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Access to Information, Public Participation
in Decision-making and Access to Justice
in Environmental Matters

Working Group of the Parties

Twenty-fourth meeting
Geneva, 1–3 July 2020
Item 3 (b) of the provisional agenda
Substantive issues: access to information

Draft updated Recommendations on the more effective use of electronic information tools*

Prepared by the Chair of the Task Force on Access to Information

Summary

 The present document was prepared under the auspices of the Task Force on Access to Information pursuant to decision VI/1 on promoting effective access to information (ECE/MP.PP/2017/2/Add.1, para. 13 (b) (i)), adopted by the Meeting of the Parties to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) at its sixth session (Budva, Montenegro, 11–14 September 2017). Through this decision, the Meeting of the Parties requested the Task Force on Access to Information to update the Recommendations on the more effective use of electronic information tools to provide public access to environmental information set out in decision II/3 on electronic information tools and the clearing-house mechanism (see ECE/MP.PP/2005/2/Add.4, annex).

 The document is based on the outcomes of the consultation on the update of the Recommendations in advance of the sixth meeting of the Task Force on Access to Information (Geneva, 3 and 4 October 2020), comments received at the meeting and follow-up consultation in advance of the twenty-fourth meeting of the Working Group of the Parties to the Convention.

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 * Preparation of the present document was supported by a consultant with expertise in electronic information tools commissioned by the Convention secretariat.

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Introduction

1.   Through decision VI/1 (see ECE/MP.PP/2017/2/Add.1) adopted by the Meeting of the Parties to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters at its sixth session (Aarhus Convention) (Budva, Montenegro, 11–14 September 2017), the Meeting of the Parties recognized that effective public access to environmental information is critical for the successful implementation of a number of Sustainable Development Goals and for supporting the work on a data revolution, and is specifically targeted by Sustainable Development Goal 16 (target 10).

2.   Furthermore, the Meeting of the Parties reviewed the summary report of the Task Force on Access to Information containing the results of the survey on the implementation of the Recommendations on the more effective use of electronic information tools to provide public access to environmental information set out in decision II/3 (see ECE/MP.PP/WG.1/2017/4, annex, and AC/WGP-21/Inf.2).[1] The Meeting of the Parties recognized the need to ensure that modern information and communication electronic tools be fully employed so as to safeguard the effective implementation of the information pillar of the Aarhus Convention.

3.   In that regard, the Meeting of the Parties requested the Task Force on Access to Information to promote, among other things, active dissemination of environmental information, with the focus on the update of the Recommendations on the more effective use of electronic information tools to provide public access to environmental information set out in decision II/3 (see ECE/MP.PP/2005/2/Add.4, annex) (hereinafter - Recommendations), taking into account the developments regarding the Shared Environmental Information System, geospatial information management, Earth observation data, e-government, open government data, reuse of public sector information and other relevant initiatives across the region and recent technical developments.

4.   Parties, Signatories, other interested States Members of the United Nations, non-governmental organizations (NGOs), international organizations, academia and other interested stakeholders were invited to participate in the consultation on the update of the Recommendations in advance of the sixth meeting of the Task Force on Access to Information (Geneva, 3 and 4 October 2020) by submitting case studies and drafting proposals. The Task Force discussed the outcomes of the consultations and took note of further comments and proposals presented at the meeting and sent afterwards by 1 November 2019.[2]

5.   Following the first round of consultation, the draft updated Recommendations were prepared by the Chair of the Task Force on Access to Information with the assistance of the secretariat, taking into account:[3]

        (a)   The drafting proposals and case studies received to date (AC/TF.AI-6/Inf.3 and Add.1) and further comments received;

        (b)   The summary report on the results of the survey on the implementation of the recommendations on electronic information tools (ECE/MP.PP/WG.1/2017/4, annex, and AC/WGP-21/Inf.2) and the questionnaire to assess implementation of the Recommendations of the Meeting of the Parties on Electronic Information Tools (AC/TF.AI-5/Inf.2);[4]

        (c)   The outcomes of the discussion by the Task Force on Access to Information at its sixth meeting and the Workshop on Open Data for the Environment (Geneva, 2 October 2019) organized by the United Nations Economic Commission for Europe (ECE) and the European Environment Agency back-to-back with the sixth meeting (ECE/MP.PP/WG.1/2020/3 and annex);

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[1]   Available under tab marked "Intersessional docs" at www.unece.org/env/pp/aarhus/mop6_docs.html .

[2]   Available at www.unece.org/index.php?id=50574 .

[3]   Unless otherwise specified, the documents listed in the present paragraph are available at www.unece.org/index.php?id=50574 .

[4]   Available at www.unece.org/env/pp/aarhus/tfai5.html .

(d)   The outcomes of the capacity-building activities carried out by the Parties and partner organizations; in particular the outcomes of a project commissioned by the European Commission on the promotion of good practices for national environmental information systems and tools for data harvesting at the European Union level[5] and a European Environment Agency project on further implementation of the Shared Environment Information System principles in the six Eastern Partnership countries funded by the European neighbourhood instrument.[6]

6.   Parties, Signatories, other interested States Members of the United Nations, NGOs, international organizations, academia and other interested stakeholders were invited to participate in the next round of the consultation on the draft updated Recommendations in advance of the twenty-fourth meeting of the Working Group of the Parties (online sessions, 1–3 July 2020) and provided their comments, which were published on the consultation web page.[7]

7.   The draft updated Recommendations were further revised by the Chair of the Task Force on Access to Information with the assistance of the secretariat, taking into account the comments received.[8]

8.   Owing to the conflicting nature of some comments, it was not possible to reflect every comment in the final text; consequently, the final content of the present draft should be seen as a compromise text. In the face of conflicting comments regarding the wording of a particular recommendation, the approach that was the most consistent with the language and spirit of the Convention was preferred. Careful consideration was also given to meeting the different needs of Parties in terms of comprehensiveness and the degree of detail in the guidance, bearing in mind the various levels of and approaches to implementation of the Convention's provisions. For some recommendations, wording such as "a good practice", "best available standard" and "best available state-of-the-art digital technology" has been used throughout the text in order to offer possibilities to those interested in applying such practices, standards and technologies. New substantive changes and editorial revisions are shown in track changes in the accompanying document AC/WGP-24/Inf.12.

9.   The current draft updated Recommendations (see annex to the present document) include the following sections:

    I.   Purpose;

    II.   General policy;

    III.   Priority types of information and its accessibility;

    IV.   Tools and infrastructure;

    V.   Engagement of the public, operators and other interested stakeholders;

    VI.   Governance, institutional development and capacity-building;

    VII.   Clearing-house mechanism.

10.   The current draft updated Recommendations are also accompanied by an addendum (ECE/MP.PP/WG.1/2020/14/Add.1), which provides supporting explanatory notes on terminology, data-sharing principles, data-management principles, standards for a digital environmental information system and approaches to a single one-stop web access point (portal) for use therein.

11.   The updated Recommendations will aim to assist Parties, Signatories and other interested States in supporting the implementation of the Convention through the

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[5] See www.eis-data.eu/ .

[6] See https://eni-seis.eionet.europa.eu/east .

[7] Available at www.unece.org/environmental-policy/conventions/public-participation/aarhus-convention/tfwg/task-force-on-access-to-information/consultation-on-the-recommendations-on-electronic-information-tools.html .

[8] Available at www.unece.org/environmental-policy/conventions/public-participation/aarhus-convention/tfwg/task-force-on-access-to-information/consultation-on-the-recommendations-on-electronic-information-tools.html .

development, maintenance, upgrade and use of electronic information tools by applying common approaches and standards. In addition, they will support efforts to implement other relevant international commitments, such as environment-related Sustainable Development Goal and targets, the Paris Agreement and other multilateral environmental agreements, the Sendai Framework for Disaster Risk Reduction 2015–2030, a number of Human Rights Council resolutions, in particular resolutions 20/8 on the promotion, protection and enjoyment of human rights on the Internet (see A/HRC/RES/23/2), 23/2 on the role of freedom of opinion and expression in women's empowerment (see A/HRC/RES/23/2), 31/32 on protecting human rights defenders, whether individuals, groups or organs of society, addressing economic, social and cultural rights (see A/HRC/RES/31/32), 37/8 on human rights and the environment (see A/HRC/RES/37/8) and 40/11 on recognizing the contribution of environmental human rights defenders to the enjoyment of human rights, environmental protection and sustainable development (see A/HRC/RES/40/11), and relevant pledges under the framework of the World Meteorological Organization, the World Health Organization, the United Nations Environment Assembly of the United Nations Environment Programme, the "Environment for Europe" Ministerial Conference and the Group on Earth Observations. Lastly, they will aim to enhance knowledge-sharing and technology transfer to overcome digital divide and all aspects related thereto.

12.   Further steps in the preparatory process are outlined in the Indicative timeline for the update of the Recommendations on Electronic Information Tools (AC/TF.AI-6/Inf.2).

Annex

Draft updated Recommendations on the more effective use of electronic information tools

The Meeting of the Parties recommends that Parties, Signatories and other interested States undertake the following measures:

I. Purpose

1.   The present Recommendations aim to assist Parties, Signatories and other interested States in supporting the implementation of the Convention through the promotion of the development, maintenance, upgrade and use of electronic information tools by applying common approaches and standards. In addition, they will support efforts to implement other relevant international commitments;

2.   For the purposes of the Recommendations, supporting explanatory notes on terms and approaches are provided in the addendum to the present document;

II. General policy

3.   Develop and adopt national/state strategies aimed at promoting electronic tools to facilitate administrative processes and services relevant for assisting the public, especially those in vulnerable situations, to exercise their rights under the Convention, such as "e-government", "open government", "open data" and the "digital transformation";

4.   Take the necessary legislative, regulatory, institutional, practical and other measures to implement the above-mentioned strategies so as to make public administration more transparent, accountable and efficient in: providing environmental information of appropriate quality and dealing with requests for such information from the public; facilitating public participation in decision-making; and assisting the public in obtaining access to justice;

5.   While applying the above-mentioned measures, take into account the cross-cutting nature and comprehensive scope of environmental information under the Convention, and promote interoperability and data exchange between different information systems – such as environmental, geospatial, statistical, meteorological, health, Earth observation and other relevant systems – guided by the best available international standards (see also sections III and IV below and the addendum to the present document);

6.   Develop, where missing, continuously maintain and update a nationwide digital environmental information system using the best available state-of-the-art digital technologies, in accordance with the approach of "open by design and by default" (see also section IV below and the addendum to the present document, chaps. II, III and IV). The system should contain up-to-date and historical data and information, as described in paragraph 20 below, and be well structured to: inform evidence-based decision-making and policy development relating to environmental matters; enhance early notification measures; support measuring and reporting of progress towards the achievement of relevant internationally and nationally agreed goals and targets; identify emerging environmental risks and vulnerabilities; support a multi-hazard early warning system; and promote environmental awareness among the public and other stakeholders;

7.   Take the necessary measures to reduce and remove social, financial and technological barriers that restrict public access to environmental information through telecommunications networks, such as high connection costs and poor connectivity, and a lack of computer literacy; enhance the inclusive use of digital technologies and electronic information tools to promote the exercise of their rights under the Convention by groups and communities in vulnerable situations, such as children, older persons, women in some societies, migrants, persons with disabilities, indigenous peoples, persons with low literacy skills or facing

language barriers, ethnic or religious minorities, economically disadvantaged groups and persons without feasible access to the Internet, television or radio;[1]

8. Promote and use electronic information tools to facilitate public input to and monitoring of decision-making in environmental matters, among other things, to:

      (a)   Alert the public to opportunities to participate;

      (b)   Ensure that the public can provide publicly documented feedback on proposed activities, plans, programmes, policies and legally binding instruments electronically;

      (c)   Ensure that submissions received electronically are given equal weight to comments received non-electronically;

9. Ensure the mobilization and sufficient allocation of resources to design, develop, continuously maintain and upgrade electronic information tools to support the implementation of the Convention using best available state-of-the-art digital technologies; use the gains from a reduction in the administrative burden of public authorities, especially from processing information requests, and the associated cost savings from improved efficiency to contribute to resource mobilization;

10. Promote and contribute to international policy dialogue on the use of electronic information tools for public access to environmental information and public participation in decision-making in environmental matters through the exchange of experience and the dissemination of good practices, the transfer of know-how and the provision of technical assistance, as well as actively contribute to the development of a global environmental data strategy under the auspices of the United Nations Environment Programme;

11. Use and further develop existing schemes for the transfer of technology and expertise so as to overcome or reduce the digital divide and all aspects related thereto – for example, through bilateral and multilateral projects or partnerships – and promote digital inclusion, especially in remote areas, and gender and intergenerational equality. Where resources are available, establish and, in the case of donor countries, international financial institutions and other partner organizations, provide financial and technological support for, new schemes for the transfer of technology and expertise;

12. Base the provision, form and content of electronic information tools on user needs identified through surveys, the evaluation of the effectiveness of the tools, citizen science data, user feedback mechanisms, foresight methodologies and other user research tools in accordance with good practices; monitor and assess the impact of the information delivered, in order to raise environmental awareness; facilitate effective access to information, public participation and other public engagements in environmental matters;

13. Ensure that the mandatory systems established to provide an adequate flow of information to public authorities about proposed and existing activities which may significantly affect the environment are continuously maintained and upgraded using best available state-of-the-art digital technologies and international interoperability and other standards;[2]

14. Improve accessibility to environmental data and its quality, interoperability and governance to maximize the benefits of a nationwide digital environmental information system; encourage the integration of big data, including, but not limited to, remotely sensed data and data from other complementary sources, as appropriate, into a nationwide digital environmental information system to facilitate environmental monitoring, timeliness,

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[1] See also Human Rights Council resolutions 20/8 on the promotion, protection and enjoyment of human rights on the Internet (see A/HRC/RES/20/8), 23/2 on the role of freedom of opinion and expression in women's empowerment (see A/HRC/RES/23/2) and 31/32 on protecting human rights defenders, whether individuals, groups or organs of society, addressing economic, social and cultural rights (see A/HRC/RES/31/32); and paragraph 20 of the Maastricht Recommendations on Promoting Effective Public Participation in Decision-making in Environmental Matters (see ECE/MP.PP/2014/2/Add.2).

[2] Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention), art. 5 (1) (b) and (9).

openness and spatial-temporal coverage of data and its cost-efficiency, usefulness for discovering trends, reanalysis, forecasts and projections, and for cross-thematic analysis;

15.   Support and use open science and open research data initiatives, based on robust and scientific methodologies, to inform environmental policymaking and facilitate transparent public discussions;

16.   Promote the use of citizen science, crowdsourcing and local and indigenous knowledge through electronic information tools to support the performance of public functions and the provision of public services related to environmental monitoring and to promote environmental awareness among the public (see section V below);

17.   Promote multilingual electronic information tools by providing information in the national language(s) and at least basic information of interest to the international community in the official languages of the United Nations;

18.   Disseminate good practices related to the application of the Convention at the national/state, subnational and local levels in areas outlined in paragraph 20 below, and share information on such good practices through the Convention's clearing-house mechanism;[3]

19.   Provide information on the implementation of the present recommendations, including on the obstacles encountered and how they could be overcome, through the Convention's national implementation reports, so as to support the review of progress in the implementation of the Convention and the exchange of experiences under its relevant bodies in this area;[4]

III.   Priority types of information and its accessibility

20.   Ensure, where necessary through the introduction of appropriate legislative or regulatory measures, that, subject to article 5 (10) of the Convention:

(a)   Public access to environmental information is provided in electronic form and made available through the Internet, so that information required to be publicly available under the Convention is provided in electronic form where so requested and where the information exists in that form or can be readily converted to that form at reasonable cost;

(b)   Documentation which is required to be drawn up and/or submitted in the context of decision-making procedures in environmental matters that are subject to the provisions of articles 6, 7 and 8 of the Convention is required to be provided in electronic form and is progressively made accessible to the public through the Internet;

(c)   A nationwide digital environmental information system supports public access to real-time and other dynamic and historical, up-to-date, accurate and quality-controlled, comprehensive, standardized and functional environmental information and this information is made discoverable and accessible through the Internet in forms and formats meeting the needs of different users;

(d)   The following types of information progressively become publicly accessible, in a timely manner, through the Internet, preferably through a one-stop web access point:

(i)   Reports on the state of the environment;[5]

(ii)   Texts, including consolidated versions, of legislation, regulations, rules and other legally binding instruments relating to the environment and their drafts;[6]

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[3] See ECE/MP.PP/2005/2/Add.4, decision II/3, para.2; and section VII of the present recommendations;

[4] See Format for Aarhus Convention implementation report (ECE/MP.PP/2011/2/Add.1, decision IV/4, annex, questions XI–XIV).

[5] Aarhus Convention, art. 5 (3) (a) and (4).

[6] Ibid., arts. 5 (3) (b) and (5) (a) and 8 (b).

(iii)   Texts, including consolidated versions, of policies, plans and programmes relating to the environment, and environmental agreements and their drafts;[7]

(iv)   International treaties, conventions and agreements on environmental issues, decisions and reports relevant to their implementation and compliance at the national/state level, including findings and recommendations of the Convention's Compliance Committee concerning the Party in question, and environmental performance reviews conducted upon request of the country;[8]

(v)   Data on releases and transfers of pollutants within the scope of the Convention;[9]

(vi)   Documentation related to environmental impact assessments, state ecological expertise, licensing or permitting processes subject to the provisions of article 6 of the Convention (for example, public notices, applications, risk assessment and other studies, all other relevant documentation, comments of third parties, draft and final decisions and attached conditions) where it is held in, or can be readily converted to, electronic form. Where it is not available in electronic form and cannot be converted to electronic form at reasonable cost, a reference to where such documentation can be accessed;[10]

(vii)   Documentation related to strategic environmental assessment or other processes of preparing plans, programmes or policies relating to the environment subject to the provisions of article 7 of the Convention (for example, public notices, all other relevant documentation, including risk assessment and other studies, economic analysis and assumptions, comments of third parties, draft and final decisions) where it is held in or can be readily converted to electronic form. Where it is not available in electronic form and cannot be converted to electronic form at reasonable cost, a reference to where such documentation can be accessed;[11]

(viii)   All information which could enable the public to take measures to prevent or mitigate harm arising from an imminent threat to human health or the environment, whether caused by human activities or due to natural causes;[12]

(ix)   Information on mechanisms related to access to justice, and decisions and reports of courts, information commissioners, Ombudsmen and other national human rights institutions and review bodies related to environmental matters;[13]

(e)   To the extent feasible and appropriate, the following types of information progressively become publicly accessible, in a timely manner, through the Internet, preferably through a one-stop web access point:

(i)   Environmental monitoring data[14] held by or on behalf of public authorities, including spatially attributed historical and dynamic data, both primary and processed, regarding quality and pollution of air, soil, water and other elements of the environment;

(ii)   Other environmental information, such as big data or space-based data, and data contained in electronic databases, registers, cadastres and inventories;[15]

(iii)   Product-specific data and information, such as those on material and energy efficiency, toxicity, material composition, durability, repairability and recycling, to enable consumers as well as other actors in value chains (for example, market

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[7] Ibid., art. 5 (3) (c) and (5) (a).

[8] Ibid., art. 5 (5) (b) and (c); and the Almaty Guidelines on Promoting the Application of the Principles of the Aarhus Convention in International Forums (ECE/MP.PP/2005/2/Add.5, annex).

[9] Aarhus Convention, art. 5 (9).

[10] Ibid., arts. 5 (3) (d) and 6.

[11] Ibid., arts. 5 (3) (d) and 7.

[12] Ibid., art. 5 (1) (c).

[13] Ibid., art. 9, in particular (4) and (5).

[14] Ibid., art. 5 (2) (b) and (c), (3) (d), (7) (a) and (9).

[15] Ibid., article 5 (2) (b) and (c), (3) (d), (7) (a) and (9).

surveillance and waste management) to improve their environmental performance;[16] cooperation with the private sector being essential in ensuring provision of this information. Examples include product databases, digital product passports, eco-labelling, energy efficiency and eco-auditing schemes and environmental product declarations;

(iv)   Good practice information and guidelines on better environmental management, sustainable consumption and production, best available techniques, green procurement, green and circular economy and sustainable development;[17]

(v)   Environmental monitoring, pollution, waste-related and other environmental data and information crowdsourced by a public authority, obtained with the use of public funds or supplied to the public authority by a third party;[18]

(vi)   Information on environmental enforcement and compliance;[19]

(vii)   Information on funded environmental projects, including international projects, revenues and expenditures of environment-related funds, public procurement and other public records on the performance of public functions or the provision of public services relating to the environment by government at all levels;[20]

(viii)   Standardized metadata so that the data source, date of its production and update, restrictions, production, verification and validation methods, processes, legal obligations, and context of data and information collection and management are transparent, allow data discoverability and mining, machine-to-machine communication, use and reuse (see also chapter IV of the addendum to the present document);[21]

(ix)   Metainformation, including catalogues of data sources and details of the scope of information held by public authorities and mechanisms for the provision of access to environmental information;[22]

(f)   The report on the state of the environment,[23] to be published and disseminated in accordance with article 5 (4) of the Convention, and to include information on the quality of the environment and information on pressures on the environment, should be based on national/state environmental indicators and on the relevant indicators of Sustainable Development Goals, or on environmental indicators agreed under ECE[24] or under other international processes. The report should provide references to underlying data sets from a nationwide pollutant release and transfer register and other sources, as appropriate. The report should be prepared through an inclusive consultation process with all interested members of the public and other stakeholders;

(g)   Ensure that summaries and press releases relating to the information listed in subparagraphs (d)–(f) above provide a reference to the sources where these underlying data and information can be traced and accessed by the public;

(h)   Open licences should be issued to promote the use and reuse of environmental information. However, in some cases justified by a public interest objective, a licence may be issued imposing conditions on the reuse by the licensee dealing with issues such as liability, the protection of personal data, the proper use of documents, guaranteeing non-alteration and the acknowledgement of source. If public authorities license environmental information for reuse, the licence conditions should be objective, proportionate and non-discriminatory and in accordance with articles 4–8 of the Convention;

[16] Ibid., art. 5 (6) and (8).
[17]   Ibid., art. 5 (7) (b).
[18] Ibid., art. 5 (1) (b) and (9).
[19] Ibid., arts. 5 (7) (c) and 9 (3).
[20] Ibid., art. 5 (2) (b) and (c), (3) (d), (7) (c) and (9).
[21] Ibid., art. 5 (2) (b) and (c), (3) and (9).
[22] Ibid., art. 5 (2).
[23] Ibid., art. 5 (3) (a) and (4).
[24] See http://www.unece.org/env/europe/monitoring/iandr_en.html .

21. The term 'progressively' in article 5 (3) of the Convention and in paragraph 20 (d) and (e) above should imply demonstrable progress with regard to the following parameters:

(a) The proportion of members of the public that have electronic access;

(b) The scope and quality of information that is electronically accessible;

(c) The quality of electronic access;

(d) The level of understanding of user needs;

(e) The extent to which user needs are being met;

and that such progress should be communicated to the public, including through the report on the state of the environment;

IV. Tools and infrastructure

22. Environmental information can be disseminated to the public using various electronic information tools, as appropriate, including:

(a) Websites of public authorities performing public functions, or providing public services related to the environment at the national, subnational and local levels;

(b) Single one-stop web access point (hereinafter – environmental portal) for environmental information, including types of information listed in section III above;[25]

(c) Open Data portal;

(d) General government or e-government portal;

(e) Portals of other key providers of information as relevant with respect to legislation, case law, law-making, justice and other legal, policy and public records information;

(f) Widgets;

(g) Mobile applications;

(h) Social media and online media;

(i) Email alerts;

(j) Tools to access environmental information through bar-code or quick-response (QR)-code scanning;

(k) Tools to access environmental information through touch-tone dialling;

(l) Short message services (SMS) and mobile messaging applications, including chatbots;

(m) Public electronic information kiosks;

(n) Telephone hotline;

(o) Television teletext;[26]

23. Develop, if missing, and continuously maintain and upgrade an environmental portal based on the nationwide digital environmental information system, to: ensure effective public access to information through the Internet; promote environmental education and awareness; and support effective public participation in decision-making and other public engagements in environmental matters (see chapter V of the addendum to the present document);

24. Ensure that databases, registers, lists, inventories, cadastres and other resources containing environmental information listed in section III above are developed, continuously maintained and converted, where possible, or upgraded in digital form by default as integral

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[25] See ECE/MP.PP/2017/2/Add.1, decision VI/1, para. 3.
[26] Aarhus Convention, art. 5 (3).

parts of the nationwide digital environmental information system. A modular approach can be used to allow an autonomous upgrade of different integral parts as needed;

25. Ensure that the environmental portal:

(a) Is user-friendly and promotes user customization and accessibility;

(b) Aggregates data and information resulting from different sources or provides visible links to other thematic portals (see chapter V of the addendum to the present document);

(c) Supports the implementation of the national "e-government", "open government", "open data" and "the digital transformation" frameworks;

(d) Supports the implementation of the Shared Environmental Information System principles (see chapter III of the addendum to the present document);

(e) Supports the implementation of the Group on Earth Observation data-sharing principles and data-management principles covering the entire data life cycle (see chapter II of the addendum to the present document);

(f) Promotes machine-to-machine communication and interoperability with statistical, geospatial, health and other information systems throughout the technical, semantic and legal dimensions;

(g) Allows for the use of cloud computing services and other best available state-of-the-art digital technologies;

26. Promotes the development, continuous maintenance and upgrade of online portals providing access to legislation, case law, law-making, justice and other legal, policy and public records information systems using best available international standards and state-of-the-art digital technologies. Resources of such systems should be properly categorized according to the relevant environmental matters and made discoverable and accessible to the public in accordance with the Convention through these portals and environmental portal;[27]

27. To support effective public participation in decision-making in environmental matters,[28] the following tools can be used, without neglecting the need for traditional means of communication, such as official noticeboards, placards at proposed activity sites, notices in appropriate print and online local, regional or nationwide newspapers and television media:

(a) Electronic official noticeboards of the public authorities;

(b) Public advisory e-committees;

(c) Web meetings;

(d) Public e-consultations platforms;

(e) E-petitions platforms;

(f) Social media groups;

(g) Mobile messaging applications, including chatbots;

(h) Teleconferences;

28. In case of any imminent threat to human health or the environment, ensure that all information is disseminated immediately and without delay to members of the public who may be affected.[29] Encourage the establishment of a multi-hazard early warning system; the use of emergency telephone numbers, mobile messaging applications, including chatbots, radio emergency networks, media, including traditional media and social media, online portals and mobile applications used for the routine dissemination of environmental

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[27] Ibid., arts. 5 (3) (b) and (c) and (5) and 7–9.

[28] Ibid., arts. 5 (3) (d) and (7) and 6–8; and Maastricht Recommendations on Promoting Effective Public Participation in Decision-making in Environmental Matters (ECE/MP.PP/2014/2/Add.2).

[29] Aarhus Convention, art. 5 (1) (b) and (c), (6) and (9).

information to provide information in case of imminent threat to human health or the environment in forms and formats meeting the needs of different users;

29.   Electronic information tools progressively should contain an open application programming interface to provide data and metadata as appropriate, supported by clear technical documentation that is complete and available online. The set-up and use of the application programming interface should be based on several principles: availability; stability; maintenance over life cycle; uniformity of use and standards; user-friendliness; and security. If open application programming interfaces are not possible, electronic information tools should contain a publicly available justification;

30.   Ensure the availability of machine-readable, user-friendly and open formats for the data and information listed in section III above in a way that they can be shared and reused (see chapter IV of the addendum to the present document);

31.   Ensure continuous maintenance and update of electronic information tools and their content, including links, information on the reliability of the information sources and dates of the last updates. If a public authority can no longer make available certain environmental information or electronic information tools for use or reuse, or has to cease updating that information or those tools, it should make this publicly known and give reasons, at the earliest opportunity, by electronic means where possible;

32.   Promote and support efforts towards the development of methodologies, mobile applications and tools to provide the public with accessible, comprehensive, up-to-date and comparable information on the environmental impact of products that enables consumers to make informed environmental choices;

33.   Encourage the use of pilot and lab-based projects and state-of-the-art public engagement processes to develop and upgrade electronic information tools or to apply new or emerging digital technologies, including cloud computing services, open data cubes, artificial intelligence, machine learning, blockchain, linked data, text mining, autonomous technologies for drones and other unmanned aerial vehicles, and the Internet of things;

V. Engagement of the public, operators and other interested stakeholders

34.   Provide opportunities for public participation in the design, development and upgrade of electronic information tools taking into account good practices to ensure that the needs of different users are met;

35.   Take appropriate measures in accordance with best available international standards to render electronic information tools more accessible to the users – in particular to older persons, persons with disabilities, persons with low literacy skills or facing language barriers and other persons in vulnerable situations – by making them user-friendly, operable, understandable and robust;

36.   Implement the onboarding for different types of potential users (for example, decision-makers, the scientific community and researchers, education professionals, business operators, journalists, NGOs promoting environmental protection, Aarhus Centres, indigenous peoples, children and youth, other groups of the public with specific interests) tailored to each electronic information tool;

37.   Ensure that electronic information tools have an open source user-feedback mechanism, which provides possibilities to all interested users comment on data and information accessibility, quality, sustainability of use and reuse, as well as on issues or events that condition the interpretation of the data;

38.   Promote the use and reuse of environmental information by the public and other interested stakeholders by organizing hackathons, forums, promotion campaigns, start-up incubators, public-private partnerships and other forms of engagement;

39.   Encourage the collection of local and indigenous knowledge, citizen science and crowdsourced data provided or generated by members of the public through citizen science

observatories or other relevant initiatives, and promote the interoperability of such data in accordance with best available international standards;

40. Promote the accessibility, reuse and interoperability of research data, taking into consideration the principles for scientific data management and stewardship and other best available international standards (see chapters II–IV of the addendum to the present document);

41. Encourage operators whose activities have a significant impact on the environment to develop and use, as appropriate, web-based, mobile and social media applications taking into account the best available state-of-the-art digital technologies and international interoperability and other standards (see paragraph 33 above and chapter IV of the addendum to the present document) to:

(a) Inform the public regularly of the environmental impact of the operators' activities and products and other environmental information collected under a legal obligation to do so;

(b) Provide the public authorities with an adequate flow of information about these activities through the mandatory system (see paragraph 13 above) regularly and in case of any imminent threat to human health or the environment;[30]

VI. Governance, institutional development and capacity-building

42. Establish, in physical and/or virtual environments, environmental information centres or equivalent settings that will promote public access to information and public participation in decision-making in environmental matters;

43. Promote access to electronically stored environmental information by establishing and maintaining Internet access points for the local population at information sites available for public use, including in Aarhus Centres, public libraries, environmental information centres, museums, archives and at other sites;

44. Ensure that "e-government" and "open data" governance frameworks integrate environmental matters;

45. Identify points of contact and data stewards who will be responsible for information management, dissemination of environmental information and maintenance of electronic information tools;[31]

46. Promote the development and wider use of electronic information tools based on best available state-of-the-art digital technologies as an effective instrument for putting into practice the Convention's provisions, including through public-private partnerships;

47. Develop human capacity for the use of electronic information tools to promote the implementation of the Convention through comprehensive and forward-looking training and education programmes for public officials, the scientific community and researchers, education professionals, business operators, journalists, NGOs promoting environmental protection, Aarhus Centres, indigenous peoples, children and youth, women, and other groups of the public with specific interests;

48. Undertake measures to develop the institutional capacities of public authorities to collect, update, organize and store environmental data and information in electronic and digital forms as the default in the nationwide digital environmental information system and to disseminate them through electronic information tools;

49. Develop and apply comprehensive environment-related educational and capacity-building programmes that also cover the use of electronic information tools and the best available state-of-the-art digital technologies;

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[30] Ibid., art. 5 (1) (b) and (c), (6) and (9).
[31] Ibid., article 5 (2) (b).

50.   Share good practices, case studies, project outcomes and other useful material through the Convention's clearing-house mechanism (see section VII below);

VII.   Clearing-house mechanism

51.   Maintain a national website, preferably as an environmental portal (see paragraph 23 above and chapter V of the addendum to the present document), with information related to the nationwide implementation of the Convention, which will serve as the national node of the Convention's clearing-house mechanism and provide its link to the Convention's secretariat for uploading to the central node;

52.   Designate contact points responsible for collecting, managing and updating the information contained in the national node and for providing the necessary information for the central node of the Convention's clearing-house mechanism, and undertake measures to disseminate information to the public on the clearing-house mechanism;

53.   Develop capacity for public officials managing and updating information for the national node, and for providing the necessary information for the central node of the clearing-house mechanism.