

Human-water interactions in Myanmar's Dry Zone under climate change

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Understanding human-water interactions is particularly essential in countries where the economy and the people's well-being and income strongly depend on the availability and quality of sufficient water resources. Such a strong dependency on water is existent in Myanmar's Dry Zone located in the central Ayeyarwady River basin. In this area, rainfall is associated with high heterogeneity across space and time. Precipitation amounts in the Dry Zone (500-1000 mm annually) are generally less compared to other regions in Myanmar (up to 4000-6000 mm). Following the Global Climate Risk Index, Myanmar is one of the countries which were most affected by extreme weather events between 1994 and 2013. Severe drought periods e.g in the years 1997-1998, 2010 and 2014 led to crop failures and water shortage in the Dry Zone, where more than 14 mio people predominantly practice agriculture. Due to the high variability of rainfalls, farming is only possible with irrigation, mainly conducted by canal systems from the rivers and groundwater withdrawal.

Myanmar is recently facing big challenges which result from comprehensive political and economic reforms since 2011. These may also include increasing water use by new industrial zones and urbanization. However, not only policy and economy modify the need for water. Variability of river runoff and changes in seasonality are expected as a result of climate change.

The overarching goal of the study is to understand and increase the knowledge on human-water-climate interactions and to elaborate possible future scenarios for Myanmar's Dry Zone. It is not well studied yet how current and future climate change and increasing human impact will influence the country's abundant water resources including groundwater. Therefore, the first step of this study is to identify the major drivers within the central Ayeyarwady River basin. We are in the process of collecting and analyzing data sets and information including hydrologic and eco-hydrologic (discharge, sediment load, river biology), climatic (precipitation, temperature, evaporation) and anthropologic (water use, water management, dam projects) aspects. We identified key study sites in the Dry Zone, in order to assess and study the interplays, dependencies and feedbacks within the human-water system.

First results based on meteorological data sets and literature survey indicate, that the central Dry Zone is affected by increasing interannual rainfall variability. Additionally, human impacts in this region are increasing due to numerous pumping (both river and groundwater) activities which will possibly alter water availability, river ecology and hydraulic processes in the near future. At the current state, the main course of the Ayeyarwady River is still unregulated but several larger dam projects are in the planning phase in the central area which will also impact the rich river biodiversity as well as the society. Our research will contribute to understand human-water-climate interactions in Myanmar's central Dry Zone with possible transferability to other large river basins in Asia.