

Environmental monitoring, natural resources and biodiversity



The JRC has a long history of environmental monitoring and networking in Africa and it relies on Earth Observation (EO) information for improved and evidence-based decision-making. It supports the African Union

Commission (AUC) and Regional Economic Communities (RECs) in the management and conservation of natural habitats in the areas of agriculture, crops and rangeland, environment, biodiversity, water, land, forest, marine and coastal resources.

Since 2000, the JRC has been involved in the transfer of technologies to increase African capacities and ownership through the PUMA (Preparation for the Use of Meteosat) and AMESD (African Monitoring of Environment for Sustainable Development) projects and now through MESA (Monitoring Environment and Security in Africa), a project worth €37 million supported by the European Development Fund 10 (EDF) for 2013 to 2017.

Examples of JRC partners in Africa:

Regional and national authorities and laboratories

- Africa Soil Science Society, Burkina Faso
- Agricultural Research Institutes of Benin, Cameroon, Kenya
- Central African Forests Commission (COMIFAC), Congo
- Congo Basin Forest Partnership (CBFP), Cameroun
- Council for Scientific and Industrial Research (CSIR), South Africa
- International Center for Tropical Agriculture (CIAT), Kenya
- International Center for Water Economics and Governance in Africa, Mozambique
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Mali
- International Institute for Water and Environmental Engineering, Burkina Faso
- National Water Resources Institute, Nigeria
- Niger Basin Authority (NBA), Niger
- Regional Centre for Mapping of Resources for Development (RCMRD)
- Regional Centre of the Permanent Interstate Committee for drought control in the Sahel (AGRHYMET), Burkina Faso
- Réseau des aires protégées d'Afrique Centrale (RAPAC), Gabon
- Réseau des Institutions de formation forestière et environnementale d'Afrique Centrale (RIFFEAC), Gabon
- South African National Space Agency (SANSA)

Academia

- Kwame Nkrumah University for Sciences and Technology, Ghana
- Sokoine University of Agriculture, Tanzania
- University of Benin
- University of Botswana
- University of Cape Town, South Africa
- University of Cheikh Anta Diop, Senegal
- University of the Free State, South Africa
- University of Khartoum, Sudan
- University of Malawi
- University of Nigeria
- University of Stellenbosch, South Africa
- University of Tripoli, Libya
- University of Tunis, Tunisia
- University of Zambia

Industry

- Association Interafricaine des industries forestières (IFIA)

With the Lisbon Declaration in December 2007, the African community called upon the EU to extend its Copernicus European initiative to Africa to support African decision makers in the identification of priorities, policy formulation and the operational implementation of programs and projects for sound environmental management.

In the context of the Africa-EU Action Plan 2008-2013, the EU and Africa have been working towards the elaboration of a Copernicus & Africa Action Plan. This sets up a medium/long term strategy in key thematic areas, and aims to make full use of the potential of space systems for sustainable development. The JRC is a key partner in the process and has been actively cooperating with the AUC, with the positive conclusion of the first phase of the process in South Africa in October 2013. A continental Action Plan for "Water", "Coastal & Marine" and "Natural Resources" was endorsed and of a Call for the Implementation of Copernicus and Africa made. Building on the outcomes of the AMESD and MESA projects, the JRC is now supporting the AUC to move the process forward through the formulation of an important project covering the period from 2015 to 2020, to be funded by the Pan African Program (PAP).

The JRC is also involved in the development of the Digital Observatory for Protected Areas (DOPA). This is a biodiversity information system of interoperable web services that assess, monitor and forecast the status of, and environmental pressures on, protected areas worldwide. DOPA will also support the setting up of two regional biodiversity observatories in Africa in the frame of the Biodiversity and Protected Areas Management (BIOPAMA) project which will further strengthen conservation capacities. The eStation, a web processing system used in DOPA and developed in the frame of the AMESD and the MESA projects, is currently being used in most African countries. This system processes key parameters derived from remotely sensed data to provide environmental indicators.

① <http://dopa.jrc.ec.europa.eu/>

JRC – The European Commission's in-house science service

As the European Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners.

The JRC's headquarters are in Brussels, in close proximity to many of its most important stakeholders. These include the policy-making Directorates-General of the European Commission and other institutions, in particular, the European Parliament. Most of the JRC's scientific work is carried out in the JRC's Institutes located on specialist sites in five countries, with the main site located in Ispra, Italy.

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Serving society, stimulating innovation, supporting legislation



The African Union and the Joint Research Centre (JRC)

In line with the EU-Africa Strategic Partnership, the European Commission's Joint Research Centre (JRC) has developed a productive cooperation with the African Union (AU).

This cooperation aims to provide evidence-based scientific and technical support to decision makers, universities, research institutes and the scientific community at large, contributing to the fulfilment of the objectives defined at the Rio+20 United Nations Conference on Sustainable Development.

Key priority areas are environmental monitoring, protection of biodiversity, sustainable development, water management, renewable energy, food security, and conflict prevention and early warning.

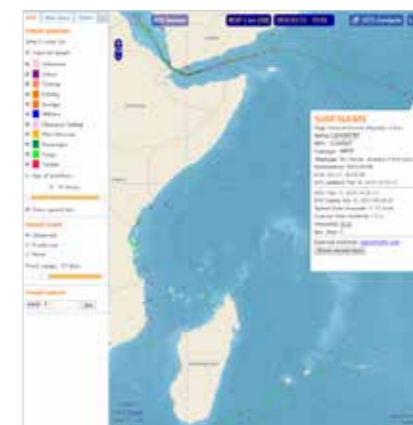
JRC support to the African Union's Continental Early Warning System (CEWS)

In cooperation with the African Union Commission (AUC), the JRC has developed a range of systems, tools and methods to strengthen the AU capabilities to anticipate and prevent conflicts in Africa by facilitating information monitoring and analysis. More specifically, these have contributed to set up the AU Continental Early Warning System (CEWS). The operational 24/7 automatic information monitoring and analysis tool, the Africa Media Monitor, delivers information that is routinely used by the AU CEWS to produce the Africa NewsBrief and Daily News Highlights on issues which could impact the whole continent. The information is used not only in the AU Situation Room to track live news, but also by AU decision makers and stakeholders, including the Regional Economic Communities (RECs).

This cooperation has helped the AU Peace and Security Department to develop its capacity to monitor, gather and analyse up-to-date

information relevant to decision-making on the continent for peace and security. It will be further extended to include the development of advanced analytical tools for early warning of conflict and socio-political type events.

Fight against piracy with PMAR project



A Maritime Situational Picture produced by the PMAR system. By clicking on a ship, its track and details will be shown.

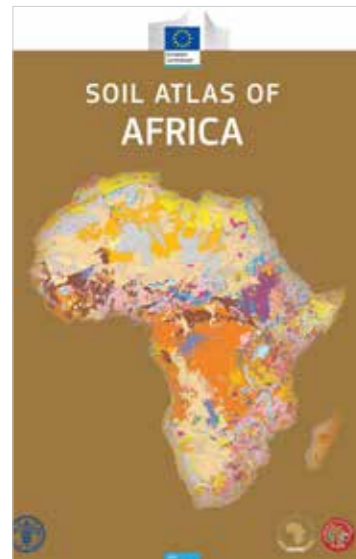
The JRC has demonstrated that through the PMAR (Piracy, Maritime Awareness and Risks) project, it is possible for maritime authorities in Africa to obtain and maintain maritime awareness. Starting in 2014, PMAR will allow the JRC to support two operational centres in Mombasa, Kenya, and Seychelles for a year in order to create a live Maritime Situational Picture, indicating ship positions in real-time on a digital map covering the Western Indian Ocean.

An experimental system with state-of-the-art software integrates data from vessel reporting and earth observation systems into one single maritime picture. Historic piracy risk occurrence and ship traffic density maps are also produced. With a strong focus on regional maritime capacity building, this system can also be used for other maritime governance purposes, such as combating illegal fisheries or irregular migration.



Joint
Research
Centre

Soil atlas of Africa



In collaboration with African and European soil scientists and the FAO, the JRC produced the first ever Soil Atlas of Africa. The African partners include the AU Commission, the Africa Soil Science Society, and several African universities and research institutes. This unique atlas shows the changing nature of soils across the African continent, analyses the major threats to soil and presents the steps needed to protect soil resources. The Soil Atlas of Africa is an essential reference tool in preserving a fundamental non-renewable resource.

The Soil Atlas of Africa was published in April 2013 (EUR 24375).

<http://eusoiils.jrc.ec.europa.eu/>

Drought monitoring and forecasting

To strengthen preparation for and adaptation to droughts in Africa, the JRC contributed to the establishment of a pan-African system for drought monitoring and forecasting through the DEWFORA (Drought Early Warning and Forecasting in Africa) project: the African Drought Observatory (ADO). ADO is a map viewer providing historical and near-real time monitoring information on meteorological drought, as well as seasonal forecasts. It also includes indicators on drought vulnerability and risk at country and river basin level. This system is complementary to already operative systems such as the Greater Horn of Africa Climate Outlook Forum (GHACOF).

<http://www.dewfora.net/>

Desertification and land degradation

In partnership with the United Nations Environment Programme (UNEP) and African partners, the JRC is finalising a new World Atlas of Desertification. The Atlas will help to better include desertification and land degradation in strategies that address food security, resource efficiency, energy and emissions schemes, development and poverty reduction. Publication is planned for 2014.

Forest monitoring



The JRC has contributed to the set-up of the Observatory for Central African Forests (OFAC) which acts as a reference observatory for better management of Congo Basin forest resources. OFAC produces periodic reports on the state of the forests in Central Africa and maintains an updated monitoring database of Central African Forests.

Renewable energy technologies

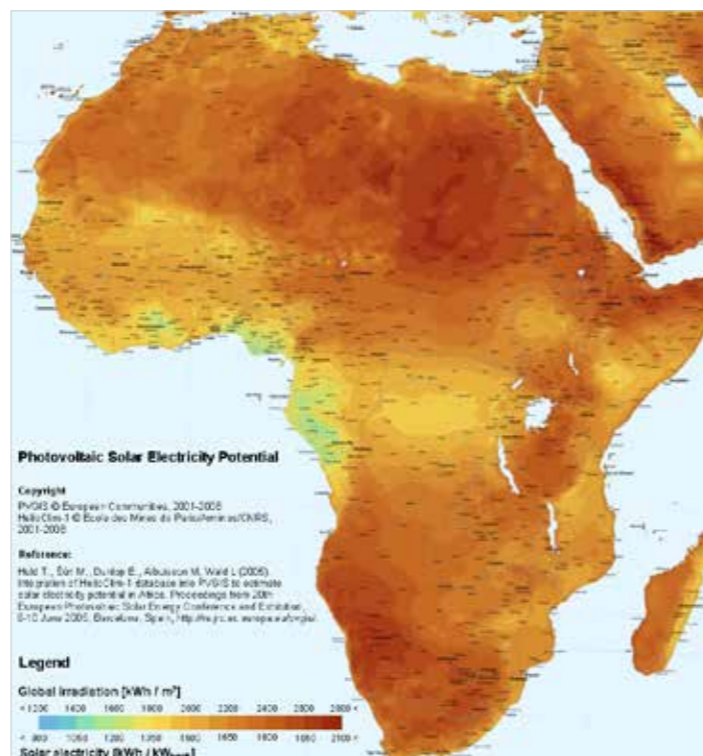
Contributing to the Sustainable Energy for All initiative, the JRC promotes the use of renewable energy technologies in Africa through several research projects under the EU Energy Initiative and the Africa-EU Energy Partnership. JRC activities focus on providing high quality resource information, developing technical and socio-economic criteria for assessing rural electrification projects and developing a web-based network of renewable energy research centres, the African Renewable Energy Technology Platform (AFRETEP). Compiled of 40 African and 25 European countries, with over 600 members from ministries, universities and research centres, AFRETEP supports the capacity building of African researchers in the field of renewable energy through hands-on sessions, field visits and case studies.



The AFRETEP Workshop in Cape Town in February 2012.

The JRC produced a map of current energy consumption and the share of renewables in Africa to set up a framework for estimating the potential of available solar, wind, biomass and hydropower resources. This will enable each region of Africa to evaluate the best choice of renewable solutions, taking into account sustainability and environmental criteria. The JRC also developed an interactive map of electricity grid in African countries for AFRETEP and the REMEA action (Renewable Energy Monitoring in Europe and Africa).

<http://iet.jrc.ec.europa.eu/remea/>



Solar electricity potential in Africa from the JRC report 'Renewable energies in Africa' (EUR 25247).

Improving food security

The JRC supports the capacity building of African regional and national food security information systems, allowing for an efficient transfer of knowledge and know-how about crop monitoring activities. This is done in close collaboration with partners such as the Food and Agriculture Organization of the United Nations (FAO), the New Partnership for Africa's Development (NEPAD) and regional African organisations like the Permanent Inter-state Committee for Drought Control in the Sahel (CILSS), the Southern Africa Development Community (SADC) and the Intergovernmental Authority on Development (IGAD), and their technical Institutions. Using Earth observation and agro-meteorological models, the JRC publishes bulletins on the agricultural and pastoral situation, providing qualitative and quantitative yield forecasts and early warnings on hotspots where crop or rangeland conditions could result in food insecurity.



The JRC is also involved in the technical development of global and regional initiatives to improve the use of food security information for decision-making.

<http://mars.jrc.ec.europa.eu/mars/About-us/FOODSEC>

Centres of Excellence in water science



The Water Project Toolkit produced by the European Commission (EUR 24773).

With the aim of improving the quality and management of water resources, the JRC has helped the AU and the New Partnership for Africa's Development (NEPAD) to establish regional networks of Centres of Excellence in Water Science and Technology in Western and Southern Africa. It carries out water sector stakeholder analyses in support of capacity building, coordinates the establishment of joint regional training courses and develops impact assessments of climate variability on water resource management.

<http://www.aquaknow.net/>

Marine and coastal areas

Using satellite data, the JRC has long-standing expertise in providing continuous and detailed information on important marine bio-physical parameters and indicators of change. Data and maps on the coastal environment are available through a web-based marine information system (<http://gmis.jrc.ec.europa.eu/>). Initially developed for Africa, this system became global in 2012, enabling the scientific and managerial user community to create maps and conduct basic environmental assessments at national and regional scales.

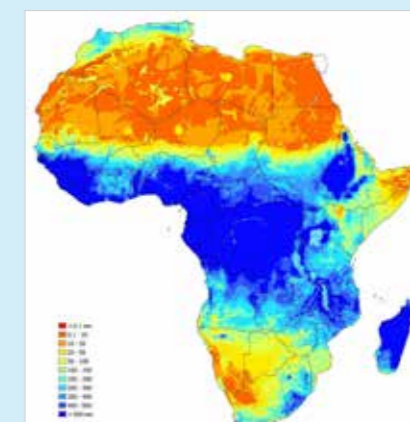
The JRC also organises training courses in Africa in support to the EU Development Cooperation policy on environmental issues such as climate change, marine resources management and water quality monitoring.

Transboundary river basin management

The Mékrou River Basin, a sub-basin of the Niger Basin, is shared between three countries: Benin, Burkina Faso and Niger. Sustainable management of water resources in this basin requires the development of transboundary water management plans, support for policy and institutional capacity building. The JRC collaborates on these issues with the Niger Basin Authority (NBA), the AGRHYMET Regional Centre and ministries in charge of water resource management,

as well as hydrometeorological services in the three countries. The aim is to promote investment in the water sector by developing an Integrated Water Resource Strategy for green growth in the Mékrou River Basin that addresses climate change, food security, urban and rural development and environmental conservation.

Assessment of water resources



Average annual rainfall from the JRC report 'Current water resources in Europe and Africa' (EUR 25247).

The JRC works on hydrological simulation modelling in order to assess current and future water availability and help optimise water supply and demand. It carried out a high spatial resolution analysis in Europe and Africa using its LISFLOOD hydrological simulation model with data on water uses for irrigation, livestock, industry, energy and domestic purposes. In the future, the JRC will

develop an optimisation model that will facilitate the selection of the best combination of measures affecting water availability and demand while ensuring economic and environmental sustainability.

<http://floods.jrc.ec.europa.eu/>

Pan-African flood forecasting

Over the past years, the African continent has experienced severe transnational floods that caused substantial socio-economic losses. The JRC is developing a Pan-African flood alert system which builds on the knowledge and experience gained with its European Flood Awareness System (EFAS). The applicability of EFAS-methodologies to equatorial African basins has been assessed through a feasibility study carried out in the Juba-Shabelle River Basin in Somalia/Ethiopia in collaboration with the Somalia Water and Land Information Management Project (FAO-SWALIM). Results showed that the JRC flood methodologies and models are transferable to African basins. The JRC plans to further develop this initiative with hydrological and meteorological services from Eastern, Western and Southern African river basins such as the Volta and Zambezi River.