

# INFORMATION OF THE DISSERTATION

Dissertation's title: **Assessment of climate change impacts on water resources of the Ba river basin by a combined approach of climate projection and system's performance threshold**

Major: **Water Resources Engineering**

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## **Dissertation summary**

The Ba River Basin is the largest river basin in Central Vietnam. In recent years, due to the requirements of socio-economic development, the demand for water in the Ba river basin increases significantly, while water resources in this basin contain many unsustainable factors. In the context of climate change, these factors become more serious, threatening the water safety in the basin in the future. In Vietnam, there are huge numbers of studies assessing the impacts of climate change on water resources in general and water supply capacity in particular in the Ba river basin. These studies are mainly based on traditional top-down approach, which provides information on the potential impacts of climate change on water resources system in the Ba River basin under several socio-economic development scenarios. However, the uncertainty of climate projections from climate model outputs lead to difficulties for policymakers to make decisions about adaptation options. Therefore, this dissertation develops an alternative approach that minimizes the influence of uncertainty from climate model outputs on the assessment of impacts of climate change on the water resources system in the Ba River basin to better support the decision-making process of policy makers.

With the goal of building a scientific basis for assessing the impacts of climate change on water resources in the Ba river basin by a combined approach of climate projection and system's performance threshold for a sustainable water resources management of the Ba river basin in the context of climate change, the main contents of this dissertation include: (1) Assessing water shortage situation in the Ba river basin and determining the system performance threshold; (2) Setting up simulation models for the system; (3) Determining the system's response to climate change; (4) Exploiting results from GCMs for future climate projections in the Ba river basin; and (5) Estimating probabilities of water shortage situation of water resource system in the Ba river basin in the context of climate change and proposing adaptation measures.

The results show that, the performance thresholds of the water resources system in the Ba river basin for irrigation sector are from 75-84% for different climate zones areas; for domestic sector, the number is 88-93%. Regarding the possibilities of water shortage situation of water demand nodes across the Ba river basin in near future, mid-century and end-century, there are 4,770; 3,675 and 3,675 hectares of crops facing with water shortage in the 95% probability, respectively. With 75% probability, these numbers are 6,130.75; 4,770 and 4,770 ha, respectively. The results corresponding to 50% probability are 10,194.75; 6,131 and 6,131 ha of crops facing with water shortage. The dissertation also conducts the detailed assessment for 3 typical districts in the Ba river basin according to this approach and then proposed measures for adaptation.