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## Integration of IKONOS data in assessing the dynamics of the range ecosystems of the Manzla watershed (Tangier , Morocco)

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**Key words :** Brushland (matorral) , range ecosystems , trend (dynamics) , high spatial resolution , western Rif

**Key points** The sustainable and participatory management of sylvo-pastoral ecosystems of the Rif's mountains require a precise analysis of the profile of the natural resources and the evolution of human intervention on the level of the commune and village . The Ikonos image processing enabled us to identify new plant associations and communities and thus to define new range ecological sites resulting from the processes of degradation in a small watershed representative of the Rif mountains (Tangier , Morocco) .

**Introduction** The new orientations and the needs for planning a sustainable development of the Rif's mountains require an exhaustive and precise inventory as well as cartography of the range ecological sites .

**Population and the problematic of the pastoral area transformation** In the Rif region , the matorral (brushland) represents a stage of degradation and a phase of transition between the clearing from the national forest and its setting in culture to take advantage of a right of ownership . (Mejjati Alami *et al.* , 2000) .

**Objectives** The study was carried out within the framework of one program of cartography of land use by remote sensing and its integration in models of study of the dynamics of degradation of the forests and the Rif's brushland , by using the images of the last generation of satellite sensors (SPOT HRV , Landsat TM and Ikonos) .

**Materials and methods** The study area is represented by the Manzla watershed , located at 15 km south of Tangier , in the north western part of the Rif's mountains (Morocco) .The area is marked by a strong climatic aggressiveness (800 mm/an) (DMN , 2004) , eroded soils and strong anthropic pressure .In accordance with the aim of the study , the method of work is founded on the comparison of the land use maps , more particularly delimitation of the unit of matorral , obtained with supervised classification .

### Results and discussion

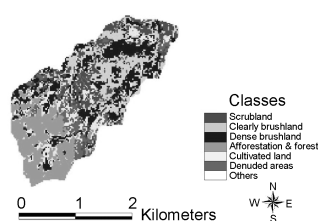


Figure 1 SPOT HRV image .

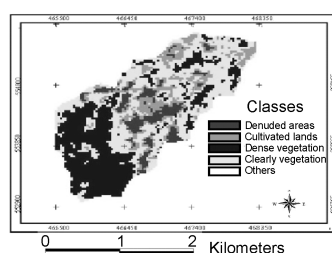


Figure 2 Landsat TM image .

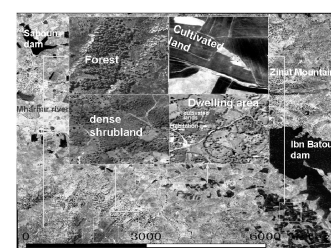


Figure 3 Ikonos image .

The precision allowed by Ikonos (figure 3) was exploited for better recognizing and delimiting of all the stages of degradation . The setting in culture was clearly determined on the scale of the plot , thus offering a powerful tool for the follow-up of this process of degradation with strong land implication .

**Conclusion** This study constitutes the core of a base of rich and up to date information within the framework of one local GIS (with a metric resolution) for the development of rainfed agricultural lands of the Manzla watershed (Tangier) .

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