



OBSERVATOIRE DU SAHARA ET DU SAHEL  
SAHARA AND SAHEL OBSERVATORY



**GMES  
AND AFRICA**



**Global Monitoring for Environment and Security & Africa  
(GMES&Africa)  
North Africa Consortium**

**CONCEPT NOTE**

TELE-TRAINING WORKSHOP

**Drought and natural resources mapping and  
monitoring using EO data in ESA-Dunia cloud  
computing services**

From November 14 - 15, 2024

September 2024

## Introduction

The African Union Commission (AUC) has strongly recommended that each consortium leverages new technologies relying on **Cloud Computing** and **Machine Learning**, and Copernicus EO-based products to ease and support the decision-making process.

The **GMES North Africa Consortium** has been thus promoting these technologies of **Cloud Computing** and **Machine Learning** which represent nowadays key innovations that help in processing a large volume of data in a short period to generate information resources and decision support tools. This was supported by a series of actions aimed at strengthening the capabilities and raising awareness of experts, researchers, developers, students, start-ups, etc.

In December 2022, an online training course on how to use the Dunia platform was organized to give participants a better understanding of the Dunia platform. The event was held as a prelude to the Hackathon, which itself focused on the use of Copernicus data and the Dunia platform to develop decision-support products for agricultural lands and natural resources mapping and characterisation.

The present workshop is part of this process, with the aim to contribute to the improvement of satellite data accessibility and exploitation, facilitating the development and use of EO-derived thematic products over Africa by giving access to Copernicus Sentinels data and DUNIA cloud-based computational platform.

The workshop will be held online, on **14 and 15 November 2024**, from 9h00 - 12h30 (Tunisian time) according to the schedule presented below. This Online training on the Dunia platform will take place as follows:

- Session 1: Introduction to ESA – Dunia cloud computing environment and services for EO data processing;
- Session 2: Development of a workflow on drought condition mapping, crop stress mapping, vegetation/forest cover change mapping using EO data in Dunia platform.

## WORKSHOP OBJECTIVES

This tele-training sessions aims to train participant in using Machine learning to produce accurate map of drought, crop stress, vegetation/forest cover change based on EO and cloud computing resources and technologies.

Specifically, the training seeks to:

- Train participants in the interactive use of Dunia (especially Dunia's Sandbox, Jupyter environment);
- Train users on building notebooks on **drought, crop stress, vegetation/forest cover change** themes based on Dunia platform;
- Collect feedback from end-users and better appropriate the platform, in the view of setting up a user community of the Dunia platform.

## APPROACH

The training will be focused on the thematic related to agriculture and land degradation. For instance, the theme can concern **drought condition mapping, crop stress mapping, vegetation/forest cover change mapping**, using Machine Learning classification/regression techniques to further generate maps that show areas affected by drought. These maps can be produced at different spatial and temporal resolutions.

Each participant will have to create an account in the be able to access the Dunia Sandbox (Jupyter Lab) environnement and resources and work with Python develop their Notebooks.

## TARGETED AUDIENCE

The tele-training is intended for individuals with knowledge, on the one hand, of Copernicus EO data processing derived product generation; and on the other hand, on machine learning techniques and Cloud computing tools.

## DOCUMENTS AND WORKING TOOLS

The tele-training will be held in English via Zoom video conference platform. The training materials will be available and accessible for free on the GMES&Africa digital E-training platform. To make the training practical and useful, each participant must use a computer with a good internet connection.

## EXPECTED RESULTS

The expected results from this tele-workshop are as follows:

- Train participant on how to use Dunia platform to process Copernicus EO data;
- Train participants on Jupyter environment (search, read and work with data);
- Train participants, in their zone of interest, to use Deep learning for:
  - **Drought condition mapping;**
  - **Crop stress mapping;**
  - **Vegetation/forest cover change mapping, etc.**
- Their feedbacks are collected to help better operationalize the Dunia platform;
- The user community of the Dunia platform tool is reinforced.

## PROVISIONAL AGENDA

Time	Main activities
<b>Day-1: Introduction to Dunia platform cloud computing environnement</b>	
Session 1: Introduction to ESA – Dunia cloud computing environment and services for EO data processing	
12h00-12h05	Opening & introduction
12h05-12h15	Overview on concept and approach of modelling and mapping Drought condition, Crop stress and vegetation/forest cover
12h15-12h30	Presentation of <b>Dunia platform</b> and Tour through Dunia (Discover, build, exchange)
12h30-12h45	Getting started with Dunia's Sandbox tools: EO data access analyses in the <b>Dunia Jupyter Environment</b> (interactive session)
Session 2: Development of a workflow on <b>drought condition mapping, crop stress mapping, vegetation/forest cover change mapping</b> using EO data in Dunia platform	
12h30-13h45	Technical & practical session on Dunia platform for <b>drought condition mapping</b> (using Deep Learning approach)
13h45-14h00	Wrap-up and end of day 1
<b>Day-2: Delimitation of Plots Using Sentinel-2 Data in Dunia platforms</b>	
12h00-12h05	Quick reminder of last session
12h05-13h00	Technical & practical session on Dunia platform for <b>crop stress mapping</b> (using Deep Learning approach)
13h00-14h00	Technical & practical session on Dunia platform for <b>vegetation/forest cover change mapping</b> (using Deep Learning approach)
14h00-14h05	Wrap-up and end of the training