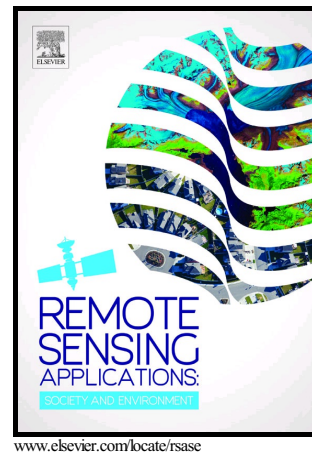


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**MULTI-TEMPORAL ANALYSIS FOR LAND USE AND LAND COVER
CHANGES IN AN AGRICULTURAL REGION USING OPEN SOURCE TOOLS**

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ABSTRACT

Sinaloa has the highest percentage of agricultural land with irrigation systems in Mexico. Due to its economic contribution, the exportation of fresh fruits and vegetables represent one of the most important activities in this region. Natural and/or anthropogenic activities in this area result in the loss of soil due to erosion process, which greatly reduces its productivity. A tool that enables an integrated management for a rational use and preservation of water resources and a proper management and planning of the territory is proposed in this study. With the purpose of assessing the changes in land use and land cover that occurred during the periods 1990-2000 and 2000-2014, a methodology that combines the use of digital classification techniques from images, geographic information systems (GIS) and statistical analysis was used. Transition matrix analysis was used in order to distinguish those changes as a product result of the transitions. Exchange rate results obtained in this study showed the occurrence of significant land cover changes for both study periods. The results showed that the changes detected in the Culiacan river basin were determined by the direct influence of anthropogenic activities. Loss surface area was

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