LAND DEGRADATION

Land degradation represents one of the main threats for the Earth and its inhabitants: it affects at least 3.2 billion people and costs about €5.5-10.5 trillion per year and 10% of the annual global gross product in terms of biodiversity and ecosystem services.

Land degradation has been considered as one of the planet's most urgent issues for many years. A third of the Earth's land surface is allegedly experiencing various stages of degradation, and over half of the world's population already lives on degraded lands, according to alarming estimations frequently made by the academic community and intergovernmental organisations. Furthermore, because land degradation directly impacts the biophysical processes of vegetation and modifies how ecosystems function, it has an impact on habitats and, as a result, many species of flora and fauna that are at risk of extinction.

Target 15.3 of the Sustainable Development Goals (SDGs) focuses on the issue and calls for "land degradation neutrality -LDN" as "a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystem". There is an interconnection between land degradation and the entire sustainable development framework that poses an urgent challenge: on the one hand, water management (SDG 6), responsible production (SDG 11), and sustainable economic growth (SDG 8) are negatively impacted by land degradation; yet, on the other hand, the targets of other SDGs related to food, health, water, and climate, pose a high pressure on land and soil.

Many approaches and methodologies are suggested to tackle land degradation, all, however, show some accuracy-related limits. The use of Earth observation (EO) data has definitely been the most widely adopted method to assess the land degradation. Numerous studies and research on land degradation have been conducted, particularly during the last decade thanks to technology developments, increased computing power, and the accessibility of open access archives for remotely sensed data.

UpToEarth proposes an approach that differs from traditional studies based on the use of satellite data. In addition to land cover maps, it uses satellite data to characterise soil texture, weather conditions, agronomic interventions (tillage, fertilisation, etc.) and anthropogenic elements in the areas of interest. The historical and near-real-time data on the environmental characteristics just listed make it possible to:

- identify the restoration area;
- select the best agricultural practices to be used for the implementation of the selected restoration project;
- predict the impact of agricultural practices and support the farmer in optimising their application;
- monitor the results achieved over time.