

Activities and Research Priorities of the GFOI R&D Coordination Component 2023/2024

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The [Research and Development Coordination Component](#) of the [Global Forest Observations Initiative \(GFOI\)](#) is focused on addressing methodological and technical challenges that hinder the progress of forest monitoring and greenhouse gas (GHG) accounting efforts in developing countries. Its main goal is to foster a community of experts to identify scientific advancements and technologies that can reduce uncertainties and enhance the efficiency of forest monitoring, thereby meeting the specific needs of countries involved.

Since 2015, the GFOI R&D coordination activities have been embedded in GOFC-GOLD Land Cover Project Office (GLC-PO), based at Wageningen University and Research. In 2022, building upon the long-term GOFC-GOLD and GFOI R&D leadership and coordination experiences, both coordination leaderships migrated to GFZ Potsdam. This summary sets out **recent activities** and **future steps** of the R&D Component in 2023/24, including an **updated list of priority research topics** which will serve as a guiding focus for upcoming GFOI activities in the coming years.

Key 2023/24 Activities:

1. **Leading and engaging with the GFOI Community:** Collaboration with other components of GFOI is also prioritized, such as supporting Capacity Building activities, contributing to the GFOI Methods and Guidance Documentation (MGD) and the GFOI Registry of Tools. The R&D Coordination Component has taken lead in coordinating GFOI R&D activities and participated in the GFOI Plenary meetings, most recently the [2023 Plenary](#). Within the later, the Component held a [side event](#) in which updates on recent achievements related to each Priority were presented, followed by a discussion them with the broad GFOI community. Furthermore, two Component Meetings were held in [January 2023](#) and in [May 2023](#). Both meetings had the participation of the other GFOI Components and discussed the future steps of the R&D Component in the coming year and beyond.
2. **Assessing and tracking operationality:** The R&D Coordination Component utilizes the [CALM tool](#), which employs a Technical Readiness Level approach with three main levels: research, pre-operational, and operational. This tool is used to assess and track the operationality of new and existing methods, tools, data, and platforms. Concepts are evaluated based on their stage of operationality, with 'research' concepts requiring further testing and development, and 'operational' concepts requiring guidance documentation for practical use.
3. **Promoting priority research topics:** The R&D Coordination Component focuses on priority research topics identified through stakeholder interactions, which includes the GFOI Plenary, GFOI Components Meetings, R&D workshops and side events, among others. Based on recent discussions, the updated priorities consist of **(1) Degradation and Regrowth Mapping, (2) Biomass/Emission Factor (EF) Estimation, (3) Deforestation Alerts, (4) Land Use and GHGs** and the cross-cutting topic of **(5) Uncertainty analysis**.
4. **Gathering user needs and organizing expert workshops:** The R&D Coordination Component gathers information on user needs, particularly from tropical countries. It also organizes dedicated expert workshops to tackle research priorities and synthesize the state-of-the-art forest monitoring methods. The outcomes of these workshops contribute to standalone guidance documents that can be incorporated into the GFOI Methods and Guidance Documentation. One expert workshop focused on space-based Biomass/EF estimation is anticipated to take place in the second half of 2023, in collaboration with CEOS. The organization of this workshop was deliberated during the GFOI Components Meeting preceding the 2023 Plenary, with a specific emphasis on the integration of space-based biomass data with National Forest Inventories (NFIs).
5. **Engaging with international fora:** The GFOI R&D Component has been actively engaged in various outreach platforms throughout 2023, notably including the 2023 GFOI Plenary. Looking ahead to the second half of the year, the Component has plans to participate in key events such as the Subsidiary Body for Scientific and Technological Advice (SBSTA) in June 2023 and

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the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP28) in December 2023. These conferences and forums provide valuable opportunities for knowledge sharing, collaboration, and showcasing the progress and impact of the GFOI R&D program in advancing forest monitoring methodologies and supporting global efforts in mitigating climate change.

- 6. **Building science networks:** The R&D Coordination Component seeks to build science networks by participating in conferences and symposiums related to forest monitoring. To facilitate effective communication and enhance knowledge exchange, the R&D Component will renew their efforts as communication liaison. This will be done through prioritizing stakeholder engagement in regular meetings and public fora, updating the GOF-C-GOLD-LC Website, organizing regular meetings and expert workshops and leveraging social media platforms to reach wider audiences.

2023/2024 GFOI priority research topics

<p>1. Degradation and Regrowth Mapping</p>	<ul style="list-style-type: none"> • Focus on the implications of using or responding to different definitions of degradation and regrowth for reporting purposes. • Develop appropriate methods for differentiating different types of degradation (e.g. logging activities, fires, clear cut). • Using satellite image time series analysis for monitoring and characterising degradation and regrowth. • Improve methods for monitoring ecosystem restoration activities.
<p>2. Biomass/EF estimation</p>	<ul style="list-style-type: none"> • Assess and consolidate techniques (methods, gain-loss/stock-change) and technical characteristics (spatial/temporal resolution) for biomass change analysis. • Improve reference data and uncertainty analysis/error propagation for improved biomass estimation. • Demonstrate suitable approaches for uptake of space-based biomass data by countries of different characteristics (types of forests, available reference data, NFI designs etc.). • Improve methods for estimating Emission Factors for Forest Degradation.
<p>3. Deforestation Alerts (i.e. Near Real Time Alerting)</p>	<ul style="list-style-type: none"> • Characterisation of drivers of forest disturbances. • Prediction of future deforestation. • Develop appropriate methods in which two-way flows of information between satellite-derived deforestation alerts and ground insights.
<p>4. Land Use and GHGs</p>	<ul style="list-style-type: none"> • Separating anthropogenic and natural emissions from forest disturbance and degradation (for example, for fires). • Calculating GHG fluxes in the AFOLU sector beyond forests (i.e. wetlands, grasslands, trees outside forests). • Comparing, reconciling, and combining different kinds of GHG flux models (process-based, inventory, top-down, Earth observation, etc.).
<p>5. Uncertainty Analysis</p>	<ul style="list-style-type: none"> • Assist countries with suitable approaches for estimating/communicating uncertainty ensuring their applicability with suitable methods for response design. • Develop rigorous methods for correctly estimating uncertainty especially for emission and removal factors. • Provide a catalogue of empirical examples for countries to implement and select the most appropriate methods based on their circumstances.

In addition to these five priorities, the following emerging R&D topics have also been identified:

- Addressing varying reporting requirements between project/jurisdictional versus national forest / carbon monitoring. Different reporting mechanisms requiring area estimates versus maps, and whether both can be achieved with the same data input sources.
- Need for improved monitoring of emissions and removals from wetland ecosystems. This is now included as a subtopic of Land Use and GHGs.
- Estimating and monitoring biodiversity in forest ecosystems, aligned future requirements related to biodiversity credits.

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