Reuse of agro-industrial (vegetable processing) wastewater in agriculture. Full-scale tertiary treatment (4500 P.E.)
## Description of the case study

### Water Reuse Chain
- **Treatment**: Activated sludge, tertiary sand and membrane filtration
- **Disinfection**: Membrane ultrafiltration, UV (on-demand)
- **Irrigation**: Drip
- **Storage Capacity (m³)**: Tanks (20 m³)

### Sources
- **Origin**: Agro-industrial wastewater
- **Water reused (m³/Y)**: 1000 ÷ 2000

### Uses
- **Crops**: Tomato and Broccoli (cabbage)
- **Irrigated Area (Ha)**: 0,3
- **Cost of the Cubic meter (€/m³)**: 0,2 ÷ 0,4

### Project Details

<table>
<thead>
<tr>
<th>Project's name</th>
<th>Country</th>
<th>City</th>
<th>Start Date-End Date</th>
<th>Water Sources</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agroindustrial ww reuse</td>
<td>Italy</td>
<td>Stornarella (FG)</td>
<td>2012 -</td>
<td>Treated agroindustrial wastewater</td>
<td>Irrigation</td>
</tr>
</tbody>
</table>

### Process Diagram

- **Wastewater Treatment**
  - Equalization
  - Activated Sludge Process
  - Sedimentation
  - Sand Filtration
  - Membrane Ultrafiltration
  - Storage Tank
  - UV Disinfection
  - Irrigation

- **Storage Capacity**
  - Tanks (20 m³)
How do I illustrate the question: Which practices, technologies and institutional framework to create effective, safe and cost effective water reuse chain?

For reuse in irrigation

Membrane ultrafiltration (MBR or tertiary filtration) allows to comply with standards for reuse with no need of disinfection.

Cloth filtration (disk filters, etc.), followed by UV disinfection, represents a cost effective tertiary treatment scheme.

Nitrogen conservation by performing only nitrification (no denitrification) limits the needs of external fertilization.
How do I illustrate the question:
Can we successfully reuse raw or low treated waste water?

For reuse in irrigation

No need to remove nitrogen (algal blooms in storage tanks can be controlled by removing phosphorus).

Fecal contamination indicators (E. Coli) have a very limited persistence in topsoil and on plants, and their movement through the soil is overcome by bacterial decay.


- Partially treated wastewater can safely be used for irrigation;
- Current standards are often too strict and imply costly overtreatment.