



Economic Commission for Europe**Committee on Urban Development, Housing and Land Management****Working Party on Land Administration****Twelfth session**

Valletta, Malta, 31 May and 1 June 2021

Item 3 of the provisional agenda**Review of scenarios for future land administration****Scenario Study on Future Land Administration in the UNECE region****Note by the Bureau of the Working Party***Summary*

Decision makers in the field of land administration need a broad understanding of emerging issues and developments that are expected to shape the future of the sector. To this end in 2017, the Working Party agreed to elaborate scenarios for future land administration and land management solutions (ECE/HBP/WP.7/2017/6). It renewed this mandate at the eleventh session in 2019 (ECE/HBP/WP.7/2019/2). This activity was included in the Working Party programmes of work 2018-2019 (ECE/HBP/190) and 2020-2021 (ECE/HBP/201).

Accordingly, the Bureau initiated a study to develop future scenarios for the land administration sector, based on the relative importance and anticipated impacts of global megatrends. This document includes the introduction, objectives, scenarios, guiding principles and self-assessment framework of the draft Scenario Study on Future Land Administration.

At its twelfth session, the Working Party will be presented with the intermediate results of the Scenario Study, including the scenarios and a self-assessment questionnaire.

The Working Party will be invited to (i) endorse the draft study with some technical updates to be agreed by the Bureau; (ii) request the Bureau to finalize the study, reflecting the comments received during the session; and (c) approve the publication of the Scenario Study on Future Land Administration as an official publication (in English and Russian, digital and print).

Once finalized, the study will be presented to the eighty-second session of the Committee on Urban Development, Housing and Land Management for endorsement.



I. Introduction

1. The lives of people across the world, regardless of location, are increasingly being influenced by global trends and developments. These trends include urbanization, climate change, technology advancements, cybersecurity, new ecosystems of collaboration, and migration. These so-called “megatrends” are universal phenomena that are profoundly shaping the world over time.¹ Although challenging due to their complexity, these megatrends also provide tremendous opportunities, including for land administration. As such, megatrends can have both positive and negative impacts. Technology advancements, for instance, can support access to information and knowledge, and thus help achieve universal literacy. At the same time, they can threaten privacy, erode security and increase the digital divide.

2. Drivers complement these megatrends. They are certain developments or causes that have an effect on, or shape, the future. As with megatrends, some drivers are particularly relevant to land administration. These include new emerging data sources and data integration options, structural shifts in collaboration opportunities, data privacy ethics and related legal considerations, and the introduction of new technology or analysis tools, to name a few. Megatrends and drivers, however, should not be considered in isolation. On the contrary, it is in combination that they generate faster and greater impact, shaping the ongoing transformation of the land sector.

3. The challenges and opportunities for land administration authorities to remain relevant and provide trustworthy services well into the future are related to their ability to continuously incorporate new user expectations, perform an often widening role as a key partner in solving emerging intersectoral state priorities (e-government, smart cities, spatial data infrastructure, forced digitalization, land development process integration, climate change initiatives, etc.), as well as managing the evolution of various constraints (financial, technological, human resources, legal, organizational, etc.). A central consideration in this continuously changing situation is how land administration authorities can create, increase, and retain value with respect to relevance, liability, stewardship and trustworthiness. The authorities should provide a foundation of trust, on the basis of which society and individuals can develop.

A. Objective of the study

4. Scenarios, in general, are used to understand potential future directions of development and to assess the readiness of an organization for this possible future environment. Moreover, they can support efforts to define and realize strategies for appropriately responding to the implications these possible futures could bring. The four scenarios set out in this Study are based on the relative importance and anticipated impacts of megatrends in combination with sector-specific drivers.

5. This study thus aims to provide a “compass” for use by national land administrative authorities to navigate these megatrends and benefit from them. By setting out possible future scenarios for the land administration sector, the study can enhance the broad understanding of decision makers of the emerging developments that are expected to shape the future of the sector. It is intended as a dialogue instrument for use in strategic planning, shaping visions and self-assessment as to where land administration authorities need to develop as agencies within their relevant land administration ecosystem. The study refers to land registry, cadastre and geospatial information management directly, while land use, valuation and development are covered implicitly. It is hoped that this study will initiate an ongoing dialogue among national land administration authorities, that draws on the scenarios and the self-assessment tool and guides them in the development of long-term strategies.

¹ Report of the UN Economist Network for the UN 75th Anniversary: Shaping the Trends of Our Time (United Nations publication, 2020). Available at <https://www.un.org/sites/un2.un.org/files/20-124-unen-75report-full-en-revised.pdf>.

6. Scenario analyses are neither predictions of the future nor expressions of intent for the future development of the land administration systems. Rather, they are developed as stories to stimulate discussion on the future development of land administration organizations. By engaging in discussion of possible scenarios, the risk of a simplistic approach being taken by land administration decision makers is reduced, and their preparedness to adapt to the future, increase their flexibility and build resilience for disruptive events is enhanced.

7. The analyses will also include aspects, such as the identification of challenges and opportunities in a transformative environment, the sharing of best practices for solutions and risk mitigation measures, the improvement of preparedness for future disruptive changes, and the assessment of impacts from national interventions. The study explicitly encourages nations to elaborate and regularly reassess country strategies on future land administration.

8. The scenarios and the self-assessment tool were elaborated during a set of roundtables with senior practitioners, policymakers and academics from Austria, Finland, the Netherlands, Norway, Sweden, and Switzerland. The scenarios were presented for the first time at the Conference of the Permanent Committee on Cadastre in Helsinki (20 and 21 November 2019), with the presentation incorporating real-time interactive feedback from the audience on the expected impact of the megatrends and specific drivers, as well as predictions for the scenarios.

9. The outbreak of the COVID-19 pandemic in early 2020 is affecting the land administration sector. This will be reflected in the forthcoming revised version of this study. Immediate impacts that have been observed include, among others, an opportunity for “forced digitalization”. This involves an increase in the use of e-services and online applications. Efficient measures to prepare for similar disruptive events through scenario analysis could be linked to this study. The study could, for example, support decisions to take early action regarding expected impacts on the land market, support measures to promote sufficient responsiveness and resilience within national land administration ecosystems and be used for analysing the impact of a chosen strategy. At the same time, the pandemic will also impact the elaborated scenarios, trigger implementation schemes, and lead to the revision of priorities. The impact of the pandemic on land administration, as well as the relevance of using the scenarios for similar possible and unexpected experiences, will be included in the revised final draft, following the consultations at the Working Party session.

B. Megatrends

10. The concept of megatrends has been explained by various authors.² In comparison to regular trends, a combined definition of megatrends is their inevitability, the extent of their impacts, and the duration of time within which they evolve. The Working Party Bureau agreed to use 11 out of 12 megatrends, as defined by Z-punkt³ in 2018, as the basis for the analysis of this study. A short description of the characteristics of these megatrends are given in **Error! Reference source not found.** They were complemented by drivers specifically related to land administration.

² See, for instance: John D. Mittelstaedt, Clifford J. Shultz, William E. Kilbourne and Mark Peterson, “Sustainability as megatrend – two schools of macromarketing thought”, *Journal of Macromarketing*, vol. 34, Issue 3 (2014), pp. 253–264; John Naisbitt, *Megatrends: Ten New Directions Transforming Our Lives* (New York, NY, Warner Books, 1982).

³ A consulting company specializing in trends and futures research. <http://www.z-punkt.de/en/>.

Table 1
Megatrends and their brief characteristics

<i>Megatrend</i>	<i>Indicator</i>
1. Demographic change	Regional development asymmetries Global population ageing
2. Societal disparities	Increased wealth concentration Intensification of social conflicts
3. Differentiated life worlds	Weakening of traditional gender roles New forms of individuality
4. The digital transformation	Digital networking in everyday life New opportunities through “big data”, artificial intelligence, robot process automation etc.
5. Volatile economy	Global debt overload Concentration of productivity and profits
6. Business ecosystems	Expansion of the platform economy Sharing as a business model
7. Anthropogenic environmental damage	Anthropogenic climate change Increased environmental pollution
8. Decentralized environments	Decentralized organization Assisted and automated working arrangements
9. New political world order	Multipolar world Asymmetrical conflict lines
10. Global/regional power shifts	Growth of the global middle class Increased influence of non-state actors
11. Urbanization	Unmanaged urban growth Modernization crisis in municipal infrastructures

Source: (Z-Punkt, 2017)

C. Drivers related to land administration

11. In addition to the global megatrends, land administration-related drivers will also impact on future land administration systems. They include:

- (a) Cybersecurity, privacy aspects and digital ethics;
- (b) Next generation demands;
- (c) Open data and new data sources;
- (d) Artificial intelligence and robot process automation;
- (e) Confidence in the digital world;
- (f) Collaboration, sharing, ecosystems and distributed solutions;
- (g) Innovation through open source, incubators and hackathons;

- (h) Crowdsourcing; and
- (i) Skills requirements and education programmes.

D. The scenarios

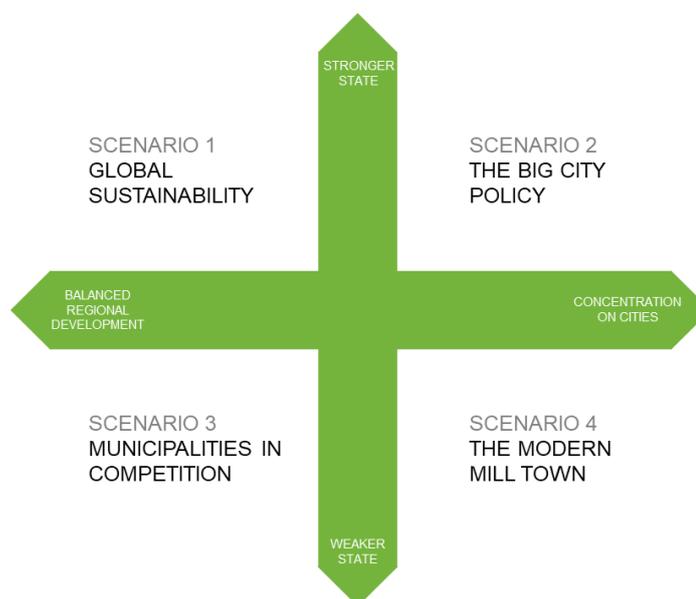
12. The global megatrends and specific domain drivers described in the previous section constitute the basis for forming the scenarios. As mentioned, the scenarios describe possible futures and development directions in order to help an organization estimate its readiness for this potential new environment. Moreover, they can support efforts to define and realize strategies for appropriately responding to the implications these futures may bring.

1. Definition of the scenario cross and the scenarios

13. There are different approaches to describing scenarios. This study applies the “scenario cross” approach. This approach can be best described by giving the example of the Lantmäteriet, the Swedish mapping, cadastral and land registration authority. The Lantmäteriet used the scenario cross to better understand how future spatial and land use planning would be conducted based on the influence of external trends and, consequently, the expected role of Lantmäteriet in that context. They aimed to understand what the major processes would be, who would be the most important actors, and what the most prominent and determining questions for spatial change would be. Analyses of trends determined the two axes in the scenario cross. The vertical axis defined the influence of the State, that is, will the State influence spatial planning more strongly or will other actors, such as municipalities and the private sector, take the lead? The horizontal axis defined regional development: will there be continued concentration on larger cities, or will regional development be more balanced? Then, for each quadrant, a possible scenario was elaborated.

Figure 1

An example of a scenario cross application



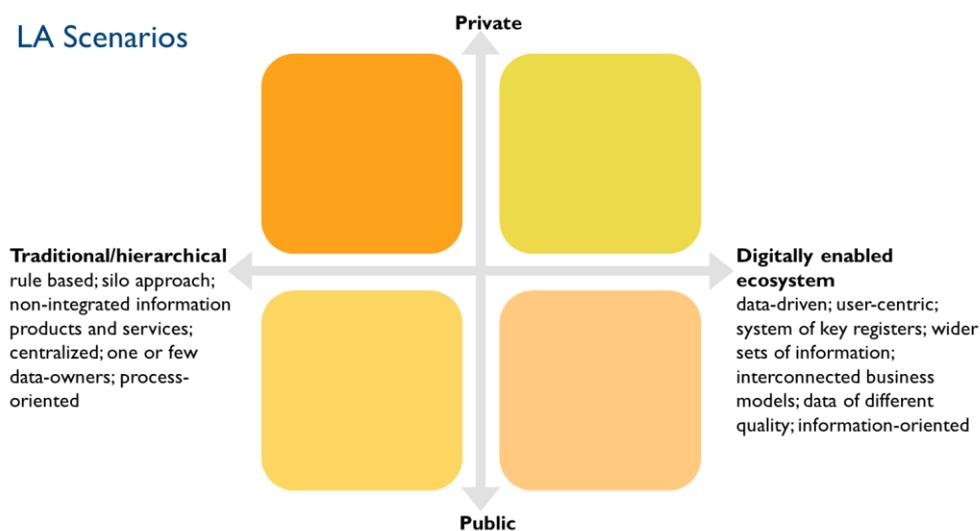
14. During the development of possible scenarios of future land administration, the conclusions by the expert group on the importance of certain megatrends and drivers for land administration were used as input for two roundtable sessions on scenario development, organized in Stockholm in June 2018 and in Amsterdam in December 2018. The roundtables first identified a shared point of departure: how land administration authorities stay relevant, liable and trustworthy and/or increase their relevance, independently of where they currently

position themselves in the scenario cross and/or if they intend to move in a certain direction within the cross.

15. The scenario cross was outlined from clustering the 11 megatrends combined with the land administration-related drivers and the collective experience of experts. The “business ecosystem” megatrend was selected to explicitly be part of one of the axes. “Urbanization” and “digital transformation” were two megatrends considered to greatly affect all scenarios. Therefore, they could not be used for defining the axes as such. Rather, they were used as “influencers” when interpolating the trends to define the scenarios.

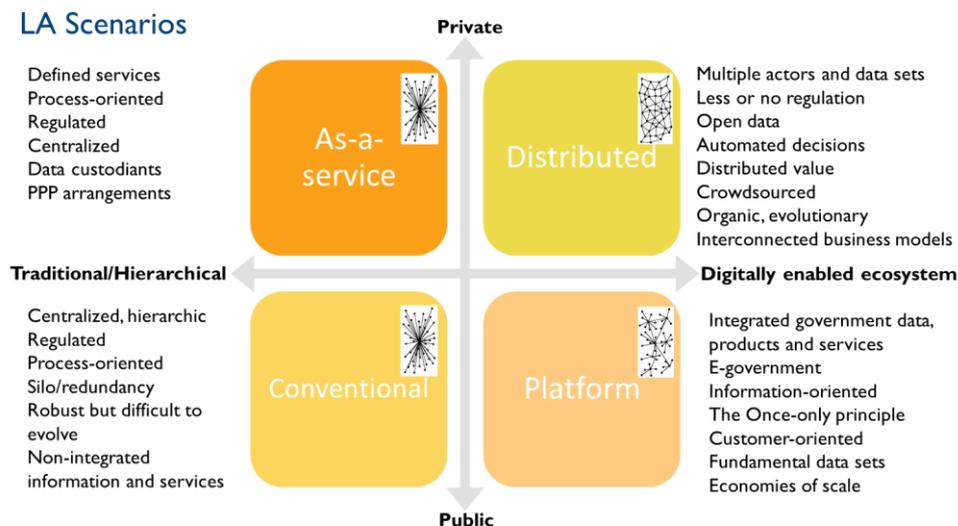
16. The elaborated scenario cross is defined by the horizontal axis representing land administration governance, with a traditional/hierarchical ecosystem on the outer left side and a digitally enabled ecosystem to the outer right side. The vertical axis defines the responsible actors for land administration operations, with the upper end representing private actors and the lower end public actors (see figure 2).

Figure 2
Defined axes of the scenario cross



The scenario cross is completed by adding the four land administration scenarios (see figure 3).

Figure 3
Characteristics of the scenarios



2. Characteristics of the four scenarios

(a) *Conventional land administration*

17. This scenario characterizes the most common situation in UNECE countries (and beyond) today. It represents a centralized land administration, where functions, operations, services and data are typically managed and governed by the State. It is characterized by a hierarchical organization, top-down management, limited delegation downwards, and often limited transparency of the financing of services. Data is captured and updated in a controlled way, resulting in authoritative data. Services and processes are regulated in detail. The conditions and performance of professionals, representing both the private and public sectors, are also strictly regulated. Often, the various data sets are stored in several silos, such as building, property, parcel, title, address, and land use. There is a risk of work redundancy and overlap of information at attribute level. Much of the information products and services are non-integrated. The scenario tends to have system solutions characterized by constraints on their ability to evolve, develop new capabilities and meet new expectations. This is particularly true when geospatial data is included, as this attracts many producers and users. It also drives applications that require an open and more integrated environment. Expected increased complexities in people-to-land relations (rights, restrictions and responsibilities) and e-services challenge land administration systems positioned within this scenario. The fact that land administration authorities are, to an increasing extent, involved in state priorities in the vicinity of their core responsibilities, for example, e-government, integration of building and land development processes, spatial data infrastructures, smart cities and climate change initiatives, puts additional pressure on land administration authorities represented in this scenario.

(b) *As-a-service land administration*

18. This represents a scenario where one or a few private sector actors execute all or some land administration services, often through a long-term as-a-service model, with the State still governing the data and setting the rules for land administration. The private actor(s) might also be responsible for the technical system and its maintenance. The idea that capital, technology and skills can be leveraged from the private sector to enhance land administration is increasingly gaining traction. Often a private-public partnership (PPP) model is applied, with revenue-sharing, using, for example, transaction fees, data/service fees and property tax. Existing use cases are typically from developed countries where the land registry is operated by private companies [e.g. Australia (western), and in Canada (Ontario)]. Several emerging economies are now investigating PPP/as-a-service solutions for parts of their services, such as the operation of continuously operating reference stations (CORS), first registration processes, land registry, and valuation for taxation and mortgaging. The World Bank has conducted a global PPP consultation to further explore these opportunities.

(c) *Platform land administration*

19. In this scenario, land administration is executed within a national/sectoral framework which includes several state bodies. Each state body has its own designated functions, responsibilities and defined data sets. Typically, a range of key registers with national data sets (for example cadastre, land registry, business register, mortgage register, statistics, utility register and address register) are included, sometimes within a government cloud. The updating process considers all registers, and the once-only principle is applied for data capture in order to avoid work redundancy, data duplication and inconsistency. Key identifiers, and not the data content, are exchanged. National architecture of key registers thus overarches agencies and institutions. The updating process therefore embraces all relevant registers, and each attribute is linked to a specific custodian, that is, the authority responsible for the defined data set. This approach, sometimes referred to as "Government as a platform", facilitates the provision of data-centric applications, extended state services with integrated governmental data, and automated processing. E-government initiatives are often a driver towards this concept and have the potential to provide economies of scale for the Government while, at the same time, improving the sharing of national data sets and

capabilities across organizations and sector boundaries for extended integrated public products and services.

(d) *Distributed land administration*

20. This is considered the most visionary scenario. It represents an environment with a highly automated and multi-stakeholder land administration, where the private sector has a large stake and where governance is moving to an ecosystem of technologies, platforms and diverse sets of stakeholders. Thus, there is a high level of trust “within the system”. Trust is distributed among the stakeholders, private as well as public. Governance is aligned with distributed liabilities. The services and information products are fully digital. Distributed value chains, for example, blockchain, are implemented. A set of configurable building blocks (technology and services) are implemented to meet various user requirements and societal needs. This requires extensive cooperation and the clear distribution of responsibilities and risks. The widened opportunities for the integration of data from multiple providers, including crowd-sourced data combined with an open data policy, require a high degree of standardization and stringent policies on compliance with data privacy and data security regulations. The concept facilitates process automation and transparency and enables a wide spectra of user applications. It also provides for a built-in evolutionary environment that, in a complex context, could transform and adapt to new expectations and requirements over time (e.g. starting from 2-dimensional to 3-dimensional, introduction of blockchain, artificial intelligence, and big data analysis). It has the potential to trigger digital engagements and efficiently leverage digital trust.

E. Guiding principles for future-proof land administration systems

21. When developing strategic planning based on the scenarios, this planning should be checked against a set of global principles which had been developed based on previous experiences and existing good practices. Such guiding principles are the recently endorsed UN-GGIM *Framework for Effective Land Administration*.⁴ These principles are deemed valid for all jurisdictions in the world today. They should be applied irrespective of the predicted scenario.

22. In addition, a more specific set of guiding principles was developed by the group of senior land administration experts. These guiding principles are designed for countries of the UNECE region, focusing on their mid- and long-term future. They are provided in this section.

23. The following guiding principles should be ensured:

(a) The land administration system provides security of tenure and guarantees the integrity and transparency of both information and transactions regarding property. This is for the benefit of the people and the State, in order to support social stability and economic growth;

(b) The land administration system is resilient to cyber-attacks, natural disasters and other events that could destroy or damage the register and its information;

(c) The land administration system is fully digitalized, including maps of property and geospatial information;

(d) The land administration system is uniform throughout the country, and contains information about all properties, regardless of type, use and ownership;

(e) The land administration system contains information about rights, restrictions and responsibilities relevant to all properties;

⁴ For more information see UN-GGIM, 2020a. Framework for Effective Land Administration (FELA). Available from: http://ggim.un.org/meetings/GGIM-committee/10th-Session/documents/E-C.20-2020-29-Add_2-Framework-for-Effective-Land-Administration.pdf

(f) The land administration system is robust and capable of reflecting the dynamic nature of information stored in it over time, including information on rights, responsibilities and restrictions, thereby containing historical data on properties, such as information about changes in ownership and parcel boundaries;

(g) All professional and private users can access all information about the location of properties, as well as information related to land and property rights, restrictions and responsibilities;

(h) Information contained in the land administration system is open for remote inspection by all professional and private users, to ensure transparency and accountability;

(i) Users of the land administration system should be able to trust that the information provided in the system is correct, and that they will be compensated should they suffer a loss due to erroneous information;

(j) The land administration system provides information about the origin and quality of information, including that of the details in the cadastral maps, such as boundaries;

(k) The land administration system takes into account the dynamic nature of geodetic reference systems, reflecting that the surface of the Earth is moving horizontally and vertically;

(l) The land administration system is integrated with the overall national spatial data infrastructure and is able to provide the most accurate information about the location of a property and the wider territory;

(m) The land administration system provides 3D information about the vertical and horizontal limitation of properties, with their related rights, restrictions and responsibilities. Hence, the system contains information about properties under or above the surface of earth, such as apartments, tunnels and underground storage facilities;

(n) The land administration system facilitates linkages with building information modelling systems (BIM), both for data production and data dissemination;

(o) The land administration system facilitates the registration of different tenure types, such as freehold, leasehold, occupancy right, and common property. It incorporates the fact that the tenure could be dynamic over time, and that related limitations could be fixed or ambiguous;

(p) The land administration system provides access to information supporting the registration of transactions, such as contracts, deeds and survey reports. If relevant, this is organized in a digital archive integrated with the land administration system;

(q) The land administration system information is available on a variety of fixed and mobile platforms and electronic devices;

(r) When relevant, crowdsourcing is used for data preparation and for the verification of data contained in the land administration system;

(s) The preparation of data for registration in the land administration system is well integrated with the digital processes of private agents, such as notaries, real estate agents, lending banks and land surveyors;

(t) The land administration system offers real-time registration of transactions, largely subject to automatic digital checks only. Transaction documents are standardized for machine reading. Only complex cases are checked manually by the land administration authority;

(u) Fees and taxes for property transactions are transparent to users, and digital payment is facilitated;

(v) The land administration system contains legally valid information. It can disseminate information to users, which replicates the content of the system with full integrity;

(w) International standards are applied for the design and operation of the land administration system; and

(x) Licensing and monitoring of private agents is adapted to facilitate electronic communication with the land administration system, for both the registration of transactions and the dissemination of registered information to their clients.

F. Self-assessment framework

24. The Scenario Study is intended as a dialogue instrument for use in strategic planning, shaping visions and self-assessment as to where land administration authorities need to develop as agencies within their relevant land administration ecosystem. To help estimate the preparedness of an organization and define what strategy is appropriate for the respective scenario, a set of questions to facilitate self-assessment is provided. The questions are preliminary. It is anticipated that they will be reviewed and refined during the twelfth session of the Working Party.

25. Which of the scenarios is preferred depends on the local context of each jurisdiction, the maturity of its land administration, and the degree of pressing societal needs in relation to land present in the country. Other central considerations are how land administration systems can create, increase and retain value with respect to the relevance, liability and trustworthiness of the land market and with respect to policy and societal issues related to land.

1. Guiding questions to assess the scenarios

26. To assess the value of each of the four scenarios for a country and its land administration system, the following guiding questions were prepared by the group of land administration experts. The questions are based on the seven principles of the UN-GGIM *Integrated Geospatial Information Framework*:⁵

(a) Strategic enablement

- Is land administration considered an essential strategic resource in the (national) political, administrative and societal context?
- Is there a robust legal basis underpinning the land administration system?

(b) Transparent and accountable

- Do all stakeholders have access to the land administration system, based on shared and transparent guidelines?
- Is the accountability of all stakeholders involved in land administration established and maintained?
- Is the accountability established for all elements in the value chain?
- Are the costs for users fair and transparent?
- Are the roles and responsibilities of all parties in the system clear, transparent and adhered to?

(c) Reliable, accessible and easily used

- Is the information on land available, easily accessible and usable to all stakeholders?
- Is land information authoritative and/or subject to state guarantees?

⁵ UN-GGIM, “Part 1: Overarching Strategic Framework”, in *Integrated Geospatial Information Framework. A Strategic Guide to Develop and Strengthen Geospatial Information Management* (July 2018). Available at <https://ggim.un.org/meetings/GGIM-committee/8th-Session/documents/Part%201-IGIF-Overarching-Strategic-Framework-24July2018.pdf>.

- Is all information on land (rights, restrictions, and responsibilities) available, over multiple dimensions (3D) and over time (4D)?
- Is coverage of land information national and complete?

(d) *Collaboration and cooperation*

- Are all parties in the public sector, private sector, academia, and civil society involved in the operation and development of the land administration system?
- Are duplications within the system avoided?
- Is the system open to new entrants or information sources?

(e) *Integrated solution*

- Is the proposed system integrated in, or at least connected with, the information society (both public and private)?
- Is the system effectively managed by the stakeholders?

(f) *Sustainable and valued*

- Is there a sustainable business model in place for the whole system and for each party in the land administration value chain?
- Are appropriate mechanisms and incentives in place to further develop the system?
- Is the system responsive and able to absorb new needs related to land from society?

(g) *Leadership and commitment*

- Is strong political leadership and commitment in place to warrant continuity and long-term investment in the system?
-