Food and Agriculture Organization of the United Nations

ONLINE FACILITATED COURSE

FOREST AND LAND MONITORING FOR CLIMATE ACTION

SEPAL

METHODOLOGICAL NOTE

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SEPAL

Food and Agriculture Organization of the United Nations
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This course is available thanks to the collaboration among the following contributors:

CORE TEAM:

Overall course coordination: Rocío Dánica Cóndor Golec, Forestry Division, FAO.

E-learning content development, instructional design and storyboard development:

Annalisa De Vitis, Forestry Division and Food and Nutrition Division, FAO.

Learning management system coordinator: Sara Ferrante, FAO elearning Academy.

Outreach and knowledge management: Vanessa Vertiz Larrea, Forestry Division, FAO.

ADDITIONAL CONTRIBUTORS:

Overall elearning Academy coordination: Cristina Petracchi, FAO elearning Academy.

National Forest Monitoring team leadership: Julian Fox, Forestry Division, FAO.

SEPAL project Lead Technical Officer: Erik Lindquist, Forestry Division, FAO.

Course subject-matter experts (in alphabetical order): Rocío Dánica Cóndor Golec, Yelena Finegold, Julian Fox, Erik Lindquist, David Morales, Maria Nuutinen, Marieke Sandker, and Laura Villegas of the Forestry Division, FAO.

SEPAL presentations developers (in alphabetical order): Remi D'Annunzio, Annalisa De Vitis, Yelena Finegold, Daniel Guerrero Machado, Erik Lindiquist, Pablo Martin, Pierrick Rambaud, Andreas Vollrath, Daniel Wiell, and the entire SEPAL team of the Forestry Division, FAO.

Graphic design and layout: Lorenzo Catena, FAO elearning Academy.

Proofreading: Alex Gregor, Forestry Division, FAO.

This methodological note was developed by Annalisa De Vitis; with contributions by Rocío Dánica Cóndor Golec, Vanessa Vertiz Larrea, and Sara Ferrante.

1. OVERVIEW

FAO has supported several countries in their development of National forest monitoring systems (NFMS), namely through the production of guidelines and resources, such as Open Foris, a set of free and open-source tools that facilitates flexible and efficient data collection, analysis and reporting.

Part of Open Foris, the System for Earth Observation Data Access, Processing and Analysis for Land Monitoring (SEPAL) is a free, open-source, online platform that enables autonomous processing of geospatial data for customized forest and land monitoring by anyone, anywhere.

SEPAL empowers users to process satellite data, create maps, and detect land cover and land-use change. SEPAL also provides many other functions critical to effective land management without the need of coding skills.

Hosted by the FAO elearning Academy, the course provides an overview of select functionalities and applications of the SEPAL platform, as well as of specific frameworks, systems and processes for forest and land monitoring for climate action.

2. COURSE GOAL

The overall goal of this course is to support knowledge and skills development to operationally apply high-resolution satellite imagery to critical forest and land monitoring in tropical forest countries. More specifically, the course focuses on how the SEPAL platform can support land and forest monitoring for climate action.

3. TARGET AUDIENCES

The course is designed for staff in governmental and implementing agencies, but also for anyone who might be interested in the topic. In particular, remote-sensing experts from academia, civil society and private sector, who can contribute to further development and transparency of national forest and other ecosystems monitoring.

4. COURSE LEARNING OBJECTIVES

Depending on the learning path chosen, by the end of the course participants will be able to:

- understand the foundations of a National forest monitoring system (NFMS) and how remote-sensing can contribute to NFMS operations;

- understand how SEPAL can support forest and land monitoring for climate action through its functionalities and applications;

- describe the main steps to perform sample-based area estimation with SEPAL in support of high-integrity measurement, reporting and verification (MRV);
- identify the main steps to generate information and maps through SE.PLAN in support of decision-making for forest and ecosystem restoration; and
- describe the main steps to perform soil moisture mapping through SEPAL, and how SEPAL tools can be combined for peatland monitoring.

5. COURSE METHODOLOGY

This online facilitated course promotes an interactive learning-by-doing approach through

practice-oriented activities that enhance skills development while stimulating critical thinking.

Course materials include handouts, case studies, presentations and videos, complemented by a glossary of key terms and additional references.

Course activities include readings, discussion fora, graded tests, and self-assessment quizzes, which are not graded but are designed to help participants evaluate their progress.

Course documentation, activities and online live sessions will be available in English, French, and Spanish. Course participants will be able to access the recordings of all live sessions through the e-learning course platform.

6. COURSE STRUCTURE, WORKLOAD AND COMPLETION REQUIREMENTS

The course is composed of five modules that will be covered over 6 weeks and **delivered simultaneously in English, French and Spanish:**

Module 1: Institutionalization of forest data.

Module 2: Introducing SEPAL for forest and land monitoring.

Module 3: High-integrity measurement, reporting and verification.

Module 4: Monitoring of forest and ecosystem restoration.

Module 5: Peatland mapping and monitoring.

The course is structured around flexible learning paths, each with an expected daily minimum workload of one hour, depending on previous knowledge of the topics.

Participants may choose to either follow the entire course or a limited number of modules, based on three options:

- **Learning path 1**: complete Module 1 and 2.
- **Learning path 2**: complete Module 1, Module 2 and one additional module of your choice – Module 3, Module 4 or Module 5.
- **Learning path 3**: complete all 5 modules.

To complete the learning path selected and receive a course certification, participants need to complete all compulsory lessons and activities, and pass the graded tests of all modules included.

Participants' performance will be measured through graded tests at the end of each module—all based on multiple choice, single choice and TRUE/FALSE questions.

To pass a graded test, a score of at least 75 out of 100 points is needed.

Learning path	Modules	Graded tests	Duration
Path 1	Module 1 and 2	2 graded tests, 1 per module	At least 2 weeks
Path 2	Module 1, 2, and one of your choice between modules 3, 4 and 5	3 graded tests, 1 per module	At least 3 weeks
Path 3	All 5 modules	5 graded tests, 1 per module	At least 5 weeks

7. COURSE CALENDAR

The whole course runs over six weeks – including weekends – from **March 24th to May 7th, 2023**.

In order to allow participants to organize their daily schedule and time dedicated to the course:

- each module opens on **Mondays**, and related materials and activities **will remain available until the end of the course**;
- graded tests for each module open on **Wednesdays** and **will also remain available until the end of the course**;

discussion fora will be available from Wednesdays of the opening week of each module, and will remain open until **Tuesdays of the week after**; and

- online live sessions for Modules 2, 3, 4 and 5 will be **recorded and their recordings available until the end of the course**.

Before approaching the graded tests for each module, it is recommended to study the material included and participate in each module's activities —at least in those marked as compulsory.

Although all modules and recordings of online live-sessions will be available until the end of the course, participants willing to participate in discussion fora and online live-sessions, need to take into account the following calendar:

Module	Module opening	Discussion fora opening and closure	Online live-sessions
Module 1 – Institutionalization of forest data	March 24	From March 29 to April 4, 2023	n/a
Module 2 – Introducing SEPAL for forest and land monitoring	April 3	From April 5 to April 11, 2023	**Date**: April 6, 2023 **Time**: from 14h00 to 15h30 CEST **Languages**: delivered in English with interpretation in French and Spanish
Module 3 – High-integrity measurement, reporting and verification	April 10	From April 12 to April 18, 2023	**Date**: April 13, 2023 **Time**: from 14h00 to 15h30 CEST **Languages**: delivered in English with interpretation in French and Spanish
Module 4 – Monitoring of forest and ecosystem restoration	April 17	From April 19 to April 25, 2023	**Date**: April 20, 2023 **Time**: from 14h00 to 15h30 CEST **Languages**: delivered in English with interpretation in French and Spanish
Module 5 – Peatland mapping and monitoring	April 24	From April 26 to May 2, 2023	**Date**: May 2, 2023 **Time**: from 14h00 to 15h30 CEST **Languages**: delivered in English with interpretation in French and Spanish

8. CERTIFICATES

Depending on the learning path of choice, participants can obtain two types of course certificates:

- **Certificate of completion**: issued for Learning path 1 and Learning path 2, upon completion of course-related assignments and a graded test for each module. To obtain this certificate, participants need to pass two graded tests for Learning path 1, and three graded tests for Learning path 2.

- **Digital badge certification:** issued for Learning path 3, an FAO digital badge certification is granted upon completion of course-related assignments. To earn this badge, participants need to pass all five graded tests by scoring, at least, 75 points out of 100.

Completing and submitting the course survey is the final step required for participants to be able to download certificates of attendance or a digital badge certification.

9. MODULES, LEARNING OBJECTIVES AND ACTIVITIES

This section presents the learning objectives for each module of the course and related activities to be completed.

Compulsory activities for the completion of each module are marked in bold.

Module	Learning objectives	Activities
Module 1 — Institutionalization of forest data	• Understand the foundations of National forest monitoring system (NFMS). • Understand how a NFMS can be operationalized through institutional arrangements.	• **Video**: Forests and transparency under the Paris Agreement • **Interactive e-learning module**: "The National Forest Monitoring System'' • **Handout**: Institutionalization of forest data • Discussion forum: Read one of the National forest monitoring systems case studies provided, and share a summary and any reflections with the other participants • Self-assessment quiz (not graded) • **Reading**: "Information note. Legal assessment to set up and operationalize a NFMS". • **Video presentation**: Institutionalization of forest data: establishing legal frameworks for sustainable forest monitoring in REDD+ countries. Slides will be available in French and Spanish. • **Graded test**

Module 2 — Introducing SEPAL for forest and land monitoring	• Understand how SEPAL can support forest and land monitoring. • Identify SEPAL's basic functionalities, including data organization, resources, instances and applications. • Describe SEPAL's basic functionalities for making optical and radar mosaics, classifications, change detection, and time series analysis.	• **Video**: SEPAL – A powerful open-source platform for forest and land monitoring • **Handout**: Introducing SEPAL for forest and land monitoring • **Power Point presentation**: Introduction to SEPAL • Discussion forum: Briefly describe the main benefits of using SEPAL. If you are using or have used similar platforms, compare them with SEPAL. • **Power Point presentations**: creating and downloading mosaics in SEPAL, optical and radar mosaics, image classification, change detection, and creating time series with SEPAL. • Self-assessment quiz (not graded) • **Online live session in English, French and Spanish**: "Creating mosaics with SEPAL, image classification, change detection, and time series". Part of the session will be dedicated to questions and answers. • **Graded test**
Module 3 — High-integrity measurement, reporting and verification	• Recall the benefits of using high-quality data and sample-based area estimation for high-integrity measurement, reporting and verification. • Identify the main steps to perform sample-based area estimation with SEPAL.	• **Handout**: High-integrity measurement, reporting and verification • Discussion forum: 1. Explain why high-integrity MRV is important for REDD+?; and 2. Describe the main steps of the workflow for sample-based area estimation and name the main tools that can be used for steps 3 and 4. • **Power Point presentation**: ''Introduction to forest area change estimation'', including examples from two countries. • **Handout**: ''Performing sample-based area estimation with SEPAL-CEO". • Self-assessment quiz (not-graded) • **Online live session in English, French and Spanish**: "Main steps for performing sample-based area estimation with SEPAL-CEO". Part of the session will be dedicated to questions and answers. • **Graded test**

Module 4 — Monitoring of forest and ecosystem restoration	• Recall FAO's set of tools that facilitate efficient data collection, analysis and reporting for forest and ecosystem restoration. • Describe the main steps to generate information and maps through SE.PLAN.	• **Video**: What is ecosystem restoration? • **Handout**: Monitoring of forest and ecosystem restoration • **Case study**: Using SEPAL to detect forest change from restoration activities in Uganda • Discussion forum: if you have been/are working in areas related to forest and ecosystem restoration, please share your experience with the other participants. • **Video**: SE.PLAN – A Forest Restoration Suitability Decision Support Tool • **Handout**: 'Introduction to SE.PLAN's purpose and usage". • Self-assessment quiz (not graded) • **Online live session in English, French and Spanish**: "How to generate information and maps for forest and ecosystem restoration through SE.PLAN". Part of the session will be dedicated to questions and answers. • **Graded test**

Module 5 — Peatland mapping and monitoring	• Recall the main principles for peatland mapping and monitoring. • Identify the main steps to perform soil moisture mapping through SEPAL, and the main SEPAL tools that can be used for peatland monitoring.	• **Handout**: Peatland mapping and monitoring • **Case studies**: Choose one of the following: 1. "Indonesia: new monitoring methods and challenges"; 2. ''The United Kingdom of Great Britain and Northern Ireland" • **Video**: Understand the importance of peatland monitoring • **Video**: Identifying and addressing existing gaps in global peatland monitoring • Discussion forum: 1. If you have any experience with peatland mapping and/or monitoring, share it with the other participants. 2. Mention some of the applications you have learned about in the first part of this Module. Have used any of those, or others that have not been mentioned? • **Handout**: ''Soil moisture mapping with SEPAL'' • **Case study**: Peatland monitoring in Indonesia • Self-assessment quiz (not graded) • **Online live session in English, French and Spanish**: "How SEPAL can be used for soil moisture mapping, and for peatland monitoring". Part of the session will be dedicated to questions and answers. • **Graded test**