



Impact of irrigation systems on the water resources at the basin scale

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The sustainable use of natural water resources is a significant necessity in irrigation management due to increasing problems with water scarcity and contamination. The aim of this research project is the development of evaluation methods for the control of the impact of irrigation systems on the water resources at the basin scale in the Central Valley of Chile. Therefore a monitoring of several quality parameters of the irrigation and drainage canals and the ground water and a documentation of the visible impact is carried out. Several simulation models are used for analysing the impact on the soil water (HYDRUS 2D) and the ground water (Visual MODFLOW). Special attention is given to the risk assessment of contamination by crop protection products (PESTAN). Scenario techniques are used to compensate unavailable data and to analyse the potential risk of contamination. Therefore three main scenarios are used, sprinkler, furrow and drip irrigation systems, with different irrigation managements. Irrigation schedules were developed by using CROPWAT (FAO) for delivering INPUT data for the simulation models. The first results of the monitoring system show a low concentration of nitrate and phosphorus in all samples, though eutrophication processes were observed in the drainage canals. The application of HYDRUS 2D shows leaching processes, which produce a contamination of the ground water. The pathways of nutrients and pollutants are used as INPUT data for the simulation of the impact on the ground water quality. The first results of Visual MODFLOW show that the groundwater level is influenced by the amount of applied irrigation water. The quality aspects are part of the ongoing simulations, which will be used for the contamination risk assessment.