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TITULO DE LA PONENCIA

Groundwater spring potential using statistical techniques in Central Boyacá, Colombia

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PALABRAS CLAVE

Groundwater, spring potential, statistical methods, Boyaca

CONTENIDO DEL RESUMEN

Central Boyacá is an area with approximately 350000 inhabitants where most of the economic activities are related to industry, agriculture and mining. There is a growing need for water to fulfill the requirements of these activities that cannot be solved with surface water. Groundwater has emerged as a viable option for water supply in this area, specially during summer season and drought periods associated with ENSO. The growing demand and exigency for groundwater resources in the study area requires the demarcation of Groundwater Spring Potential (GSP) for effective sustainable strategy in groundwater identification, conservation, and management. Three different methods including Naive Bayes (NB), modified weights of evidence (MWoE) and logistic regression-LASSO (LR-LASSO) were used to map groundwater

spring potential (GSP). A total of 19 predictive factors were considered including topographic, geomorphic, hydrological, geological and anthropic variables. A groundwater spring database was created including 495 springs that were randomly divided into a training and validation sets (346 and 149 samples respectively). The accuracy of the spring GSP maps were checked using the area under the curve (AUC) of the receiver operating characteristic (ROC) curve. Over 58% of the study area had high to very high Groundwater Spring Potential located mainly on the mountain areas. The influential factors for the spring occurrence include the NDVI, soil type and lithology. The results indicate that all models have good predictive capabilities where the AUC of MWoE, NB and LR-LASSO are 0.9054, 0.8875 and 0.8776 for training and 0.7688, 0.7728 and 0.7787 for validation, respectively. The GSP maps are critical for environmental authorities and policy makers to define strategies for sustainable groundwater management and effective land use planning in this area.