# Lower than Expected Risks of Wastewater Irrigated Agriculture along the Musi River, India

*Philipp Weckenbrock[1*], Prof. Dr. Axel Drescher[1], Dr. Priyanie Amerasinghe[2], Dr. Robert W. Simmons[3], Johanna Jacobi[1]*
*[1]Section on Applied Geography of the Tropics and Subtropics, Department of Physical Geography, Freiburg University, Germany.*
*[2]International Water Management Institute, South Asia Regional Office, Patancheru, India.*
*[3]School of Applied Sciences, Department of Natural Resources, Cranfield University, UK.*

**Corresponding author. Email address: philipp.weckenbrock@geographie.uni-freiburg.de*

One result of the growing water scarcity in many parts of the world is that wastewater is increasingly used for irrigation purposes. According to the WHO, more than 10 % of the world's population consumes food produced by irrigation with wastewater (WHO, 2006). In India, an example of wastewater irrigated agriculture can be found along the Musi River.

The Musi River (Fig. 1) flows through the city of Hyderabad, collecting more than one million litres of wastewater per day (Amerasinghe et al., 2008). Only some of this wastewater receives treatment before being discharged into the Musi. A variety of food and non-food crops are irrigated with this water supporting the livelihoods of the households of thousands of farmers along the river (Fig. 2). In a research project funded by the German Federal Ministry of Economic Cooperation and Development (BMZ) and coordinated by the International Water Management Institute (IWMI), risks and benefits of wastewater irrigation in six villages along the Musi River were analysed from 2006-2008. The international research team consisted of scientists from the fields of public health, soil and agricultural sciences, social and economic sciences and geography.

Figures 1, 2: The Musi River near Hyderabad, rice farming with river water

The vast majority of the households in the research area (88 %) were involved in agriculture. On most of the agricultural area (86 %), river water was used for irrigation.

Among the risks of wastewater irrigation that have been mentioned most in the literature are health problems, in particular hookworm infections and environmental pollution, especially soil pollution (WHO, 2006). However, contrary to expectations, the levels of parasite infections in the research villages along the Musi River were low. In four out of six of the research villages, no hookworm infections were found. Also the levels of other parasite infections were low (Amerasinghe et al., 2008).

Also with regard to levels of heavy metals in soils and crops, the situation was not as serious as generally expected: levels of Lead in all soil samples and levels of Zinc in almost all soil samples analysed were significantly below the EU Maximum Permissible Level (MPL). With regard to Cadmium, even though some of the soil samples exceeded the MPL, there was hardly any uptake of Cadmium by plants due to a high soil pH (ibid.).

Another unexpected finding was that, contrary to previous suggestions (compare for example Clemett and Ensink, 2006), biodiversity under wastewater irrigation did not decline. A great variety of vegetables was produced with Musi water (Jacobi et al., 2009). One strategy of farmers to cope with the high nutrient load of the river water was to change the crops they cultivated: in locations close to the city, the predominant crop rice was replaced by fodder grass (Fig. 3) and in the case of vegetable farmers irrigating with river water, green leafy vegetables were produced instead of fruit-bearing vegetables.

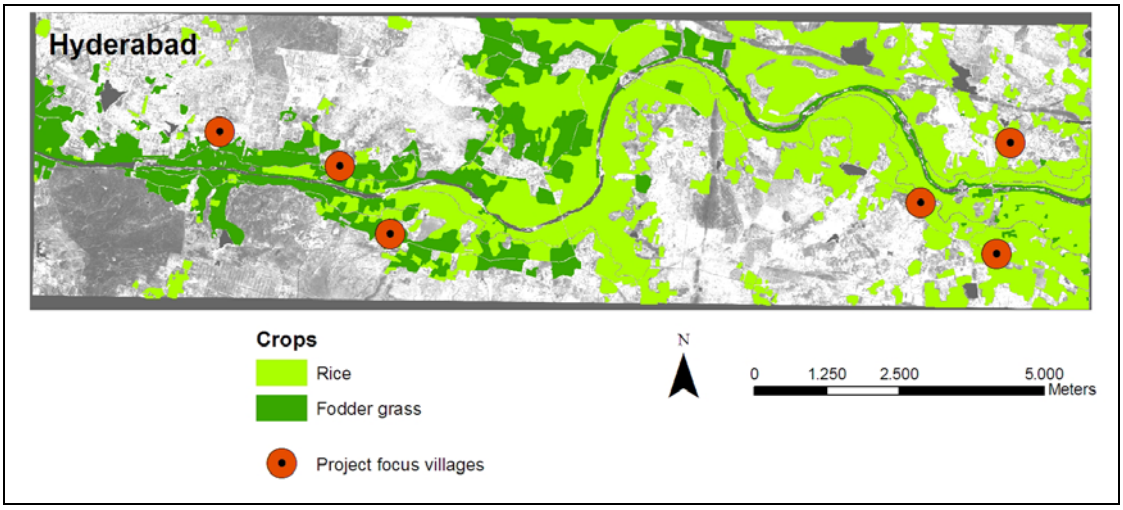


Figure 3: Fodder grass and rice production along the Musi River

This research shows that, contrary to common perception, wastewater can be regarded as a valuable resource. Properly managed, wastewater irrigation can make an important contribution to providing fresh, affordable food to rapidly growing populations of cities in water scarce regions.

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