Abstract

Rational use and management of water resources is a priority for conserving natural resources. Surface runoff, rainfall and infiltration are factors in the recharge of aquifers and water availability. This work develops a methodology to define and identify watersheds that meet conditions for implementation of projects to aid groundwater recharge in the Mixteca and Sierra Negra region of the state of Puebla. Runoff coefficients were calculated taking into account the use and texture of the soil, as well as the slope of the terrain to model the flow and direction of rainwater. In just over 2 million hectares, 178 watersheds were identified, 125 of which affect 1.31 million hectares in the Mixteca region where approximately 9.513 Hm$^3$ total annual precipitation is captured; 42% of this drains off (4.030 mm$^3$). In Sierra Negra, which comprises an approximate area of 704 hectares, 53 watersheds were identified with 6.972 Hm$^3$ annual total precipitation captured, 54% of which is run-off. We applied principal component analysis to reduce the dimensionality of the micro database, for a classification of 5 types using the Dalenius and Hodges method, considering the land area of each watershed, its water production, population density and soil degradation. Finally, 11 were identified as priorities for conservation and construction of irrigation infrastructure, including water holes, dams and/or infiltration ponds.

Keywords
Aquifer, watershed, precipitation, runoff, Prevert.