UNIVERSIDAD POLITÉCNICA DE MADRID

ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA AGRONÓMICA, ALIMENTARIA Y DE BIOSISTEMAS

Cartografía del cultivo de Arroz en Guayas, Ecuador mediante el uso de series de tiempo de imágenes de alta resolución espacial SENTINEL-2

Trabajo Fin de Máster Universitario en

Tecnología Agroambiental para una Agricultura Sostenible

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Septiembre, 2019

ABSTRACT

Rice is the most important crop in the food and in the Economy of Ecuador, it covers a third of the surface of transitory products, being the crop of greater agricultural extension of the country. The execution of time and surface monitoring results in the use of technology, tools and new methodologies required by the demand for this crop. In this case, time series of the Normalized Difference Vegetation Index (NDVI) acquired through the SENTINEL-2 sensor were used over a period of 3 years (2016 - 2019). The resources of this sensor have been taken advantage of, for the handling of downloads and image processing tools and for the generation of NDVI time series. Sentinel-2 images with a spatial resolution of 10 meters and a periodicity of 10 days have been used. The NDVI time series were constructed from the reflectance values of red and near infrared. An image filtering methodology was created to improve the quality of the series, due to the lack of images in the years of study and the climatology of the area selected for this work. The functions of Autocorrelation and the Periodogram of the NDVI time series have been calculated to determine the dynamics present in the rice crop. The results indicate that rice cultivation presents Autocorrelations and Periodograms with two well differentiated dynamics, one with an annual cycle and the other with two annual cycles. However, the presence of three annual cycles could be identified in a smaller percentage. A mapping has been made to classify the pixels of the study area, Guayas Province, according to the number of times the rice crop is repeated in a year. This classification has been contrasted with the data provided by the Ministry of Agriculture and Livestock of Ecuador regarding the regime of this crop in that Province. The results of the validation carried out are satisfactory, the methodology used has great potential for the identification of rice crop cycles and their intensification in areas where cloudiness does not allow any differentiation, therefore, in the future they must be carried out more studies with this methodology, including other contributions and evaluating other crops.