

COMPREHENSIVE MONITORING METHODOLOGY FOR AGRICULTURAL LAND USE DYNAMIC CHANGES USING MULTISOURCE REMOTE SENSING DATA – AGRITELD

Goal of the project

The scientific study of agricultural lands is found in the specialty literature since the 1930s. These studies gradually turn from traditional studies (field investigations, field studies and then laboratory) to 3s spatially-based technology. The Integrated Approach to 3s Technology represents trends in precision farming. In this respect, in Europe and beyond, the factors responsible for the rational and sustainable management of agricultural land (governments) gradually achieve the importance of “remote” monitoring of agricultural lands and the importance of studying them globally.

Short description of the project

Information acquisitioned by remote sensing facilitate rapid and effective quantification of changes or advances a plant or several plants have encountered, their development phases and the basis for a new perception of research into precision farming.

Research and agricultural land monitoring using the benefits of remote sensing has developed a lot in recent years, but there are still unresolved issues related to: remote monitoring of a wide range of species (high variety), high accuracy, quasi-reality is still at the operating stage etc.

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Project implemented by

Beneficiary:

Politehnica University Timișoara

Department: Overland Communication Ways, Foundations and Cadastral Survey

Partner:

Chinese Academy of Science

Institute of Remote Sensing and Digital Earth

Implementation period

June 2018 – December 2019

Main activities

Through the cooperation, we wish to form a systematic method to monitor the agricultural land use quickly and accurately, build up the remote sensing model of agricultural land use change assessment, prediction and spatial optimization. This could support centralized and orderly management of agricultural land, which provides scientific basis for agricultural land.

As originality and innovation elements following objective can be specified:

1. Developing multi-source remote sensing data fusion technology, and increasing the accuracy of land field determinations;
2. Developing a comprehensive monitoring technology based on multi-source remote sensing analysis of dynamic change of agricultural land use;
3. Establishing and validating an assessment, prediction and spatial optimization model of agricultural land use change using GIS facilities (Vilceanu, Herban and Meng 2017);

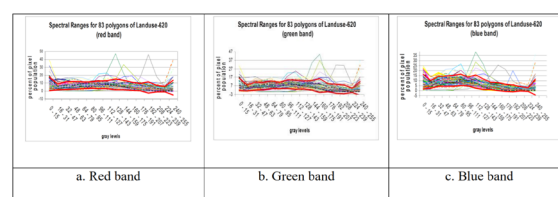


Fig. 1 GIS-Driven – Detectarea schimbărilor

There are several objectives standing before us. The cooperation in itself is a very positive goal as it opens each team to: other regions; different angles, view and facets of agricultural management; and different ways of thinking. More specifically, the cooperation proposed here between China and Romania is envisaged to help with introducing each other with the technology of monitoring and of land classification with high precision, as done at the other country.

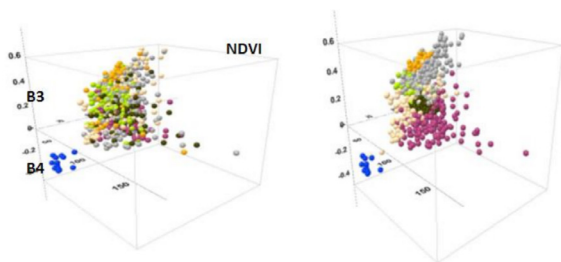


Fig. 2 IDA change detection and classification (left-before, right- after)

A secondary objective would be realizing better the usage of the spatial information embedded in the satellite images for the advancement of agricultural technology. The concept of GIS-Driven / GIS-support, mentioned above, is clearly one of the clear cut tools for such endeavour. In addition, both teams set some more specific goals:

- To learn the special characteristics of the satellite images provided by the Chinese cartographic satellite and any other products that will be provided for parallel processing.
- To establish the minimal resolution needed for the change detection and agricultural related classification at hand.
- To develop a modular concept of methodology that will support future adaptation to new satellite sources.

Results

- Developing a fusion technology of remote sensing data acquired from multiple sources;
- Developing a smart monitoring method based on dynamic changes of agricultural lands analysis from multiple sources of remote sensing;
- Establishing and validating an assessment, prediction and spatial optimization model of agricultural land use changes;
- Integrating spatial information in GIS platforms.

Applicability and transferability of the results

Applicability of the study its very various and useful for:

- Governments - implementing agricultural smart polities;
- small and large agricultural farms;
- another areas of research like forestry;
- etc..

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