Markov chain model has been used extensively to access the probabilities of the occurrences of sequences of wet and dry periods. Weekly precipitation data from several climatological stations were used to determine the drought proneness, based on the parameters of the Markov chain model. Markov chain model were used to compute: 1) absolute probabilities; 2) probabilities of dry sequences longer than 12 weeks and 3) expected value of the length of drought period. Furthermore, the standardized precipitation index based on 53 years of monthly precipitation data was computed and drought classes, derived from SPI, were used as input to the Markov chain model. In this phase, Markov chain model was used in order to estimate: 1) the probability of different drought severity classes; 2) the expected time in each class of severity; 3) the recurrence time for a particular class; 4) the expected time for the SPI to change from a particular class to another and 5) the short term conditional probabilities of drought classes. Results show that the Markov chain model was an appropriate tool for estimating drought proneness. If the present drought class was moderate or severe, the probability of being one month from now in the same drought class was higher than the probability of changing to another class.