ESA EO AFRICA R&D Facility, in collaboration with the African Union Commission (AUC), announces:

Call for Research Proposals 2024-2025

The main focus of this call is to leverage **earth observation to tackle present and future challenges in water and food security for Africa.**

Introduction

EO AFRICA is an African-EU Framework for Research, Innovation, Communities, and Applications to foster an African-European R&D partnership facilitating the sustainable adoption of Earth Observation and related space technologies in Africa. The ESA initiative has a long-term (>10 years) vision with an African user-driven approach in a collaborative partnership with the African Union Commission (AUC) and its operational GMES & Africa initiative, taking into account requirements and capacities from African regional centres and programmes.

EO AFRICA R&D Facility is the flagship initiative of ESA EO AFRICA with overarching goals of enabling an active research community and promoting creative innovation processes for the continuous development of African EO capabilities. To facilitate modern research workflows that take advantage of cloud satellite archives and are shareable and reproducible, the Facility sets up cloud computing environments for the researchers (**Innovation Lab**). The facility supports African–European research tandems and delivers a range of collaborative capacity development activities (**Space Academy**) and initiatives between the African and European research communities based on a comprehensive review of African EO research challenges.

Besides this research call, a call will be launched specifically focusing on African universities for the development of EO-related training materials to become part of the university's curriculum.

Objective

In collaboration with the AUC, the ESA EO AFRICA R&D Facility launches a call for research proposals to support African–European collaborative efforts to develop innovative and reusable open-source EO algorithms and applications adapted to African solutions to African challenges by leveraging cutting-edge cloud-based data access and computing infrastructure. This is the first call of the second phase of the EO AFRICA R&D Facility. More information on the earlier calls and awarded research projects are available on the web portal.

Call for Research Proposals

The ESA EO AFRICA R&D Facility, in collaboration with AUC, will support up to **10 (ten)** research proposals for 15-month projects, commencing on 1st of November 2024 as follows:

Research Topics

Water and **food** are the main themes of the EO AFRICA R&D Facility's Research Calls. The present call aims at addressing research topics related to **leveraging Earth Observation data to tackle present and future challenges in water and food security for Africa**. Proposals in the following topics are encouraged to apply:

EO contributions, using various techniques such as e.g. optical and hyperspectral remote sensing, Polarimetric and SAR to study and monitor
- Marine and coastal resources

- Regional evapotranspiration and hydrological stresses
- Hydrological extremes and induced hazards such as droughts and floods
- Crop development, yield forecast, precision farming and irrigation demand
- Lakes and rivers dynamics
- Water and air quality
- Forest and rangeland processes

Application Criteria

Project proposals shall meet the following criteria:

- The project must be proposed by **two scientists representing a collaborative partnership of one African and one European research entity** (e.g., institute, laboratory, university). The co-principal investigators should possess a PhD degree relevant to the topics of the call or be in the process of obtaining it as a PhD candidate.
- Project teams may include more researchers.
- Projects should be completed within **15 months**.
- Project proposals should **focus on one or more of the research topics** of the call.
- Each proposal is expected to contain a research plan for the scientific cooperation of the African and European partners to develop an **innovative and open-source EO algorithm/ workflow** (e.g., as set of Jupyter Notebooks hosted on a public git-enabled platform).
- The proposal should explain how the work will be shared among the partners, including the roles of project team members and their expected contributions.
- The proposed research can be linked to the partners' ongoing (collaborative) project. In that case, the proposal should clearly delineate the proposed activities from those of the ongoing research project.
- Research plan should be accompanied by a detailed budget, including anticipated cost items related to the research project.
- bProposed budget cannot include ICT resources for computing purposes (e.g., servers, HPC budgets), as such resources will be provided by the [Network of Resources](#) of the ESA separately.
- The proposed budget must allocate for the costs of a visit to the Living Planet Symposium 2025 (Vienna, 23-27 June 2025). At least one person associated with the project is expected to visit the symposium.
- Both partners have equal rights on the budget, so its allocation must be decided in a full agreement. Nevertheless, due to the governing regulations, the European partner is responsible for administering the entire project budget, and consequently takes care of handling costs and invoices of the African partner.
- The **Innovation Lab** of the EO AFRICA R&D Facility **should be used for the development** and execution of the algorithm/workflow and auxiliary project activities. Commercial use of the resources or executing activities not related to the project are not allowed.
- The developed algorithm/workflow **should utilise EO data from ESA missions**, such as Sentinel. Third-party data can also be utilised. The use of analysis-ready data and EO data services is encouraged.
- Projects are recommended to allocate resources so that at least one of the team members attends a face to face course presented by the facility on "Cloud Computing for EO Data Analysis" to be held in 20-24 Jan 2025, (African continent, location to be determined)

- In case one of the outputs of the project is a dataset, it must follow the attached guidelines on publishing cloud-native datasets.
- The developed algorithm/workflow and its application in the thematic context of the call **shall be published** at least in one international conference proceeding or in an open-access peer-reviewed journal. Open-access publications are supported by the Facility from an additional fund. Thus open-access publication costs should not be included in the budget.

Funding and Benefits

The EO AFRICA R&D Facility will provide the selected projects with:

- A budget of up to **30,000 EUR** to cover research activities during the project period (max. 15 months), such as personnel costs, fieldwork, data collection, bilateral visits, scientific meetings, training activities, etc.

- **Free access** to cloud-based Virtual Research Environments (VREs) through the Innovation Lab of the Facility, an **interactive geospatial computing platform** with ready-to-use **EO software,** and facilitated access to **EO data** (e.g., Sentinel and other ESA missions) through the host DIAS infrastructure. See

- Appendix for more information on VREs.
- Dedicated **user and technical support** for using VREs and developing geospatial computing workflows.
- **Scientific support and advice** by senior researchers and experts of the EO AFRICA R&D Facility consortium.
- **Access** to the EO AFRICA Space Academy and its Digital Campus for capacity and knowledge development activities, such as **online courses, webinars, and face-to-face training events** on topics related to EO, cloud computing, food security, and water scarcity.
- Integration into the **EO AFRICA Network** for international scientific networking, collaboration, and visibility.

Proposal Submission

The call is announced on 1st of July **2024** and will be open for submission for 8 **(eight) weeks**. The deadline for submitting a full proposal is 20 September **2024, 18:00 CET**.

The proposal submission shall include:

- Research proposal fully completed in all parts according to the provided template (English or French), duly signed by the African and the European Co-PIs and authorised representatives of the African and European research institutions,
- Detailed CV of the African co-principal investigator,
- Detailed CV of the European co-principal investigator,
- Short resumes of other researchers in the team.

The following items are optional and will be considered assets:

- Support letter(s) from the beneficiaries,
- Any other relevant document.

Proposals shall be submitted as a single signed PDF document with all supportive documents (e.g., CVs, support letters) to ESA through the EO AFRICA R&D Facility via e-mail to: research@eoafrica-rd.org

Expected Deliverables

Deliverable	Deadline
Progress report including materials for public dissemination through the website	KO + 7 months
Final report (including materials for public dissemination through the website)	KO + 15 months
Open-source research code and data repository, including a demonstration workflow/visualization.	KO + 15 months
Open-access peer-reviewed scientific publication (draft or submitted)	KO + 15 months

Evaluation

An expert committee will evaluate proposals with members delegated by ESA, AUC, and EO AFRICA R&D Facility. The following criteria will be considered:

- Level of innovation of the EO application with relevance to the topics of the call
- Addressing the specific needs in Africa
- Scientific soundness and maturity
- Making innovative use of modern cloud computing facilities

- The availability of a sound open science strategy
- Impact for fostering the use of EO data and services in Africa
- Balanced cooperation of the partners
- Background of the African and European co-principal investigators
- Geographic representation of Africa

The applicants will be informed about the result of the selection in an e-mail, and the list of awarded projects will be published on the EO AFRICA R&D website in September **2024**.

The scientific content and the budget distribution for each selected project will be finalised in agreement with the EO AFRICA R&D Facility. After authorisation by ESA, a tri-lateral collaboration agreement will be signed between the EO AFRICA R&D Facility and the African and European institutions of each selected project. The applicants are expected to review the draft collaboration agreement before submission of their proposals to prevent any potential conflict at a later stage. The projects will start following an online Kick-off Workshop on 4th of **November 2024**.

Relevant Links

EO AFRICA Initiative website: https://eo4society.esa.int/eo-africa/
EO AFRICA R&D Facility website: https://eoafrica-rd.org/
EO AFRICA R&D research projects: https://eoafrica-rd.org/research/eo-africa-rd-research-projects/

Important Dates

Open Call	1 July 2024
Submission of Proposals	20 September 2024 18:00 CET
Communication of Selection Results	October 2024
Start of projects	1 November 2024
Kick-off Workshop	4 November 2024

Contact

Any questions relating to the call should be sent by e-mail to research@eoafrica-rd.org **no later than 2 (two) working days** before the submission deadline.

Appendix

Virtual Research Environments (VREs)

Each research team will have access to one or more VREs with the following features:

- 4 vCPU with Intel x86-64 architecture
- 32 GB RAM
- 100 GB SSD local storage for temporary storage
- SSD network storage for permanent storage (min. 1 TB)
- Direct network access to EO Data is available on the host DIAS platform.
- JupyterLab interface with terminal and remote desktop access
- Pre-installed scientific computing, EO data analysis, and machine learning packages for accessing EO data services, developing EO algorithms and workflows, and visualising results in interactive notebooks (e.g., Python and R packages)
- Pre-installed scientific and EO desktop software for pre-processing and other needs (e.g., SNAP, QGIS, Visual Code, RStudio, etc.)

GPU-enabled VREs with the following features will be available for specific needs, which are explicitly indicated and justified in the proposal and quantified in terms of hours necessary. Please note that the facility expects the teams to exploit normal VREs for data pre-processing, model building and testing on a subset of the dataset; the GPU-enabled VREs will only be used at the end to run the developed model on the whole dataset. The GPU-enabled VREs will have the following features.

- 12 vCPU with Intel x86-64 architecture
- 117 GB RAM
- 128 GB SSD local storage for temporary storage
- SSD network storage for permanent storage (min. 1 TB)
- Direct network access to EO Data available on the host DIAS platform.
- JupyterLab interface with terminal and remote desktop access
- Pre-installed scientific computing, EO data analysis, and machine learning packages for accessing EO data services, developing GPU-accelerated EO algorithms and workflows, and visualising results in interactive notebooks (e.g., Python and R packages)
- Pre-installed scientific and EO desktop software for pre-processing and other needs (e.g., SNAP, QGIS, Visual Code, RStudio, etc.)