

# Remote sensing for estimating depleted fraction and its implication in the changes of groundwater table in the Roxo irrigation area, Portugal

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## **ABSTRACT:**

Actual evapotranspiration ( $ET_a$ ), which is one of the components required for determining depleted fraction, could be estimated through a remote sensing technique called Surface Energy Balance Algorithm for Land (SEBAL) with a high reliability as it maps the spatial and temporal structure of  $ET_a$ . In this study, fifteen satellite imageries produced from two sensors: four Thematic Mapper (TM) imageries (resolution: 30 m at visible bands and 60 m at thermal infrared bands) and eleven MODIS imageries (resolution: 250 m at visible bands and 1,000 m at thermal infrared bands) were used to compute monthly  $ET_a$  of the Roxo irrigation area in Portugal for 2003. Depleted fraction, defined as the ratio of  $ET_a$  over precipitation (P) + Irrigation Supply ( $V_c$ ) informs about the changes in groundwater table in an irrigated area. Groundwater table in the Roxo irrigation area is stable at depleted fraction value of range between 0.6 and 0.7 while water is stored in the aquifer for lower values of depleted fraction. The groundwater table decreases if depleted fraction exceeds this range.

*Key words:* Actual evapotranspiration, SEBAL, depleted fraction, groundwater table

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