



## **Water resources in Central Asia - status quo and future conflicts in transboundary river catchments – the example of the Zarafshan River (Tajikistan-Uzbekistan)**

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Water is the most valuable resource in Central Asia and due to its uneven distribution and usage among the countries of the region it is also the main source of tension between upstream and downstream water users. Due to the rapidly shrinking glaciers in the Pamir, Tien-Shan and Alai mountains, the available water resources will, by 2030, be 30% lower than today while the water demand of the growing economies will increase by 30%. This will further aggravate the pressure on the water resources and increase the water deficit caused by an unsustainable water use and political agendas. These challenges can only be overcome by an integrated water resource management for the important transboundary river catchments. The basis for such an IWRM approach however needs to be a solid data base about the status quo of the water resources. To that end the research presented here provides a detailed overview of the transboundary Zarafshan River (Tajikistan-Uzbekistan), the lifeline for more than 6 mln people. The Zarafshan River is well suited for this as it is not only one of the most important rivers in Central Asia but because the public availability of hydrological and ecological data is very limited. Furthermore the catchment is characterized by the same imbalances in the Water-Energy-Food-Nexus as most river systems in that region, which makes the Zarafshan a perfect model river for Central Asia as a whole. The findings presented here are based on field measurements, existing data from the national hydrometeorological services and an extensive literature analysis and cover the status quo of the meteorological and hydrological characteristics of the Zarafshan as well as the most important water quality parameters (pH, conductivity, nitrate, phosphate, arsenic, chromate, copper, zinc, fluoride, petroleum products, phenols and the aquatic invertebrate fauna). The hydrology of the Zarafshan is characterized by a high natural discharge dynamic in the mountainous upper parts of the catchment and by sizeable anthropogenic water extractions in the lower parts of the catchment, where on average 60.6% of the available water is diverted for irrigation purposes in the Samarkand and Navoi provinces. The water quality is heavily affected by the unsustainable land use and inadequate/missing water purification techniques. The reduced discharge and the return flow of untreated agricultural drainage water lead to a critical pollution of the river in the lower parts of the catchment. Additional sources of pollutants were identified in the upstream (the Anzob ore mining and processing complex) and downstream (the Navoi special economic area) parts of the catchment. The impact of the different water uses on the availability and the quality of the water resources are discussed in detail and outlook for the expected development during the next decades is given. These results form the basis for future investigations and for the conception of an IWRM plan for the Zarafshan River catchment.