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1s7 Water efficiency and water recycling: what are the options?

Water banking in horticulture: maintaining water supply, while improving the water system

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The Westland region of the Netherlands is known for its greenhouse horticulture and its vast production of vegetables and flowers. Rainwater is the main source of irrigation water, yet horticulturalists use desalinated brackish groundwater as an additional water source to overcome prolonged periods of low rainfall. These groundwater extractions result in increased groundwater salinization, which puts current practice under legal discussion. A second challenge in the Westland is prevention of pluvial flooding after intense precipitation events; because of the high density of greenhouses, the region has a very low buffer capacity for rainwater.

To deal with these issues, a system of water banking is proposed in which groundwater extraction is conditional to injection of freshwater into the aquifer. Historically, these type of systems are used to prevent aquifer depletion, but our analysis showed that water banks can be used to counteract groundwater salinization as well, and can even help to reduce risks of pluvial flooding.

We explored several aspects of a water banking system, starting with water balances of different water use scenarios, and their effects on groundwater salinization and flood risk on the regional level. Furthermore, we explored potential legal, organizational and economic consequences, mostly in collaboration with regional stakeholders. In addition, for a small case study area of 10 greenhouse companies, various aspects of a water banking system (hydrological, technological, organizational, economical) were studied on a local level.

We conclude that water banking is a promising solution to jointly solve several water related issues in the Westland region. Successful implementation would require policy changes in which permits for the current (less sustainable) practice are no longer issued. To further explore water banking in practice, regional stakeholders are in consultation to initiate a large-scale water banking pilot.

Keywords: water banking, horticulture, water supply, groundwater, salinization