10. Mehrzad, M. (2013). Cadastre, Jangal, Javedane, First edition
11. Mirzaei, A. (2005). Law on registration in the current legal order, Tehran, Behnami, First Edition
12. Monthly Journal of the Association of Registrars and Clerks, 2005, No. 85
13. Monthly Journal of the Association of Registrars and Clerks, 2005, No. 56
14. Monthly Journal of the Association of Registrars and Clerks, 2005, No. 57
15. Monthly Journal of the Association of Registrars and Clerks, 2005, No. 58
16. Monthly Journal of the Association of Registrars and Clerks, 2006, No. 68
17. Monthly Journal of the Association of Registrars and Clerks, 2007, No. 71
18. Monthly Journal of the Association of Registrars and Clerks, 2007, No. 70
19. Monthly Journal of the Association of Registrars and Clerks, 2008, No. 85
20. Monthly Journal of the Association of Registrars and Clerks. 2007, No. 78
21. Razani, B. (2000). Entry registration law, Tehran, Asatir Publications, First Edition.
22. Shahri, Gholamreza. (2006). Property registration law, Tehran, Jahad-daneshgahi, Tenth Edition.
23. Shams, A. (2006). National land legal system, Dadgostar, Second Edition.
24. Tafakorian, M. (2006). Registration law, recognition of registration Offices, Tehran, Negah Bineh, First Edition.
25. Tafakorian, M. (2008). Property registration law, Tehran, Negah Bineh, First Edition.
26. Yousefi, R. (2006) Digital cadastre. Second Edition.
27. www.cadaster.ir.