Abstract Title	Milk, farmer, water: water reuse from dairy producer to farmer
Topic	O Improving water quality O Resilient water systems X Circular solutions: Reuse, Recover and Recycle O Transitions in water, agro/food and energy
Challenges and Solutions	The Dutch water system is under pressure. Water reuse from dairy processing by agriculture, nature or the water system can help to relieve stress on the water system.
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Abstract	Groundwater in the Netherlands is under pressure, both in quantity and quality. Groundwater is used for several purposes, including nature, drinking water production, agriculture and industry. These uses compete with each other for available water, while demand is growing. Reusing industrial residual water can contribute to a reduction of the pressure on groundwater resources. Members of dairy cooperatives have to deal with desiccation, while dairy processing produces a lot of wastewater. Almost one-third of groundwater consumption by industry in the Netherlands is accounted for by the food industry (34.7 million m^3/year). A large part of this is discharged into the sewer or surface water. In addition, the food industry also draws a significant amount of tap water (54.7 million m3/year) and surface water (170.8 million m^3/year). One of the major dairy producers in The Netherlands, uses 15.5 million m^3/year with its factories in the Netherlands. The Dutch industry discharges 275 million m^3 of process and wastewater per year at a WWTP, and an

	additional 157 million m^3/year on surface water, disregarding cooling water. If the water from the (dairy) industry can be reused, this can contribute to a significant decrease in abstraction by agriculture and horticulture, which now amounts to 664 million m^3/year. The aim of this project is to make water from the dairy industry available to the agricultural sector so that less groundwater needs to be extracted for this purpose. Incentives for water reuse on the side of the dairy factory are the license to operate, possibly a cost reduction, and the reduced impact on the local ecosystem. Two cases were studied. An inventory of water streams led to the selection of several streams that can be reused for other purposes. Some major streams are suitable for reuse, while some small streams have a high contribution to the total water quality of the factories' wastewater. These small streams will be discharged to the WWTP while the other selected streams can be reused, either directly of after treatment. Matching both water supply and demand led to a selection of water streams and required treatment technologies to make these water streams available. Reuse can be either direct or indirect for irrigation for agriculture, supplementing the surface water system, recharging groundwater, or nature. One of the cases is in a dry area and supplementing the water to the local water system also reduces stress on the groundwater resources and nature in the area. When water streams are directly reused, this may also affect WWTP and local water system. This effect was found to be low in one of the case studies Although a major part of the water in the brook is effluent, removing the streams from the dairy factory lowers the flow in the waterbody by max 10% and this would not lead to ecological damage. In the second case study, the WWTP effluent is discharged on a large river and removing the water from the dairy factory does not have a substantial impact. However, this impact needs to be investigated per case. A risk analysis showed that reuse for agricultural purposes or supply to nature was limited regarding pathogens, salts and micropollutants. The contribution of nutrients to the system depends on the chosen treatment and purpose for reuse. In conclusion, water from dairy factories can be reused for several purposes. This can have a positive effect on the local water system.

Figures/diagrams/illustrations	Up to 2 (in abstract)