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## The Impact of Wastewater Irrigation on Crop Diversity — Two Studies from South Asia

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### Abstract

In the increasing competition for scarce resources of fresh water, the amount of water for agriculture is expected to rise much slower than that for other sectors in spite of the fact that even now, water scarcity is one of the greatest limiting factors for food production. Faced with a lack of irrigation water, farmers in waterscarce regions have begun to make use of the ever increasing volumes of untreated wastewater created in many cities of low income countries. This practice is perceived as highly dangerous not only by many planners and decision makers but also by scientists. It was only in the last years that the topic received wider scientific attention beyond studies focussing on health risks. This has led to a debate about risks and benefits of irrigation with untreated wastewater. Beside questions relating to the impacts of wastewater irrigation on health, soils and groundwater there has also been discussion about the implications for agricultural sustainability. Based on theoretical considerations, several researchers have stated that wastewater irrigation lead to a reduction in crop diversity. This would be a negative impact as crop diversity plays an important role for small scale farmers' resilience and livelihoods. To test this hypothesis of declining crop diversity under wastewater irrigation, two studies were carried out in South Asia, one near Faisalabad, Pakistan and one near Hyderabad, India. In Pakistan, an increased vegetable production under wastewater irrigation was found. It was linked to a higher crop diversity in wastewater irrigated areas as compared to non-wastewater irrigated areas. In India, crop diversity on wastewater irrigated vegetable gardens was found to be similar to that in vegetable gardens irrigated with groundwater. Thus, the empirical data from two South Asian research areas show that wastewater irrigation has not had the expected negative impact on crop diversity there. These findings add further weight to the growing conviction among many researchers that wastewater irrigation, if properly managed, can play a beneficial role in limiting the pressure on scarce fresh water resources and contribute to food security.

**Keywords:** Crop diversity, India, irrigation, Pakistan, wastewater