



## **Vegetation condition assessment and monitoring in Mediterranean agropastoral regions**

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In the Mediterranean island of Sardinia pasturelands represent a major component of the landscape and livestock farming is one of the main economic activities. Intensification of the agropastoral activities on unsuited lands on the one hand, and land abandonment on the other are considerably affecting the structure and function of ecosystems, leading in some case to severe land degradation processes. The development of operational techniques for assessing and monitoring pasture condition at landscape level is therefore fundamental to implement efficient territorial management policies and to determinate the right compromise between resource exploitation and ecosystem service maintenance. Remote sensing technologies can significantly contribute to this task, providing timely and increasingly cost-effective information about several land condition indicators at different spatial and temporal scales.

The main aim of this study is the development of a pasture condition diagnostic tool at landscape scale based on satellite remote sensing data suitable for Northern Sardinia agro-pastoral regions. Hypertemporal (16 day composite) MODIS NDVI images (MOD13Q1-v005) at 250 m spatial resolution were analyzed to monitor the short-term (2000-2010) temporal dynamics of pasture growth and assess the actual vegetation condition. The deviation of the vegetation productivity estimated in a given location from the one estimated in a reference area was used as indicator of pasture condition. Diachronic analysis of Landsat data was instead performed to assess long-term land use/cover dynamics associated to pasture degradation patterns at high spatial resolution.

The integration of the information provided by different methodological approaches and remote sensing data with complementary spatial and temporal scale is expected to give a reliable set of indicators of Mediterranean pasture functionality and to improve our understanding of the main factors affecting degradation trends in the study area. Preliminary results indicate that the high temporal resolution of MODIS NDVI time series allows monitoring vegetation productivity as well as land surface phenological indicators. These indicators are effective in discriminating degraded pastures not only when poor conditions are related to decreasing plant cover and productivity, as generally observed in arid and semi-arid ecosystems, but also when a change in vegetation communities composition associated to land abandonment or over-exploitation is observed. The integration of MODIS data with higher spatial resolution information provides additional information concerning the long-term land use/cover history in the area, and it is necessary in highly fragmented agrosilvopastoral regions, where MODIS images are significantly affected by "mixed pixel" problems.