Improving the local relevance of large scale water demand predictions: the way forward

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Securing adequate availability of fresh water is of vital importance for socio-economic development of present and future Europe. Due to strong heterogeneity in climate conditions, some regions receive an abundant supply of water, where other areas almost completely depend on limited river discharge from upstream catchments. Furthermore, water demand differs greatly between regions due to differences in population density and local presence of intensive water using industries and agriculture. This results in many situations all across Europe where competition between water users translates into relative scarcity and economic damage. Additionally it is expected that inter-related economic and demographic developments, as well as climate change are to only further increase the need for efficient management of our water resources in the future. Successful policy making for such complex problems requires a good understanding of the system and reliable forecasting of conditions. The extent and complexity of the water use system however, stands in high contrast with the poor state of available data and lack of reliable predictions for this multi-disciplinary topic. Although the matching of available water to its demand is a European-wide problem, the amount of data with pan-European coverage is limited and usually with a national resolution at best. This is hindering researchers and policy makers because it usually makes large scale water demand predictions little relevant due to the strong regional heterogenic nature of the problem.

We present in our study a first attempt of European-wide water demand predictions based on consistent regional data and econometric methods for the household and industry sector. We gathered data on water consumption, water prices and other relevant variables at the highest spatial detail available from national statistical offices and other organizational bodies. This database provides the most detailed up to date picture of present water use and water prices. Subsequently, econometric estimates allow us to make a monetary valuation of water and identify the dominant drivers of domestic and industrial water demand per country. Combined with socio-economic, demographic and climate scenarios we made predictions for future Europe.

Since this is a first attempt we obtained mixed results between countries when it comes to data availability and therefore model uncertainty. For some countries we have been able to develop robust predictions based on vast amounts of data while some other countries proved more challenging. We do feel however, that large scale predictions based on regional data are the way forward to provide relevant scientific policy support. In order to improve on our work it is imperative to further expand our database of consistent regional data. We are looking forward to any kind of input and would be very interested in sharing our data to collaborate towards a better understanding of the water use system.