

DROUGHT CHARACTERISATION IN AN IRRIGATED AREA

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Hydrologic systems are impacted by extreme events such as floods and droughts, which can cause severe damage to natural and human environments. A significant number of studies deal with the definition of droughts, in general, a drought is defined as a sustained period of significantly lower soil moisture levels and water supply relative to normal levels. Dracup et al., (1980), based on the nature of water deficit, define three types of droughts: meteorologic drought, hydrologic drought, and agricultural drought. The meteorologic drought is defined as a lack of rainfall that severely affects the flora and fauna of a region. The hydrologic drought is related to a period during which streamflows are inadequate to supply established uses under a given water resources management system. The agricultural drought is described in terms of crop failure from decline in soil moisture without any reference to streamflow. For an irrigated area with a reservoir system, the above definitions of droughts are not suitable because reservoirs are designed to control runoffs and droughts. Nevertheless, in an irrigated area a drought can be defined as a period of significantly lower water supply from the reservoir system due the reservoir operation. For applying this definition it is necessary to have an explicit reservoir operation management rule. If an explicit reservoir operation management rule is considered (which determines in each particular period the exact amount of water to be released) and a method for forecasting future streamflow is selected; it is possible to analyse the severity, the accumulated deficit, drought length and intensity of drought (Salas et al., 2005) for this particular reservoir operation management rule. This approach to characterise drought in an irrigated area is applied to the Yaqui Valley reservoir system in northwest México under two reservoir operation management rules. It is shown that the results of the application of this approach gives drought information which permits to compare among competing reservoir operation management rules.