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Assessing the Status and Challenges of Urban Land Administration Systems Using Framework for Effective Land Administration (FELA): A Case Study in Pakistan

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Abstract: The urban land administration system (LAS) of any country serves as a key pillar for good governance, resource planning, service delivery, infrastructure development, and revenue collection. To reform their LASs, countries need a thorough understanding of their existing context and global relevance. The goal of this paper is to examine the status and challenges of urban LASs in Pakistan using the United Nations Framework for Effective Land Administration (FELA). The exploratory case study method used in the paper employs a mixed approach, which includes FELA-based questionnaire surveys, group discussions, and desk reviews. A total of 525 urban LAS stakeholders, including owner-buyers, real estate agents, bankers, lawyers, and LAS organizations, participated in the activity. The results show that more than half of the stakeholders are not satisfied with existing urban LASs, their governance and accountability, laws, and policies. Corruption is prevalent mostly in government organizations. Fraud and joint ownership are the most common sources of dispute, with 67 percent of the respondents stating that the cases take more than two years to resolve in court. The financial aspect of urban LASs is suffering due to property undervaluation and low revenue collection. Manual data and record keeping in LASs further complicate the system, with 87 percent of all respondents interested in innovating the urban LAS using modern technologies. Furthermore, 92 percent of all respondents expressed the need to standardize the existing LASs. There is a lack of capacity and skills, and 89 percent of organizations' respondents believe that human resources skilled in Geographical Information Systems (GIS) and Remote Sensing (RS) can improve the efficiency of urban LASs. There is a lack of partnership among LAS organizations and a gap in the accessibility of LAS-related quality information. The country's vision of building smart cities can be realized through LAS standardization and 3D and GIS innovation.

Keywords: Board of Revenue Pakistan; UN FELA; deed registration; stakeholders' opinion; urban cadastre; allotment system; UN GGIM; urban land record; real estate; LRMIS



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1. Introduction

An urban land administration system (LAS) is vital to a country's good governance, resource planning, service delivery, infrastructure development, and revenue collection. Developed countries have already achieved a higher level of urbanization; hence, going forward, 95 percent of new urbanization will happen in Asia and Africa in the coming decades [1]. As part of the Sustainable Development Goals (SDGs), the United Nations aims to develop sustainable communities and cities, eradicate poverty, achieve gender equality, and promote economic development, among other objectives, until 2030. The

SDGs' milestones are closely linked to the modern administration and management of LASs. In developing countries, urban LASs face various technological and societal challenges that prevent them from achieving the development goals [2].

It is estimated that 75 percent of the European and American population lives in urban areas, and in South Asia, it is around 35 percent [3]. According to the national population census of 2017, Pakistan's urban population ratio was around 36 percent, and half of the country's population is expected to be living in urban areas by 2030 [1,4,5]. During 1951–2017, Pakistan's urban population increased from 6 million to 76 million, and its urban ratio increased from 18 to 36 percent [4,6,7]. The Pakistan Economic Survey 2022–2023 reported that the urban population has even increased to 84.69 million [8,9]. The urban population, the number of cities, and their size have increased manifold in Pakistan [9]. Moreover, the pace of urbanization in the country is the fastest compared to other neighboring South Asian countries [3,5]. As Pakistan's urbanization trend is escalating, it is imperative to evaluate existing LASs and underlying policies to strategically respond to the massive urbanization anticipated in the near future.

The Framework for Effective Land Administration (FELA) is a comprehensive set of policy guidelines on LASs developed by an expert group on land administration and management from the United Nations Committee on global geospatial information management [10]. FELA is specifically designed to secure people-to-land relations and is a specialized version of the Integrated Geospatial Information Framework [11] aimed at achieving the SDGs related to LASs. Its primary objective is to enable UN member countries to upgrade and monitor their LAS to make it efficient and effective by adopting the best practices and procedures outlined in its nine strategic pathways [12,13]. The FELA is designed to provide a roadmap for LAS policymakers and practitioners to strengthen secure and reliable relationships between people and land, thereby contributing to sustainable development efforts. The FELA is valid for all UN member countries, whether they are developing new LASs or improving, monitoring, appraising, or modernizing existing ones. The framework describes best practices of LAS domains that are valid and applicable across the globe. The FELA pathways encompass the whole LAS life cycle including the following: (1) governance, institutes, and accountability; (2) policy and legal; (3) financial; (4) data; (5) innovation; (6) standards; (7) partnerships; (8) capacity and education; and (9) advocacy and awareness. The framework can be used as a reference to better communicate LASs at global, national, and sub-national levels. The strategic pathways and guidelines presented in the FELA can serve as valuable references for renewing, assessing, and modernizing the current state of LASs.

Globally, cutting-edge and fit-for-purpose solutions are proposed by many academic/professional experts to achieve sustainable solutions for an overall LAS [14–16]. Developing countries are struggling with their LASs to meet the socio-technical challenges of rapid urbanization [17]. Bennett et al. [18] recommended conducting country-specific assessments utilizing the FELA to tackle the challenges of LASs, and one such study was conducted by Unger et al. [19] in Europe and Unger et al. [20] in Chad. Pakistan, along with other South Asian countries like Bangladesh and India, faces challenges in establishing a clear, comprehensive, secure, and effective LAS [21–23]. The context of land administration and cadastre in Pakistan has been studied by many with a focus on rural areas. There is a feasibility of upgrading manually prepared rural land records using geospatial technology and satellite imageries [24–32]. Most of the quality parameters of LASs in Pakistan, i.e., policy, tenure, legal, technical, etc., are either unclear, complex, or inadequate [33]. Little is done about the urban cadastre and LASs, and among one of the very few who researched the topic, Hamid et al. [34] created a 3D prototype of a building using commercially available software. The development of LASs and cadastre can play a crucial role in a country's prosperity and sustainable economic development [31]. A further in-depth and systematic analysis is required as a baseline to address the issues in the existing LASs, with an emphasis on urban administration. The current urban LAS in the country is unable to meet modern requirements due to its manual and outdated nature and procedures. The

study addresses the following research questions. What is the existing status of urban LASs in Pakistan as assessed under FELA guidelines? What are the stakeholders' perceptions about the existing urban LAS? What are challenges faced by the urban LAS in Pakistan, and what is the way forward?

The main objective of this study is to assess the status and challenges of urban LASs in Pakistan using the FELA. The secondary objectives include stakeholders' perception about the LASs and the way forward to meet any challenges. This study provides a baseline for future policy and planning of urban LASs and their assessment and implementation in UN member countries.

2. Background

In general, the LASs in Pakistan have issues such as being slow and having costly and complicated administration, management, and judicial processing [35–37]. Pakistan also has inefficient policies and corruption [38–40], an insecure land title system [41–43], tax evasion [44], joint ownership [45], gender inequality in urban LASs [46], poor public land management [47,48], an obsolete spatial reference system and paper maps [25,31], as well as land grabbing, fraud, and a lack of transparency [49,50]. Kardar [41] and CCP [51] appraised the problems associated with LASs in Pakistan in a policy brief. The British established a fiscal system during their colonial era to collect revenue on agriculture from landowners in the subcontinent. Since then, the revenue records have been a *de facto* title of ownership in the country. However, the revenue record is not recognized by courts as a legal title of property ownership unless a mandatory deed is registered. Javed et al. [52] provided valuable insight into the development of national urban LAS policy in Pakistan. They highlighted that the country still follows the colonial-era LAS, which has been in place for hundreds of years. The more than a century old rural LAS is still applicable in urban land administration and management in the country.

The urban LASs in Pakistan have poor land record management, unregulated urban development without master planning, and overlapping organizational hierarchy in provision of public services [53,54]. There is also a difference in the definition of urban and rural areas used in Pakistan and globally [5,55,56]. Due to this, the officially reported urban population in Pakistan is 36 percent, while it is believed to be more than 50% [52,55,57]. Pakistan is grappling with uncontrolled urban expansion [58], as an estimated two-thirds of housing societies in the twin cities of Islamabad and Rawalpindi have been designated as informal settlements [59,60].

3. Material and Methods

The study area is within the urban limits of the twin cities of Islamabad (federal capital territory) and Rawalpindi (garrison city) in Pakistan, with an urban area of 224 km² (out of the total 906.5 km²) and 421 km² (out of total 1640 km²), respectively. The twin cities are home to the fourth-largest urban population in Pakistan [61]. According to the 2021 land cover data [62], the total built-up area of urban Islamabad and Rawalpindi is 67 percent and 51 percent, respectively. Interestingly, the rural peripheries of Islamabad also exhibit a significant built-up area of 48 percent, much like its urban areas.

An exploratory case study method was used, utilizing a mixed approach that involved desk review, group discussions, and questionnaire surveys. We interviewed 525 stakeholders involved in LASs within the twin cities (Tables 1 and 2). The selected stakeholders cover most of the LAS actors in Pakistan, as recommended by Zahir [63]. The questionnaire surveys were designed based on the nine strategic pathways outlined in the FELA. The purpose was to assess the status and challenges of urban LASs in the country, aligning with the recommendations provided in the FELA pathways. The content of each questionnaire was carefully crafted to provide valuable insights to the existing urban LASs, following guidelines provided by UN-GGIM and Mataferia et al. [10,64].

Table 1. Details of LASs' stakeholders involved in questionnaire-based survey.

Sr. No	Stakeholders	City	
		Islamabad	Rawalpindi
1	Lawyers	54	53
2	Bankers	50	51
3	Owner-Buyers	62	57
4	Estate Agents	67	49
5	Organizations	49	33
	Total	282	243

Table 2. Details of respondent from organizations involved in questionnaire-based survey.

Sr. No	Organizations	Islamabad	Rawalpindi	Total
1	Board of Revenue	0	5	5
2	Cantonment Boards	0	2	2
3	Cooperative Housing Societies	14	0	14
4	Development Authorities	5	2	7
5	Private Housing Societies	16	22	38
6	Others	14	2	16
	Total	49	33	82

The LAS organizations categorized as "Others" consist of vertically developed multi-storey buildings being used as separate residential and/or commercial units in urban areas. Due to the number of irregularities in CHSs, the government banned the registration of new CHSs since 1997 in Punjab province, which includes Rawalpindi [65]. The administrative boundaries of urban areas in Islamabad do not include the jurisdiction of the Board of Revenue, and there is no Cantonment Board present in the city. The PHSs also include the housing authorities like the Defence Housing Authority and the Federal Government Employees Housing Authority.

Many of the respondents were reluctant to share their land- and property-related information and opted not to participate in the survey. This made data collection difficult and challenging. However, lawyers were very open about sharing information, whereas respondents from LAS organizations were cautious and reluctant.

4. Results

A comprehensive analysis of status and challenges of the urban LASs, assessed through the nine strategic FELA pathways, is presented in the following sub-sections. Table 3 provides the main findings derived from stakeholder responses, while the Appendices A and B contains detailed results of questionnaire surveys.

4.1. Governance, Institute, and Accountability

The organizations involved in urban LASs in Pakistan include the Board of Revenue (BoR), Development Authorities (DA), Municipal Corporations (MC), Cantonment Boards (CB), the Federal Board of Revenue (FBR), the Excise and Taxation Department (ET&D), Private Housing Societies (PHS), and Cooperative Housing Societies (CHS). The roles and responsibilities of the organizations are diversified, overlapping, and often manual in nature [66,67]. The DA carries out its functions through an allotment system, while the BoR operates through a deed registration system in the country. The PHSs and CHSs

also engage in an allotment system, despite lacking legal authorization. Each of them has their own hierarchy, administration, and management practices. The specific roles and responsibilities of these organizations are given in Figure 1.

Table 3. Selected responses of urban LASs stakeholders from nine FELA pathways, x = response not recorded.

FELA Pathway	Question	Response	Banker (n = 101)	Owner-Buyers (n = 119)	Estate Agent (n = 116)	Lawyer (n = 107)	Organization (n = 82)
1	Are you satisfied with the existing urban LASs?	Satisfied	37%	38%	44%	x	x
		Highly Satisfied	8%	3%	3%	x	x
		Not Satisfied	43%	44%	44%	x	x
		Highly Not Satisfied	13%	16%	9%	x	x
2	Are you satisfied with the laws and policies governing urban LASs?	Satisfied	38%	35%	50%	20%	54%
		Highly Satisfied	11%	3%	4%	5%	6%
		Not Satisfied	41%	50%	42%	58%	33%
		Highly Not Satisfied	11%	12%	3%	18%	7%
3	Is DC rate for urban property valuation reflecting the actual market price?	Don't Know	x	19%	7%	x	18%
		Yes	x	8%	28%	x	27%
		No	x	72%	65%	x	55%
4	How much time is required for the transfer of allotment (registry) of urban property?	15 Days	x	39%	75%	x	x
		30 Days	x	28%	7%	x	x
		45 Days	x	15%	13%	x	x
		60 Days or more	x	18%	5%	x	x
5	Do you agree that latest GIS and computerization innovations will help solving the problems of urban LASs?	Agree	47%	39%	47%	47%	40%
		Strongly Agree	44%	48%	42%	29%	55%
		Not Agree	5%	11%	9%	14%	4%
		Strongly Not Agree	5%	2%	1%	10%	1%
6	Do you agree that a national or international standard is required for synchronized and effective urban LASs?	Don't Know	1%	5%	3%	3%	0%
		No	6%	3%	3%	11%	4%
		Yes	93%	92%	93%	86%	96%
7	Do you agree that building more cooperation and partnership among stakeholders will help solving problems and increasing efficiency of urban LASs?	Agree	49%	39%	48%	39%	x
		Strongly Agree	45%	51%	47%	36%	x
		Not Agree	2%	7%	4%	12%	x
		Strongly Not Agree	5%	3%	0%	12%	x
8	Is the human resource of your relevant organization skilled to solve the problems related to urban LASs?	Don't know	15%	13%	4%	5%	x
		Yes	57%	52%	58%	26%	x
		No	28%	35%	38%	69%	x
9	Is the information related to laws and policies of your relevant organization available easily or online?	Don't Know	17%	9%	3%	5%	x
		Yes	46%	38%	55%	25%	x
		No	38%	53%	42%	70%	x

The BoR and DA are the key organizations responsible for urban land tenure in Rawalpindi and Islamabad, respectively. The DA in Rawalpindi plays a minimal role in land tenure management, limited to a few developed schemes [68]. The key role of DAs is to regulate the LAS functions in urban areas and, at the same time, act as competitors to develop housing schemes. PHSs are individually owned, while CHSs are jointly owned by their members. Municipalities are categorized as Metropolitan Corporations, Municipal Corporations, Municipal Committees, and Town Committees based on urban population size. Both Islamabad and Rawalpindi are Metropolitan Corporations. Although the MCs work alongside the DAs for LAS functions, they are not involved in land tenure management. The military-administered CBs in Rawalpindi operate most of the LAS functions independently; however, their land tenure operations are carried out by the BoR. Vulnerable segments of society face challenges with regard to property rights, which was witnessed in a judicial ruling that highlighted the deprivation of land rights due to the misuse of authority by state organizations [69]. State expropriation and payment of compensation to the right holders has widespread implications, resulting in protracting litigation [70]. The Land Acquisition Act 1894 [71] and the Islamabad Land Disposal Regulations 2005 [72] define the procedures for compulsory land acquisition; however, as noted by the apex court, the colonial laws are vague and need to be abolished [73], as was done in neighboring India in 2013 [74]. Slow accountability and deep-rooted corruption [75] contributes to delayed

resolutions within the LAS framework. Overall, urban LASs are characterized by manual processes, complexity, and a fragmented administration paradigm [66].

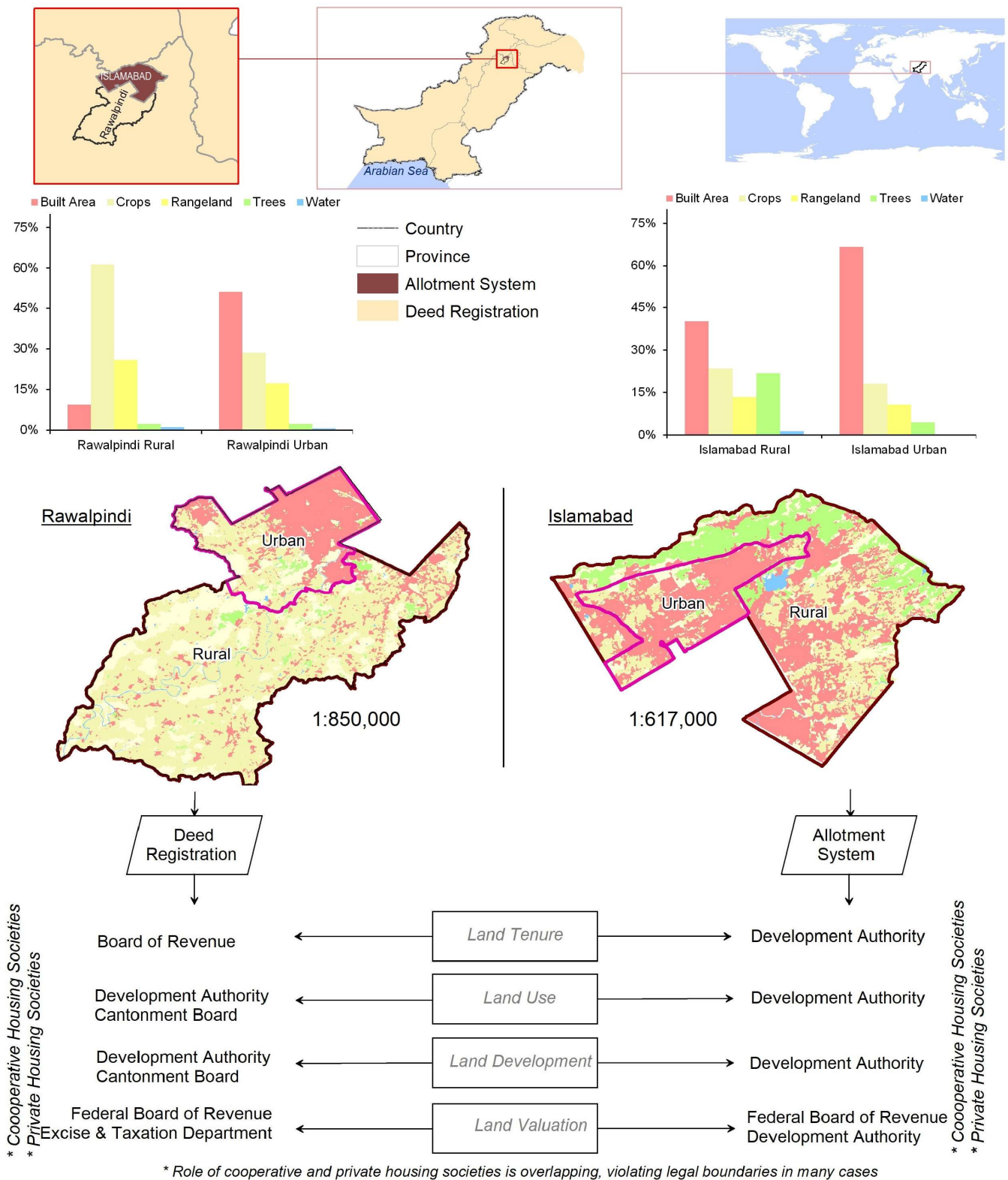


Figure 1. Overview of study area and description of urban LASs in Pakistan.

For urban LAS, 90 percent of all respondents preferred computerization, while lawyers and organizations preferred manual systems. A total of 62 percent of respondents from the surveyed organizations believed the computerization of their land and property records has already started, and 88 percent of the respondents were willing to adopt computerization to improve the efficiency of their urban LAS. More than 82 percent of all respondents wanted to see the land and property records online. Individually, owner-buyers (90 percent) and bankers (88 percent) were very keen to have property and land records online, whereas respondents from surveyed organizations (38 percent), estate agents (17 percent) and lawyers (15 percent) were not interested in making the record available online. More than half of the owner-buyers, estate agents, and bankers were dissatisfied with the availability and access to property records. The level of dissatisfaction among owner-buyers was higher as compared to estate agents.

Due to the manual administration and fragmented management of urban LASs, fraud, joint ownership, and encroachments were the three major reasons for land and property disputes in urban areas (Figure 2). Half of the owner-buyer and estate agent respondents faced corruption and lack of transparency in the system during their interaction with urban-LAS-related matters. In relation to organizational corruption, the survey respondents reported a concerning lack of transparency within government-controlled entities. Conversely, the private sector demonstrated higher levels of transparency and was regarded favorably by the respondents. Only around 21 percent and 25 percent of the respondents from owner-buyers and 28 percent and 14 percent estate agents believed that only urban LAS affairs in the BoR and DAs, respectively, were corruption free and transparent. Regarding overall satisfaction with existing urban LASs, owner-buyers (60 percent), bankers (55 percent), and estate agents (53 percent) were (highly) unsatisfied with existing urban LASs. The same respondents showed their (high) satisfaction with the private and cooperative housing sector's LAS.

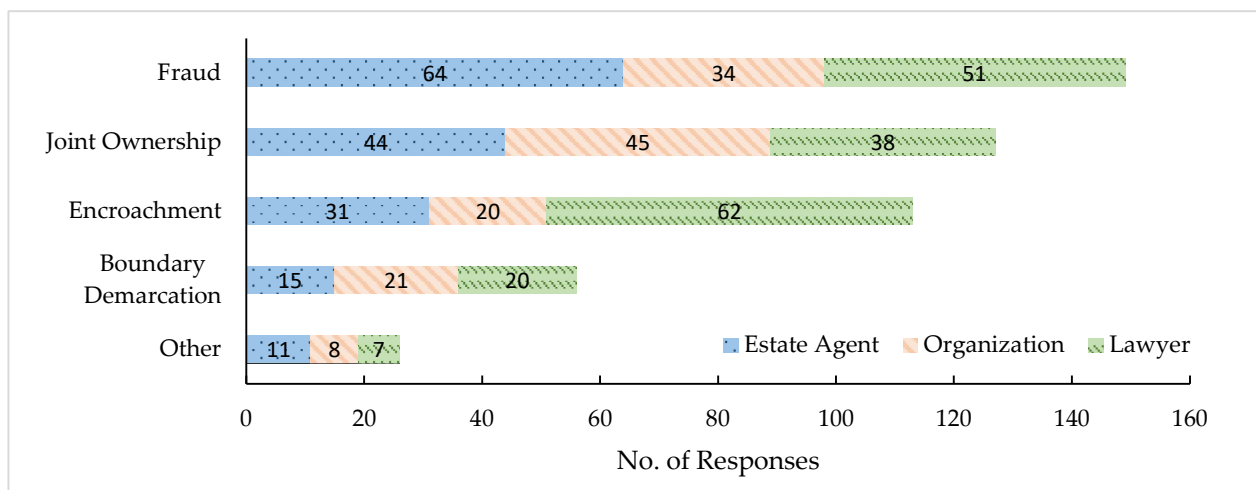


Figure 2. The major reasons for urban property disputes by stakeholders.

In Pakistan, it is a common practice for land to be offered for sale on an installment basis, typically spanning a period of four years, particularly at the commencement of new housing projects. Many respondents from organizations (74 percent) also confirmed the sale of land on installment. The phenomenon is known as file (system), and it is not recognized by the courts as a legal title document as it does not have designated property location on the ground. For investment reasons, the housing projects start selling files prior to receiving approval of relevant Das, as indicated by 45 percent of organizational respondents. In practical terms, the file system encounters various issues, as highlighted by Babar [76], one of which is the sale of a larger number of files than the actual number of properties available on the ground. Only 33 percent of lawyers and organizational respondents indicated that

there is legal protection for the file system, while 54 percent denied this fact. The lack of legal protection for the file system has emerged as a significant issue in land tenure and property rights.

Urban LAS data are disintegrated and inaccessible to the public for online record verification and authentication. Due to manual record keeping, more than 80 percent of respondents found it (very) difficult to verify seller records. Around 62 percent of owner-buyers faced delays and long queues during the property registration process. They faced difficulties in the process of ownership transfer, even though it took some of them 45–60 days or more to complete the process. The estate agents ranked the PHSs and CHSs very fast, whereas Das were slow for them. The owner-buyers rated the CHSs very swift and the Das very slow. The processing speed at BoR was ranked better than the Das by both owner-buyers and estate agents. Along with other LAS functions, land tenure in the twin cities is the additional responsibility of Das and BoR,

4.2. Policy and Legal

Recently, the Islamabad Real Estate Regulation and Development Act 2020 was adopted to protect the rights of land owners, developers, and estate agents, as well as establish dedicated appellate tribunals for the speedy resolution of land frauds and disputes [77]. A Real Estate Regulatory Authority (RERA) was to be established under the act to ensure transparency in property matters by regulating the existing problems of the real estate sector. However, even after more than three years since the inception of the Act, neither the authority nor appellate tribunal has been established to address the challenges of urban LASs. Pakistan has no dedicated urban national and provincial policy since its inception in 1947, whereas the urban population has increased many folds in the country, requiring serious policy measures [78]. However, it introduced some relevant measures like housing policy, national vision, and five-year development plans. Pakistan's national "Vision 2025" lays basic foundations and strategies for national prosperity, economic development, and good governance in the country. Among other items of the vision, the concepts of smart cities and vertical development are believed to be essential for sustainable urban development in the country. According to the 2025 vision, the country should computerize and maintain land records for urban development [79]. The country introduced the National Affordable Housing Policy (NAHP) for the first time in 2001 [80,81]. The NAHP milestones proposed include land record computerization, vertical urban development, fast tracking the process of ownership transfer, and establishing a property regulatory authority and property information centers to facilitate the stakeholders [82].

The Land Revenue Act 1887, initially introduced by British Rule, was adopted by Pakistan as the West Pakistan Land Revenue Act [83], serving as a key legislative framework for land administration through the BoR. The act focuses on land mutation, administration, and management in both urban and rural areas. The Transfer of Property Act 1882 [84] and The Registration Act 1908 [85] extend the operational responsibilities of the BoR in urban areas for the mandatory transfer and registration of rights of urban immovable property. However, ensuring transparent and unambiguous property records, as mandated by the Acts, remains a challenge. Islamabad, being a newly built capital city, has its own distinct legal framework for land administration, slightly different from the rest of the country [86]. The legal framework in urban areas of Rawalpindi follows conventional systems, but some newly developed private housing schemes in the city bypass these frameworks and mandatory deed registration, leading to concerns about land tenure security.

In addition, land disputes and land grabbing are common in Pakistan due to poor governance and management, manipulation of manual land records and misuse of authority [27,87–89]. The issue of land grabbing is also prevalent in European countries but is previewed from the perspective of Romania [90] and Hungary [91]. A recent government estimate suggests state land encroachment is worth USD 32.7 billion in Pakistan [92]. The judicial system faces challenges in handling a large number of land dispute cases [93], with a significant portion of civil court cases relating to property and land disputes [94]. Dispute

resolution for land and property matters in the country involves three streams: revenue courts administered by the BoR, civil courts under the judicial system, and the cooperative registrar for CHSs. Each stream has its own procedures and avenues for appeal, including higher courts at the provincial and national levels (see Figure 3). Overall, the complex legal frameworks, issues with property registration, and the high prevalence of land disputes pose significant challenges to land tenure security in Pakistan [37]. The four pillars of urban LASs, i.e., tenure, value, use, and development, require re-definition in the existing legal framework in the country. The DA of Islamabad is authorized to perform all the LAS functions, whereas in Rawalpindi LAS is joint and overlapping responsibility of its DA, BoR, and CBs. As required in the Registration Act, a centralized land tenure registration system is of vital importance as adopted in Turkey, Malaysia, Netherlands, etc. [95–99]. A well-functioning and centralized land tenure registration can serve as a valuable resource to empower and augment the other LAS functions (value, use, and development).

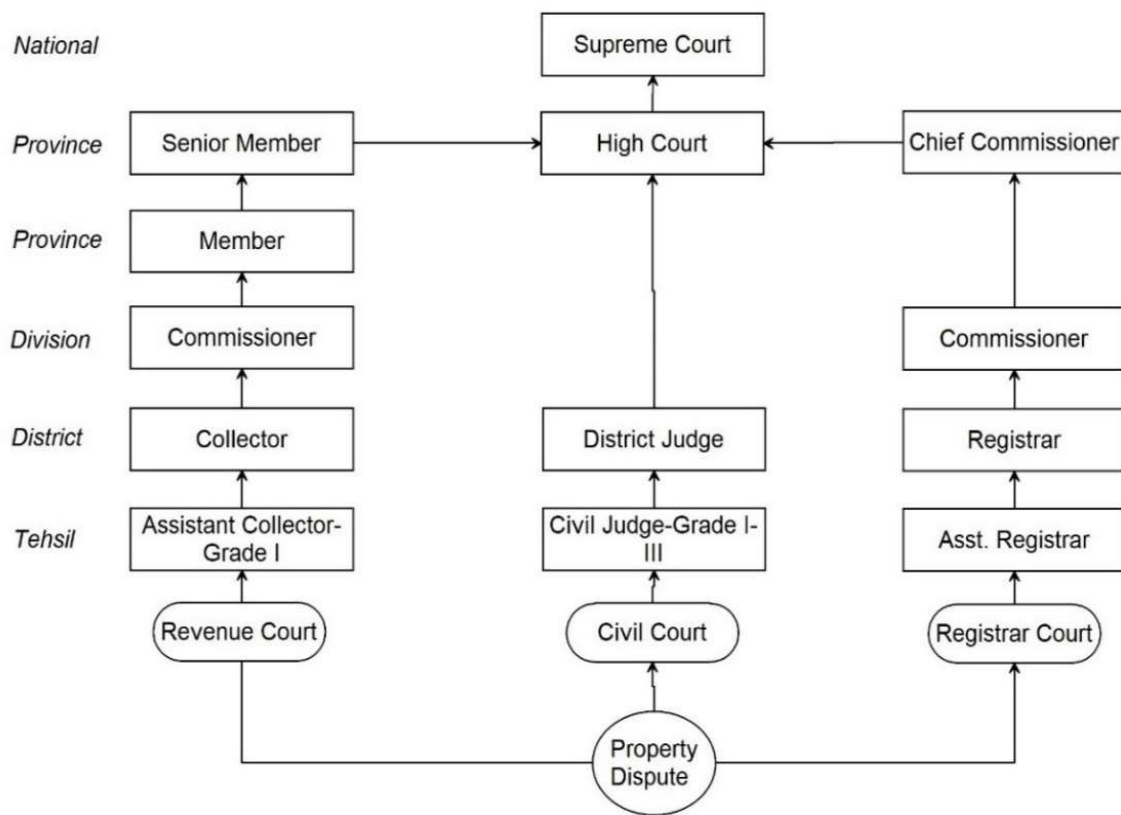


Figure 3. Urban land and property dispute resolution hierarchy in Pakistan.

Overall, more than half of the stakeholders were not satisfied or even highly not satisfied with the laws and policies related to urban LASs in the country. More alarmingly, the dissatisfaction of practicing lawyers was the highest (76 percent). The dissatisfaction level of organizations (40 percent) and estate agents (43 percent) was interestingly lower, as both are the beneficiary of the loopholes in the system. The owner-buyers (51 percent) were the second most dissatisfied stakeholders regarding laws and policies in the country. Most lawyers (73 percent) and respondents from organizations (59 percent) believed that it takes more than two years to resolve a land dispute case in court. There is no dedicated legal framework available to regulate the sale and purchase of land on installments (file system) by local government or development authorities. More than two-thirds of lawyers and estate agents were of the view that the sale-purchase of land files yields disputes and difficulties among owner-buyers, estate agents, and real estate developers.

4.3. Financial

The process of land and property valuation is believed to be unrealistic and manual in nature, leading to the underperformance of the financial aspect of LASs in the country. For example, Chennai city in India with 10 million population collects more property tax than the 100 million total population of the Punjab province in Pakistan [100]. Property tax collection faces hurdles due to inaccurate, outdated, and wrong assessment methods without digital mapping and geospatial integration. An evidence-based integrated geospatial survey and mapping study found urban tax collection irregularities worth PKR 23 million (PKR 285 = USD 1) in 48 percent properties only in one zone (total 25 zones) of Rawalpindi city [44]. The huge potential in Pakistan’s real estate and urban land market can be tapped if the LASs becomes transparent, viable strategies for tax collection are adopted and gradual reforms are introduced in the country [101,102]. E&TD in Rawalpindi and DA in Islamabad are responsible for annual property tax collection.

Due to the manual nature of property valuation in the country, there is a huge gap in property’s actual market value and price determined by the government authorities like the FBR and the Deputy Commissioner (DC) rate of the BoR [103–105]. A comparison of market value of the property determined from the online property portal Zameen¹, FBR², and DC rate³ in 2022 is given in Figure 4. Globally, there are continuous efforts in terms of legislation and technology adoption to make property-related valuation more realistic [106,107], and further proposals are still being put forth [108]. Similarly, Stamp Act 1899 [109] and Land Acquisition Act 1894 [71] in Pakistan require extensive revisions to establish a meaningful financial domain related to property matters.

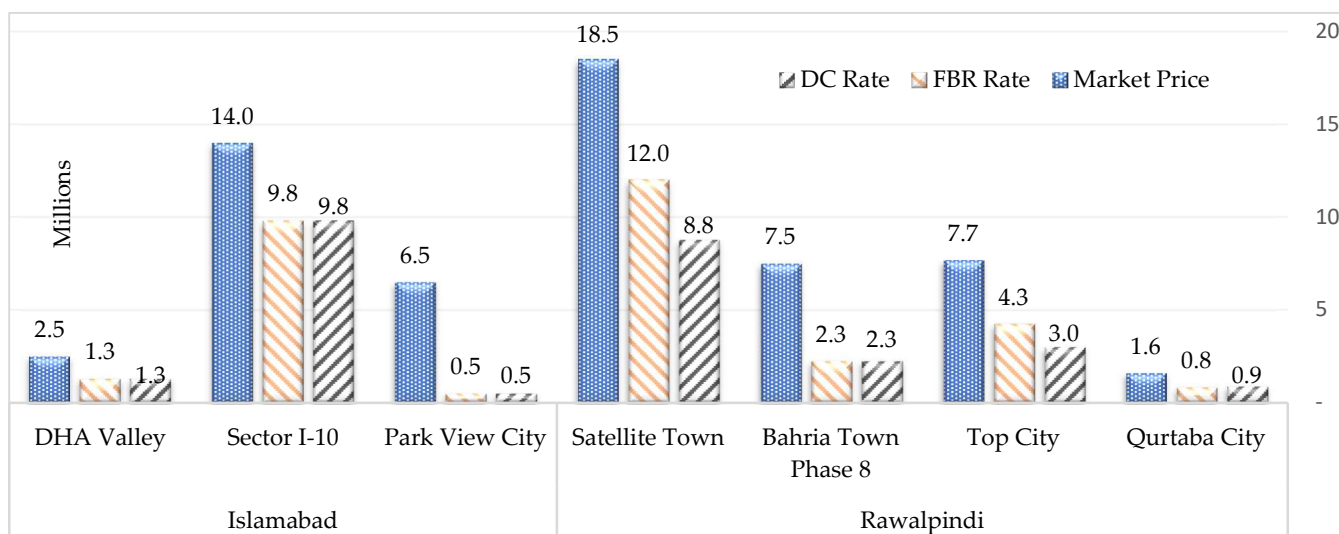


Figure 4. Comparison of property valuation (million PKR) by DC rate, FBR, and Market Price in selected areas of Islamabad and Rawalpindi.

Most of the stakeholders also believed that the actual market value does not match the minimum value decided by the government through the DC rate and FBR. There are usually two legal documents prepared during the sale or purchase of property, one of which is used to pay taxes to the government having minimum required valuation. The other legal document of the same property contains the actual market value of the property for the owner’s records.

Due to the complicated and manual nature of urban LASs, 82 percent of owner-buyers relied on the services of estate agents for the sale and purchase of urban property. Most of them paid 1–2 percent of the total property amount as service charges to the agent. However, there is no legal obligation to hire the services of agents for property-related matters.

4.4. Data

Although the Punjab BoR maintains LRMISs which have ownership-rights-related records (attribute only) available in digital format [25,35], the urban LAS data including map and attribute records are still maintained as hardcopies on paper, as shown in Figure 5. The manual and outdated nature of land records creates complications including inaccuracies and limited and slow information retrieval and analysis. Perspective buyers of urban property are advised to conduct due diligence before making any property purchases. The PHSs and CHSs maintain their urban land records independently, and there are hundreds of such organizations in the twin cities.



Figure 5. A glimpse of urban land record keeping at BoR, Sub-Registrar office in Rawalpindi.

The urban land tenure is managed by the BoR and DAs as an additional responsibility. It consists of deed registration and allotment letters (attribute) in Islamabad and Rawalpindi, respectively. Many estate agents (81 percent) found it very easy to locate the urban property accurately using the descriptions written on both documents. Very few owner-buyers were able to locate the property using maps, whereas the same respondents were able to easily locate the property using the written property description. It was also difficult for many lawyers (45 percent) to identify the urban property's location through written descriptions or maps. Less than one-third of respondents from organizations surveyed were using modern technologies like GIS, Global Navigation Satellite System (GNSS) for surveying, ICT, and 3D data for their urban LASs.

4.5. Innovation

There has been a lack of innovation and a few changes to the conventional urban LAS since it was introduced during the colonial era. Globally, LASs are witnessing innovative solutions and modern technological interventions [110–112]. The use of GNSS and measurements using Electronic Distance Measurement (EDM) units in LASs is rare in Pakistan. In urban areas, few organizations have adopted the latest technologies to modernize their LASs to ensure better customers service delivery. The LAS in Islamabad is an exception where an allotment system was introduced as an instrument of land titles instead of the conventional deed registration system; however, the LASs remain manual. Innovation is required for the adoption of technology and streamlining the processes and governance of overall urban LASs.

In total, 87% of all respondents agreed that GIS and digital innovation could solve the problems of existing urban LASs. Some of the lawyers (24 percent) were not convinced by the innovative solutions and benefits offered by the technology. Organization respondents (96 percent) expressed a keen interest and agreement in adopting the latest technologies to innovate their existing urban LASs. They are also convinced that presenting smart cities and multistory buildings into 3D virtual reality will better help in the planning and management of urban LASs.

In the near future, the Government of Pakistan is keen on promoting the vertical growth of cities [113–115]. In developed economies, the computerization of land records through Information and Communication Technology (ICT) and GIS is evolving into a 3D LAS that incorporates vertical urban development [116–120]. The Australian future vision of a 3D LAS accommodates the digital economy, smart cities, and vertical development for social welfare and economic prosperity. To attain its objectives, the development of an accurate 3D LAS is one of the five goals of the vision [121]. Due to the complex infrastructure development above and below ground and the evolving quest to make cities smart, there is a growing trend in 3D LAS development, worldwide [17,97,110,122–129]. The 3D LASs shall provide a clear picture of complicated land and property conditions and support efficient urban planning.

4.6. Standards

For an efficient urban LAS, standardization is essential in any country. In Pakistan, thousands of organizations manage and operate urban LASs, both in the public and private sectors of the country, without any interoperable mechanism in place. Even data interoperability and sharing within public departments is a challenge as the base systems are manual in many organizations [63,130]. An integrated and standard approach can further minimize the hurdles currently being faced in tenure security, revenue collection, infrastructure planning, and overall LAS operations. The Land Administration Domain Model (LADM) is an internationally recognized standard approved by the International Organization for Standardization (ISO). The LADM offers generic guidelines for countries to adopt and translate their LASs into a standard format [131,132]. The standard allows the systematic recording of property ownership details; its related rights, restrictions, and responsibilities (RRR); and precise location information in an integrated manner. The interoperability and flow of information across organizations can be achieved using these standards. Over 40 countries across the globe have already adopted the LADM and modified it to meet their legal requirements, including Kenya [133], Malaysia [97], Morocco [134] Turkey [95,135], Croatia [136], China [137], and many others [138]. The standard allows 2D land administration, as well as vertical urban development in 3D.

A majority of all the respondents (92 percent) expressed their agreement with the need for national or international standards to streamline the manual urban LASs in the country. Several respondents, except a few (11 percent) lawyers, believed that a standard will assist in developing a synchronized and effective urban LAS. Many respondents from organizations expressed their strong desire to adopt national or international standards to revive their manual LAS and improve its efficiency.

4.7. Partnerships

The land record in Pakistan serves as a base and key input for the operations of various other organizations at the national and sub-national levels. For example, the delimitation of census and electoral boundaries by the Pakistan Bureau of Statistics and the Election Commission of Pakistan, respectively, are based on land parcel and revenue estate records. The annual Urban Immoveable Property Tax collection through DAs and the E&TD is purely reliant on urban land records. The feasibility of systematic urban planning rests on the existing LASs' data and on collaboration and partnership among stakeholders. The National Spatial Data Infrastructure plays a pivotal role in creating partnerships and collaboration among stakeholders, which the Surveying and Mapping

Act 2014 [79] aims to establish. However, the country continues to face challenges in strengthening partnerships among stakeholders to facilitate the smooth flow of data and information through the NSDI [130,139]. Like an urban LAS, the country must develop standards in each domain to effectively establish the NSDI and achieve its overarching objectives. The challenges faced in implementing the NSDI in the country encompass a lack of national coordination, limited partnerships, the absence of a national data-sharing policy, and insufficient availability of technical, financial, and trained human resources for NSDI development and implementation in Pakistan [130,140]. Many respondents (90 percent) believed that there is a need to build strong partnership and cooperation among stakeholders to increase the efficiency of the LASs and resolve their problems. Two-thirds of the respondents from organizations acknowledged a lack of cooperation and partnership concerning urban LASs in the country. Even the LAS-related organizations of the twin cities of Islamabad and Rawalpindi are unable to precisely define their administrative limits for the regulation of housing societies, one reason for this being the lack of coordination among these organizations and the opaque nature of the current governance [141].

4.8. Capacity and Education

The legacy system for land administration deployed by the British in the sub-continent, and later adopted by Pakistan, relied on the lowest revenue estate official, known as *patwari* [63]. Until recently, the required qualification for the revenue official was a secondary school certificate (equivalent to O-Levels) with no additional technical skills required at recruitment [142,143]. The revenue officials utilize conventional measuring techniques for land surveys and maintain records in the local measurement unit called *karam*; 1 *karam* is approximately equal to 1.6764 m [25]. There is no mandatory requirement of technical qualification in surveying, ICT, or GIS for these officials. The BoR offers on-job training to the newly hired officials. However, these officials lack knowledge of modern cartography, GIS, and up-to-date methods of electronic and satellite-based surveying. Some of the DAs, PHSs, and CHSs manage separate departments of land surveying, customer service delivery, planning and development, working manually in most cases. For the supervision of land title registration in urban areas, a sub-registrar is appointed by the BoR to smoothly execute the registration process, and their role is limited to executions of registrations without any field verification.

The Higher Education Commission in Pakistan has included land information systems and (real) estate management as elective courses in undergraduate- and postgraduate-level studies of remote sensing (RS) and GIS, as well as city, urban, and regional planning [144]. Various institutes in the country also offer certificate courses in surveying and GIS [145]. An undergraduate degree program in real estate management has recently been launched. The degree is accredited by the HEC and covers the technical, policy, and administrative aspects of LASs [146].

The organizations involved in the urban LAS fabric, including government and private sectors, have different capacities and skill levels. Several PHSs have taken advantage of the technological innovation and computerization for quick and quality service delivery to their customers. Half of all the respondents were confident that the existing human resources were skilled enough to efficiently run and manage urban LASs. Many lawyers (69 percent) were not convinced of the skills of the existing human resources, whereas the estate agents (65 percent) were more convinced of their capabilities.

Many respondents from organizations stated that both skilled GIS and RS personnel were not available within their organizations or in the country (65 percent and 70 percent). According to 89 percent of organizational respondents, if the skills related to GIS and RS were to be included in the workflows, the human resources trained in the two skills would improve the efficiency of their organizations.

4.9. Advocacy and Awareness

According to an estimate, around 16 percent of the urban population in Islamabad and Rawalpindi is illiterate. Similarly 55 percent and 59 percent of the population use the Internet for communication in the urban areas of Rawalpindi and Islamabad, respectively [147]. The illiterate population is unable to comprehend information from official LAS documents independently. Moreover, 60 percent of all respondents believed that people were not aware of the laws about RRRs related to their land and property in urban areas. Many lawyers (78 percent) believed that their clients were not aware of their legal protections and RRRs in case of any property dispute; however, a few owner-buyers were aware of their rights.

Currently, the Internet is the fastest medium to create awareness and communicate information through websites and mobile applications, at least for those with access. The availability of LAS-related information through the Internet in Pakistan is very poor. Only a few of the lawyers (25 percent) and owner-buyers (38 percent) could find the urban-LAS-related laws, rules, and regulations online over the Internet. Most urban LAS organizations (86 percent) had their own websites for communication; however, the websites mainly focused on marketing their projects. Critical customer-related information was mostly missing on the websites, especially for the PHS and CHS. Most organizations did not have their detailed and approved maps, layout plans, laws, terms, and conditions available online on their websites.

5. Discussion

The FELA has a vital role in LASs in terms of understanding the fundamental relationship between people and land, encompassing all its strategic aspects. The FELA has been invaluable in our study, enabling us to assess urban LASs. The FELA provided comprehensive insights into all aspects of LASs and served as an important reference for developing the critical thinking necessary for designing questionnaire surveys. By utilizing the globally accepted FELA framework, the study was able to effectively evaluate the status and challenges of urban LASs in Pakistan. Furthermore, the questionnaire developed can be employed globally to replicate LAS assessments in other UN member countries, as it encompasses all its vital aspects. The findings of this study, based on the FELA, can play a crucial role in advancing the 2030 agenda of sustainable development in Pakistan. The identified gaps highlighted in the study provide an opportunity for rectification, enabling the fulfilment of specific goals outlined in the SDGs and the IGIF for LASs. A summary of the existing statuses and challenges of urban LASs against each FELA pathway and their way forward is given in Table 4, and their detailed results are given in Appendices A and B.

The current urban LASs in Pakistan are characterized by manual processes, complexity, and a fragmented administration paradigm. This has led to several problems, including fraud, joint ownership, and encroachment. There is also a lack of transparency and corruption within the system. Most respondents are dissatisfied with the current LASs and would prefer computerization. The file system, which is a common practice in Pakistan for selling land on installment, is not recognized by the courts as a legal title document. The urban LASs' data are disintegrated and inaccessible to the public for online record verification and authentication. The property registration and dispute resolution process is slow and inefficient. Due to the opaque nature of outdated procedures implied for urban LASs, the twin cities lack a clear and conclusive land title system. The policy recommendations have long been advocating a simple, conclusive, and straightforward system of title registration as adopted by many countries, including Australia, Malaysia, Singapore, and Canada (selected provinces), etc. In principle, a conclusive title registration system can be established, if a single organization serves as the custodian of land records. The records should be continuously updated in real-time, have a conclusive nature, and include state insurance to address potential errors [23]. For better land tenure security in the country, a centralized land registration and mapping system must be strengthened, as required in the Registration Act of 1908.

Table 4. Summary of status, challenges, and way forward of urban LASs against nine FELA pathways.

FELA Pathways	Status	Challenge	Way Forward
Governance, Institute and Accountability	Existing manual LASs with future preference of computerization. Disputes, land grabbing, corruption, and frauds are common.	Up-scaling and reforming existing urban LAS into a conclusive, transparent, secure, and digital system. Unregulated file system and private housing sector.	RERA/Das to improve accountability, enhance governance, and revise mandate to establish responsible LASs. To improve governance, establish centralized land tenure system.
Policy and Legal	Laws and policies exist but are centuries old. Dispute resolution procedures are lengthy and slow.	Implementation of law is very low. Need new laws and policies for anticipated complex urban LASs.	Amending existing and introducing new laws and policies through acts of parliament and strict implementation of the laws by the government. Expedite RERA implementation.
Financial	Property under-valuation, tax evasion and manual assessment methods. Difference in actual market value and government rates.	Unleash the full economic potential of LASs through technological innovations and tax reforms.	Revenue departments to introduce integrated modern technologies to devise a realistic revenue assessment and taxation system.
Data	Lengthy processes and delays due to paper-based manual data and record keeping.	Secure, digital, and online data availability and ease of conducting business.	DAs/RERAs formulate clear roadmap for LAS organization to migrate their manual LASs into a sophisticated land information system.
Innovation	Manual, opaque, and outdated LASs in practice, rely on conventional procedures.	Adoption of ICT, GIS, 3D, and satellite technologies in existing workflows.	Strong political endorsement regarding resource investment, technology adoption, and infrastructure development is essential to innovate the manual LASs for social good.
Standards	No national or international standard on LASs exists in the country.	Design and implementing LADM country profile and other data and quality standards of GIS/LAS.	Academics and professionals to play their role in developing country-specific LAS standards; government to ensure their country-wide implementation across LAS organizations.
Partnership	Lack of partnership among organizations for governance and management of exiting LASs.	Framework to enhance partnerships to avoid unnecessary delays and duplications.	An interoperable and centralized system to enhance partnership, avoid redundancy, and in turn facilitate stakeholders.
Capacity and Education	LAS organizations lack technical skills and capacity; however, the required skill sets are available in the country.	Upgrade the capacity of organizations by introducing modern technologies and skills.	Government to devise realistic policies and deadlines to overhaul organizations' existing capacity and education to meet modern LAS requirements.
Advocacy and Awareness	LAS organizations' websites are available; however, quality information related to ownership and RRRs is not available online.	It is further needed to devise a mechanism and framework for the flow of quality LAS information through the Internet.	RERAs/DAs to prepare, implement guidelines and play their critical role as regulatory bodies to ensure awareness and accessibility of quality LAS information for stakeholders.

Laws and policies related to LASs are in place (mostly outdated in nature), but they are not being implemented or enforced effectively. For example, the RERA in Islamabad has not yet been fully established and implemented, even three years after its enactment. Similarly, the NAHP-proposed milestones for urban LASs' improvement are still to materialize after 22 years. PHSs in most cases bypass the mandatory deed registration under the Registration Act. The stakeholders were generally dissatisfied with the laws and policies related to urban LASs, especially the practicing lawyers. Due to weak policies and lack of implementations, two-thirds of private housing society projects are informal [148,149]. Consequently, the twin cities are facing unplanned and haphazard urban development because of widespread violations of by-laws and land use guidelines. Due to inadequate organizational arrangements and limited technical capacity of DAs and BoRs, the urban LASs are facing difficulties, leading to dissatisfaction among rights holders. The city's master plans are outdated, frauds are common due to manual record keeping, and the judicial process for land disputes settlement takes years to conclude. The complexity of the legal system, issues with property registration, and the prevalence of land disputes lead to land tenure insecurity. Existing laws need further amendments to tackle new LAS challenges, like to the unregulated file system and a re-definition of organizational jurisdiction.

The financial aspect of urban LASs is suffering due to the undervaluation of land and property and the manual nature of its assessment. More than 70 percent of owner-buyers believe that the property valuation carried out by the government through the FBR or DC rates do not sufficiently reflect its market value. Tax collection and its utilization remain an ongoing legal dispute among government organizations. The urban LASs' data are prepared and archived manually on paper. The outdated procedures and lack of computerization in LASs lead to complications in the system, such as ambiguous rights, slow information retrieval, and frequent litigations. The descriptive nature of property locations makes it harder for lawyers and owner-buyers to identify its actual on ground location.

There is a dire need for innovation in LASs in terms of technology adoption and the streamlining of processes and governance to modernize the urban LAS. Standardization in LASs within the country will provide interoperability, quality, and consistency for overall LAS operations, including enhanced tenure security, revenue collection, and infrastructure planning. DAs and anticipated RERAs can set forth realistic guidelines for suggested improvement and their strict implementation within the stipulated timeline. Strong collaboration and partnership among stakeholders is required in the country to achieve effective urban LAS development. A significant proportion of the population, mainly those who are illiterate, struggles to comprehend LAS-related information independently. On the other hand, the availability of LAS-related information through the Internet is also limited, and LAS organizations often lack critical customer-required information available online. The stakeholders are in strong agreement to innovate and standardize the existing LASs and improve partnership among organizations. There is a need to invest in the physical infrastructure development, capacity building, and education of existing LASs. The government and LAS organizations require prioritizing the development objectives and pool funds for the upgradation.

More than 80 percent of owner-buyers hired the services of estate agents to avoid complications associated with the manual system of land administration and property sale-purchase. It is important to note that there is no legal obligation to hire the agent. Both owner and buyer pay 1–4 percent of the property price to the agent for identification of the property and facilitating the smooth transaction. The stakeholder survey results indicate that estate agents and LAS organizations are more satisfied with the current manual urban LASs than any other stakeholder, as both are the beneficiaries of the manual systems. Due to the nexus of estate agents and LAS organizations, the process of property registration is very quick for most of the estate agents. The practicing lawyers showed severe reservations about the system, more than any other stakeholder, and most of them are (highly) not satisfied with existing laws and policies. Bankers do not directly interact with urban LASs during the mortgage financing process, but third-party (mostly lawyers)

services are hired to verify the required revenue records. Usually, the banker's response deviates from the expected result, as most of them are not practically involved in the process. Most of the owner-buyers report difficulties, long queues, delays, corruption, and the lowest level of satisfaction with existing urban LASs, especially under the control of DAs and the BoR. Owner-buyers are the most interested in the online availability of urban land records. Most of the organizations were eager to adopt GIS, GNSS, and ICT in their existing urban LAS workflows. A strong political endorsement and social willingness can further streamline the quest to overcome urban LASs' challenges via the adoption of technology and standardization. Few organizations (PHSs and CHSs) have already implemented GIS and surveys, employing GNSS for their property record management; however, the data are mostly not available to right holders either online or through allotment letters (registered deed). One-third of the organization respondents reported the availability of their property-related data are in 3D, and it is critical to note that the data are currently limited to physical models, being used solely for marketing purposes. More than half of the stakeholders believe existing human resource can run the processes and solve the problems in the urban LASs. Many stakeholders questioned the poor performance of officials, especially under the DAs and BoR, because of the lack of monitoring and evaluation of the system. The awareness of citizens about their RRRs is quite low, which is due to the lack of freely available LAS-related information online.

6. Conclusions

The guidelines provided in the FELA proved very effective in assessing the status and challenges of urban LASs. For Pakistan, there are greater challenges ahead in terms of obsolete record management, maintenance, and inclusion of vertical urban development in the existing manual system. It is recommended to establish a centralized land registry system by developing a standardized LADM country profile. Strengthening existing laws through substantial amendments and rigorous enforcement is crucial to avoid fraud, delays, and corruption in LASs. The existing challenges require the innovation, standardization, and capacity building of existing LASs. Both long- and short-term policy initiatives, with strong political, social, and financial support, are recommended for the development of responsible LASs. Stakeholders' confidence in the existing LASs is low, especially for the organizations who deal with a large portion of urban LASs, namely DAs and the BoR. It is of paramount importance to ensure transparency and accountability within the organizations to strengthen LASs and improve land tenure security. The management of land records is decentralized among multiple organizations, lacking real-time updates and efficient tracking of records. To address disputes, cumbersome registries spanning hundreds of years of manual papers are necessary, resulting in delayed justice. The use of modern technologies in LASs is imperative to avoid delays and disputes. It is worth mentioning that while the government assumes the responsibility of registering sale deeds, it does not bear the liability to authenticate the accuracy of the records. A clear and conclusive land and property title system does not exist; instead, revenue records serve as *de facto* titles for properties, and manual deed registries only validate property sale-purchase agreements. The feedback received from stakeholders regarding the current urban LASs is predominantly negative. A significant majority of respondents expressed a preference for the implementation of technological innovations to address existing challenges and to foster a transformation towards a transparent and equitable system. This feedback underscores the importance of embracing technological advancements to improve the efficiency, accountability, and fairness of the urban LAS. The country is facing serious challenges of tenure insecurity, economic losses due to inefficient land valuation, manual data and processes, lack of innovation and LAS standards, and serious issues of communication, awareness, and partnership gaps among LAS stakeholders. These challenges need immediate attention from the government and policy makers to introduce fundamental reforms in the system. It is of utmost importance for existing LASs to comply with the FELA guidelines to achieve LAS-related SDGs.

A systematic framework is essential to scale up the efforts to standardize and computerize manual LASs into a conclusive and reliable system in the country. The country's future vision of urban land record computerization and smart cities development necessitates the innovative use of ICT, GNSS, RS, GIS, and 3D technology to modernize its urban LAS and avoid malpractices and corruption. The concept of the smart city in the country will flourish whenever standardized baseline 3D urban LAS data are made available and institutional workflows are sufficiently trained to systematically capture the required LAS data and maintain digital records. To establish efficient LASs, critical considerations include ensuring a fair and gender-unbiased people-to-land relationship and implementing stable laws and policies. The study recommends future investigation into operational aspects of urban LASs, their standardization, and the implementation of the 3D aspect to manage vertical urban development.

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Appendix A

Table A1. Stakeholders' detailed responses against nine FELA Pathways, (x = response not recorded).

FELA Pathway	Question	Response	Banker <i>n</i> = 101	Owner-Buyers <i>n</i> = 119	Estate Agent <i>n</i> = 116	Lawyer <i>n</i> = 107	Organization <i>n</i> = 80
	What is the preferred mechanism for urban property record keeping	Computerized	94%	92%	95%	79%	88%
		Manual	6%	8%	5%	21%	13%
	Do you prefer availability of urban land and property ownership record online?	Don't know	3%	0%	0%	3%	3%
		Yes	88%	90%	83%	82%	61%
		No	9%	10%	17%	15%	36%
1	Is it easy for perspective buyer to verify the seller record of urban property? Both attributes and map	Easy	39%	34%	42%	x	x
		Very Easy	3%	8%	9%	x	x
		Difficult	38%	31%	39%	x	x
		Very Difficult	21%	27%	10%	x	x
	Does process of urban property allotment and (registry) transparent and corruption free?	Don't Know	x	11%	3%	x	x
		Yes	x	39%	53%	x	x
		No	x	50%	45%	x	x
	Are you satisfied with the existing urban LASs?	Satisfied	37%	38%	44%	x	x
		Highly Satisfied	8%	3%	3%	x	x
		Not Satisfied	43%	44%	44%	x	x
		Highly Not Satisfied	13%	16%	9%	x	x

Table A1. Cont.

FELA Pathway	Question	Response	Banker <i>n</i> = 101	Owner-Buyers <i>n</i> = 119	Estate Agent <i>n</i> = 116	Lawyer <i>n</i> = 107	Organization <i>n</i> = 80
2	Are you satisfied with the laws and policies governing urban LASs?	Satisfied	38%	35%	50%	20%	54%
		Highly Satisfied	11%	3%	4%	5%	6%
		Not Satisfied	41%	50%	42%	58%	33%
		Highly Not Satisfied	11%	12%	3%	18%	7%
	How much time is required to resolve urban property disputes?	1 Month	x	x	x	9%	15%
		6 Months	x	x	x	12%	13%
		1 Year	x	x	x	6%	14%
		2 Years or more	x	x	x	73%	59%
3	Is DC rate for urban property valuation reflecting the actual market price?	Don't Know	x	19%	7%	x	18%
		Yes	x	8%	28%	x	28%
		No	x	72%	65%	x	55%
	Is FBR rate for urban property valuation reflecting the actual market price?	Don't Know	x	19%	4%	x	16%
		Yes	x	11%	32%	x	29%
		No	x	70%	64%	x	55%
4	How much time is required for the transfer of allotment (registry) of urban property?	15 Days	x	39%	75%	x	x
		30 Days	x	28%	7%	x	x
		45 Days	x	15%	13%	x	x
		60 Days or more	x	18%	5%	x	x
	Is it easy to locate the property from information given on allotment letter (registry)?	Don't Know	x	9%	4%	6%	x
		Yes	x	55%	81%	49%	x
		No	x	35%	15%	46%	x
	Is it easy to locate the property from information given on layout plan?	Don't Know	x	8%	2%	8%	x
		Yes	x	74%	80%	48%	x
		No	x	18%	18%	44%	x
5	Do you agree that the latest GIS and computerization innovations will help solve the problems of urban LASs?	Agree	47%	39%	47%	47%	40%
		Strongly Agree	44%	48%	42%	29%	55%
		Disagree	5%	11%	9%	14%	4%
		Strongly Disagree	5%	2%	1%	10%	1%
6	Do you agree that a national or international standard is required for synchronized and effective urban LASs?	Don't Know	1%	5%	3%	3%	0%
		No	6%	3%	3%	11%	4%
		Yes	93%	92%	93%	86%	96%
7	Do you agree that building more cooperation and partnership among stakeholders will help solving problems and increasing efficiency of urban LASs?	Agree	49%	39%	48%	39%	x
		Strongly Agree	45%	51%	47%	36%	x
		Not Agree	2%	7%	4%	12%	x
		Strongly Not Agree	5%	3%	0%	12%	x
8	Does the human resource of your relevant organization skilled enough to smoothly run and manage urban LASs?	Don't know	15%	9%	4%	5%	x
		Yes	59%	61%	65%	26%	x
		No	26%	29%	31%	69%	x
	Does the human resource of your relevant organization skilled to solve the problems related to urban LASs?	Don't know	15%	13%	4%	5%	x
		Yes	57%	52%	58%	26%	x
		No	28%	35%	38%	69%	x

Table A1. Cont.

FELA Pathway	Question	Response	Banker <i>n</i> = 101	Owner-Buyers <i>n</i> = 119	Estate Agent <i>n</i> = 116	Lawyer <i>n</i> = 107	Organization <i>n</i> = 80
9	Do citizens are aware of laws, rights, restrictions, responsibilities related to their urban property?	Don't know	6%	3%	x	7%	x
		Yes	46%	43%	x	16%	x
		No	49%	54%	x	78%	x
	Do the information related to laws and policies of your relevant organization available easily or online?	Don't know	17%	9%	3%	5%	x
		Yes	46%	38%	55%	25%	x
		No	38%	53%	42%	70%	x

Appendix B

Table A2. Organizations' detailed responses against nine FELA pathways.

FELA Pathway	Question	Response	BoR <i>n</i> = 5	CB <i>n</i> = 2	CHS <i>n</i> = 14	DA <i>n</i> = 7	Others <i>n</i> = 16	PHS <i>n</i> = 38
1	What is the current mechanism for urban property record keeping?	Computerized	0%	0%	86%	0%	56%	58%
		Manual	100%	100%	14%	100%	44%	42%
	Does your organization offer purchase of urban property through installments?	Don't Know	0%	0%	0%	29%	6%	0%
		No	100%	100%	36%	43%	13%	8%
	Does your organization offer sales purchase of urban property in your own office?	Yes	0%	0%	64%	29%	81%	92%
		Don't Know	0%	0%	0%	29%	0%	3%
	How many steps are involved in transfer of allotment (registry) of urban property?	No	100%	100%	57%	57%	31%	24%
		Yes	0%	0%	43%	14%	69%	74%
	How much time is required for transfer of allotment (registry) of urban property?	More than 9	0%	0%	0%	14%	25%	8%
		Nine	0%	0%	0%	14%	0%	5%
		Six	20%	100%	21%	14%	0%	29%
	Are you satisfied that the current urban property record keeping mechanism is safe and error free?	Three	80%	0%	79%	57%	75%	58%
15 Days		80%	0%	64%	29%	69%	53%	
30 Days		0%	100%	36%	43%	19%	21%	
45 Days		0%	0%	0%	14%	6%	5%	
Does the record require for urban property dispute settlement available timely and easily?	60 Days or more	20%	0%	0%	14%	6%	13%	
	Highly Not Satisfied	20%	0%	0%	14%	6%	8%	
	Highly Satisfied	0%	0%	7%	0%	0%	24%	
	Not Satisfied	60%	0%	50%	57%	25%	13%	
Does uniform laws are in practice for urban property in the whole country?	Satisfied	20%	100%	43%	29%	69%	55%	
	Don't Know	20%	0%	0%	0%	0%	3%	
	No	20%	100%	21%	71%	50%	37%	
2	Is there any urban national policy for property management?	Yes	60%	0%	79%	29%	50%	61%
		Don't Know	0%	0%	50%	14%	13%	8%
		No	80%	0%	43%	57%	88%	66%
	Is there a law which govern the purchase of allotment file and installment payment instead of actual allotment title of urban property?	Yes	20%	100%	7%	29%	0%	26%
		Don't Know	20%	0%	36%	0%	25%	24%
		No	20%	0%	14%	71%	50%	39%
Is there a law which govern the purchase of allotment file and installment payment instead of actual allotment title of urban property?	Yes	60%	100%	50%	29%	25%	37%	
	Don't Know	20%	0%	14%	14%	6%	11%	
Is there a law which govern the purchase of allotment file and installment payment instead of actual allotment title of urban property?	No	80%	100%	36%	57%	75%	34%	
	Yes	0%	0%	50%	0%	19%	55%	

Table A2. Cont.

FELA Pathway	Question	Response	BoR n = 5	CB n = 2	CHS n = 14	DA n = 7	Others n = 16	PHS n = 38
2	Are you satisfied that existing laws are sufficient for future requirements of urban LASSs?	Highly Not Satisfied	0%	0%	7%	0%	0%	8%
		Highly Satisfied	0%	0%	7%	14%	0%	8%
		Not Satisfied	60%	0%	21%	57%	63%	55%
		Satisfied	40%	100%	64%	29%	38%	29%
	Does your organization offer facility to deposit property related dues online?	Don't Know	0%	0%	0%	14%	13%	3%
		No	40%	0%	93%	57%	50%	18%
		Yes	60%	100%	7%	29%	38%	79%
	Are your organization collects monthly charges on services like water and sanitation?	Don't Know	0%	0%	0%	0%	6%	8%
		No	100%	0%	7%	29%	6%	21%
		Yes	0%	100%	93%	71%	88%	71%
	Are you satisfied with the services provided by government in return to fee submitted to it?	Highly Not Satisfied	0%	0%	7%	14%	13%	16%
		Highly Satisfied	0%	0%	0%	0%	0%	5%
		Not Satisfied	20%	100%	57%	14%	38%	45%
		Satisfied	80%	0%	36%	71%	50%	34%
	Is your organization using GIS technology for urban LAS?	Don't Know	0%	0%	0%	14%	19%	8%
		No	100%	100%	71%	57%	44%	63%
		Yes	0%	0%	29%	29%	38%	29%
	Will your organization prefer using GIS technology for urban LAS?	Don't Know	20%	0%	21%	14%	6%	5%
		No	0%	0%	7%	14%	13%	13%
		Yes	80%	100%	71%	71%	81%	82%
4	Is your organization using precise GPS surveying for urban property management?	Don't Know	0%	0%	0%	43%	19%	11%
		No	100%	100%	57%	43%	50%	55%
		Yes	0%	0%	43%	14%	31%	34%
	Does urban property ownership record available in GIS is integrated with other organizational data and updated on daily basis?	Don't Know	0%	0%	14%	14%	13%	18%
		No	100%	100%	79%	86%	63%	66%
		Yes	0%	0%	7%	0%	25%	16%
	Does urban property record available in 3D in case of multistory buildings?	Don't Know	0%	0%	0%	14%	19%	18%
		No	100%	100%	93%	71%	25%	47%
		Yes	0%	0%	7%	14%	56%	34%
5	Do you want to innovate the system and process of urban LAS in your organization?	Don't Know	0%	0%	14%	0%	13%	13%
		No	0%	0%	7%	0%	0%	3%
		Yes	100%	100%	79%	100%	88%	84%
	Do you agree that presenting multi-story building and smart city into 3D virtual reality will help better planning and management of urban LAS?	Agree	40%	0%	57%	86%	69%	58%
		Not Agree	0%	0%	7%	0%	6%	5%
		Strongly Agree	60%	100%	36%	14%	25%	37%
6	Do you have plans to implement any national or international standard for the LAS Operation in your organization?	Don't Know	20%	0%	14%	0%	6%	18%
		No	0%	0%	0%	0%	0%	8%
		Yes	80%	100%	86%	100%	94%	74%
7	Do you agree that there is lack of cooperation and partnership among local LAS stakeholders in Pakistan?	Don't Know	20%	0%	0%	0%	13%	29%
		No	20%	100%	14%	0%	13%	24%
		Yes	60%	0%	86%	100%	75%	47%
	Do you agree that building more cooperation and partnership among stakeholders will increase overall efficiency of LAS?	Don't Know	0%	0%	0%	0%	6%	5%
		No	0%	0%	7%	0%	6%	8%
		Yes	100%	100%	93%	100%	88%	87%

Table A2. Cont.

FELA Pathway	Question	Response	BoR n = 5	CB n = 2	CHS n = 14	DA n = 7	Others n = 16	PHS n = 38
8	Is trained human resource in GIS and surveying easily available in Pakistan?	Don't Know	20%	0%	21%	0%	19%	16%
		No	80%	100%	64%	57%	38%	53%
		Yes	0%	0%	14%	43%	44%	32%
	Can GIS and RS skilled human resource improve the efficiency of urban LAS?	Don't Know	20%	0%	0%	0%	6%	13%
		No	0%	0%	0%	0%	6%	3%
		Yes	80%	100%	100%	100%	88%	84%
9	Is website of your relevant organization available?	No	0%	0%	29%	0%	31%	5%
		Yes	100%	100%	71%	100%	69%	95%
	Are property related layout plans and maps available on the website?	Don't Know	0%	0%	0%	0%	0%	5%
		No	100%	100%	86%	0%	50%	45%
		Yes	0%	0%	14%	100%	50%	50%

Notes

¹ <https://www.zameen.com/> (accessed on 1 July 2022).

² <https://fbr.gov.pk/valuation-of-immovable-properties/51147/131220> (accessed on 1 July 2022).

³ <https://es.punjab.gov.pk/eStampCitizenPortal/ChallanFormView/RateOfChallanView?name=PropertyDCValuation&vCount=215077> (accessed on 1 July 2022).

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