ECMWF's support to enhancing Early Warning Systems in Africa

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ECMWF – Who we are

Intergovernmental Organisation Established in 1975

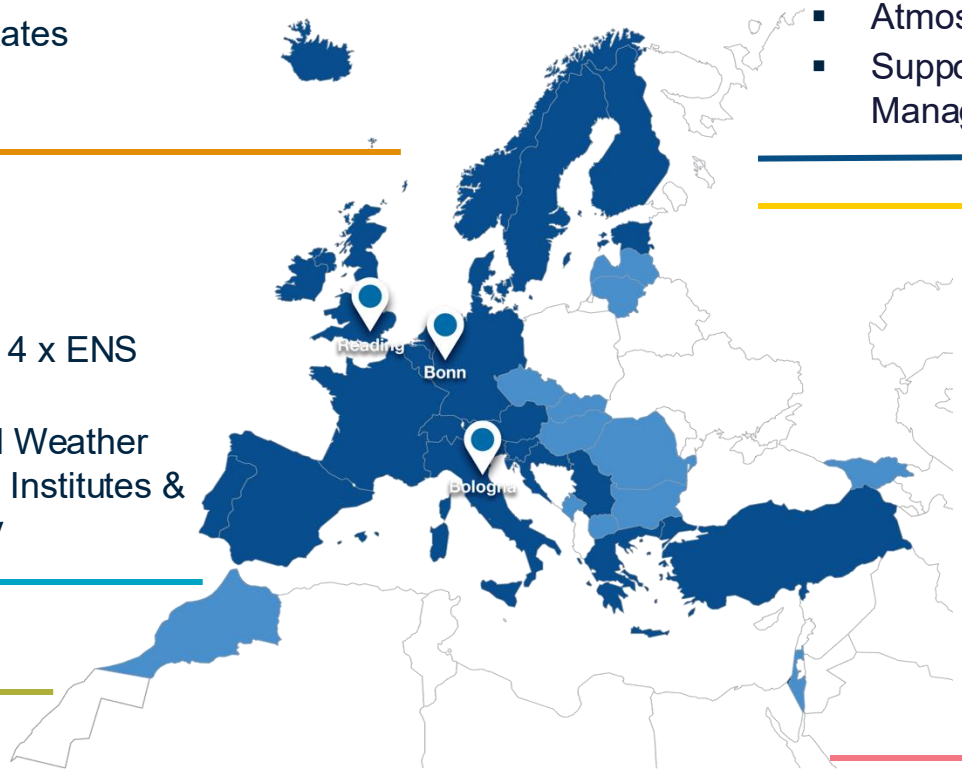
- 23 Member States
- 12 Cooperating States
- 550+ staff

Operate Two EU Copernicus Services

- Climate Change Service (C3S)
- Atmosphere Monitoring Service (CAMS)
- Support Copernicus Emergency Management Service (CEMS)

24/7 operational service

- Operational NWP – 4 x ENS forecasts / day
- Supporting National Weather Services, Research Institutes & Businesses globally



Space for Early Warning in Africa (SEWA)

- Peer-to-Peer partnership between African – European community on Impact-Based Forecast services, tools and training

Research institution

- Experiments to continuously improve our models
- Reforecasts and Climate Reanalysis

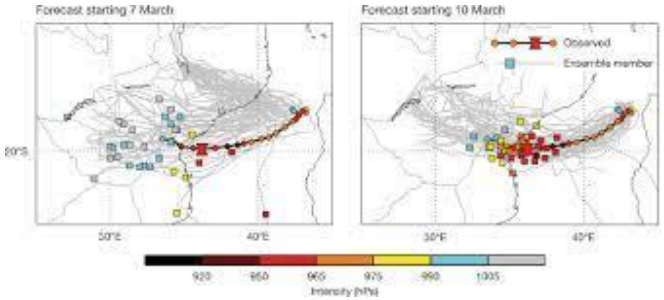
Destination Earth

- Operates the DestinE Digital Twin Engine (DTE)
- Operates two Digital Twins

ECMWF's support on weather and environmental data uptake in Africa

Since 1995

Support to **ACMAD:** Co-operation Agreements



Since 2006

Support to **WMO SWFP** and **ACMAD countries** (WMO RAI) via **EUMETCast**

Since 2015

Support to **ICPAC** and African countries via **Copernicus:** CEMS, C3S and CAMS and training

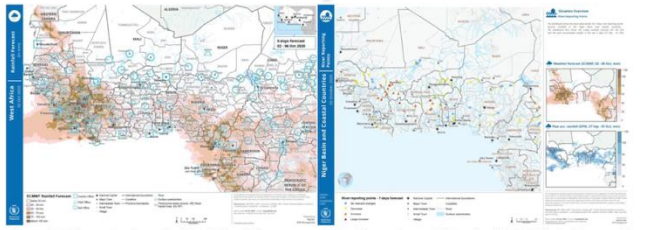


Figure 1. Information from the World Food Programme 'Alert Detection and Mapping (ADAM) platform making use of ECMWF rainfall forecast (left) and CEMS-GloFAS flood forecasts (right). Source: WFP, GFP virtual conference 2020

Since 2023

Support via **WMO SOFF** use of ECMWF's weather data products

Weather and climate data for resilience

Systematic Observations Financing Facility

Since 2025

Africa-EU Space Partnership: **Space for Early Warning in Africa**

Global Gateway

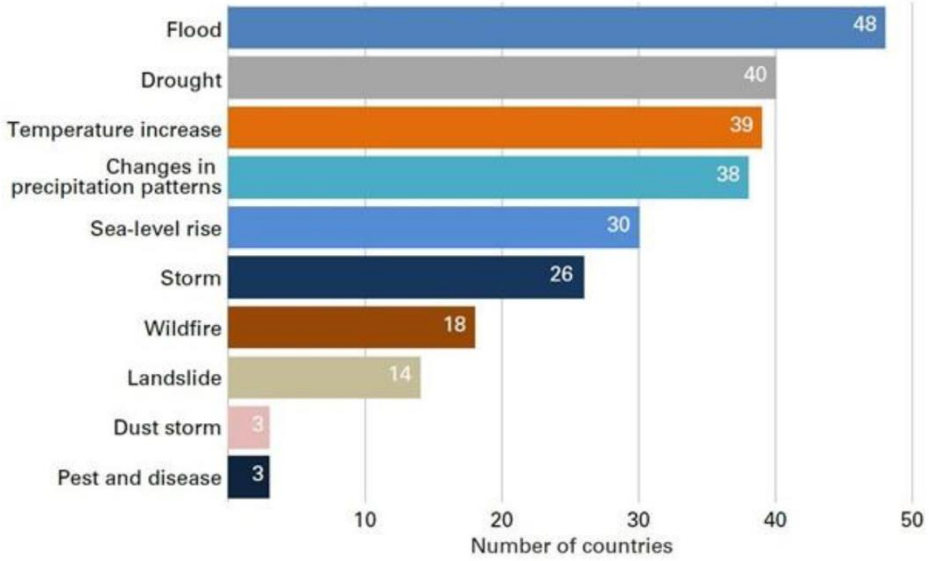
Context

WMO's press release 2.09.2024

"Africa faces a disproportionate burden from climate change and adaptation costs"

Africa is particularly vulnerable to the impacts of climate change, with an increasing frequency and intensity of extreme weather events such as droughts, floods, and storms. These events have devastating effects on communities, economies and ecosystems.

⇒ The ability to predict and prepare for these events through effective early warning systems is therefore crucial.



Hazards of greatest concern for the African region. This graph was generated by WMO using the NDCs of 53 countries in Africa based on the active NDCs submitted as of June 2024.

https://wmo.int/news/media-centre/africa-faces-disproportionate-burden-from-climate-change-and-adaptation-costs

ECMWF supports the African community with its **open data provisions**, generation and sharing of **basic weather and climate observations** and **co-design of impact-based forecast tools** to advise on early warning.

ECMWF's new Data Policy:

Towards open data provisions

Open Data at ECMWF

Free and open charts including meteograms (Open Charts)

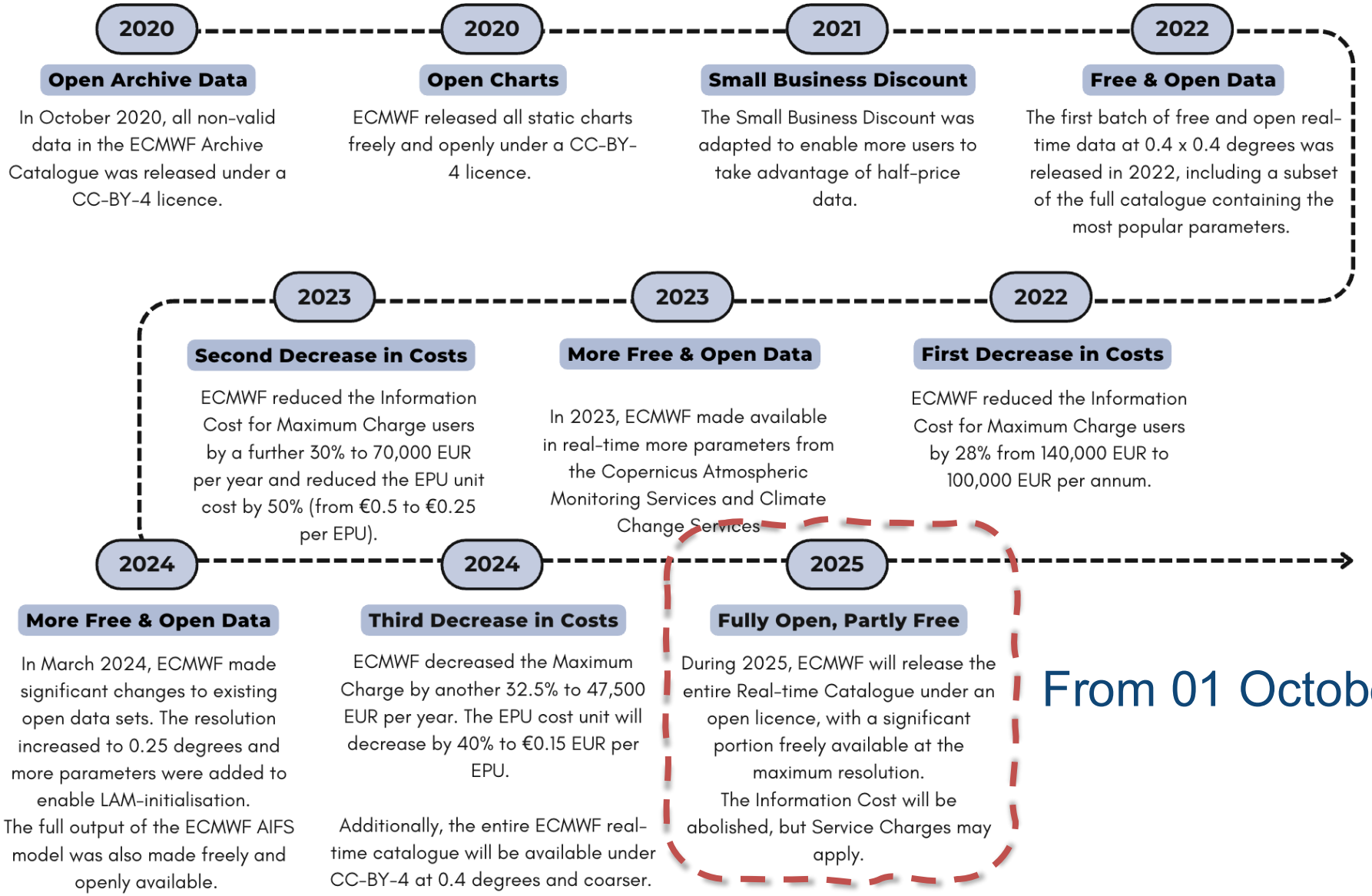
Free and open data available on ECMWF Data Portal and in Microsoft Azure, Google & Amazon AWS

Contents of the ECMWF real-time catalogue provided with an open licence (CC-BY-4) for data >= 0.4 degrees

Reduced fees for some licence types

ECMWF Open Data Roadmap

underscores commitment to support UN Early Warning for All (EW4All)



From 01 October 2025!

Present Status

Present
(today, June 2025)

Products of the Real-time Catalogue at less than 0.25 degrees are still restricted!

Future
(From October 2025)

Products of the Real-time Catalogue at the maximum temporal and spatial resolution are **open**!

- For ECMWF, Open does not mean Free! Open means no restrictions on use.
- A subset of the full catalogue will be available openly and freely from our FTP and via the 3 public cloud providers.
- The remainder will be available subject to service charges (delivery charges for volume and services).
- Over time, we will work to increase the volume of open and free data.

Global Gateway

Africa – EU Space Programme – Strengthening Early Warning in Africa (AESPP – SEWA):

Co-designed impact-based forecast tools and trainings to advise on early warning

ECMWF | EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS

Implemented in partnership with AUC and EUMETSAT

Wider framework…

SEWA will contribute to the implementation of the UN led **"Early Warnings for All" (EW4All),** in particular to pillar 2 '**Detection, observations, monitoring, analysis and forecasting of hazards' (led by WMO)**

SEWA will also contribute to African Union Commission's **Africa Multi-Hazard Early Warning and Action System (AMHEWAS)**

… SEWA at ECMWF will build on strong existing capacities

- **EU-funded initiatives**, such as **Copernicus and GMES & Africa**, **ClimSA,** etc. which laid the groundwork for the use of EU funded Earth Observation (EO) data in Africa
- **European meteorological infrastructure (EMI), incl. European NMHSs** in their expertise on Early Warning
- **ECMWF's** long-standing experience supporting WMO and WMO's Regional Association-I (RA-I) countries and Regional Climate Centres (RCCs) in data provisions and services on Numerical Weather Predictions.
- **ECMWF's** cloud infrastructure and ECMWF weather and Copernicus data and training capacities

Implementation Outputs of ECMWF in SEWA

Outputs	Role EUMETSAT	Role ECMWF	Role AUC
2.1 Improved access, processing, applicability and use of data and services for Early Warning	**Shared**	**Shared**	Support
2.2 Established and operated African Meteorological Satellite Application Facility (AMSAF)	**EUMETSAT lead**	/	Support
2.3 Enable co-design and delivery of Impact Based Forecast services & tools	/	**ECMWF lead**	Support
2.4 Enhanced coordination with institutional framework and shared knowledge across regions	Support	Support	**AUC lead**
2.5 Strengthened human capacities, knowledge and community shaping	**Shared**	**Shared**	Support

Implementation through close peer-to-peer partnerships

Creation of African ownership

Focus at regional level: Eastern Africa (ICPAC); Western Africa (AGRHYMET); Southern Africa incl. Indian Ocean Islands (SADC-CSC); Central Africa (CAPC-AC).

Close engagements with **ACMAD** for inputs on all four regions

Each RCC would take the role to engage other essential African entities, incl. **RSMCs / selected African NMHSs**

Mandate NMHSs on issuing EW to be respected in line with WMO 1947 UN Convention of the WMO

African Union Commission: central role in governance.

Enable European meteorological capacity

European NMHSs and related partners active in the domain of Early Warnings are expected to play central role to team up with African RCCs to implement regional pilots on impact-based forecasts and the training activities.

Use of **European Weather Cloud infrastructure:** capitalize on European investment to serve both African and European communities.

In-depth scoping study

Funding Opportunity 2025

Mechanism Competitive procurement via an Invitation To Tender (ITT) with aim to award one contract

Max. budget ~450kEUR

Planning ITT launched on 12 June, closure on **31 July**, start implementation study in Q4 2025

Further info https://www.ecmwf.int/en/about/suppliers

Scope and objectives

- Identify existing initiatives, user needs, gaps and priorities:
  - Ensure a *coherent and complementary* approach to strengthening Early Warning systems for hazardous weather and climate-related events
  - Support the *selection of the most relevant hazards* to focus on with the aim to advance on impact-based forecasts, demonstration tools and services
- The scoping study is an essential precursor to the four regional IbF pilot demonstrators, focusing on West Africa, East Africa, Central Africa, and Southern Africa (incl. Indian Ocean Islands).
- The scoping study shall include the entire African continent, besides needs at regional level

Africa-EU Space Programme – Strengthening Early Warning in Africa (AESPP – SEWA)

Scoping Study – Early Warning and Impact-based Forecast initiatives across Africa

Volume II: Specification of Requirements

ITT Ref: SEWA/2025/01
ISSUED BY: ECMWF Administration Department Procurement Section
Date: 12 June 2025
Version: final

Implemented by ECMWF

Regional pilots on impact-based forecasts and warning tools for hazardous weather and climate events

Funding Opportunity Q2 2026

Mechanism	Competitive Call for Grants with aim to award 4 grants
Max. budget	~5mioEUR (actual amount can be slightly changed)
Planning	Launch of Call early Q2 2026 Start implementation of grants in Q4 2026 Each grant is aimed to run for up to 30 months, an interim version of the regional pilots output is anticipated to be ready by Q4 2027.

Process to identify and award grants

Definition specific scope

Study finished:
End Q1 2026

Scoping Study

Identification potential grantees

Call for
Expression of Interest

Long-list:
Q4 2025

Call for Grants Regional Pilots on Impact-based Forecasts demonstation tools and applications

Launch: beginning Q2 2026
Closure: Q3 2026

Four grants, each focusing on a specific Regional Pilots

Start: Q4 2026

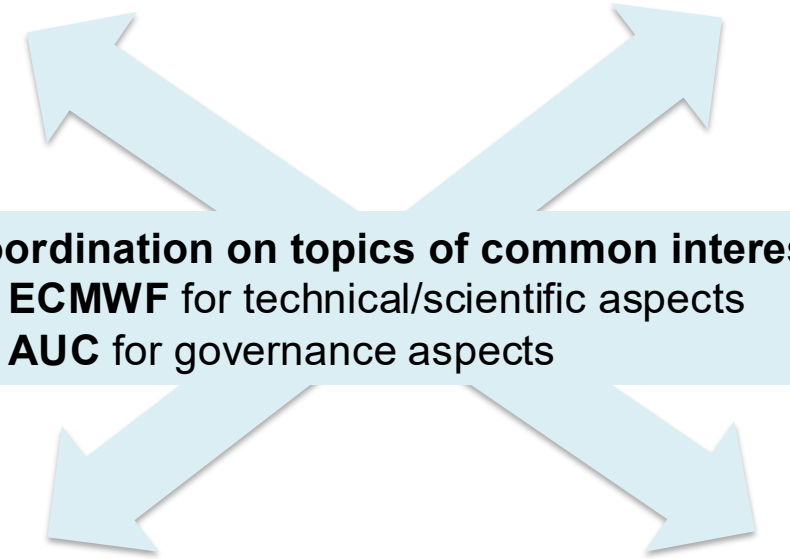
Coordination in and between the grants

Grant on Regional Pilot **Western Africa**

Co-beneficiaries to be included: **AGRHYMET** and **ACMAD**

Grant on Regional Pilot **Eastern Africa**

Co-beneficiaries to be included: **ICPAC** and **ACMAD**



Coordination on topics of common interest:

- **ECMWF** for technical/scientific aspects
- **AUC** for governance aspects

Grant on Regional Pilot **Central Africa**

Co-beneficiaries to be included: **CAPC-AC** and **ACMAD**

Grant on Regional Pilot **Southern Africa**, incl.Indian Ocean Islands

Co-beneficiaries to be included: **SADC-CSC** and **ACMAD**

Each RCC shall take the role to engage the essential African entities in their region, incl. RSMCs

Working Group to advise on the implementation: WMO AMCOMET, EUMETSAT, EC DG JRC

Co-design of 4 regional pilots on impact-based forecast

Priorities shall be based on the conclusions of an in-depth **scoping study**

For each region, the **two most relevant hazards** will be selected:

WMO EW4All priority hazards	Other 'Space' relevant hazards
flash floods	wildfires/smoke
drought/dry spells	dust storms
riverine floods	
tropical cyclones	
thunderstorms	
heatwaves	

Use of data (not exhaustive):

- **ECMWF data products**
- **Copernicus** data: C3S, CAMS, CEMS (JRC), etc.
- **Nowcasting** date as provided through AMSAF (EUMETSAT)
- **LAMs** focusing on specific areas of interest in Africa

Notes on the outputs of the regional pilots

- A fully operational deployment is **not** the target
- Priority is given on **enhancements** of pre-existing of tools and applications
- Each of the regional pilots will serve as a '**test-bed**' on a **range of demonstration tools** for selected hazards in support of early warnings as well as the establishment of **documented "best practices"**.
- Development of the demonstration tools in a Cloud environment (**CCI-EWCloud)**

Grant on training activities

Funding Opportunity

Mechanism	Competitive Call for Grants with aim to award 1 grant
Max. budget	~795kEUR (actual amount can be slightly changed)
Planning	Launch of ITT: Q3 2026 Start implementation of grant: Q1 2027 Expected end date: Q1 2029

Scope of grant on training activities

Funding Opportunity

- Co-design training plans and co-organise trainings events for practitioners via **train-the-trainer events** in the entire ‘space-based’ EW value chain
- Grant Action to be **coordinated and implemented by a consortium of European and African institutions**, specialised in trainings on impact-based forecasts and early warning on weather and climate hazards as well as the use of Cloud infrastructure.
- The **target trainees** are senior practitioners active in weather forecasts, climate, hydrology and early warning, as agreed by ACMAD and the other African RCCs and AUC/AMHEWAS and who are appointed as trainers themselves within their organisations:
  - Through this train-the-trainers approach, **ownership** is created within the African communities to share the gained knowledge with other colleagues.
  - **Gender balance** shall be a criterion for the selection of the practitioners to participate in these train-the-trainers programmes.

Grant on co-design and development of new digital tools in the CCI-EWC

Funding Opportunity

Subject to formal approval by the European Commission early 2026

Mechanism	Competitive Call for Grants with aim to award 1 grant
Max. budget	~1.2MEUR (actual amount can be slightly changed)
Planning	Launch of Call for Grant: end 2026 Start implementation of grant: early 2027 Expected end date: mid 2029

Grant on co-design and development of new digital tools in the CCI-EWC

Funding Opportunity

Subject to formal approval by the European Commission early 2026

Aim

Develop ***new*** co-designed tools focused on **digital solutions** in support of advice on Early Warning in Africa.

Downscaling of ECMWF's global AIFS (Artificial Intelligence Forecasting System) model **using ML/AI**: aim to increase the spatial resolution of the forecasts and thus enhance applicability of ECMWF's global model at regional level.

The AI/ML algorithms trained using **C3S ERA5 data, local observational data, etc**.

Alignments between AUC, ECMWF, EUMETSAT and external stakeholders

Governance

EC DG INTPA: overarching management of Action

Tight collaboration and alignment of activities between ECMWF and EUMETSAT on impact-based forecasts and training.

Governance instruments within SEWA implemented via Output 2.4. as managed by **AUC** including ad-hoc **Working Groups (WG)** which aim to Coordinate and Advise on implementation specific activities

Main WGs driven by ECMWF	Indicative entities involved
WG SCOPING STUDY	Reps. from EUMETSAT, WMO (EW4All team and linked entities), AUC
WG PILOTS	Reps. from at least WMO AMCOMET, EUMETSAT and EC DG JRC
WG TRAINING	Reps. from at least EUMETSAT and AUC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