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Greenhouse Gas Observation & Climate-Smart Agriculture

For more information please contact us:

mylene.ndisi@icos-ri.eu

Highlights of a pan-African system for long-term Greenhouse Gas observations

M. Ndisi[1], E. Salmon[1], W.L. Kutsch[1], V. Jorch[2] and the SEACRIFOG consortium

[1]Integrated Carbon Observation System (ICOS ERIC), [2]Thünen Institute of Climate Smart Agriculture

Background

The improvement of global climate science necessitates the **reduction of uncertainty in greenhouse gas observations** in Africa. A combination of satellite products, ground-based stations, and data centres is needed to optimise emission measurements of **CO_2, CH_4 and N_2O** over the African continent.

Science

A scientific assessment of essential variables was performed to identify and select a **set of variables** that need to be systematically observed in order to quantify natural and anthropogenic climate forces in Africa.

Collaborative Inventory Tool

The tool is a dynamic inventory of existing **stations, essential variables, data sets** and related **protocols.** It draws on already defined climate, oceanic and biodiversity parameters. A total of **58 essential variables** were rated by experts against **cost, feasibility and relevance.**

https://seacrifog-tool.sasscal.org

Sustainability

The sustainability of the system is envisaged through **partnerships, long-term commitment and shared governance.** This will involve international, national and sub-national actors.

Support within the framework of **AU-EU cooperation** is needed for the setup of a

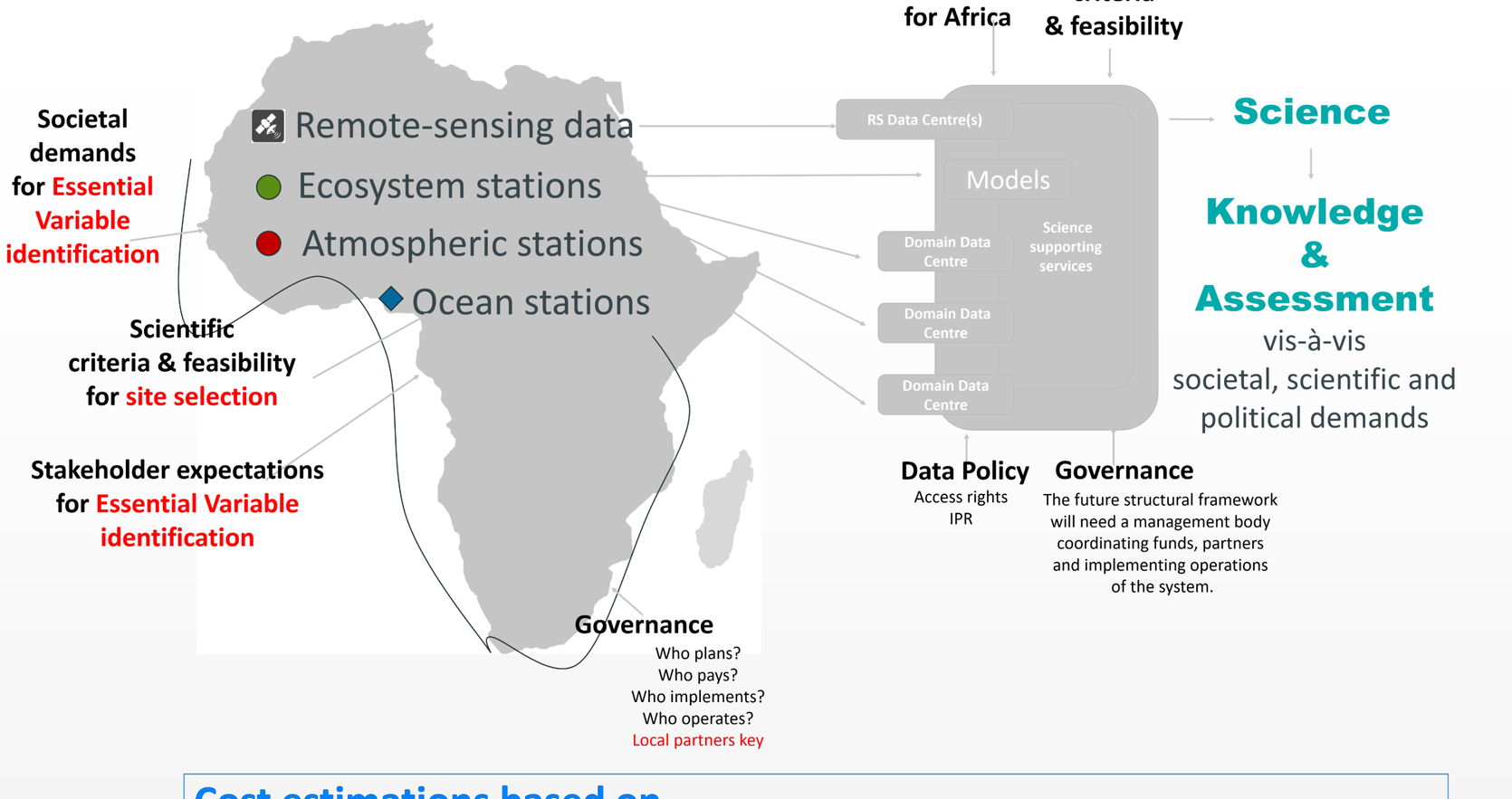
SEACRIFOG Dialogue Platform.

It will be well placed to establish long-term strategies regarding all aspects, including funding. An initial meeting is envisaged in spring 2020.

Optimized network

The concept of an ideal network has been designed by inverse modeling techniques based on **spatial and temporal optimization** of potential observation stations. The aim is to yield the highest reduction in uncertainty in GHG measurements in Africa and globally for a given investment.

Figure 1: Overview of the concept



Expected impact

- ✓ **Food security and climate smart agriculture:** ensure enhanced productivity, income, and appropriate land-use.
- ✓ **GHG inventories:** combine *in situ* measurements at multiple scales and calculated emission factors, in order to provide accurate GHG emission baselines e.g. from crop-livestock farming.
- ✓ **Energy:** improve resource use efficiency through consumption practices suitable for ecological conservation.
- ✓ **Health:** improve air quality research.

Cost estimations based on

- ➢ **Initial costs** for new sites: equipment, installation….
- ➢ **Operational costs** for atmospheric or ecosystem flux measurement sites, including the cost of processing, storing and serving data

This results in estimated funding needed:

- ❖ Initial cost of **30 M€**
- ❖ Annual operational costs of **10M€**
- ❖ Long-term (30-year) cumulated cost with modular extensions: **400-500 M€**