

The objective of the event was to present H2020 projects (e.g. AfriCultuRes, TWIGA, SWOS, GEOCRADLE, GROUNDTRUTH 2.0, ECOPOTENTIAL, SEACRIFOG) promoting the uptake of EO data in Africa in order to enhance food security, water supply, protection of biodiversity, diversification of the energy resources, and building of a climate resilient society. The event explored reinforcing the participation of those projects in the GEO multiannual Work Programme in coordination with the initiative GMES in Africa.

## Organizers

European Commission/EASME

## Contact

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## Programme

Time	Speaker	Title
11:00-11:10	Franz Immler	Welcome
11:10-11:20	Gerard Margarit (AfriCultuRES)	A long-term self-sustainable & user-centered initiative in Africa on food security
11:20-11:30	Mark Noort (TWIGA):	How to achieve sustainability for in-situ observations on weather and water?
11:30-11:40	Emmanuel Salmon (SEACRIFOG):	Designing a feasible and representative research infrastructure network for GHG observations in Africa
11:40-11:50	Javier Muro: (SWOS)	Wetlands: supporting the implementation of SDG's in Africa with Earth Observation Systems
11:50-12:00	Joan Masó (GroundTruth 2.0)	"Applying the Citizen Science GroundTruth 2.0 methodology in Africa. The Kenya and Zambia case."
12:00-12:10	Omar Elbadawy (GMES&Africa):	Developing an Earth observation operational application for coastal ecosystems mapping, monitoring and assessment of the northern African coastal zone – NAFCOAST
12:10-12-20	Haris KONTOES (GEO Cradle)	Promoting GEOSS and COPERNICUS in NAMEBA: the GEO-CRADLE EU project and GEO Initiative
12:20-12-30	Discussion on Cross cutting issues: <ul style="list-style-type: none"> <li>• Stakeholder involvement, how to reach out to the people?</li> <li>• Data and applications, Ensuring sustainability of services</li> <li>• Involving local business sector</li> <li>• EU-Africa cooperation, GMES &amp; Africa, future initiatives, (Climate services for Africa, H2020 Call 2019, Devco)</li> <li>• National initiatives, e.g. <a href="#">G4AW, NL</a></li> </ul>	

## Abstracts

### Moses Cho (ECOPOTENTIAL)

Application of Earth Observation in Kruger National Park region within the framework of ECOPOTENTIAL

Adaptive management is the cornerstone of the management strategy of the Kruger National Park (KNP) – the largest protected area in South Africa. It is based on monitoring a set of operation goals termed thresholds of potential concern (TPC). TPCs are the lower and upper limits along a continuum of change in selected environmental indicators beyond which an assessment is required to (i) understand the cause of the extent of change and (ii) enable managers to undertake measures to moderate the change. The TPCs include indicators such as vegetation vertical and horizontal structure, woody and herbaceous species composition, invasive species, degradation of landscape function etc. Within the framework of ECOPOTENTIAL, The Council for Scientific and Industrial Research (CSIR) has explored Earth Observation systems, mainly remote sensing to generate algorithms and mapping protocols for several TPCs including grass quality, grass biomass, phenological changes, tree species diversity and tree cover, height and biomass. This has involved a multi-sensor approach involving Sentinel-1 & 2, Landsat 8, MODIS and ALOS PALSAR data. The products generated from the project are serving the needs of The South African National Parks (SANPARKS), the South African Departments of (i) Forestry and (ii) Environmental Affairs. The project is also linked to other initiatives e.g. The Southern Africa Science Service Centre for Climate Change and Adaptive Management (SASSCAL) and one of GMES-Africa's objectives on long-term management of natural resources.

### Mark Noort (TWIGA)

How to achieve sustainability for in-situ observations on weather and water?

One of the biggest challenges that we face in the TWIGA project is to continue successfully with operations after the project has ended. The most obvious option is selling the data, which is currently the business model of the TWIGA partner TAHMO, but in an era of free and open data this may not be the best solution in the long run. Similarly, supplying in-situ data as a public good is, at least for the short-term, not very realistic in the African context. I will discuss a number of promising alternative options, based on partnerships and bundling of services, for the TWIGA focal areas of agriculture, water and sanitation, disasters, energy, and inclusive finance.

### Emmanuel Salmon (SEACRIFOG)

Designing a feasible and representative research infrastructure network for GHG observations in Africa

There is currently a lack of representative, systematic and harmonized greenhouse gas (GHG) observations covering the variety of natural and human-altered biomes present in Africa. This impedes the long-term assessment of the drivers of climate change, in addition to their impacts and feedback loops at the continental scale, but also limits our understanding of the contribution of the African continent to the global carbon cycle. Given the current and projected transformation of socio-economic conditions in Africa (i.e. the increasing trend of urbanization, population growth and land-use change) and the adverse impacts of climate change, the development of a GHG research infrastructure is needed to support the design of suitable mitigation and adaptation strategies required to assure food, fuel, nutrition and economic security for the African population.

The initial results of the EU-African SEACRIFOG project presented here draw on several steps: the identification and engagement of key stakeholders; the assessment of 47 existing and planned networks across the continent ; the definition of a conceptual monitoring framework to select a set of 58 “essential SEACRIFOG variables” that need to be measured in the future environmental RI. This selection is based on a dual approach: bottom-up, through a consultation of experts from the atmospheric, terrestrial and oceanic thematic areas, and top-down, by analyzing the components of the climate forcing observation system.

### Javier Muro, Jonas Eberle, Adrian Strauch, Kathrin Weisse & the SWOS team

#### SWOS & GEO-Wetlands: supporting the implementation of SDG's in Africa with Earth Observation Systems

The economic and environmental value of wetlands is widely recognized. However, they keep degrading and disappearing at alarming and increasing rates, particularly in low and middle income countries. The 2018 Global Wetland Outlook Ramsar report identifies "knowledge" as a key to engage institutions, secure investment and develop sustainable management.

The EU-H2020 project “Satellite-based Wetland Observation Service” (SWOS, <https://www.swos-service.eu>) has spent the last three years bringing decades of expertise of remote sensing for wetland monitoring and management to stakeholders and wetland users in European and African sites. Liaising with local institutions, we have been providing mapping products (e.g., Land Use Land Cover, Land Use Land Cover Change, Land Surface Temperature Trend, Surface Water Dynamics) tailored to their needs, and training personnel to continue with the monitoring activities.

Through the GEO-Wetlands Community portal we provide the mapping products along with external data and indicators generated to support the Sustainable Development Goals and the Ramsar Convention. The portal acts as a knowledge hub for wetland related spatial information where users can discover satellite data available, visualize and download mapping products, and get information about how satellite data can be used.

The GEO Wetlands initiative will take upon the results and infrastructure built within the SWOS project to continue to provide wetland managers and users with accurate and up to date spatial information.

### Joan Masó

"Applying the Citizen Science GroundTruth 2.0 methodology in Africa. The Kenya and Zambia case."

GroundTruth 2.0 is developing a methodology for starting and managing Citizen Science project that was applied to 6 demo cases so far. Two of them are in Africa. We will present the experiences and difficulties that we face in the deploying the methodology in africa. For an ecosystem such as the wider. In Kenya Maasai Mara region stakeholders involved in these areas need reliable data on which to make daily decisions. Citizens play a key role in helping fill data gaps in Biodiversity, Livelihood and Water. In Zambia, Ground Truth 2.0 citizen observatory Niti Luli is designing a platform to support the work of existing Village Action Groups (VAG) and Community Resource Boards (CRB), a structure mandated under the Wildlife Law to realize a community-based natural resource management (CBNRM) approach

## Project descriptions :

[AfriCultuRes](#) is a project which started in November 2017 and which is coordinated by GMV Aerospace and Defence (SPAIN). AfriCultuReS aims to design, implement and demonstrate an integrated **agricultural monitoring and early warning system** that will support decision making in the field of food security. AfriCultuReS delivers a broad range of climatic, production, biophysical and economic information, for various regions in Africa. AfriCultuReS applies geospatial science to **sustainable agricultural development, natural resource management, biodiversity conservation, and poverty alleviation in Africa**. AfriCultuReS, supported by the GEO Secretariat, involves all key players of AfriGEOSS, GEOGLAM, SIGMA, ARTEMIS, African Drought Observatory and other initiatives as well as partners representing the diversity of African agricultural systems, in an effort to push forward the services provided by current systems, with innovative fusion of data from multiple sources (EO, in-situ, citizen-based crowdsourcing, climate services and weather, crop models) in a vertical manner.

The African partners and collaborating networks are essential for local training and promoting further use of the project tools. Social innovation is used to increase the number of involved stakeholders and to boost the flow of information in a user-friendly manner. The final target is to produce a web tool that supports early decision-making for the stakeholders of African food production.

**TWIGA** - Transforming **Weather Water data** into value-added Information services for sustainable Growth in Africa – is a project which started in February 2018 and which is coordinated by TECHNISCHE UNIVERSITEIT DELFT (Netherlands). TWIGA will provide currently unavailable geo-information on weather, water and climate for sub-Saharan Africa by enhancing satellite-based geo-data with innovative in situ sensors and developing related information services that answer needs of African stakeholders and the GEOSS community. The concept is based on a systematic feedback loop to reciprocally validate in situ measurements and satellite data in one integrated model. There will be over 500 in situ measurement stations using citizen science. TWIGA will build on and push further recent advances in sensor and communication technology to provide cheaper and more robust in situ measurements covering a wider area at a higher resolution in sub-Saharan Africa. It will work with tech-hubs in Europe and Africa to feed creation and growth of European and African start-ups that develop sensors and geo-services, deliver complete value chains from sensor to customer-ready information delivery. TWIGA's impacts should be

- Integration of in situ components into models based on GEOSS and Copernicus data
- OGC compliant science-grade geo-data (atmosphere, hydrosphere, biosphere) delivered to GEOSS, incl. near-real time statistically characterized **soil moisture data** from Africa that can be used operationally (not currently available) and radar derived soil moisture measurements also available under cloudy conditions, or vegetation overgrowth
- at least 20 new **products for use in food, water, energy security, climate change and resilience to natural hazards** validated and ready for large-scale implementation by consortium partners and external stakeholders
- based on at least 10 innovative, cost efficient, robust, sensors, including fast neutron counter, tracking of convective storms with consumer lightning sensors and accelerometer for tree-crown weighing
- (Bio-degradable) sensors reduced to one tenth to one hundredth of their current price, extremely low-maintenance, use of Unmanned Aerial Vehicles.

**SWOS** – Satellite-based Wetland Observation Service- is a project which started in 2015 and which is coordinated by Jena-Optronik GmbH (Germany). SWOS generates information on wetland ecosystems using the new possibilities offered by free satellite data.

SWOS focuses on wetlands because they are hotspots of biodiversity; wetlands they are home to more than 100,000 freshwater species, essential for many amphibians and reptiles, for bird breeding and migration. Wetlands provide also invaluable ecosystem services. They regulate **water availability and quality, filtration, purification, and nutrient cycling as well as provide food for millions of people. They absorb shocks from natural events such as floods and droughts and regulate climate through carbon storage.**

The SWOS Service Portal provides wetland managers, policy-makers and scientists with access to maps and indicators of wetland condition and changes.

SWOS has several test sites, notably in AFRICA. For instance, they recently explored the impact of aquaculture expansion on Lake Burullus, a Ramsar site in Egypt or they provided valuable data for updating River Basin Management Plans in Algeria.

**GEOCRADLE** is a project which started in 2015 and which is coordinated by NOA (Greece). The project has a regional focus on North Africa, Middle East and Balkans. Four thematic areas for pilot activities in: **Adaptation to Climate Change, Improved Food Security & Water Extremes Management, and better Access to Raw Materials & Energy.** GEO-CRADLE launched both its Networking Platform and its Regional Data Hub, which are publicly available online from the project's portal. The Networking Platform provides a wealth of information on key EO stakeholders active in North Africa, Middle East, and the Balkans. The users can navigate through the profiles of stakeholders and be informed on the existing networks, capacities, skills, etc. in the entire region. Whilst the platform is primarily targeting stakeholders from the region, organisations from other countries are invited to become part of the network too. The Regional Data Hub provides access to both region-related datasets, portals, and services developed by a regional network of raw data providers, intermediate users/service providers, end-users from the industry, the academic and public sector from the region of interest, and, also, datasets and services directly fed from the GEOSS-portal.

**GROUNDTRUTH 2.0** is a project which started in 2016 and which is coordinated by IHE Delft (The Netherlands). The project has set up and validated six citizen observatories in real conditions, in four European and two African demonstration cases (Zambia and Namibia). The project is demonstrating that such observatories are technologically feasible, can be implemented sustainably and that they have many societal and economic benefits. The ultimate objective is the global market uptake of the concept and the enabling technologies. The thematic focus of Ground Truth 2.0 is **on flora and fauna, as well as water availability and water quality, for land and natural resources management.** The project uses mobile apps and social media analytics to collect explicitly and implicitly-sensed citizen data. As such, citizens are enabled to share data about the environment and to take on a new, crucial role in environmental monitoring, decision making, cooperative planning and environmental stewardship.