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Integrated geospatial information for effective land administration and management

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Note by the Secretariat

Summary

The present paper contains the report of the Expert Group on Land Administration and Management for consideration by the Committee of Experts on Global Geospatial Information Management.

At its thirteenth session, held from 2 to 4 August 2023, the Committee of Experts adopted decision 13/109, in which it reiterated that the Framework was an important element of the work of the Committee of Experts and provided a valuable step forward in assisting and guiding Member States when developing, reforming, strengthening and modernizing effective and efficient land administration. The Committee emphasized that the implementation of the Framework at the country level must be according to national circumstances and needs and urged the expert group to further consider the alignment between the United Nations Integrated Geospatial Information Framework, the Operational Framework for Integrated Marine Geospatial Information Management and the Framework for Effective Land Administration, and that those Frameworks should not exist in isolation.

The Committee of Experts encouraged the expert group to work through its identified inventory of issues and to consider the roles of effective land administration in the area of climate change and the integration of the terrestrial, maritime and cadastral domains, including through collaborative activities with partnering international organizations. In addition, the Committee urged the expert group to continue to collaborate with the United Nations Global Geospatial Information Management regional committees and thematic networks to raise awareness and advocate for national and subnational implementation of the Framework for Effective Land Administration, together with the United Nations Integrated Geospatial Information Framework, and the role of effective land administration and management, and to consider a special effort towards strengthening the capacities of small island developing States and African Member States to better mainstream land management information systems into the plans, strategies and policies of their national digital economies.

In this present report, the expert group provides information on its progress and activities, including virtual meetings aimed at engaging its members and advancing its workplan. It provides the Committee of Experts with updates on fostering partnerships and collaborations. These collaborations involve United Nations Global Geospatial Information Management regional committees, functional groups and thematic networks, as well as international organizations, including the International Federation of Surveyors. The primary focus of these partnerships is to communicate, promote and raise awareness about the importance and benefits of effective land administration and implementing the Framework for Effective Land Administration. They also aim to provide support to Member States in their efforts to develop, reform, strengthen and modernize their land administration systems, ensuring they are both effective and efficient.

* [E/C.20/2024/1](#).

In this report, the expert group provides a summary of the outcomes derived from several meetings and discussions related to the integration of terrestrial, maritime, built and cadastral domains that took place during the intersessional period. The summary serves as an overview of the progress made in this area. The report includes details on the expert group's collaboration with the working group on marine geospatial information and other interested United Nations Global Geospatial Information Management functional groups. This joint effort is directed towards the preparation of a paper that focuses primarily on addressing the technical complexities of the land-sea interface.

In this report, the expert group also provides information on the fifth meeting of the expert group, held with the International Seminar on United Nations Global Geospatial Information Management, on the theme "effective land administration", in Aguascalientes, Mexico. The four-day event included presentations and breakout group work in which participants considered and discussed the inventory of issues identified by the work of the expert group as well as work on key issues, including implementation of the Framework for Effective Land Administration; the integration of the terrestrial, maritime, built and cadastral domains; the merits and benefits of effective land administration; and partnerships and innovations for effective land administration. During the meeting, the expert group welcomed and deliberated on General Assembly resolution [78/265](#), on seizing the opportunities of safe, secure and trustworthy artificial intelligence systems for sustainable development. In the report, the expert group explores the potential application of artificial intelligence in future land administration and management systems and emphasizes the significance of the recommendations from the General Assembly resolution in the development and implementation of the Framework at the country level.

I. Introduction

1. Land administration relates people to land and informs on the ‘how’, the ‘what’, the ‘who’, the ‘when’ and the ‘where’ of land tenure, land use, land value, and land development. Land administration systems are the basis for recording the complex range of rights, restrictions and responsibilities related to people, policies and places. Effective land administration is fit-for-purpose, appropriate and adequate, interoperable and sustainable, flexible and inclusive, and able to accelerate efforts to document, record, recognize, and monitor people to land relationships in all forms. Effective land administration provides humanity with better access to and security of land and property rights, noting that not all actors can be satisfied with every land administration decision. Effective land administration is able to mitigate issues relating to land as a root cause triggering conflict and supports leaving no one behind - the commitment of the 2030 Agenda for Sustainable Development.

2. The Framework for Effective Land Administration (FELA) with its nine pathways provides the reference and guidance for Member States when establishing, strengthening, co-ordinating and monitoring their land administration nationally or sub-nationally. FELA aligns directly with the overarching and strategic United Nations Integrated Geospatial Information Framework (UN-IGIF), and implements the UN-IGIF for the land sector. The nine pathways of FELA provide a mechanism towards effective leadership, advocacy, mobilization and actions to effectively document, record and recognize people to land relationships in all forms for the well-being of society, environment and economy.

3. At its thirteenth session, held from 2 to 4 August 2023, the Committee of Experts adopted decision [13/109](#) to rename its agenda item to “Integrated geospatial information for effective land administration and management”, and encouraged the Expert Group to work through its identified inventory of issues and to consider the roles of effective land administration in the area of climate change and the integration of the terrestrial, maritime and cadastral domains, including through collaborative activities with partnering international organizations.

4. In this report, the Expert Group provides updates on its progress and workplan for the period 2023–2025, as well as its activities, including the collaborations with the regional committee, functional groups, and other international organizations during the intersessional period. The report also details the fifth meeting of the Expert Group together with an International Seminar on United Nations Global Geospatial Information Management with the theme “Effective land administration”. Additionally, this report updates the Committee of Experts on joint efforts addressing the integration of terrestrial, maritime, built, and cadastral domains, including the technical complexities related to the land-sea interface. This report concludes with information about next steps and considerations for future activities.

5. The Committee of Experts is invited to take note of the report and express its views on the activities and progress of the Expert Group, focusing on improving leadership, advocacy, and awareness of FELA and the merits and benefits of effective land administration at the country-level; the implementation of FELA alongside the UN-IGIF at the country level; the integration of terrestrial, maritime, built and cadastral domains; and working through the inventory of issues and the workplan for the period 2023 – 2025. Points for discussion and decision are provided in paragraph 31.

II. Workplan 2023 – 2025

6. During the intersessional period, the Expert Group began the implementation of its workplan, organized in-person and virtual meetings, supported activities, and collaborated regional committees and functional groups of the Committee of Experts as well with international and regional organizations. The workplan has five focus areas: (a) leadership and advocacy in effective land administration, (b) promote and encourage the implementation of the FELA at the country level, (c) integration of terrestrial, maritime, built, and cadastral domains, (d) innovation in land administration and management to strengthen resilience and sustainability, (e) engagement and collaboration including to further anchor FELA in the programme of work of the Committee.

7. For focus area (a), to advocate and demonstrate leadership in effective land administration, the Expert Group co-organized with the Government of Mexico the fifth meeting of the Expert Group together with an international seminar with the theme on “Effective Land Administration” in Aguascalientes, Mexico from 8 – 11 April 2024. The Expert Group also conducted three virtual meetings and is planning to support a joint side event during the Fourteenth session on integrating terrestrial, maritime, built and cadastral domains. The Expert Group also engages and work with other functional groups of the Committee, in particular, the Working Group on Marine Geospatial Information (WG-MGI) and the Working Group on Policy and Legal Frameworks for Geospatial Information Management, including participating in both online and in-person meetings.

8. For focus area (b), to promote FELA and develop a guide for FELA implementation, the Expert Group collaborates with Commission 7 of the International Federation of Surveyors (FIG) and its Working Group 7.1 – Framework for Effective Land Administration. This collaboration seeks to support Member States with practical guidance in developing, reforming, strengthening, and modernizing effective and efficient land administration. FIG is also collaborating with the European Spatial Data Research (EuroSDR) network. EuroSDR conducted a [research survey](#) and developed a questionnaire related to the implementation of FELA, which FIG Commission 7 plans to adapt for other regions.

9. As part of focus area (b), the Expert Group is expected to provide support to the newly established United Nations Global Geospatial Information Management Regional Committee for the Americas (UN-GGIM: Americas) in addition to Working Group 2 – Cadastre and Land Management of the United Nations Global Geospatial Information Management Regional Committee for Asia and the Pacific (UN-GGIM-AP). The Expert Group participated in panel discussions aimed at exchanging information, raising awareness, fostering dialogue on FELA implementation, and supporting discussions around land issues. At these engagements with working groups of regional committees, the Expert Group was able to promote the exchanging and sharing of country-level experiences to design strategies and direct actions tailored to specific challenges of land administration in their regions. The Expert Group noted the need to improve awareness about FELA in regional committees of the Committee.

10. For focus area (c), a technical discussion was convened on 3 November 2023, in Singapore. The purpose was to gain a better understanding of the data, processes and systems involved in integrating terrestrial, maritime, built, and cadastral domains through cooperative projects and activities among government agencies, research institutions and the private sector. The technical discussion was organized by the Singapore Land Authority (SLA) and supported by the Maritime and Port Authority of Singapore and included the International Hydrographic Organization (IHO), the United Nations Global Geodetic Centre of Excellence (UN-GGCE) and the IHO-Singapore Innovation and Technology Laboratory (IHO-Singapore Lab). The discussion launched a joint effort by the Expert Group, the WG-MGI, the IHO, the UN-GGCE and the IHO-Singapore Lab with the aim to consider and prepare a paper addressing the integration of terrestrial, maritime, built, and cadastral domains and the technical complexities related to the land-sea interface.

11. As part of the focus area (c), in the joint efforts to study the integration of the terrestrial, maritime, built, and cadastral domains, the Expert Group, through its virtual meetings, was informed that MPA, Natural Resources Canada, US National Oceanic and Atmospheric Administration, SLA, UK Hydrographic Office and OGC completed a pilot called Federated Marine Spatial Data Infrastructure (FMSDI) in 2023 that address and mitigate global issues such as storm surge. The outcome of the pilot will inform the joint efforts to address the integration of these domains.

12. For focus area (d), to strengthen resilience and sustainability, the Expert Group recognises the importance of addressing the issues related to integrating the terrestrial, maritime, built and cadastral domains. The Expert Group aims to collaborate with the UN-GGCE and the United Nations Global Geospatial Knowledge and Innovation Centre (UN-GGKIC) to explore general support and technical guidance on integrated geodetic system, long-term sea-level monitoring and digital twins. The Expert Group will continue to collaborate with EuroSDR in its research and survey related to the implementation of FELA in Europe and other regions.

13. For focus area (e), the Expert Group has engaged and collaborated with regional committees and functional groups of the Committee. The Expert Group contributed to the plenary meeting of UN-GGIM-AP held in Bali, Indonesia from 6 – 10 November 2023, and its Executive Board (EB) Meeting held on 6 May 2024 in Sydney, Australia. These engagements further strengthen the exchange of information, and promote coordination by providing updates and activities of the Expert Group to the regional committee. This is a crucial step to continuously develop a strong partnership between the Expert Group and the regional committees. The Expert Group also contributed to several virtual meetings organized by UN-GGIM: Americas focusing on promoting, raising awareness and encouraging the implementation of FELA at the country level.

III. Activities and progress

Fifth meeting of the Expert Group and International Seminar

14. The fifth in-person meeting of the Expert Group was convened in Aguascalientes, Mexico, from 8 – 11 April 2024 in conjunction with the International Seminar on United Nations Global Geospatial Information Management with the theme “Effective Land Administration”. The Government of Mexico through the National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía) (INEGI) hosted the meeting and the international seminar. The four-day event was supported by the Mexican Cadastre Institute (Instituto Mexicano de Catastro) (INMECA) and the Permanent Committee of Cadastre in Latin America (El Comité Permanente de Catastro en Iberoamérica) (CPCI).

15. The meeting included presentations and breakout group work that considered and discussed the inventory of issues identified by the Expert Group, as well as working through key issues including:

- (a) **Digital and mobile access to land information.** The Expert Group expressed the need to embrace new technology to improve the access and wider use of land information. The development in geospatial artificial intelligence (GeoAI) was shared among the participants and the use of GeoAI was recommended for inclusion in the revision to the FELA document.
- (b) **Implementing FELA together with UN-IGIF at country level.** The Expert Group recommended that Member States determine their own “path” and “pace” in implementing FELA. Own “path” means it is the country’s discretion to determine which strategic pathways are applicable and relevant at the point in time based on national circumstances and needs. Own “pace” also meant prioritization, which pathways need or could be achieved sooner when resources are available.
- (c) **Integrating the terrestrial, maritime, built and cadastral domains.** The Expert Group emphasized the importance of integrating the terrestrial, maritime, built and cadastral domains. The Expert Group also highlighted integrating these domains, focusing not only on the technical aspects but also on the economic, administrative and social benefits of integration.
- (d) **Enhancing delivery strategy.** The Expert Group recognised the need to improve the sharing of implementation experiences and approaches with countries and institutions. The focus is on outlining clear implementation steps and highlighting FELA’s benefits. The goal is to demonstrate successful approaches from other countries and support countries. It is emphasized that FELA needs to be tailored to fit unique national circumstances. There is a push for more resources to offer practical guidance, and discussions are underway about creating simpler documents, such as scientific papers and good practices, to promote awareness about the advantages of effective land administration and FELA.
- (e) **Gathering resources.** Expert Group encourages its members who have a wealth of knowledge and resources related to effective land administration, such as publications, online courses, training materials, research findings, and guidelines, to share with others. Efforts are being made to collect and re-

organize materials already available to support countries in improving their land administration practices.

- (f) **Diversity in Expert Group.** The Expert Group suggested expanding the diversity and representation within the Expert Group by inviting experts from different levels of government, academia, private sector and minority groups to provide perspectives. This will allow for broader views and perspectives, and support for varied needs when implementing FELA.
- (g) **Merits and benefits of effective land administration.** The Expert Group discussed the efforts to achieve the Sustainable Development Goals (SDGs). The importance of leveraging new technologies and reliable data sources, particularly from satellites and advancements in three-dimensional technology was highlighted. The Expert Group emphasized the need for detailed data capture and the maintenance of authoritative datasets.
- (h) **Partnerships and innovations for effective land administration.** Collaboration is vital for integrating data from different domains, underscoring the importance of forums that promote dialogue and engagement, share data and establish authoritative models. The Expert Group recognized the importance of aligning partnerships with policy frameworks.

16. The Expert Group welcomed and deliberated on the General Assembly resolution titled “Seizing the opportunities of safe, secure and trustworthy artificial intelligence systems for sustainable development”. The Expert Group explores the potential application of Artificial Intelligence (AI) in future land administration and management systems and emphasizes the significance of the recommendations from the General Assembly resolution in the development and implementation of FELA at the country level. Moreover, the significant role of AI in future geospatial information management, including the development of AI laws and systems in collaboration with stakeholders, was recognized.

17. The Expert Group expressed its utmost appreciation to the National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía) (INEGI) of Mexico for the fruitful and successful fifth meeting of the Expert Group and international seminar. The hospitality of the host country, the open discussions, interactions, and networking at the event have again proven that such a face-to-face meeting is irreplaceable by virtual meetings and is instrumental in forging stronger partnerships, engagements and collaborations among Member States. The Expert Group appreciated the support of INMECA and CPCI which greatly enriched the interactions, engagement and exchanges of knowledge and experiences.

18. The Expert Group convened its fifteenth virtual meeting on 2 November 2023 to update members about the Thirteenth session and the progress of the workplan. The sixteenth virtual meeting, held on 27 June 2024, allowed the Expert Group to prepare for the Fourteenth session from 7 – 9 August 2024.

UN-GGIM-AP Working Group 2 – Cadastre and Land Management

19. The Indonesian Geospatial Information Agency (Badan Informasi Geospasial, BIG) hosted the Twelfth plenary meeting of UN-GGIM-AP together with the Asia Pacific Forum with the theme “Embracing Geospatial Innovation for Sustainable World” from 6 – 10 November 2023 in Bali, Indonesia. The Expert Group participated in the 5-day event and interacted and worked with UN-GGIM-AP Working Group 2 to align its resolutions with the workplan of the Expert Group. The resolutions of Working Group 2 now aim i) to recognize the importance of the strategic workplan of the Expert Group, ii) to facilitate the implementation of the workplan of the Expert Group at the regional level, such as the FELA implementation, and iii) to encourage Member States in Asia and the Pacific region to engage in FELA.

20. At the UN-GGIM-AP Executive Board (EB) Meeting on 6 May 2024 held in conjunction with the Locate24 conference from 7 – 9 May 2024 in Sydney, Australia, recent activities and updates of the Expert Group were shared with the participants of the meeting. The aim was to continuously exchange knowledge and information to leverage synergies and avoid duplication of work with the regional committee.

Sixth expert meeting of Working Group on Marine Geospatial Information

21. The sixth expert meeting of the Working Group was held in Bali, Indonesia, from 4 – 8 March 2024. The Working Group acknowledged the leadership of the Expert Group on the integration of terrestrial, maritime, built and cadastral domains and will collectively leverage focus group modality, to involve other functional groups (e.g., the Working Group on Policy and Legal Framework for Geospatial Information Management, the UN-GGCE, the IHO, the Singapore-IHO Lab) in addressing this integration of domains.

22. As agreed with the Working Group, the initial focus of the joint efforts shall be on the land-sea interface and its technical complexities related to vertical reference (height datum). The Working Group also recommended convening a combined side event at the Fourteenth session to discuss the issues on the integration of terrestrial, maritime, built and cadastral domains jointly with other functional groups.

International Federation of Surveyors

23. FIG Commission 7 and its Working Group 7.1 – FELA continue to focus on communicating, promoting and raising awareness of the merits and benefits of effective land administration. The Commission and its Working Group presented its updates at FIG Commission 7 Annual Meeting in Deventer, the Netherlands from 2 – 4 October 2023, and FIG Working Week in Accra, Ghana, 19 – 23 May 2024. It is also expected that a session on FELA will be organized at the 2024 FIG Commission 7 Annual Meeting in Kuching, Malaysia, from 24 – 26 September 2024, to advocate for FELA and share information on the implementation of FELA and development of resource materials.

24. FIG is creating a repository for documents about FELA and its implementation including scientific papers at the International Office for Cadastre and Land Records (OICRF) hosted by the Netherlands and is working on a FIG Publication on FELA. In addition, FIG is conducting research on the implementation of FELA with other institutions, including cadastral and cartographic organisations in Europe, and plans to extend this research to other regions as well.

Open Geospatial Consortium

25. The OGC pilot on FMSDI had been completed at the end of 2023. The pilot was sponsored by MPA, Natural Resources Canada, the US National Oceanic and Atmospheric Administration, SLA, and the UK Hydrographic Office. The study areas cover the geographic regions of the Arctic, Caribbean, and Singapore. Tapping on global expertise, the pilot developed scenario-based prototypes to support long and near-term decision-making and experimental evaluation using digital twins that connect land and sea. The pilot also posed certain challenges such as in handling different resolutions and formats of datasets and harmonising land and sea datums. The engineering report and prototypes are available publicly. Member States, especially the Small Island Developing States (SIDS), are encouraged to read the report and further utilise the prototypes for outreach, testing and experimentation purposes.

Standards development and FELA publications

26. During the intersessional period, progress has been made in standard development. Parts of the ISO 19152 Land Administration Domain Model (LADM) II have been approved by ISO and OGCLADM Standards Working Group. The Social Tenure Domain Model (STDM) has also been extended to capture the valuation of unregistered land and overall STDM is being applied in the context of conflict and migration. EuroSDR has a publication on pathways I, II, and III of FELA, available publicly, while publication on pathways IV, V, and VI is currently under development.

IV. Integration of terrestrial, maritime, built and cadastral domains

27. The Expert Group is leveraging the focus group modality and to involve other functional groups and international organizations to work on the integration of terrestrial, maritime, built and cadastral domains through virtual meetings, combined side events at the annual sessions, and in-person technical discussions whenever possible. The paper is anchored by the nine strategic pathways of the UN-IGIF and emphasizes not only on

“what”, but also “how” and “why now” to address the integration of the terrestrial, maritime, built and cadastral domains.

28. In partnership with WG-MGI, the Expert Group has begun engaging Member States for use cases and lessons learned which will be documented in the proposed paper. The Expert Group aims to collaborate with other functional groups and international organizations to jointly develop the paper. The paper will be jointly developed in a progressive manner (i.e., in phases) due to the scope, which can be overwhelming, and has to be covered. The initial focus will be on the land and sea interface and its technical complexities before delving into other integration aspects within these joint efforts.

V. Next steps

29. The Expert Group continues to implement its agreed workplan and activities including encouraging the voluntary translation of the FELA into languages other than English. Presently, FELA has been translated into Arabic, Chinese, Dutch, French and Spanish by its members. These volunteered translation efforts support the raising of awareness, promote better understanding, and encourage the implementation of FELA at the national and sub-national levels. The Expert Group welcomes further volunteered efforts from Member States to translate the FELA into other languages.

30. The Expert Group aims to continue advocating, raising awareness of and promoting the benefits of effective land administration and the implementation of the FELA. The Expert Group intends to support, as appropriate, relevant activities organized by its members and partners as well as regional committees and functional groups of the Committee of Experts. This may include the upcoming FIG Commission 7 Annual Meeting that will incorporate the international workshop on land administration domain model (LADM) as well as the annual meeting of FIG Commission 5 and Global Land Tool Network (facilitated by UN-Habitat) meeting on social tenure domain model. The participation of the Expert Group in these activities is crucial, including staying abreast of and contributing to the developments in international standards such as ISO 19152 – Land Administration Domain Model (LADM).

VI. Points for Discussions

31. **The Committee of Experts is invited to:**

- (a) Take note of the present report, express its views and provide guidance on the work, progress and activities of the Expert Group including joint efforts in address the integration of terrestrial, maritime, built and cadastral domains;**
- (b) Provide views and guidance to further improve leadership, advocacy, and awareness of the Framework for Effective Land Administration (FELA) together with the merits and benefits of effective land administration at the country-level;**
- (c) Express its view on the engagement, collaboration and partnerships to support better awareness and coordination for the implementation of the FELA according to national circumstances and needs; and**
- (d) Express its appreciation to the Government of Mexico and the National Institute of Statistics and Geography (INEGI) for successfully hosting the fifth meeting of the Expert Group together with an international seminar from 8 – 11 April 2024 in Aguascalientes.**