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## **Harnessing Earth Observation for Environmental Monitoring in East Africa and Indian Ocean Countries under the GMES & Africa Programme 15 – 17 July 2024**

### **Training Concept Note**

#### **○ Context and Background**

Deforestation, habitat loss, and land degradation pose significant challenges to East Africa's environment and sustainable development. Earth Observation (EO) technologies offer powerful tools for monitoring these critical issues. Under the African Union Commission's (AUC) Global Monitoring for Environment and Security and Africa (GMES & Africa) project, and the consortia leads Regional Centre for Mapping of Resources for Development (RCMRD) and the IGAD Climate Prediction and Applications Centre (ICPAC), aims to enhance the capacity of East African countries. The capacity building activity will be delivered collaboratively by RCMRD and ICPAC. The aim is to equip participants with the knowledge and skills to utilize EO data and tools for effective environmental monitoring in East Africa. The training is designed to address key environmental challenges by leveraging EO technology to monitor forests, natural habitats, and land degradation.

#### **○ Objectives**

- 1) Enhance Capacity Building:
  - a. Equip participants with the knowledge and skills to use EO data for environmental monitoring.
  - b. Foster understanding of EO technology applications in forest monitoring, habitat conservation, and land degradation assessment.
- 2) Promote Sustainable Environmental Management:
  - a. Provide tools and methodologies for effective environmental management and policymaking.
  - b. Encourage the use of EO data in decision-making processes to support sustainable development goals (SDGs).
- 3) Strengthen Regional Collaboration:
  - a. Facilitate knowledge exchange and collaboration among African countries.
  - b. Develop a network of professionals skilled in EO applications for environmental monitoring.
- 4) Equip participants with a solid understanding of EO concepts, platforms, and data access mechanisms within the GMES & Africa framework.
- 5) Build capacity in utilizing EO data and tools for forest monitoring, natural habitat monitoring, and land degradation assessment.
- 6) Develop practical skills in data processing, analysis, and interpretation for generating actionable environmental information.
- 7) Foster collaboration and knowledge sharing among participants from different sectors and countries within East Africa.





- **Target Audience**

The training is designed for a diverse group of participants working on environmental issues in East Africa, including:

- Government officials and technical staff from the ministries of environment, forestry, and land management.
- Natural resource managers and conservation practitioners from NGOs and research institutions.
- Land use planners and disaster risk reduction specialists.
- Private sector professionals involved in EO data analysis and environmental services.
  - I. Environmental scientists and researchers.
  - II. Government officials and policymakers.
  - III. NGO representatives and conservationists.
  - IV. Graduate students and academicians in environmental science and remote sensing.

- **Selection Criteria:**

- Prior experience with environmental monitoring or related fields
- Basic understanding of computers and geospatial concepts (preferred)
- Strong commitment to applying acquired knowledge to address environmental challenges in their work.

- **Training Modules**

- **Module 1: Introduction to GMES & Africa and Earth Observation**

- a. Overview of GMES & Africa program, data access mechanisms, and support services for East Africa.
- b. Introduction to RCMRD and ICPAC roles in EO.
- c. Fundamental concepts of EO, sources of satellite data, and their applications for environmental monitoring.
- d. Introduction to key EO platforms, data acquisition and tools relevant to forest, habitat, and land degradation monitoring.

- **Module 2: Data Analysis and Interpretation:**

- a. GIS and remote sensing software tools (e.g., QGIS, ArcGIS).
- b. Techniques for analyzing EO data (e.g., change detection, classification).
- c. Interpreting results for policy and decision-making.





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- **Module 3: Forest Monitoring with Earth Observation**
  - a. Techniques for forest cover mapping, deforestation detection, and forest health assessment using EO data.
  - b. East Africa Forest Watch
- **Module 4: Monitoring Natural Habitats:**
  - a. EO-based approaches for mapping and monitoring natural habitats, including wetlands, grasslands, and biodiversity hotspots.
  - b. EO applications in wildlife conservation and habitat restoration.
  - c. Identifying and monitoring threats to natural habitats through EO data analysis.
  - d. Applications of EO in wildlife conservation and protected area management
- **Module 5: Land Degradation Assessment:**
  - a. Indicators and metrics for land degradation.
  - b. Methods for land degradation mapping, desertification monitoring, and soil erosion assessment using EO data.
  - c. Techniques for evaluating land cover changes and identifying drivers of land degradation.
  - d. Utilizing EO data for land rehabilitation planning and monitoring.
  - e. Strategies for land rehabilitation and sustainable land management.
- **Module 6: Advanced EO Data Processing & Analysis**
  - a. Hands-on training in accessing, processing, analyzing, and visualizing EO data using relevant software platforms (e.g., DEA, DUNIA).
  - b. Extracting meaningful environmental information from EO data for effective decision-making.
  - c. Introduction to advanced EO techniques like time series analysis and machine learning applications.
- **Module 7: Practical Applications and Case Studies:**
  - a. Hands-on sessions with real-world data.
  - b. Country case study
  - c. Group projects and presentations.
- **Module 8: Policy Implications and Future Directions:**
  - a. Role of EO in environmental policy and governance.
  - b. Future trends in EO technology and applications.





c. Building a sustainable EO ecosystem in Africa.

## ● Training Methodology

- a. Lectures and Presentations: Expert-led sessions on theoretical and practical aspects of EO.
- b. Hands-on Workshops: Interactive exercises using EO data and software tools.
- c. Case Studies: Real-world examples to illustrate EO applications.
- d. Group Discussions and Networking: Opportunities for participants to share experiences and collaborate.
- e. Field Visits (Optional): On-site demonstrations of EO applications in environmental monitoring.

## ● Trainers and Resource Persons

Trainers will be drawn from RCMRD, ICPAC, and the wider pool of GMES & Africa experts with extensive experience in EO applications for environmental monitoring in East Africa. The training will employ a blend of interactive learning approaches, including:

- a. **Expert presentations:** Delivering key concepts and best practices by leading specialists from RCMRD, ICPAC, and the broader GMES & Africa community.
- b. **Interactive workshops:** Providing participants with hands-on experience in data access, processing, and analysis using real-world case studies.
- c. **Group discussions and knowledge sharing:** Facilitating exchange of experiences, challenges, and potential solutions among participants from different backgrounds.
- d. **Demonstrations and practical exercises:** Allowing participants to gain practical skills in working with EO platforms and tools.

## ● Training Duration and Venue

The training program is envisioned for three 3 days, 15th to 17th July 2024 intensive workshop held in Madagascar before the 3<sup>rd</sup> GMES & Africa East Africa Regional Workshop.

## ● Expected Outcomes

- Improved technical skills in EO data acquisition, processing, and analysis.
- Enhanced understanding of EO applications in forest monitoring, habitat conservation, and land degradation.
- Increased capacity for using EO data in environmental policymaking and management.
- Strengthened regional collaboration and network among EO professionals in Africa.





- **Evaluation and Follow-Up**

- **Assessment:** Pre- and post-training evaluations to measure knowledge gain and skills improvement.
- **Certification:** Participants receive certificates upon successful completion of the training.
- **Follow-Up Support:** Continuous support through online forums, webinars, and follow-up workshops.
- **Feedback Mechanism:** Collection of participant feedback to improve future training programs.

- **Partners and Support**

- GMES and Africa: Providing overall framework and funding support.
- RCMRD and ICPAC: Offering technical expertise and training resources.
- Madagascar Local and International Experts: Contributing knowledge and facilitating training sessions.

