MONITORING RICE CROP VARIETIES THROUGH REMOTE SENSING TECHNIQUES

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ABSTRACT:

Growing concerns on the productivity and sustainability of agricultural land uses have increased the demand for more detailed and timely information on current and future production levels of food and strategic crops at regional scales. Indeed, decision makers in Agricultural and Food Security, require accurate and timely information on crop areas and yields. This information, for example, is quite valuable for agricultural insurances in Iran. The needs emerge when information is required for non-administrative spatial units, such as, area hit by a natural disaster: drought, kill-frost, windstorm, flood, etc. The urgent need of the Iranian agricultural insurances fund is to extract accurate yet timely information on main strategic crops (such as, Rice in this study) from remotely-sensed data. The idea behind this research is to generate more detailed and accurate quantitative assessments of the state of the agricultural production environment. Using satellite and airborne remote sensing, image interpretation, agro-meteorological crop modelling, sampling methods, and statistical techniques, new insights in how to quantitatively estimate real time current food and production levels at a regional scale will be achieved. In this study, geo-information science and Earth observation data analysis for rice crop monitoring through the following steps will be explored: - understand the basics of an agricultural insurance schemes, and the requirements of the users of geoinformation (in this case Agricultural Insurance Fund (AIF)) for crop monitoring and yield forecasting; - review existing experiences in the country and abroad about agricultural production insurances; - Assessment of existing data and/or knowledge, e.g., for Rice insurance as the main strategic crop for the Iranian agricultural insurance fund; - study of the rice varieties, phonology of the rice crops, crop calendar, and biophysical and biochemical parameters; - select the new aerial photos and remote sensing imagery (e.g., in terms of spatial, spectral, radiometric, and temporal resolutions, and cloud cover on the basis of the requirements of AIF) for rice crop area estimation in the study area, - to identify and classify two main rice types from the images, namely, modern high yielding varieties and indigenous rice varsities, - a cost-efficiency analysis of the aerial photos and newer high and coarse resolution images for rice area estimation at farm and regional levels (time for the imagery acquisition, number of collects, spatial resolutions), - a cost-efficiency analysis of the combination of ground observations with classified satellite images for rice area estimation at farm and regional levels, - integrate remote sensing as well as ground field data into decision models for crop yield estimation and monitoring in an efficient and consistent manner.

TOPIC: Land cover classification
ALTERNATIVE TOPIC: Multi-spectral and hyperspectral remote sensing