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LAND MANAGEMENT PARADIGM: GLOBAL AGENDA AND THE CASE IN TÜRKİYE

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ABSTRACT: Property ownership rights cannot be officially used for 70% of the world. Global calls for action have been made to create and protect property rights, particularly for the last three decades. Under the leadership of the United Nations, the issue of land management was examined from the economic, social, and environmental perspectives considering knowledge transfer, capacity building, and international cooperation, and efforts have been made to integrate global approaches with national conditions. Sustainable Development Goals and their implementation guides in terms of land management, i.e. Integrated Geospatial Information Framework and Framework for Effective Land Administration, are significant actors on the global agenda. This article reveals the concepts that emerged as a result of the global agenda, the development of land management and calls for action, higher education opportunities, and the main issues of the agenda. The study examines the global agenda considering the conditions of Türkiye and concludes that the successful Turkish Land Administration, which has many years of experience, should be modernized considering the new developments, and the clutter in geospatial data production should be eliminated and the efforts should be combined under a single corporate structure.

Keywords: *Land management, Land administration, Land governance, Geospatial data, Sustainable development goals*

Arazi Yönetim Paradigması: Küresel Gündem ve Türkiye'deki Durum

ÖZ: Dünyanın %70'inde arazi mülkiyeti haklarından resmi olarak yararlanılamamaktadır. Özellikle son otuz yılda mülkiyet haklarının oluşturulması ve korunması ile ilgili olarak global eylem çağrıları yapılmaktadır. Birleşmiş Milletler öncülüğünde bilgi transferi, kapasite geliştirme ve uluslararası iş birliği çerçevesinde arazi yönetimi ekonomik, sosyal ve çevresel bakış açılarıyla ele alınmış, küresel düzeydeki yaklaşımların ulusal koşullar ile entegre edilmesine çalışılmıştır. Sürdürülebilir Kalkınma Amaçları ve bunun arazi yönetimi anlamında uygulama rehberleri olacak olan Bütünleşik Mekansal Bilgi Çerçevesi, Etkin Arazi Yönetimi Çerçevesi küresel gündemin önemli oyun kurucularıdır. Bu makalede, küresel gündem gereği ortaya çıkan kavramlar, arazi yönetiminin gelişimi ve eylem çağrıları, yüksek öğretim imkânları ve gündemin ana konuları ortaya konmuştur. Küresel gündem Türkiye koşullarında irdelenmiş, çok uzun yıllar deneyime sahip ve başarılı Türk Arazi İdaresinin yeni gelişmeler çerçevesinde

modernizasyonu ile mekansal veri üretiminde olan dağınıklığın giderilerek tek bir kurumsal yapıda toplanması sonuçlarına ulaşılmıştır.

Anahtar Kelimeler: *Arazi yönetimi, Arazi idaresi, Arazi yönetişimi, Mekânsal veri, Sürdürülebilir kalkınma amaçları*

1. INTRODUCTION

About 70% of the world's population has no land-property relations. However, having a good land administration, which considers both informal and formal rights regarding the ownership and use of land, is essential for the economic and social development of nations (FELA 2020, UNGGIM 2015). The topic of Land Administration is regarded as the core component of land management. In this context, important guideline documents such as Land Administration for Sustainable Development (Williamson et al, 2010), Fit-For-Purpose Land Administration (Enemark et al., 2015), Fit-For-Purpose Land Administration Guiding Principles (UN-GLTN, 2015) were published to determine the place of land administration in the land management paradigm and to develop and implement its applications. The countries on the south of the equator have been observed to implement several projects with the understanding of fit-for-purpose.

Most of the world has been striving for having a land policy, land management instruments, institutionalization, collecting of geospatial data, and compliance with data standards despite the lack of technical staff, vocational higher education, capacity-building instruments, finance, and feudalism. On the other hand, developed countries have completed the institutionalization of land administration as a part of sustainable development. Therefore, geospatial data is collected within the framework of internationally accepted standards in these countries, and they use modern technology and try to improve geospatial data infrastructure and data sharing systems. Moreover, these countries strive to integrate their legacy systems with new technologies. Therefore, they try to have sustainable business models and focus on international networks, innovation, and digital transformation following a citizen-centered approach (Ercan, 2019). As can be seen, there is a huge digital divide between developed and developing countries.

It seems that the digital transformation goals of the United Nations (UN) cannot be achieved without solving the problems related to land and property. With this perspective, land management is a human and society-oriented structure at the very center of sustainable development, livable cities, and rural development.

Therefore, the UN has revealed the need to prepare the Integrated Geospatial Information Framework (IGIF) document to solve the spatial data problem, and the assigned expert group has completed the studies. Moreover, the UN's Committee of Experts on Global Geospatial Information Management (UNGGIM) has assigned the UNGGIM-Land Administration Expert Group in 2018. This group prepared the Framework for Effective Land Administration (FELA) document and presented it to the UN General Assembly. The document, which was approved by the General Assembly, is at the stage of printing. FELA is considered to be a framework document on Land Administration, and it is planned to support this document with IGIF. The UN plans to bridge the digital gap between developed and underdeveloped countries due to the land administration system and geospatial data and to achieve digital transformation by offering the FELA/IGIF approach as a world policy.

The awareness of the fact that land is one of the most important natural resources and the requirement for the effective use of land has increased. Due to the use of very similar terms in land management and applications documents translated from English, these terms and concepts should be clarified within the framework of common understanding for practitioners; this is required at least for Türkiye.

There are many graduate programs both in the world and in Turkey under different titles using terms such as urban, rural, real estate, environment, and cadastre.

In the world and in Türkiye, the duties and responsibilities of Land Registry Cadastre, Mapping and Land Registry, Cadastre, and Mapping Agencies have been gradually increasing as part of the global agenda. Therefore, calls for action have been made to re-organize them within the framework of building

cadastre and digital transformation. It is projected that the land administration and the institutions producing geospatial data in Türkiye will also be affected by this transformation.

This article examines the conceptual model of the land management paradigm, its global development, calls to action, education, the global agenda, and the current situation in Turkey from global perspectives. Increasing global developments in land management place a challenge on the professional agenda, and all countries learn lessons for themselves. Türkiye was examined from these perspectives, the findings were discussed and suggestions were made in the conclusion part of this research.

2. CONCEPTUAL MODEL OF LAND MANAGEMENT

Many terms seem to have quite similar meanings related to land. The fact that these terms evoke each other at least in terms of their linguistic aspect might cause confusion, and this sometimes complicates how and in what sense they are used. In Türkiye, Land Administration, Land Management, and Land Governance are the most confusing terms related to land. The fact that the meanings of the Turkish words corresponding to "management" and "administration" are close might cause this confusion. Similarly, it is observed that the words "land" and "soil" are sometimes used interchangeably.

The term "land" can be used together with the words governance, policy, paradigm, management, administration, development, ownership, value, use, spatial planning, geospatial data, spatial data infrastructure, and information system to form noun phrases. Also, these terms might be used together with other words such as sustainable, public, municipal, urban, urban periphery, rural, and agricultural. Therefore, the conceptual model of Land Management becomes even more confusing.

The word land refers to a physical object defined by its location, boundaries, and coordinates on the earth, but it is also considered as a whole with its rights, responsibilities, and restrictions on it. The land has a cognitive aspect as well as physical and legal aspects.

Cadastre, which is a concept at the heart of modern land administration, is used as the main instrument for managing parcels, thus, it essentially includes the land registry. The power of cadastres to improve land management and contribute to good governance is even greater in modern land administration (Willimson et al. 2010, Enemark 2005, 2006, 2010). Generally, cadastre includes the geometric description of the parcel associated with other descriptive records of the parcel such as the owner, value, its development, etc. (FIG, 1995). Article 1 of the Turkish Cadastre Law gives one of the best definitions of cadastre. According to this law, the term cadastre is defined as "According to country coordinate system, based on the cadastral or topographic cadastral map of the country, to set the land register stipulated by the Turkish Civil Law no. 4721 by defining their legal status by determining the boundaries of the properties on the land and map and to build the infrastructure of the spatial informatıon system."

The land registry is created as a result of the initial cadastre, and it shows the geometric and legal status of the properties. In the countries where legal cadastre is applied, these registries are kept under the responsibility of the state to show the properties and the rights on the properties according to the principles of registration and clarity.

The land hierarchy defined by Willimson et al. (2010) describes an inverse pyramid with the land policy at the top and a land parcel at the bottom. Actually, the Land Management System is designed according to a Land Management Paradigm. A hierarchy is used to indicate the concepts in the paradigm and how a spatially efficient land management vision can be formed based on the cadastral parcel. Land policy is the legal regulatory framework for the management of the land, the main asset of people, and it defines the objectives and determines the values. The land management paradigm brings a holistic approach to the Land Management System and forces the land management processes to contribute to sustainable development. The paradigm ensures that the land management system facilitates land administration. Land administration activities include all activities related to the management of land and natural resources required to ensure sustainable development, while land ownership, value, use, and development include basic functions of land management. Also, the infrastructure for the implementation of land policies and land management strategies is provided by the land management system. Moreover,

it supports the efficient operation of land markets and the effective performance of land use management. Cadastre is at the center of the land management system. Spatial data infrastructure provides access and interoperability to cadastre and other land-related information. Cadastre ensures the spatial integrity and a single significant description of each parcel of land through a cadastre map, which is usually updated by a cadastral survey. Specifying the parcel ensures securing the rights to the land and controlling the land use. It also establishes a link between people's land-use patterns and their understanding of the land. The cadastral parcel is the basis of this hierarchy because the cadastral parcel reflects the way people use land in their daily lives. Cadastre is the key goal in defining the rights on land and managing restrictions and responsibilities in land use. The parcel establishes the relationship between people and the land administration system.

One of the rights defined on the land is the ownership right. The owner of a property might be a real entity, private entities, or the state. As a result of the acquisition of a property, the owner physically acquires the property right (rights, responsibilities, and restrictions) in the legal sense and the land itself in the practical sense. The land in the property subject to trade is used in any way, this refers to land use. Traditional, permissible, illegal, etc. ways of land use are possible. The change in economy and technology triggers change in society. As a result of this change, land use also changes (Mattsson et al., 2021). The ever-changing and evolving needs of societies may create the need for changing land use. Such changes are referred to as land development. Operations such as land use planning (land readjustment, land consolidation, expropriation, etc.) or spatial planning are required for land development.

The concept of "land governance" is defined as the policies, processes, and organizations which are used to manage natural resources, land, and property. A legal regulatory framework and operational processes are required for "sound land governance" to implement policies consistently and sustainably within a jurisdiction or a country (UN-GGIM 2015, Enemark et al., 2015). Today, “land governance” has become the essential principle by which land administration and land management are usually addressed. In 2012, this land administration approach was highlighted when the Voluntary Guidelines on Responsible Governance of Tenure, Land, Fisheries, and Forests in the Context of Food Security (VGGT) was accepted by the Member States (UN-GGIM 2015). FIG (2009) states that "land governance relates to policies, processes, and institutions in which land, property, and natural resources are managed. This includes decisions regarding access to land, rights on land, land use, and land development. Land governance is basically about setting and implementing sustainable land policies and establishing a strong relationship between people and land." FIG also notes that sound land management is essential and the contribution of land professionals is vital for ensuring sustainable development. "All countries have to deal with the management of land. They have to deal with land tenure, land value, land use, and land development management in some way or another. A country may have an advanced capacity, and it may combine all its activities in a single conceptual framework supported by sophisticated ICT models. Most probably, the capacity will consist of fragmented and essentially analog approaches."

In land management, land information is applied to land resources. It consists of several processes that include various professions and disciplines. In good practice, land management refers to the process of putting the physical resources of the land to good effect for facilitating social, economic, and environmental sustainability, which means underpinning and implementing sound Land Policies (UNGGIM 2015, Enemark 2006).

Land administration is defined by UNECE as the "processes of determining, recording, and disseminating information about the tenure, value, and use of land when implementing land management policies". The United Nations suggests that good governance in land management should include the existing formal system for the registration of land and property rights. This system should secure land ownership, investments, and other private and public interests in the property (UN, 2005). The land administration system, which is essential for the spatial enablement of society, includes land registration, cadastral surveying and mapping, fiscal, legal, and multi-purpose cadastres, and land information systems (UNECE, 1996). FAO defines land management as the way of implementing the rules of land use

rights and making them functional. Land Administration involves a wide range of systems and processes for managing the rights on land, land use regulation, land valuation, and taxation (FAO, 2012).

A policy can be regarded as a principle for providing guidance to decision-makers and achieving effective results. As a declaration of intent, a policy is implemented in procedures. Thus, the term policy may apply to public or private sector organizations, groups, and real persons. Therefore, public policy may be regarded as an administrative guideline for the actions taken by the executive bodies of the government. The land policy may address all guiding principles, which are important for rational results, to be followed in land use. It can be applied to prevent changes or to encourage changes in land use. The land policy requires various approaches according to the situation for developing measures and activities to be implemented by land administrators. The guiding principles may be general as well as specific. While public authorities may use mandatory tools for enforcement, private administrators have to act in accordance with the legal framework of land rights and regulations (Mattson et al., 2021, SDC 2012). The land policy deals with allocating resources, particularly rights for using the land to achieve maximum efficiency considering the natural environment and the welfare of the community in the future. In most countries, several ministries deal with different aspects of land policy. In good practice, (i) land administration operates within an overall framework of national land policies which should be clear and consistent, and (ii) the implementation of the land policy requires a multidisciplinary approach and an effective legal framework where land administration can operate, and (iii) the coordination among all organizations involved in land policy is critical for success (UNGGIM, 2015). Accordingly, the land policy for guidance the use of land in a broad sense.

In land valuation, the terms of appraisal and valuation might sometimes be confused. The term "appraisal" refers to an estimate or idea of the current market value of a property. On the other hand, the term "valuation" refers to a legally valid written report drawn up by valuers holding a valuation license on the property. Land valuation systems ensure control over the land management systems.

Within the framework of the above descriptions, the terms related to land management in this study can be summarized as follows:

The Land Policy is a legal document for land acquisition, use, and development.

The land management paradigm offers a conceptual framework for understanding land administration and innovation in land administration systems.

Land Use Management refers to the management of the use of a certain urban or rural land in accordance with the legal framework.

Land use planning refers to the process of deciding what/where/how the future land use will be.

In Türkiye, Land Administration is carried out by the General Directorate of Land Registry and Cadastre (TKGM). The tasks of establishing the cadastre and keeping it up-to-date, performing registry transactions under the guarantee of the state, and creating the spatial data infrastructure are among the duties assigned to it by the Constitution, Civil Code, and special laws. In addition to other tasks, it also has the following duties: carrying out inter-governmental co-ordination; meeting the needs of all public and private sector users; establishing and following up technical standards on geospatial information; coordinating activities to reduce duplication and increase efficiency; collecting data by various methods including field survey; processing data, exchanging data, and data dissemination; improving the efficiency of all land administration processes.

Land Development refers to the set of methods for changing land use, including land rights.

Spatial Planning refers to the process of determining future land use by considering specific projections.

Land valuation refers to the independent and objective appraisal of the potential value of a property, property project, or rights and benefits on a property for a particular date (TUDB, 2022).

3. GLOBAL DEVELOPMENT OF LAND MANAGEMENT AND CALLS FOR ACTION

International organizations announced the following important calls for action to raise awareness about land management and to guide practices due to the importance of the issue in the 1990s (UNGGIM, 2015):

- 1996, the Bogor Declaration of the United Nations Interregional Meeting of Experts on the Cadastre: developing modern cadastral infrastructures for improving the efficiency of the land and property markets; protecting all people's land rights; supporting the long-term sustainable development and land management; providing the spatial cadastral framework (usually a cadastral map) as the base map of the national spatial data infrastructure.
- 1997, the 8th Regional Cartographic Conference for Asia-Pacific: creating an advisory panel on cadastral surveying and mapping.
- 1999, Bathurst Declaration of the International Federation of Surveyors on Land Administration for Sustainable Development.
- 2011, Governing Council of the United Nations Human Settlement Program: Resolution on achieving sustainable urbanization by providing equitable access to land, housing, basic services, and infrastructure.
- 2012, United Nations Committee on World Food Security: The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests.
- 2014, Third High-Level Forum on United Nations Global Geospatial Information Management: The Beijing Declaration on Sustainable Development with Geospatial Information.
- 2015, UNGGIM: The Application of Geospatial Information – Land Administration and Management,
- 2015, The World Cadastre Summit: The Istanbul Declaration on Cadastre.
- 2016, The Addis Ababa Declaration on Geospatial Information Management Towards Good Land Governance for the 2030 Agenda.
- 2016, Transforming our world: The 2030 Agenda for Sustainable Development.

Important publications were made by institutions and individuals specialized in this field to accelerate the process through knowledge transfer, capacity building, and creating awareness. The major publications on this topic are as follows:

- 1995, The FIG Statement on the Cadastre, FIG Publication No. 11
- 1996, UNECE (United Nations Economic Commission for Europe) Land Administration Guidelines,
- 1996, Bogor-Declaration, FIG Publication No: 13 and 13A,
- 1998, Cadastre 2014, A Vision for a Future Cadastral System, Jürg Kaufmann and Daniel Steudler with the Working Group 1 of FIG Commission 7
- 2005, UNECE (United Nations Economic Commission for Europe). Land Administration in the UNECE Region, Development Trends and Main Principles,
- 2007, Williamson I., "Global Challenges for Land Administration and sustainable Development", Lincoln Institute of Land Policy,
- 2010, Williamson I., Enemark S., Wallace J. and Rajabifard A. Land Administration for Sustainable Development. Redlands: ESRI Press,
- 2010, Land Governance in Support of the Millennium Development Goals - a new agenda for land professionals. FIG/WB, FIG Publication No. 45,
- 2010, Policy Framework for Sustainable Real Estate Markets, Principles and Guidance for the Development of a Country's Real Estate Sector; United Nations Economic Commission for Europe Working Party on Land Administration Real Estate Market Advisory Group,
- 2014, Fit-For-Purpose Land Administration joint FIG/World Bank publication No: 60,
- 2020 (draft), UN GGIM Integrated Geospatial Information Framework (IGIF), Basılmış olabilir mi?
- 2020 (draft), UN GGIM Framework for Effective Land Administration (FELA).

In line with these developments, international organizations have taken on the task of developing, documenting, and supporting conceptual and implementation models of different features of land management, land administration, and land governance. These international organizations and the tasks they assumed are as follows:

- World Bank including Annual Land and Poverty Conference,
- UN-Habitat including GLTN,
- UN Food and Agriculture Organization (FAO),
- United Nations Statistics Division including UN-GGIM (global and regional),
- UN Economic Commission for Europe (UNECE) - Committee on Housing and Land Management - Working Party on Land Administration
- UN Economic Commission for Asia and the Pacific (UNESCAP) - Sustainable Urban Development, Environment & Development Division
- UN Economic Commission for Africa (UNECA) and the Africa Land Policy Initiative

Also, non-governmental organizations have supported the issues of land management, land administration, land use, and planning within the framework of their expertise. These organizations have made significant contributions to the production of strategic knowledge and knowledge transfer through their studies. Some of the non-governmental organizations well known by the professionals are as follows:

- International Federation of Surveyors (FIG),
- International Land Coalition
- Slum Dwellers International
- Lincoln Institute of Land Policy
- Bill and Melinda Gates Foundation
- Huairou Commission
- Oxfam International
- Omidyar Network

4. LAND MANAGEMENT EDUCATION

As a professional discipline, land management started with the history of humanity. Land management education in the world dates back several centuries. For example, the Moscow State University of Land Use Planning was founded in 1779. During the period between 1835 and 1917, the Institute trained more than 2,000 specialists, including almost 1,500 survey engineers. In 1992, it evolved into a University of Land Management which provides education for specialists in land law, land management, soil science, geobotany, geodesy, architecture, and rural planning. The university has been carrying out educational activities with its several faculties including the Faculty of Urban Cadastre, Faculty of Land Management, and Faculty of Real Estate Cadastre.

There are many departments and higher education programs on land management with an emphasis on technical issues are as follows: Sustainable Agricultural Land Management University of Florida; MSc in Conservation and Land Management, Bangor University; Sustainable Land Management, University Centre Myerscough; MSc in Rural Estate and Land Management Harper Adams University; MSc in Spatial Planning - Specialisation in Planning, Land and Real Estate Development, Radboud University; Cadastre and Land Management, Aalborg University, MSc in the Land Use Policy University of Nevada Reno; Master of Property Development, University of Technology Sydney; MSc in Land Management and Geospatial Science, Technical University of Munich; MSc in Sustainable Land Management, Ghent University.

With 70 years of experience, the Faculty of Geo-Information Science and Earth Observation (ITC) is recognized worldwide for its achievements in the application-oriented approach in teaching, research, and capacity building in land management and geospatial technologies based on international cooperation and with more than 20,000 graduates.

Technical courses such as cadastre, geodesy, development plan implementation, land valuation, spatial data infrastructure, etc. are given in 23 universities that provide surveying engineering education.

Ankara University Faculty of Applied Sciences offers the only undergraduate program on Real Estate Development and Management in Türkiye. However, 13 universities in Türkiye offer graduate programs in Land Management and Policy, Land Management, Urban Transformation, and Property Valuation, Property Valuation and Development, Property Valuation and Management, Property Financing and Valuation, Land Management, Property Valuation and Development, Property Development.

Almost all of the above-mentioned graduate programs have compulsory and elective courses. In general, geodesy-based graduate programs have technical and natural sciences; cadastre, land use, and land management graduate programs focus on legal and economic sciences as well as technical sciences.

5. GLOBAL AGENDA

The following publications have created awareness of land management and highlighted the importance of the issue: "A Vision for a Future Cadastral System" published by FIG in 1998; the report on "Land Administration in the UNECE Region, Development Trends and Main Principles" published by UNECE in 2005; Williamson et al.'s book titled "Land Administration for Sustainable Development" published in 2010; Joint FIG/World Bank's document titled "Fit-For-Purpose Land Administration" published in 2014. These studies have become significant publications that establish the global agenda of land management.

In the last decade, the global agenda of land administration is determined by the following issues: global triggers such as global development, climate change, urbanization, digital transformation, globalization, economic reforms, extreme poverty, living conditions; new generation (privacy, high technology, social media), new roles of institutional structures; the expectations of other institutions such as justice/planning/agriculture from land management; social demands such as open data, shorter response times, increased efficiency, security of tenure; external actors such as UN, WB, academics, etc.; technological challenges such as Industry 4.0, mobile applications, space-based technologies, 3D/4D, smart cities, multi-source data, new sensors, and remote sensing (Bennett et al. 2011, Ercan, 2019, Joint Article by the FIG Commission Chairs 2021).

The 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development were adopted by world leaders in September 2015 (Figure 1). These SDGs officially came into force on 1 January 2016 after a historic UN Summit. These SDGs will apply across the world from 2016 through 2030. They will mobilize efforts to tackle climate change, fight inequalities, and end all forms of poverty while ensuring not to leave anyone behind. These 17 goals and 169 targets reveal the scale and ambition of the agenda (FELA, 2020). The goals, which are action-oriented and global in nature, are applicable universally. The targets are defined as aspirational global targets. Each government set its own national targets in line with the global level of ambition. However, member states took into account their national circumstances. Integrating social, economic, and environmental aspects, the goals and targets consider their interlinkages for achieving sustainable development in all aspects. More than 70% of the targets are related to geospatial technologies and land administration. It is not possible to achieve these SDGs unless issues related to land ownership, use, value, and development are resolved in the common ground of a spatial data infrastructure.

Figure 1: Sustainable Development Goals

In August 2018, the United Nations IGIF Committee of Experts assigned its FELA Expert Group to prepare a document for securing and documenting, recording, and recognizing land and property rights for all.

This FELA document acts as an overarching policy guideline, and it can be used as a reference by the Member States for developing, reforming, renewing, modernizing, strengthening, or monitoring land administration.

An effective land administration system should meet the demands of all people, and must achieve the following targets:

i. Developing confidence and trust, promoting safety, security, peace, and peacebuilding,
ii. Allowing economic development by supporting equitable and transparent land value capture revenue systems,
iii. Accelerating the proportion of the population with tenure security,
iv. Strengthening multidisciplinary and multisectoral participation to achieve integrated geospatial information,
v. Ensuring participatory and inclusive land use, and land use planning,
vi. Contributing to smart and resilient rural and urban societies by ensuring equitable spatial/land-use planning, and land development,
vii. Promoting the recognition of the inherent rights of indigenous and vulnerable peoples to their lands, territories, and resources, and recognizing collective customs, traditions, and customary tenures in line with existing obligations in accordance with national and international law,
viii. Encouraging efficient, sustainable, and fair land markets, where appropriate, that take into account land tenure, value, use, and land development aspects,
ix. Enabling partnerships, bringing together and building knowledge, skills, and experiences on the ownership, value, use, and development of the land,
x. Catering to all circumstances, cases, and individuals during peace and prosperity, in stressful and challenging times (including conflicts and disasters, human displacement and forced migration, food and water scarcity, and poverty), and
xi. Promoting readiness and resilience on climate change issues, and supporting conservation, biodiversity, and sustainability of the ecosystem.

According to the (FELA), land administration answers the questions of 'who', 'what', 'when', 'where', and 'how' about ownership, use, value, and development of the land. Land administration can be defined as the process of determining, recording, disseminating, and updating information about the relationship between land and people. Therefore, land administration is assumed responsible for constantly aligning processes and resources with the dynamic demands of society. The word 'land' should be considered as

a general term representing also the water bodies (lakes, rivers, seas, oceans, etc.) and spaces below and above the ground, i.e., subsurface spaces and air space.

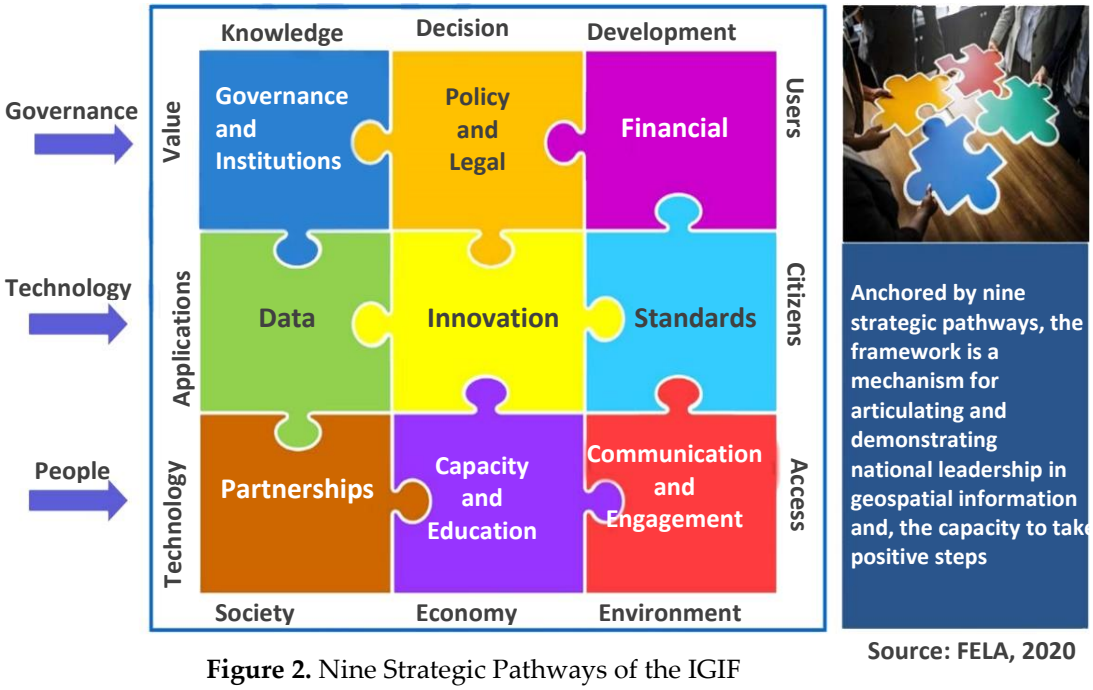

Figure 2. Nine Strategic Pathways of the IGIF

With nine strategic pathways, the joint point approach of FELA and IGIF, the issues of land administration and geospatial data were emphasized based on governance, technology, and people in the context of society, economy, environment, knowledge, decision, development, technology, applications, value, users, citizens, and access (Figure 2). Moreover, the issues of data, innovation, standards, institutions, and partnerships were also highlighted among others.

The global agenda underlines the importance of geospatial data, which is described as the "digital currency", in the evidence-based decision-making process of nations, as well as Land Administration. In Part 3 of the IGIF, Country-Level Action Plans regarding geospatial data were modeled in line with the how, when, and who concept.

6. LAND ADMINISTRATION AND LAND MANAGEMENT ORGANIZATIONS IN TÜRKİYE AND THE REQUIREMENT FOR INTEGRATED GEOSPATIAL DATA

6.1. Land Administration in Türkiye

In Türkiye, the General Directorate of Land Registry and Cadastre (TKGM) is responsible for the land administration. The first Land Registry Organization was established in 1847, and it continued to provide service under various titles until 1923 when the Republic of Türkiye was founded. The General Directorate of Land Registry was founded in 1924. Then, the cadastral unit was added to the organization in 1925. Since then, the TKGM has been carrying out the land registry and cadastral activities in Türkiye. TKGM has been operating as a public organization affiliated with the Ministry of Environment, Urbanization, and Climate Change since 2011. The main roles and responsibilities of TKGM are as follows: (i) ensuring the reliable registration of the land registry, which is the responsibility of the state; (ii) making all kinds of contractual and non-contractual transactions related to land and immovable property; (iii) conducting the cadastral survey in Türkiye, monitoring the changes, providing the renewal and updating of the cadastral maps, and thus, (iv) building the national spatial information system infrastructure (Ercan, 2021).

The organization of TKGM has a General Directorate and Regional Directorates (24), Provincial Cadastre Directorates (81 Directorates + Licensed Cadastre Bureaus), and Land Registry Directorates (973

Directorates). Land registry procedures are carried out by the land registry offices. With an amendment of the law in 2022, public notaries were also authorized to prepare the contracts.

In the last quarter-century, TKGM has automated land registry activities using the Land Registry and Cadastre Information System (TAKBIS), built Continuously Operating Reference Stations (CORS-TR), completed the rural area cadastre throughout the country, renewed the rural cadastre for about 15 million parcels, started 3D map production projects, and cooperated with the General Directorate of Forestry for establishing forest cadastre and supported the establishment of the forest cadastre. The cadastral data were digitized and presented to the use of citizens and companies through the Spatial Property System (MEGSIS) using the parcel query mobile application for informative purposes without taking legal responsibility. TKGM has become a data provider in terms of providing registry and cadastral data.

As part of the changing and developing conditions, it has transformed the Research Planning Coordination Department into the Information Technologies Department, and it strengthened its organizational structure by establishing the Land Valuation Department in 2019.

6.2. Demand for Geospatial Data

In Türkiye, similar to other countries, the military mapping service is provided by the General Command of Mapping (GCM) while large-scale maps were produced by TKGM and Iller Bank (IB) depending on their purpose. The production of the small-scale map series was carried out under the responsibility of the General Command of Mapping. 5K standard topographic maps were produced by TKGM and GCM using photogrammetric methods under the coordination of the Interministerial Coordination and Planning Board for Mapping. IB tendered 1K maps to the private sector in line with the demands of municipalities. Later on, GCM worked with the private sector on the small-scale map renewal projects while TKGM worked with the private sector in establishing cadastre and renovation projects.

The main duty of GCM, which is a military organization affiliated with the Ministry of National Defense, is to prepare all maps and plans required for the defense of the country. In accordance with the amendment of the law made in 2018, GCM was re-organized under the name of General Directorate of Mapping (GDM) as a military General Directorate. With the transformation of IB, which has an important role in the production of large-scale maps required by municipalities for spatial planning and engineering infrastructure projects, and provides the financing of the projects, into a joint-stock company, its large-scale map production activities have been reduced to a minimum.

In addition to these ones, several organizations, including municipalities, the General Directorate of Agricultural Reform, General Directorate of Highways, and General Directorate of State Hydraulic Works produce geospatial data. Large-scale map production is carried out in accordance with the Regulation on the Production of Large-Scale Maps and Map Information.

In 2011, the General Directorate of Geographic Information Systems was established to carry out works and procedures regarding the establishment, use, and development of the national geographic information system, to tender these works, to establish the standards of urban information systems related to the planning, mapping, infrastructure, and superstructure activities of local governments and to encourage their widespread use, and to operate the National Geographic Information Portal.

As can be seen, no organization produces geospatial data as part of engineering and planning purposes. Each organization produces geospatial data for its own purposes.

7. DISCUSSION AND RESULTS

In the conceptual approach to land management, there is confusion in many countries, particularly in Türkiye. The fact that the Turkish words for the term's "governance", "management", and "administration" have similar meanings was found to be the reason for this confusion. Therefore, the conceptual model of land management was examined as a separate section in the present study to ensure conceptual clarification.

The history of higher education on land management in the world dates back to 300 years ago. As of today, 13 universities in Turkey have been offering graduate programs on land management under different titles. There seems no significant bottleneck in terms of land management education in the country.

The UN document titled "Transforming our world: The 2030 Agenda for Sustainable Development" was published in 2016. The 2030 Agenda Sustainable Development Goals are a global action plan. Land administration and geospatial data mostly take part at the core of sustainable development goals. Preparations for effective land management and integrated geospatial information are carried out by the United Nations due to their importance. Both issues will be frequently included in the world professional public opinion and countries' national policies as of 2023. Non-governmental organizations such as FIG will mature the details of these issues by holding forums on them to inform the national members in terms of implementation in accordance with the national conditions and to ensure knowledge transfer.

Land administration, which is the basic component of the land management paradigm, is not an organization that only answers questions such as what, where, owner, and surface area based on ownership of the parcel. Beyond that, it evolves into a structure that includes the ownership, use, value, and development of the land through the spatial data infrastructure. It is obvious that all land administrations will experience this evolution in one way or another with the new tasks they will undertake. TKGM, which has already started these processes, needs to be restructured for establishing an effective land administration system that models human-land relations.

Digital geospatial information now provides us with much more than a simple map. Geospatial data integrated with the location constitutes the basis of public services as well as services for citizens. Geospatial data, which constitutes the digital version of our world, is also an integral part of the digital society and the digital economy. Geospatial data describes the relationship between humans and places.

Public institutions in Türkiye produce maps as the basis of their land-related projects as part of the powers granted to them by law. Particularly in the last three decades, map production projects are carried out by tendering them to the private sector.

Besides the traditional purposes of maps, digital maps offer us a wide range of use areas from social inclusion to health and education, from smart cities to industrial development. In other words, apart from the production of geospatial data that public services need, it should be re-discussed in a way that defines the relationship between people and place, provides all kinds of geospatial data that decision-makers need in the accurate decision-making process, ensures the development of e-economy and e-society, responds quickly to the resting and learning processes of the generation Z, and supports tourism and cultural activities.

Despite the breakthroughs in recent years, the institutions of Türkiye are rich in data however they are poor in information. Some of the data is kept in corporate silos. It is known that some of the datasets that can be presented in the digital environment have several problems in terms of their compatibility with the ground.

Similar to many countries in the world, Türkiye should also modernize land administration and geospatial information management, particularly in terms of their governance and institutions, legal and policy aspects, data (from data theme to the creation and delivery of data), standards (legal, semantic, data, technical interoperability), data models (LADM) and dissemination, business model, communication, and engagement.

Considering these issues,

1) TKGM should be organized to carry out land ownership, use, value, and development activities, TAKBIS should have a data model complying with an international standard such as LADM. TAKBIS should be redesigned within this framework and transformed into a land registry and cadastre information system rather than just a registry information system. Compliance of the land registry and cadastral data with the ground must be ensured. TKGM should be supported by a fully electronically managed infrastructure. TKGM, which produces and registers legally valid spatial data, should be at the very center of the digital transformation.

2) Besides the traditional productions of maps and geospatial data, citizen-society, and state-oriented significant data should also be produced by using disruptive technologies (Internet of Things, Cloud, Artificial Intelligence, Virtual Reality, Augmented Reality, Big Data, Blockchain, etc.).
3) The organizational clutter in map production should be eliminated. It is obvious that the General Directorate of Mapping is an essential organization for producing the spatial data needed for the development of the country, digitizing the data in the silos in accordance with the standards, structuring these data, and making them available for presentation. This problem can be modeled in two ways:
   a) A new General Directorate can be established.
   b) Existing organizations such as TKGM or the General Directorate of Geographical Information Systems might be turned into an organization responsible for producing geospatial data by granting the authority to produce geospatial data in addition to their current duties.

8. CONCLUSIONS

The world has been changing, and technology has been leading the digital revolution (transformation). The key to this revolution is how the life of an ordinary person changes with these technologies. Digitalization has already deeply affected the business world, and new spatial technologies have been becoming ordinary in our daily lives. The concepts of artificial intelligence (AI), the Internet of Things (IoT), and big data technologies have been reformatting industries, societies, and the way we live. The digital revolution refers to the implementation of the integration of spatial data, data analytics, and real-time operations. This revolution requires the collection and analysis of land management / geospatial data in a production environment with an opportunity to rapidly change the way the industry responds to society's demands.

Land administration and geospatial data are the leading issues of Digital Transformation. The significant conclusion of this study is that institutional reinforcements are needed in Land Administration and Geospatial Data in Türkiye. In this context, land administration, which is the core component of land management, should be strengthened as part of the new tasks to be undertaken, and it should be institutionalized by eliminating the organizational clutter on the production of geospatial data, which is the cornerstone of both land administration and digital transformation.

This article aims to create a platform for discussing the preliminary evaluations put forward in a broad perspective considering the national conditions and calls for further research on the subject.

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