In the last decade, the number and dimensions of catastrophic flooding events in the Niger River Basin (NRB) have markedly increased. Despite the devastating impact of the floods on the population and the mainly agriculturally based economy of the riverine nations, awareness of the hazards in policy and science is still low. The urgency of this topic and the existing research deficits are the motivation for the present dissertation.

The thesis is an initial detailed assessment of the increasing flood risk in the NRB. The research strategy is based on four questions regarding (1) features of the change in flood risk, (2) reasons for the change in the flood regime, (3) expected changes of the flood regime given climate and land use changes, and (4) recommendations from previous analysis for reducing the flood risk in the NRB.

The question examining the features of change in the flood regime is answered by means of statistical analysis. Trend, correlation, changepoint, and variance analyses show that, in addition to the factors exposure and vulnerability, the hazard itself has also increased significantly in the NRB, in accordance with the decadal climate pattern of West Africa. The northern arid and semi-arid parts of the NRB are those most affected by the changes.

As potential reasons for the increase in flood magnitudes, climate and land use changes are attributed by means of a hypothesis-testing framework. Two different approaches, based on either data analysis or simulation, lead to similar results, showing that the influence of climatic changes is generally larger compared to that of land use changes. Only in the dry areas of the NRB is the influence of land use changes comparable to that of climatic alterations.

Future changes of the flood regime are evaluated using modelling results. First ensembles of statistically and dynamically downscaled climate models based on different emission scenarios are analyzed. The models agree with a distinct increase in temperature. The precipitation signal, however, is not coherent. The climate scenarios are used to drive an eco-hydrological model. The influence of climatic changes on the flood regime is uncertain due to the unclear precipitation signal. Still, in general, higher flood peaks are expected. In a next step, effects of land use changes are integrated into the model. Different scenarios show that regreening might help to reduce flood peaks. In contrast, an expansion of agriculture might enhance the flood peaks in the NRB. Similarly to the analysis of observed changes in the flood regime, the impacts of climate- and land use changes for the future scenarios are also most severe in the dry areas of the NRB.

In order to answer the final research question, the results of the above analysis are integrated into a range of recommendations for science and policy on how to reduce flood risk in the NRB. The main recommendations include a stronger consideration of the enormous natural climate variability in the NRB and a focus on so called "no-regret" adaptation strategies which account for high uncertainty, as well as a stronger consideration of regional differences. Regarding the prevention and mitigation of catastrophic flooding, the most vulnerable and sensitive areas in the basin, the arid and semi-arid Sahelian and Sudano-Sahelian regions, should be prioritized. Eventually, an active, science-based and science-guided flood policy is recommended. The enormous population growth in the NRB in

connection with the expected deterioration of environmental and climatic conditions is likely to enhance the region´s vulnerability to flooding. A smart and sustainable flood policy can help mitigate these negative impacts of flooding on the development of riverine societies in West Africa.