Food and Agriculture
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SUSTAINABLE
DEVELOPMENT
GOALS

Recommendations for **priority action** on peatland mapping and monitoring

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Healthy peatlands have an immense potential to mitigate climate change and are crucial to many ecosystem services including supporting biodiversity. However, their mapping and monitoring are often not integrated in country efforts to accelerate climate action. Countries urgently require increased support to better understand and report on the potential impact of peatlands for climate change mitigation, so they can take decisive action for their sustainable management.

As the scientific basis for their monitoring has significantly developed over the past few years, peatlands are starting to receive a high level of attention. The development of robust and practical tools to integrate peatland monitoring into national monitoring and reporting frameworks became an increasingly important step for countries in their efforts to limit global warming to 2 °C.

Vulnerable carbon storage

Peatlands, also referred to as "organic soils", "bogs", "fens", "swamps" and "mires", are the most carbon-dense terrestrial ecosystems. Peatlands are formed from partially decomposed plant remains that have slowly accumulated over thousands of years under conditions of waterlogging. Peat can occur under diverse vegetation, such as mosses, shrubs, trees, including mangrove species. Especially drained peatlands can be hard to detect without soil sampling.

Known peat soils hold an estimated 650 billion tonnes of carbon on only 3 percent of the Earth's land area – a carbon store that is more than half of the carbon in the atmosphere. Peatlands thus play a critical role in the global carbon cycle and in climate regulation, as well as delivering a range of other benefits for humanity including water regulation, flood control, food, and cultural and livelihood opportunities. They are, however, highly vulnerable to degradation.

On emissions, floods and fires

Around 25 percent of the world's known peatlands have been significantly degraded through disturbances to their hydrology and vegetation. Peatland drainage leads to a rapid loss of stored carbon both as greenhouse gases (GHG) as well as losses to the water. Dry peatlands burn easily. Fires and degradation combined, globally peatlands are estimated to be responsible for approximately 5 percent of anthropogenic GHG emissions. In addition to these significant emissions, important local and regional impacts of peatland drainage include increased risks of floods, fires and haze (air pollution), which have a severe impact on human health.

On the benefits of peatland mapping and monitoring

To prevent peatland drainage and degradation, their mapping and monitoring are essential. This complex task requires the application of various remote-sensing and field measurement techniques, as well as knowledge of the socio-economic factors that determine peatland management. Whereas mapping identifies peatland occurrence, location and extent, management status and potentially approximate depth of peat, among other variables, monitoring focuses on the identification of change over time of the different variables identified in the mapping and characterization phase.

Science-based peatland mapping and monitoring allow countries to:

1. **know the location** of peat deposits in support of a more accurate assessment of peatland areas and carbon stocks, especially in remote and inaccessible locations;
2. obtain information on the **condition** of the peatlands (i.e. intact or degraded, and the extent, type and likely causes of degradation), to enable the success of interventions to be measured;
3. formulate appropriate **action plans**, including law enforcement, rehabilitation or restoration;
4. **monitor the success of management interventions**, and allow corrective action if targets are not being met; and
5. collect data and information and **report to a variety of international conventions and initiatives**, such as the Sustainable Development Goals (SDGs) under the United Nations Framework Convention on Climate Change (UNFCCC), the Ramsar Convention on Wetlands, the Convention on Biological Diversity, the United Nations Convention to Combat Desertification and the Bonn Challenge on Forest and Landscape Restoration.

Recommendations

1 Advance in mapping approaches for a better peatland monitoring

Peatland maps should contain information on the condition of the peatlands, including the location of drainage canals, logging tracks and roads to identify current and incipient threats. Moreover, knowledge of previous fire occurrence is a useful indicator for anticipating and mitigating additional threats and emissions.

Remote-sensing tools are extremely helpful to identify and estimate peatland occurrence, especially where access and information availability is limited. However determining the exact location and extent of peatlands still requires information on ground conditions, and especially validation of peat extent and depth.

Shallow peat, widely regarded as a layer less than 50 cm deep, should be included in peatland maps. Classification issues, ease of access and agricultural conversion means that shallow peat areas are often drained and degraded, causing equally high yearly emissions as deep peat deterioration. Their inclusion in national maps would help to ensure that all peatlands are more effectively managed and their emissions accounted for.

2 Focus on area and agree on definitions

The definition of carbon content of peat soil, and the minimum thickness necessary to define a peatland differ among countries therefore, it is crucial to harmonise various mapping methodologies. The decisions made during the early stages of agreeing definitions – regarding soil types and classifications, ecological and physical conditions for the identification of an area as a peatland, and key factors for peatland monitoring – will greatly influence the overall results of peatland delineation.

Countries would benefit from making reliable maps that help define future National Contributions guiding climate action as well as national conservation strategies.

Peat depth is often mentioned as an important factor when defining peatlands. However, many variables, such as GHG emissions and biodiversity, are largely independent of peat depth, especially in the short term. Therefore, it is crucial to focus on peat extent rather than depth, and be inclusive rather than restrictive in the application of such mapping.

3 Update peatland emission factors

The IPCC 2013 Wetlands Supplement provides emission factors for land use on peatlands for different climate zones, land use types and nutrient status (for boreal and temperate zones). An update of the IPCC emission factors is required to include all measurement data obtained since 2013.

Furthermore, the scientific community should be encouraged to fill the existing knowledge gaps in peatland GHG emission factors. **Investment in conducting more GHG and other carbon-loss measurements** in certain understudied peatland types, such as degrading highland peatlands, is also highly recommended.

Peatland fire emissions need to be calculated more accurately in order to build a functional and holistic system for monitoring and reporting on peatlands including transparent measurement, reporting and verification (MRV).
Some countries already have promising monitoring systems in place, employing integrated peatland indicators, whereas others have developed certain elements but still need technical support and capacity development to set up and fully implement integrated systems. In both cases, mapping and peatland status updates remains a priority.

4

Integrate peatlands into land monitoring systems

The SDGs seek to assist the management and prioritization of various reporting requirements. Prioritizing high-carbon stock ecosystems and integrating them into existing frameworks, plans, policies and legislation, as well as budgets, is essential to safeguard peat carbon sequestration. While some countries are already integrating peatland into the existing forest and agriculture monitoring and reporting frameworks, several gaps need to be filled to allow countries to improve their multi-purpose peatland mapping, monitoring and reporting, including:

1. awareness raising on the significance of climate change mitigation and adaptation actions on peatlands.
2. Targeting resources to assess the extent and condition of peatlands, not only for climate purposes but for adaptive land use and management planning.
3. Developing guidance and capacity to achieve these aims.

Peat in national forest monitoring systems

Many countries have been investing in a **national forest monitoring system** (NFMS, a comprehensive process that includes the systematic collection, analysis and dissemination of forest-related data using both remote-sensing and ground data to monitor changes over time. NFMS covers various land cover classes and soil types, peatlands among them, and is crucial in enabling countries to plan, implement and monitor their REDD+ activities.

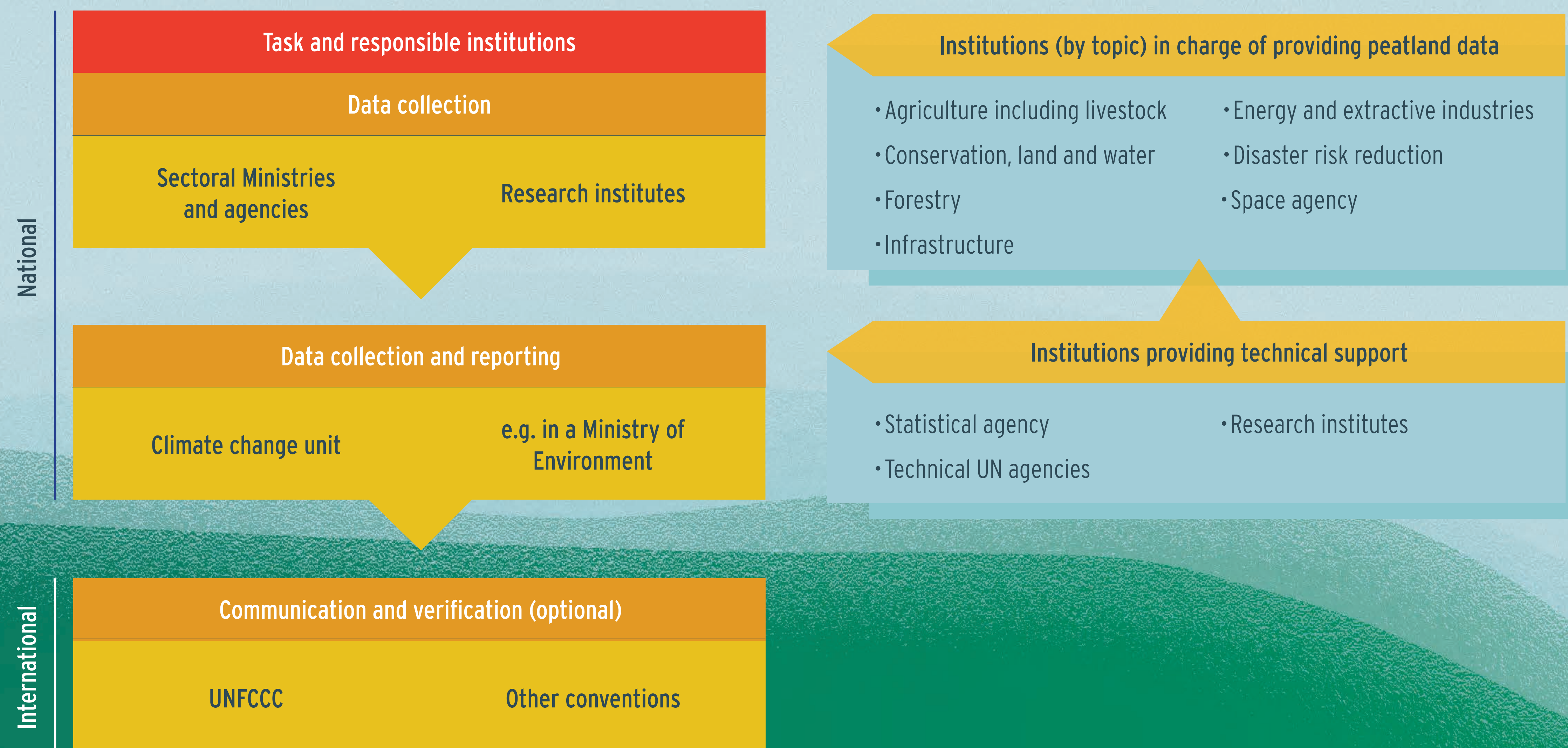
These systems and their associated institutional capacities can serve as a starting point when developing specific measurement and monitoring needs for peatlands. Ongoing initiatives have gained a wealth of experience on good practices for integrated monitoring, institutional arrangements and data management, which can be adapted to a peatland context – bearing in mind that the wetness of peatlands is their main ecological indicator for degradation. **The information generated by an NFMS can support peatland-related land use planning and reporting**.

Another challenge is the diversity of peatlands landscapes; they can be forested or have other vegetation covers such as mosses and small shrubs. In addition, when utilized for productive purposes, peatlands can be put to a range of degrading uses including drainage-based cropping or grazing. Cropping on peatlands with tillage and fertilization causes an especially high level of emissions. Therefore, it is particularly important to map and monitor conversion of peatlands into rice or corn plantations. For these reasons, peatland mapping and monitoring should reach beyond forestry and NFMS and rely on cross-cutting data sources coming from different institutions (see Figure 1. Peatland mapping can build upon tools and methodologies already used in an NFMS, such as the satellite land monitoring system, national forest inventory or socio-economic surveys. Similarly, peatland monitoring can contribute to the MRV component of an NFMS as well as national GHG inventories that cover data on GHG emissions, emission reductions, enhancement of removals by sinks, as well as reporting on adaptation actions such as reduction in vulnerability. It is recommended to align peatland monitoring awith NFMS to ensure consistency and transparency as well as to take advantage of existing verification processes.

5 Clarify the institutional setting and priorities for peatland monitoring

Given the cross-cutting nature of peatlands, institutions need to collaborate on gathering the relevant data through their current or enhanced monitoring processes (Figure 1). For example, integration of peat peat-fire monitoring within the system looking holistically at land use and land use system would be an important part of disaster risk management and reduction strategies, in particular in countries where peatland drainage has taken place.

Figure 1 Institutional setting and contribution to peatland monitoring and reporting



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