On the global water trail

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Credit: Jim Handcock

Water is one of humanity's most pressing issues. Do we have enough of it for drinking, for farming or for industry? Too much, in the shape of flooding? Or too little, in the form of drought? The WATCH project, funded by the EU, was designed to give us better answers to questions of water management. Since its completion in 2011, the data has already been downloaded 94 times from Europe but also to the US, Africa and elsewhere. It has been mainly used by scientists, but also by mapping companies, insurers and meteorological organisations, as well as wildlife

and environmental groups.

The project gives us a unique view of water resources at a variety of scales from the global on downwards, according to project manager Tanya Warnaars from the Centre for Ecology and Hydrology in Wallingford near Oxford in the UK. "The first block of work we did, looked at 20th century records and made sure that we had all that data in a consistent form," she says. "Then we moved on to produce data for modellers working on 21st century water flows and for groups looking at extreme events, both past and future," she adds, referring to floods, etc.

To get a complete picture of the water resources availability, the project also examined human water demand, including farming, manufacturing and hydro power, as well as future water vulnerability, and feedbacks in the water system. And the model aims to be comprehensive, including data never taken into account before. "We did work on water evaporation and defined new ways of quantifying evaporation consistently into water cycle estimates," Warnaars tells youris.com.

The project brought previously separate communities, such as global climate modellers and experts on specific river basins, together in a new way. "They now have a single modelling protocol," she says, "which brings these two disciplines together working in the same framework."

Some praise the ambition and originality of this project. "It is very hard to scale data up from the local to the global level and keep it consistent," says terrestrial hydrology expertEric Wood of Princeton University, US. Some high-quality science has already emerged from it, such as a valuable analysis of river temperatures. As global warming makes surface water hotter, there is a danger that cooling water will no longer be available for industry and for power generation.

"We are used to the idea of global climate models. It is also important to

have global water models, because of the globalisation of food production," Wood tells youris.com. They help us to understand the idea of "virtual water," water that is imported by means of food imports rather than directly. But Wood cautions that water data from across the world varies in quality. Current models of water management and use can become even better than they are today.

The project is considered by others as an innovative mix of land and water models.Taikan Oki, professor of industrial science at Tokyo University's Institute of Industrial Science in Japan is especially impressed with the way it built human interventions such as reservoirs and irrigation into its calculations. This, he says, allows it produce unified studies of the impact of climate change on water food, taking account of climate, population, GDP, and land use and land cover and using multiple models.

"There have been many impact studies of climate change but very few using multiple models covering the entire 20th and 21st centuries," he notes. He predicts that the project tool has the potential to be widely used by scientists. However, it cannot show how mitigation and adaptation measures might reduce climate change impacts, Oki points out. Nor can it track the impact on human health, food production, and ecosystems of changing water cycles.

Provided by Youris.com

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