

Comparison between Two Methods for agricultural drought disaster risk in southwestern China

lanying han and qiang zhang
China (sthan07@hotmail.com)

The drought is a natural disaster, which lead huge loss to agricultural yield in the world. The drought risk has become increasingly prominent because of the climatic warming during the past century, and which is also one of the main meteorological disasters and serious problem in southwestern China, where drought risk exceeds the national average. Climate change is likely to exacerbate the problem, thereby endangering China's food security. In this paper, drought disaster in the southwestern China (where there are serious drought risk and the comprehensive loss accounted for 3.9% of national drought area) were selected to show the drought change under climate change, and two methods were used to assess the drought disaster risk, drought risk assessment model and comprehensive drought risk index. Firstly, we used the analytic hierarchy process and meteorological, geographic, soil, and remote-sensing data to develop a drought risk assessment model (defined using a comprehensive drought disaster risk index, R) based on the drought hazard, environmental vulnerability, sensitivity and exposure of the values at risk, and capacity to prevent or mitigate the problem. Second, we built the comprehensive drought risk index (defined using a comprehensive drought disaster loss, L) based on statistical drought disaster data, including crop yields, drought-induced areas, drought-occurred areas, no harvest areas caused by drought and planting areas. Using the model, we assessed the drought risk. The results showed that spatial distribution of two drought disaster risks were coherent, and revealed complex zonality in southwestern China. The results also showed the drought risk is becoming more and more serious and frequent in the country under the global climatic warming background. The eastern part of the study area had an extremely high risk, and risk was generally greater in the north than in the south, and increased from southwest to northeast. The drought disaster risk or loss was highest in Sichuan Province and Chongqing Municipality. It was lowest in Yunnan province. The comprehensive drought disaster loss were uptrend in nearly 60 years, and the trend of drought occurrence in nearly 60 years was overall upward in every province of Xinan region. Drought risk of all provinces has certain relationship with the regional climate change, such as temperature and precipitation, soil moisture and vegetation coverage. The contribution of the risk factors to R was highest for the capacity for prevention and mitigation, followed by the drought hazard, sensitivity and exposure, and environmental vulnerability.