Digital Information Services for Soil Erosion Risk Management

Context and challenges

In all regions of the world, climate change is causing immense damage due to flooding, soil erosion and land degradation, as evidenced by heavy rainfall. The loss of arable land and soil fertility (on-site) as well as damage to housing and infrastructure, ecosystems and silting up of dams (off-site) are all increasing sharply.

The Maghreb region and a large part of Africa are particularly affected by climate change. In order to cope with the worsening of climate change, most countries in North Africa and sub-Saharan Africa have included adaptation measures in their climate objectives (NDCs). To meet the challenges of a sustainable land management, digital information services are increasingly needed as a basis for decision-making: for soil management, water management and climate risk management.

Various satellite earth observation missions regularly acquire data sets. The supply of derived products, for example for soil erosion and desertification management, currently focuses mainly on making individual large-scale or global datasets available and is less action-oriented for application to local or regional problems.

Objective

The aim is to develop digital information services adapted to the local/regional level to provide continuous and user-specific information as a basis for decision making for both land users and responsible technical authorities (stakeholders) towards achieving Land Degradation Neutrality (LDN). These services can be made available in OSS member countries to support the implementation of soil erosion risk management at national, regional, and local levels, as a basis for decision making.

Methodological approach

Our innovative methodological approach, in collaboration with the German Geosciences Research Centre, includes the following services:

- The development and application of **regional-specific** methods **for the derivation of thematic remote sensing products**. These products will be implemented and locally adapted to the regional setting. This includes the derivation and evaluation of time series for the reconstruction and analysis of changes of surface characteristics related to land use and climate.
- 3 main pillars for digital information services to support decision-making:
    - Remote sensing: land use, land cover
    - Process-oriented soil erosion modelling
    - Analysis and modelling of meteorological/climatic data
- Implementation: Managing the risk of soil erosion
    - Risk analysis
    - Planning of protective measures
    - Risk prevention and management
    - Surveillance/monitoring/evaluation/reconstruction

This methodological approach includes:

- a transdisciplinary and process-oriented approach (e.g. on-site/off-site; heavy rainfall, surface runoff, erosion/deposition)
- a multi-level approach: specific products and approaches for audiences in different spatial units (national/regional/local).
- a transferability of the approach to other comparable regions

Examples of applications

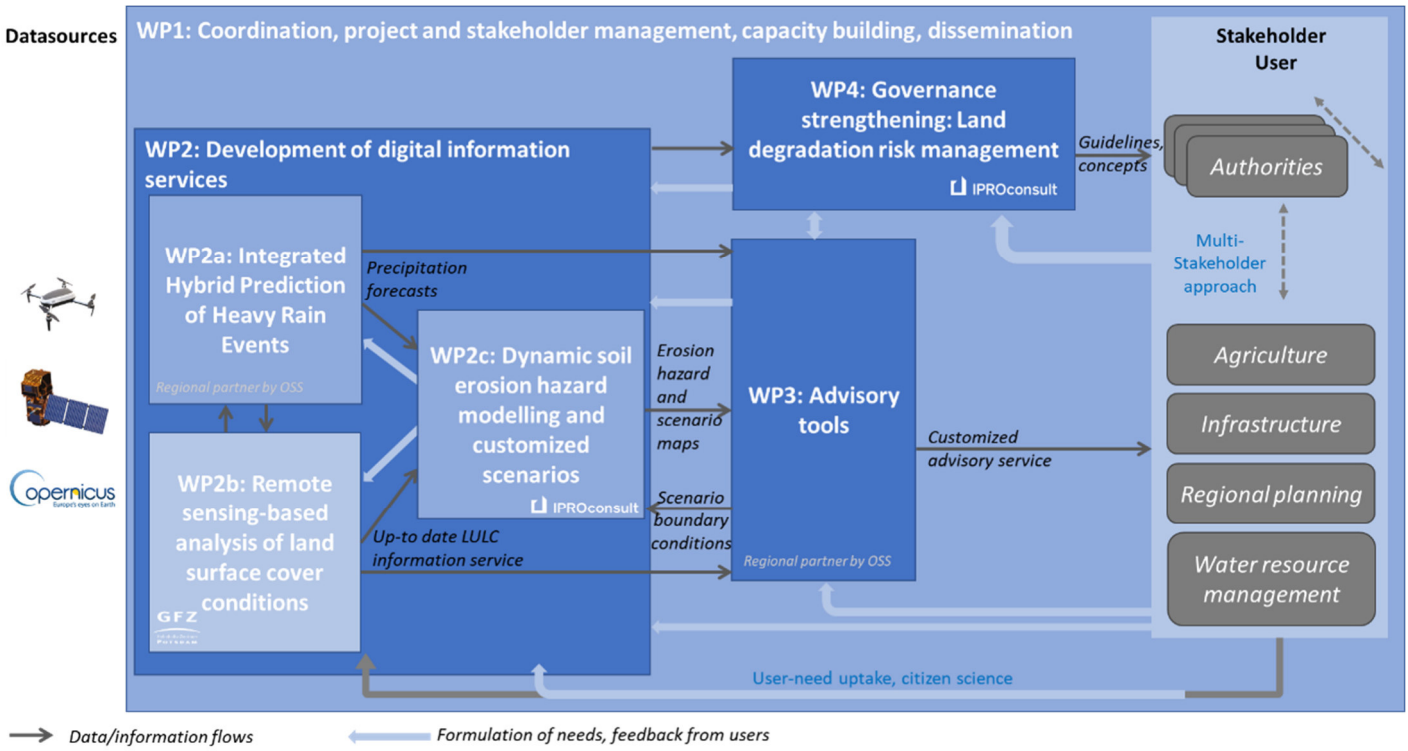
Digital information services for soil erosion risk management are aimed at authorities and stakeholders in the following sectors:

- Agriculture
- Infrastructure / transport
- Water management
- Regional planning

Our expertise in cooperation with the German Geosciences Research Centre (GFZ)

- Expertise in the development of remote sensing methods and their regional application for the derivation of problem-specific information products, with a focus on satellite-based time series analysis.
- Expertise in hyperspectral remote sensing and sensor development **(PI scientists on the EnMAP satellite mission** - scheduled for launch in April 2022)
- Expertise in process-based soil erosion modelling
- Consultancy: concept development and implementation of soil erosion risk management
- Project management + stakeholder management
- Implementation and deployment of solutions on the market (cooperation with Société des Autoroutes du Maroc (ADM), public-private partnership project: IPROconsult-ADM)

Process



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