



The benefits and challenges of an interdisciplinary approach for understanding soil sustainability hazards from irrigation with reclaimed water

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Maintenance of the productive capacity of the soil resource is essential but irrigation with treated domestic wastewater (reclaimed water) presents hazards through the input of potentially plant toxic elements. In water scarce Jordan, reclaimed water is used extensively for the irrigation of crops. There is much work concerned with short-term effects of water reuse on human and environmental health but little work which has focussed on long-term sustainability issues. This research adopts a multi-disciplinary approach to explore the interactions between stakeholder management of reclaimed water and soil processes. Semi-structured interviews were conducted with farmers using reclaimed water, and organisational representatives involved in the provision and management of reclaimed water. Soil sampling, experimentation and analysis were used to investigate physical processes taking place in the soil system as a response to irrigation with reclaimed water. The combination of methods adds a dimension to the current knowledge on soil response to irrigation with reclaimed water. Specifically, salinity, boron and crop nutrients in the soil were all shown to be heavily connected to farmer and organisation management of water quality and availability. The work also shows that soil experimentation and analysis which disregards the management dimension leads to incorrect conclusions on soil response. Soil experimentation suggests that soil salinity is a serious concern, yet interviews with farmers combined with soil analysis showed this to be manageable under appropriate conditions. Soil boron is more difficult to manage and poses serious hazards, but in short-term experimentation this risk may be undetected.

The benefits of using a multi-disciplinary approach to address complex environmental problems can be clearly identified in this work. However, hazard complexity suggests a multitude of factors are relevant. How should aspects which are included in the study and those which are ignored be determined? Another challenge involves extrapolation. Can the research framework (which places reclaimed water as the key link between soil processes and stakeholders) be applied to aid understanding in other areas such human health risk from irrigation with reclaimed water, land use and flood risk, or hazards from non-point source pollution?