

## **National wetland inventories: Synthesis of the 13 in-depth interviews for further identification of specific needs and key constraints for Contracting Parties**

1. This report consolidates the key lessons learned from various experiences of the national wetland inventory (NWI) process based on 13 in-depth interviews that were conducted from November to December 2023. The Secretariat expresses its gratitude to the National Focal Points and other national experts who agreed to share their time and experience in this regard.
2. The first section of this report summarizes these lessons. It mainly draws on the range of obstacles and supporting factors that the interviewed countries reported. It identifies key directions for future actions of the Secretariat, particularly for NWI training courses and guidance material.
3. The second section presents tables that compile the full range of initial objectives for NWIs, as well as obstacles and supporting factors that the 13 countries have faced while developing NWIs, as collected through the interviews. Items in bold have been cited by more than one country. This illustrative information aims to familiarize other countries that have yet to start their own NWI process with the potential benefits, supports or pitfalls they may face. The synthesis report does not individualize country data.

### **Key lessons learned to guide NWI process**

4. There are extensive potential demands for a unique “NWI product”. The interviews suggest that the initial objectives that triggered launch of NWIs are wide-ranging: up to 20 different objectives were reported, with 13 of them being mentioned by more than one country (see Table 1 below). This illustrates a clear appropriation of the multiple benefits of a NWI at national level, beyond wetland conservation (see the Secretariat-led guidance “A New Toolkit for NWIs”<sup>1</sup>, 2020, pages 12-13).
5. These multiple expectations may, however, lead to levels of complexity in developing NWIs that challenge or sometimes exceed countries’ capacities. This is reflected in the list of obstacles that have been collected and presented in Table 2 below. It appears that the existing guidance is perhaps insufficient to help countries select their initial objectives, or fully adjust them to the level of trained resources (internal or external) and data volumes (that require computing power) that they would be able to provide and manage during the NWI process.
6. Some countries paved the way for a NWI process that gradually raises ambitions, in order to limit NWI’s initial complexity. They did this by gradually decreasing the minimum wetland size for inclusion in the inventory (for example, from 100 hectares to 10 ha, then to less than 1 ha)

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<sup>1</sup> See <https://www.ramsar.org/document/new-toolkit-national-wetlands-inventories>.

or by extending the information type to be collected (from wetland boundary GIS mapping to a database on wetland ecological character). Such an approach would operate with gradual refinements of a more basic starting version. To support this approach, “minimum core requirements” for NWI could be identified. For instance, an NWI “first version” should be mandated to assess and export wetland extent figures, for countries to report on the requested figures for Sustainable Development Goal (SDG) Indicator 6.6.1.

7. The NWI should not be seen as a product only, but as a process which includes as phases its use and update. The production of NWI data should be user-oriented and not data supply-oriented to avoid the production and management of data that ends up not being used – and that later presents the challenge of a poor update. The interviews have shown that the launch of a NWI should be preceded by a clear assessment of the different national policies and international targets it relates with, and the identification and selection of the policy processes to which it would be immediately applicable once published (see also “A New Toolkit for NWIs”).
8. An NWI process should be developed along strong scientific and technical standards to ensure data quality. This would also ease data exchanges among different national agencies, increasing the efficiency of the NWI process. Existing guidance<sup>2</sup> could prove useful in this regard.
9. Some structured approaches with appropriate initial planning have been successfully developed by some countries. Such a structured approach encompasses setting up standardized protocols for data collection and data management as well as metadata and data quality standards. It also comprises the development of survey workplans that precede field investigations and the setting up of technical support mechanisms to guide and advise actions over time, as per the needs. At national level, an advisory board should oversee the whole NWI process to provide additional guidance.
10. The NWI process encompasses anticipation of NWI update phases. Planning of the NWI update modalities should be agreed even before launching the inventory, so as to respond fully to policy requirements over time.
11. Several national agencies and local experts supported the reporting countries’ NWI processes. Across the interviews, various structures were mentioned, such as national geographical institutes, national spatial studies/remote sensing institutes, national environmental agencies, sustainable development observatories, water agencies, integrated water resource management centres, universities, research institutes and Indigenous organisations. “Subsidiary” approaches relying as far as possible on local expertise were reported as useful, particularly to conduct field visits. Approaches involving outsourced consultancy teams sometimes led to improper database handover to national teams.
12. Ensuring reliable funding for the NWI process is a core issue for almost all countries, irrespective of their economic situation. Costs can vary greatly (from a few millions, NWI budgets amounted up to one or even 50 million CHF). The costs of course depend on the size of the country, but also on the level of ambition that is initially set. A key challenge is to secure multi-year funds. In this regard, it was noted that the Global Environment Facility (GEF) has been successfully mobilized to fund NWIs. Rapid and low-cost NWI approaches were also mentioned, with some existing guidance. Some of the supporting factors that were mentioned by the interviewed countries (see Table 3) are replicable and could guide further actions.

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<sup>2</sup> For instance, [GlobWetland Africa](#) or [MedWet Inventory System](#).

13. There is a need to advance the Convention’s existing guidance to integrate these orientations, such as refining NWI “minimum core data sets” (a version for wetland inventories is presented in the annex of Resolution X.15) or NWI data management protocols, which Appendix 5 of Handbook 15 on Wetland inventory “Recommended standard metadata record for the documentation of wetland inventories”<sup>3</sup> has partially addressed. Additional guidance on necessary steps for a structured NWI approach, as well as on NWI update modalities, also seems to be required. Training courses that are in development will also explicitly advise countries in this regard, while considering the latest techniques and countries and other organization’s experiences.

**Compilation of initial objectives for NWIs, as well as obstacles and supporting factors that the 13 countries have faced while developing NWIs**

14. The following three tables compile all different items that were brought up by interviewed countries, with some slight reformulation. Similar items are grouped together and represented in **bold** text. Some thematic ordering has been made by the Secretariat.

*Table 1. Initial objectives for a National Wetland inventory (NWI)*

<b>Implementing the Convention on Wetlands. Supporting the elaboration of a Wetland National Strategy.</b>	<b>Identifying 30*30 freshwater conservation areas as well as prioritized wetland restoration areas, to comply with Kunming-Montreal Global Biodiversity Framework.</b>	<b>Implementing 2050 Carbon Neutrality targets. Mapping carbon emission sources from degraded wetlands for national climate action plans.</b>	<b>Reporting on indicator 6.6.1.</b>
<b>Bridging knowledge gaps in relation to the biodiversity and ecological conditions, functions, and services of national wetlands.</b>	<b>Addressing ongoing pressures on wetlands.</b>	<b>Identifying important areas for biodiversity and wildlife and prioritizing conservation efforts.</b>	<b>Planning for wetland protected areas, in the context of competing demands for urbanization or food production.</b>
<b>Meeting national legislation requirements (for instance, securing/restoring floodplains for flood management, or preventing new urbanization in wetlands).</b>	<b>Managing water run-off and flooding in formal or informal urban settlements and supporting land use planning.</b>	<b>Identifying small water resources to optimize their management in drought situations.</b>	<b>Prioritizing implementation of ecosystem-based adaptation projects and/or nature-based solutions for climate change, and of wetland restoration projects.</b>
<b>Identifying potential Wetlands of International Importance.</b>	Supporting national policies to prevent flood and pollution risks.	Supporting drought prevention policies and water quality management.	Supporting green economy policies.

<sup>3</sup> See <https://www.ramsar.org/document/handbook-15-wetland-inventory>.

Assessing the presence and evolution of exotic species in wetland environments.	Identifying status and functions of wetlands, prior to new mining projects, to identify priority wetlands to protect and to adjust compensation measures.	Bridging knowledge gaps to update Wetlands of International Importance's Ramsar Information Sheets (RIS).	Developing management plans for key wetland systems (Wetlands of International Importance and others).
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Table 2. Obstacles to NWI development

**Data protocols**

<b>Lack of a national protocol with metadata standard and mapping standards reduces the efficiency of NWI process.</b>	Detailed biodiversity data that is available at site level, for instance in some protected areas, may not feed NWI database because of incompatibility of protocols.	In vast countries covering several latitudes, longitudes and topographies, standardization and normalization of data requires complex, fine-tuned approaches.	Proper guidance on how to build a trusted database, with appropriate scientific processes, is missing.
The Ramsar classification of wetlands does not encompass some specific types of seasonal wetlands that exist in the country <sup>4</sup> . However, these wetlands provide crucial water resources for local populations and should be mapped within NWIs.	Data collected through punctual projects often do not relate to compatible methodologies and/or wetland classifications. Donors often impose data collection protocols.		

<sup>4</sup> Such as "Boulis" (small rain-fed artificial or semi-artificial reservoirs) or 'Marigots' (portions of river or rivulet, that are disconnected from main channels) in Burkina Faso.

### Data collection

<p>Satellite techniques are not sufficient to cover small wetlands. Other limitations are mapping rain-supplied wetlands (clouds may prevent data collection) and wetlands under forest cover.</p>	<p><i>In-situ</i> investigations are required for data verification and/or data collection, but there are several access issues, such as in floodplain sites or in dense forests. Access in rainy seasons may be difficult too.</p>	<p>Lack of trained staff resources to develop wetland status and function baselines at the required pace (rapidity of current economic development) and technical demands (combination of Earth Observation techniques and ground verifications).</p>	<p>When NWI data has legal implications, administrative litigation may occur from residents, who challenges NWI data. In such cases, data precision requirements become difficult to meet for NWI.</p>
<p>Collection of aerial photos with helicopters are costly.</p>	<p>Resistance from some sub-national authorities to provide administrative permits to access wetland sites for collection of samples sometimes occurs. Some landowners also prevent access to their property.</p>	<p>Knowledge about hydrological relationships among wetland systems is difficult to acquire.</p>	<p>River basin agencies focus on permanent water resources and do not invest knowledge in less productive ones, such as seasonal waters and associated wetlands.</p>
<p>Collection of data on siltation volumes on some sites is complex.</p>	<p>Transboundary river basin studies do not provide detailed inventories of wetlands at national level.</p>	<p>Rapid inventories do not provide the detailed data that are required for management plans.</p>	<p>NWI may be incomplete because sub-national authorities do not comply with their wetland mapping or reporting obligations.</p>
<p>Inventorizing marine ecosystems is more expensive because of specific means of investigation (boats, etc.).</p>			

### Data management and expertise

<p><b>Massive data collection leads to technological hurdles (computing power) and impairs the ability of national authorities to ensure verification of boundaries and quality of data.</b></p>	<p><b>The task of collecting and harmonizing wetland data produced by sub-national authorities is complex as they have different classifications and approaches for mapping biotopes.</b></p>	<p>Assessing habitat conditions remains a challenge even though data on species conditions is available.</p>	<p>Global reporting requires integration of different wetlands that are treated differently, when managed at national or local levels.</p>
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Some guidance on distinct methodologies for marine and terrestrial wetlands is missing.	In a “forest-rich” country, national expertise is not well developed in hydrology, hydrobiology, and aquatic ecosystem ecology but instead in forestry.	Complex database developed by international consultants is not appropriately handed over to new staff in ministry.	
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#### NWI update

<b>Updating an existing NWI is a complex task, particularly if many years have passed.</b>	<b>Lack of an information exchange mechanism among the range of supporting national agencies (forest departments, cultural and natural heritage agencies, national parks, etc.) is a challenge.</b>	Spatial products that were developed 20 years ago are already obsolete.	Agreeing on a repeated process to update NWI requires difficult budget discussions.
Established classification systems may impair the ability to adequately update existing NWI.	Complex analytical work is required to select representative sites for long-term monitoring, with the objective of partially but meaningfully updating NWIs.		

#### Financial issues

<b>Funds at national level for NWIs are not available. Funds to map wetlands are often provided only through small-scale and time-bound internationally supported projects.</b>	<b>Field investigations to collect data on the ground are costly, up to 60 to 70% of the NWI budget.</b>	<b>Field investigations are time consuming (vegetation survey cannot be done once only) -often at odds with time-bound funded projects.</b>	Lack of sustained financing from Environment Ministry to conduct a multi-year study process.
In a ‘water-rich’ country, water resources and wetlands tend to be neglected. Public and public authorities’ awareness is low.			

Table 3. Supporting factors to NWI development

**Political support**

<p><b>Political attention to wetlands increases mobilization towards the launch of an NWI. Political support at ministerial level and new legislation are triggers for public agencies' involvement.</b></p>	<p>Several ministries are interested in the outcomes of NWIs. Environment ministry teams can count on other teams' support.</p>	<p>Legal obligations on water management and flood risk management trigger investments in mapping wetlands from sub-national authorities.</p>	<p>Explanations and guidance about the ultimate goals of NWI increases involvement and collaboration from sub-national authorities.</p>
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**Structured approach for NWI process**

<p>A structured approach based on detailed technical procedures for wetland survey and survey work plans supports the process.</p>	<p>Survey work plans should encompass technical support mechanism, as well quality inspection measures and final scientific validation.</p>	<p>The establishment of nationally uniform standards for NWI data increases scientific validity and reliability of survey results, particularly when sub-national authorities act as independent survey entities.</p>	<p>Technical support from a national expert organization ensures uniform data check processes.</p>
<p>Developing a regional wetland classification helps to address the case of vast countries covering several climatic and biogeographic regions.</p>	<p>Balancing the amount of scientific data in NWI database allows quicker publication.</p>	<p>Separating the NWI database with main wetland information from the database collecting ground truthing data eases the use of NWI database.</p>	<p>The MedWet NWI guidance provides a structured process to collect NWI data and to organize administration, scientific and survey teams.</p>
<p>Rapid inventories, developed thanks to GlobWetland Africa Toolbox, are useful for application of wetland regulation and wise use.</p>			

### Data collection and techniques

<p><b>LIDAR technologies provide information on the topography that even fieldwork cannot detect. A good coverage by LIDAR data is an asset.</b></p>	<p><b>Satellite images are very useful for mapping large areas. They also prove useful to address coastal wetlands.</b></p>	<p>Acquisition of some high-resolution imagery complements satellite images when inadequate, for instance through drones and helicopters that take aerial photographs.</p>	<p>Increasing GIS-trained staff in government offices and NGOs favours data production and access.</p>
<p>Web mapping services are useful to support the processing and use of large databases.</p>	<p>Nationally developed modelling using satellite imagery and artificial intelligence algorithms offer new possibilities for NWI in large countries.</p>	<p>Local biodiversity experts, who know the site geographies, are crucial resources to guide data collection and verification measures on the ground.</p>	<p>Local inventories of wetlands provide usable data for spatial planning and can inform the general public and other stakeholders, once validated and integrated in a national database.</p>

### Financial support

<p>Securing a stable budget over years allows continuation of surveys.</p>	<p>GEF provides funds that can support the modernization and update of an existing NWI.</p>	<p>Collaborations with universities and research institutes reduce investigation costs when the experts' salaries are already funded.</p>	
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