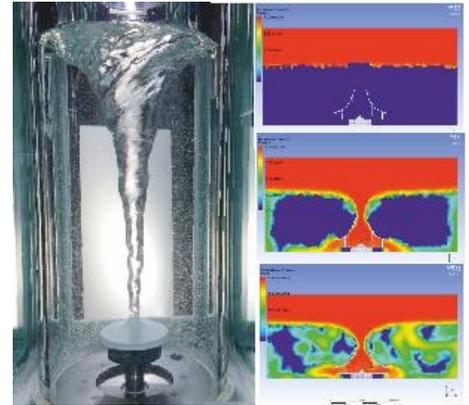


## Influence of vortex treatment of irrigation water on algae growth and crop production

### Motivation

A sustainable, additive free improvement of the quality of irrigation water in horticulture is of importance for two reasons. To prevent blockages in the irrigations system, algae growth in water reservoirs should be countered. Furthermore, it is a challenge to enhance crop production and product quality. It is known that the flow pattern of water in nature is always spiral, and vortices are naturally occurring in every river. This behavior was first studied in detail by Austrian forester Viktor Schaubberger, according to whom sustainable technology should be developed according to the principle “first understand, then copy nature”. Indeed, there are all sorts of mechanical treatment based on natural processes on the market. Such mechanical treatments like twirling (or “vortexing” = twirling accompanied by the formation of a vortex, see Fig. 1) are said to have significant impact on the microbiological, chemical and physical properties.

This impact is (partly) due to increased gas exchange and increased dissolution of solids, thereby changing physical and chemical properties of the water, and consequently also its microbiome. The aim of the proposed master project is to study the influence of vortex treatment on algae formation and the impact of treated irrigation water on crop production and crop growth.



**Fig.1:** Impeller creating a vortex (left); preliminary CFD simulation (right)

### Research challenge

Two tanks of 30 m<sup>3</sup> each will be installed of which one will be treated with a vortex system and one will stay untreated. Over time differences of algae growth will be measured in both tanks. A selected variety of crops/plants at their different stages will be irrigated with treated and untreated water. The influence on physiological processes and effects on crop production and product quality will be studied. Therefore a number of different techniques have to be applied and developed.

### Requirements

We are looking for a candidate with experience in the field of horticulture and product physiology.

Starting date: June 2019

Duration: 6 months

### Research institute

This project is embedded in the research activities of Wetsus, Centre of Excellence for Sustainable Water Technology, located in Leeuwarden. The institute employs people from very different fields and backgrounds and combines this knowledge for the best results. This project is part of the Wetsus Applied Water Physics theme. Wetsus has an international environment where the working language is English, so fluency in this language is required. Depending on the location of the two tanks, regular travelling to the experimental site will be required.

### Application

If you are interested in this project, please contact Dr. Elmar C. Fuchs at Wetsus ([elmar.fuchs@wetsus.nl](mailto:elmar.fuchs@wetsus.nl)) for more information or directly apply by sending your CV to the same address. The internship/MSc thesis includes a reimbursement for living expenses of 350 euro per month.