

Informal and formal groundwater use in peri-urban areas of Jaipur, India, and implications for its management

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Jaipur, the capital of the Indian state Rajasthan, is a fast growing city in the semi-arid region of northwestern India. In its expanding peri-urban areas, a huge share of the population has to rely on an informal water supply system which is often based on groundwater sources. To understand the influence of groundwater availability on the official and the informal water supply system, and the impact of the water demand and the fast changing land use on groundwater quality and quantity, a detailed research was conducted in two study areas in the northeast of Jaipur.

Interviews with the population, the official water supplier, and informal water suppliers revealed that the water supply system in the two study areas is characterized by a high diversity related to water sources, service providers, pricing, quality, and transport systems. This, together with a general lack of reliable data makes an analysis of the current system challenging. Hydrogeological studies showed that in both study areas the main aquifer, the Quaternary alluvium and the weathered and fractured parts of Proterozoic quartzite, respectively, is significantly influenced by the unsustainable and un-managed use of the groundwater resources. Declining water tables indicate groundwater over-abstraction, while elevated electrical conductivities up to 7 mS/cm point towards an influence by agricultural practices as well as long-term effects due to high evaporation rates. It is necessary to understand the close relationship between groundwater and humans, especially in fast changing environments like peri-urban areas, to be able to develop sustainable and fair management strategies for the future. For example, the current situation is highly unfair, with the quantity and quality of domestic water supply depending on the location of the house, on the economic status of the residents and on their social position within the community. Furthermore, the land-use change from agricultural to residential can even lead to a higher water demand due to the change in societal water consumption pattern coming with a changing lifestyle.

We will present our data on the water supply system, the socio-economic realities and impacts related to it and on the hydrogeology and, based on this, examine the above mentioned challenges on data availability and reliability. Furthermore, we will discuss the possibilities and constraints to model the current water demand and supply with the software WEAP (Water Evaluation And Planning) in which we included agricultural irrigation needs, domestic and industrial demand and the simulation of groundwater recharge.

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