The successful use of rainfall runoff model largely depends on its calibration process which requires a suitable choice of calibration criteria. The aim of this study is to analyse the effect of objective function choice on parameters estimates and on model results for the case of the HBV model. Model results are expressed in terms of flood risk indicators such as: frequency distribution of annual volumes, frequency distribution of the maximum flood discharge, frequency distribution of the number of floods per year, mean flood duration. The calibration is performed using SCE-UA algorithm. Results of six different objective functions are compared: (1) Nash-Sutcliffe criteria, (2) the RV criterion of Lindström that combines Nash-Sutcliffe and Relative water balance (3) the CREC criterion by Servat and Dezetter (4) the CRECBI criterion which combines CREC and Relative water balance (5) the Fortin criterion (6) SEXPER criterion by Servat et Dezetter. Several catchments with different climatic situations are investigated: the Tessa basin (1950 km², Tunisia, semi arid), the Sejnène Basin (378 Km², Tunisia, sub-humid), the Barbra basin (217 km², Tunisia, Sub humid climate), the Chaffar basin (232 km², Tunisia, Arid) and the Rottweil basin (456 km², Germany, humid). The optimal sets of parameters are compared using a dissimilarity index represented by the pairwise mean relative deviation. On the other hand assuming the optimal set of parameters resulting from a given criteria, the model is applied and its performance relatively to the other criteria is evaluated. Finally, comparison of the regional sensitivity analysis results obtained with different objective functions is done.