IPPS 2019

Efficient water use in ornamental production

Dr Georgina Key

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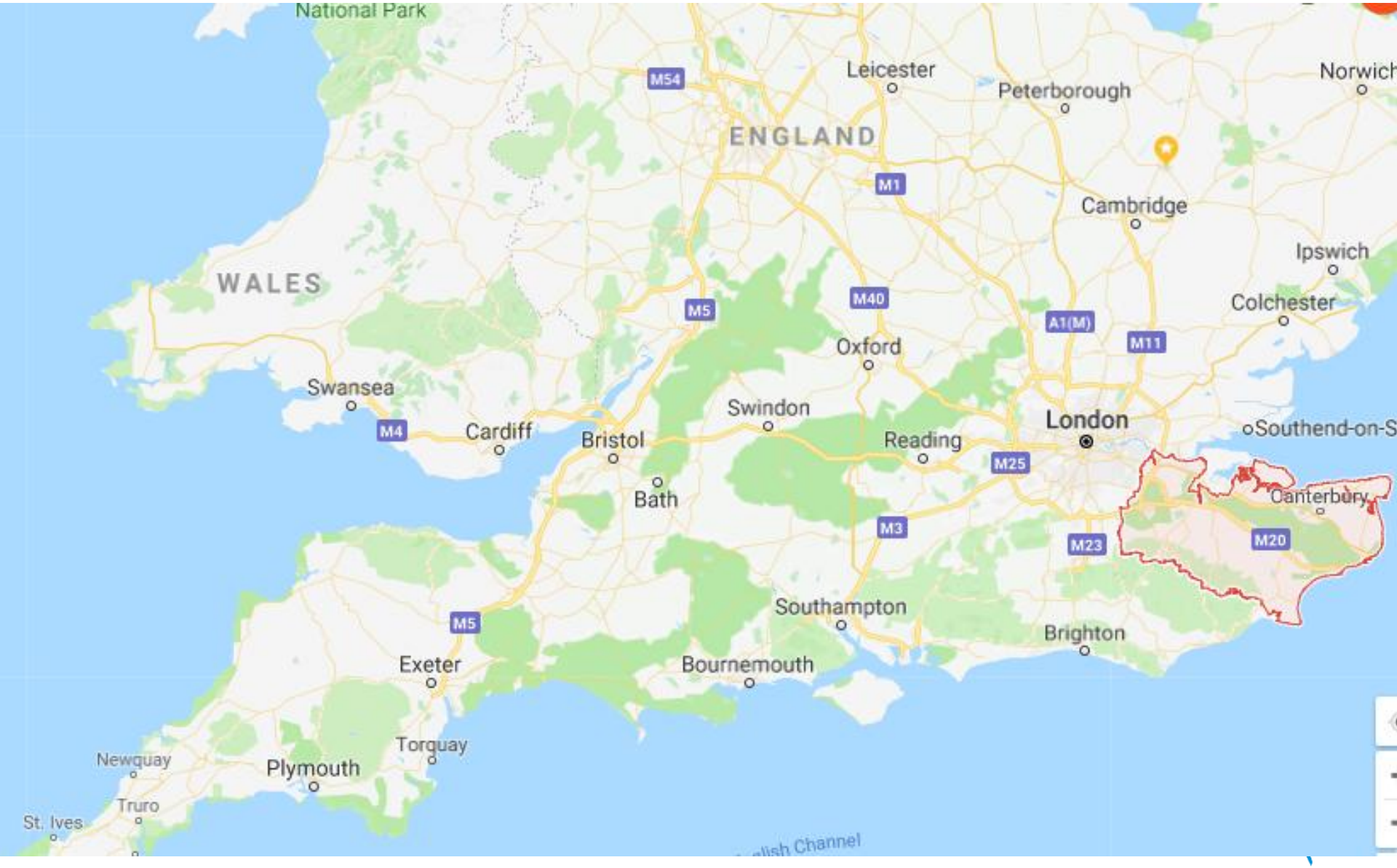
The issue



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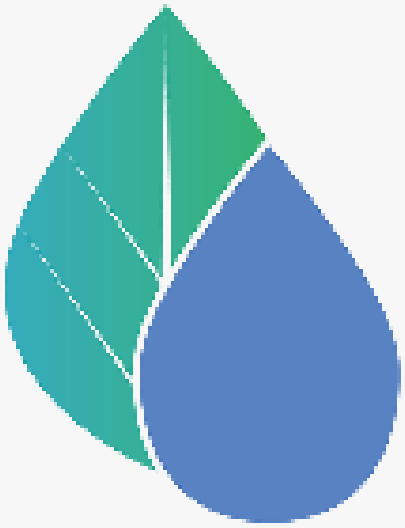

FERTINNOWA

Transfer of INNOvative techniques for sustainable WAter use in FERtigated crops

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT NO 689687


UK
Poland
Germany
Netherlands
Belgium
France
Spain
Italy
Slovenia

Grower needs

Increase quality of irrigation water

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Grower needs

Improve water and nutrient use efficiency in soil-grown crops (e.g. **reliable water monitoring tools**)

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Grower needs

Improve water and nutrient use efficiency in media-grown crops (e.g. **drainage monitoring**)

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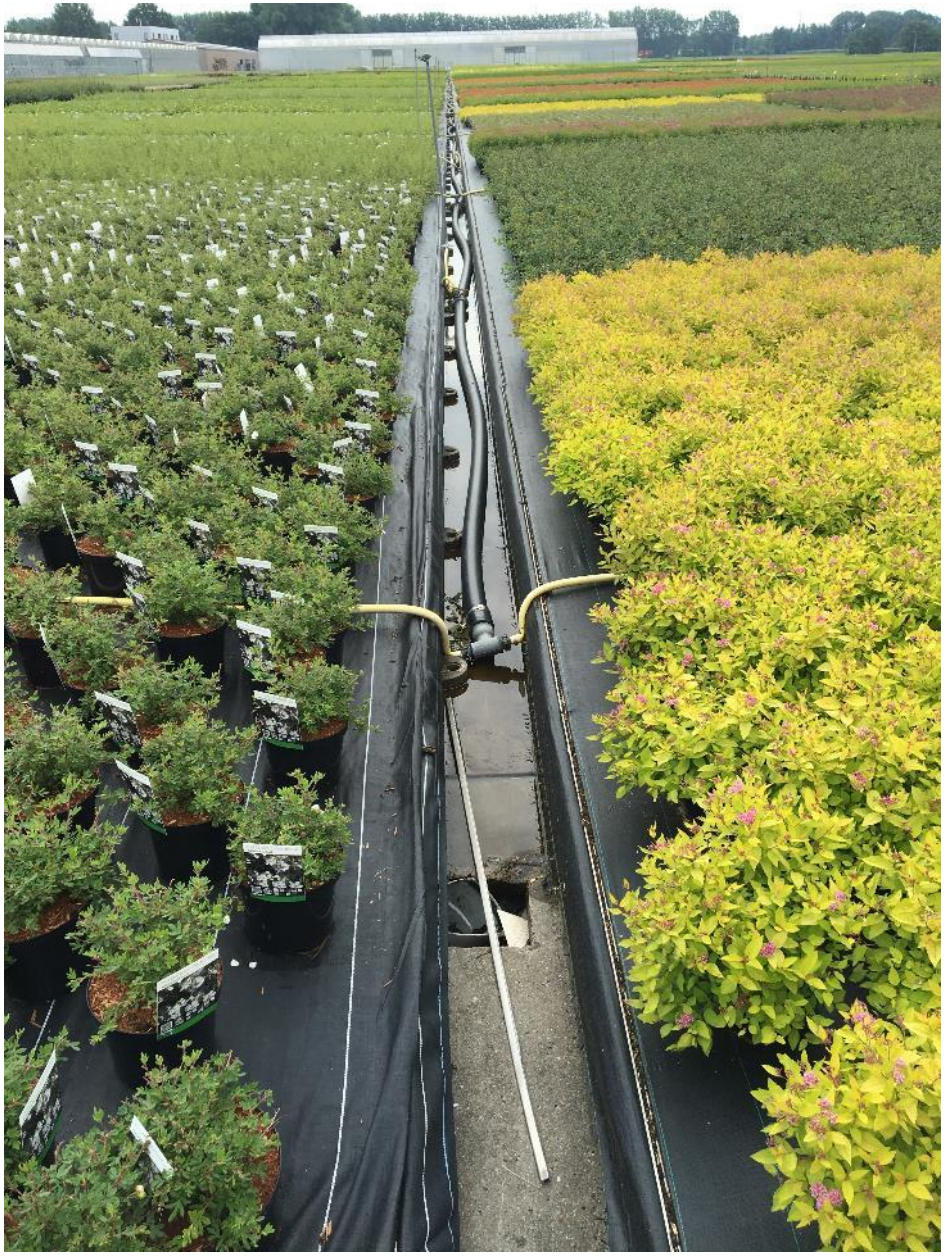
Grower needs



Minimising impact by reduction of emissions (e.g. **recovery of nutrients from discharge water**)

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The Fertigation Bible

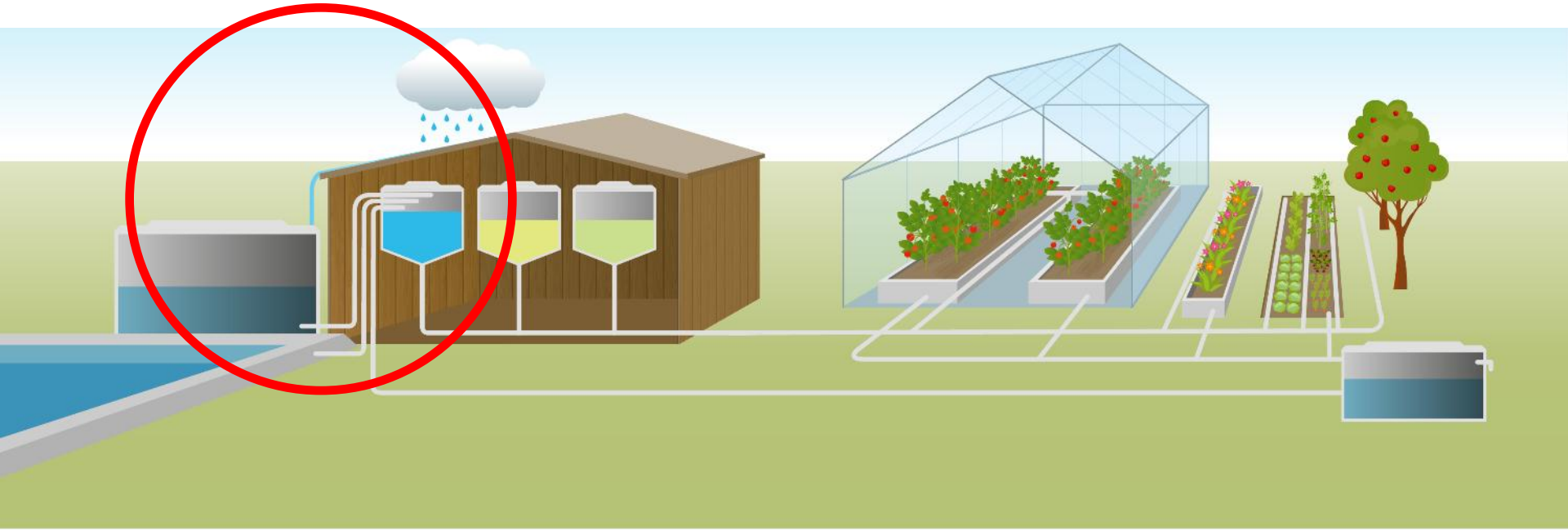
Technologies to optimise fertigation in intensive horticulture.

Editors

Rodney Thompson[23*], Ilse Delcour[19], Els Berckmoes[21], Eleftheria Stavridou[24]

www.fertinnowa.com/the-fertigation-bible/

Provision of water



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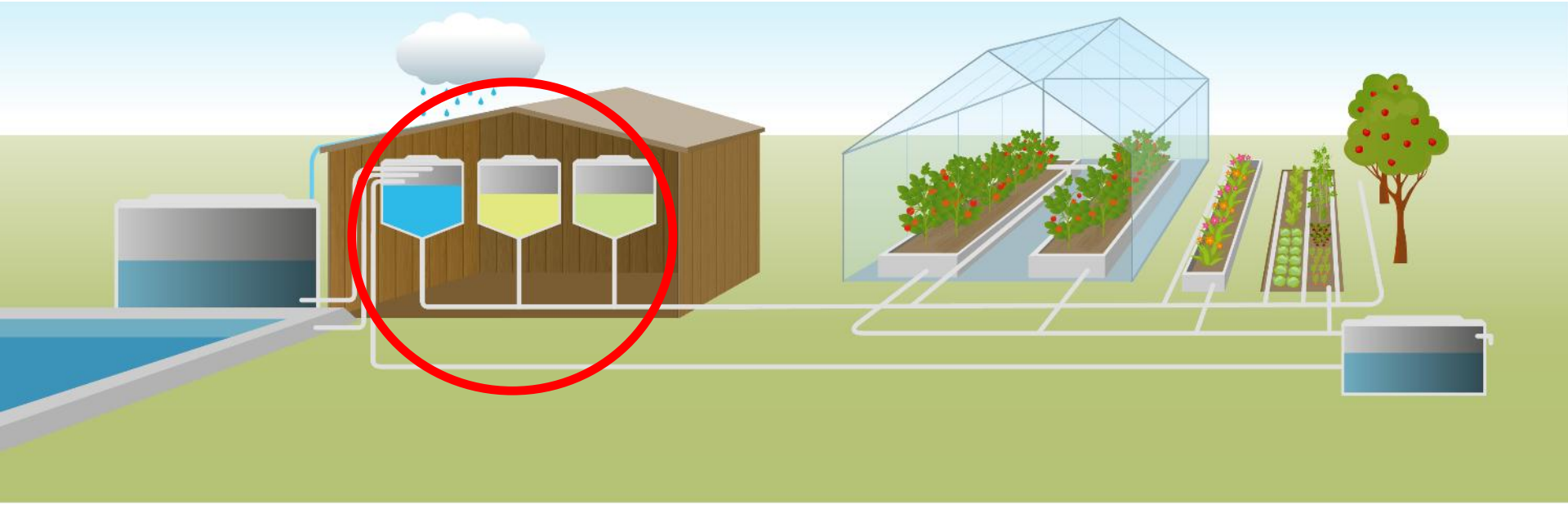
Optimising water quality



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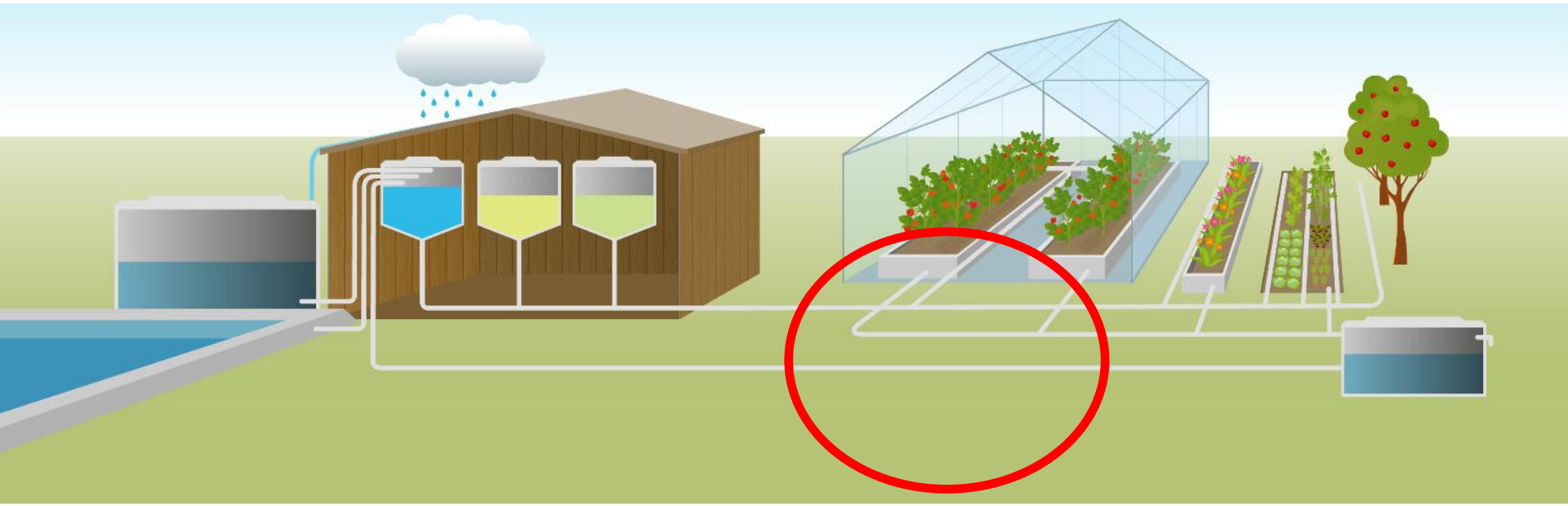

Fertigation equipment

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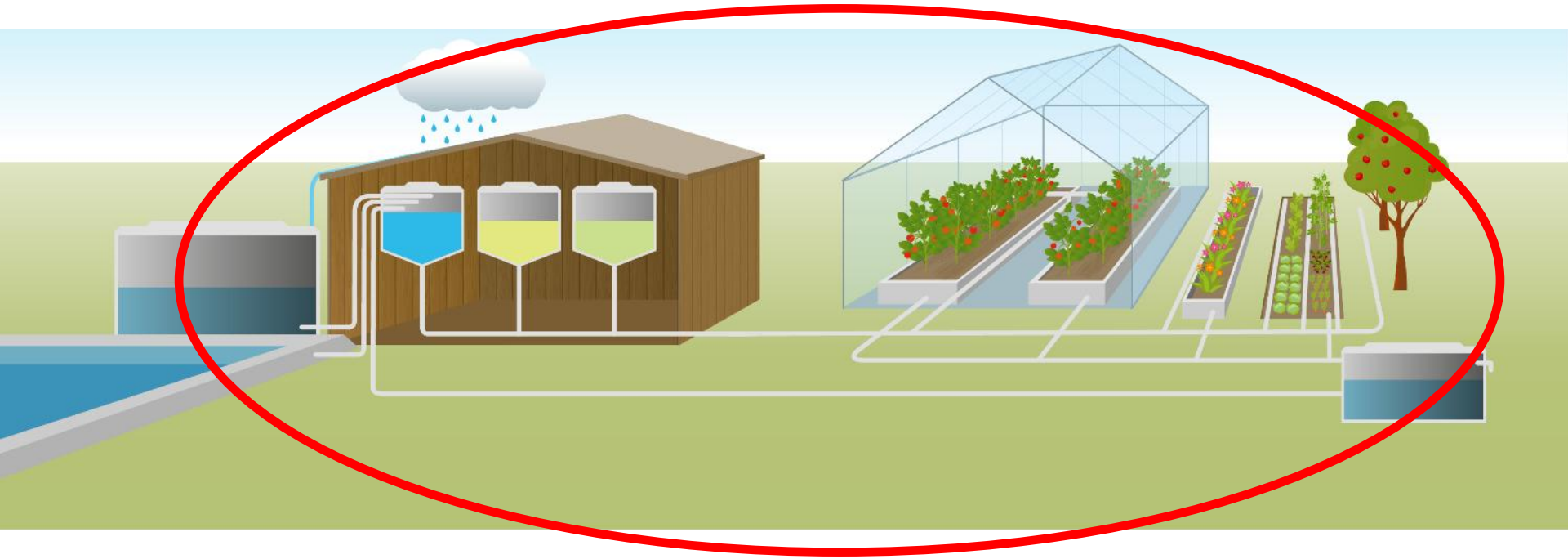
Fertigation management



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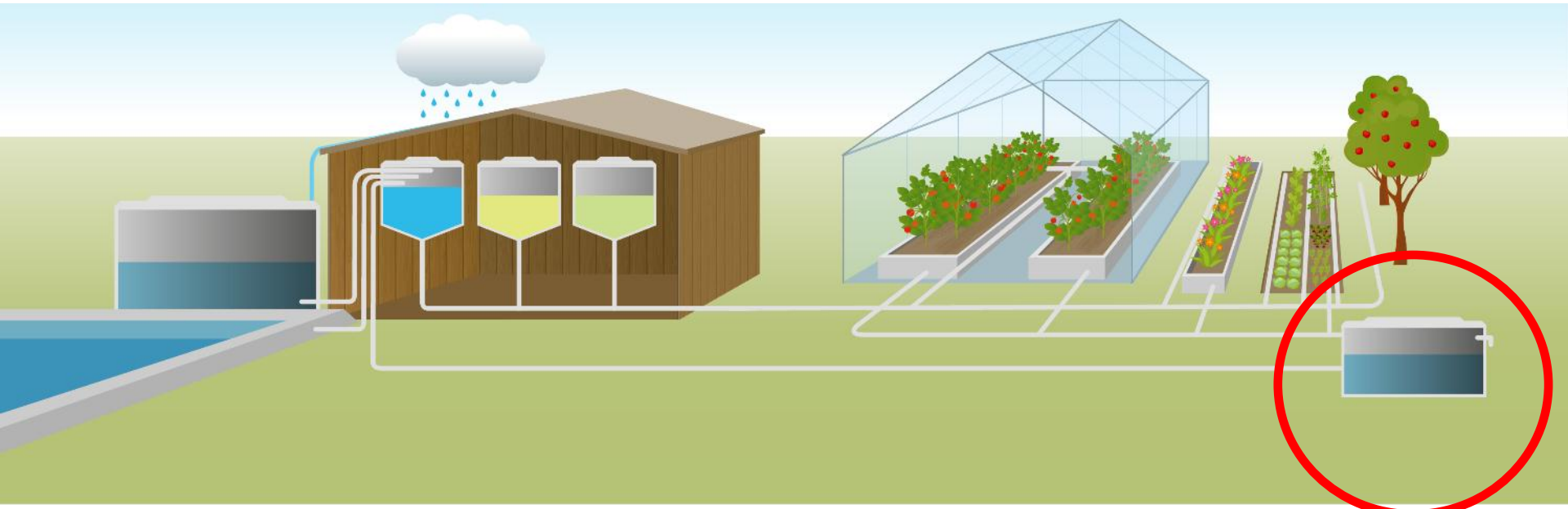

Reducing costs and emissions

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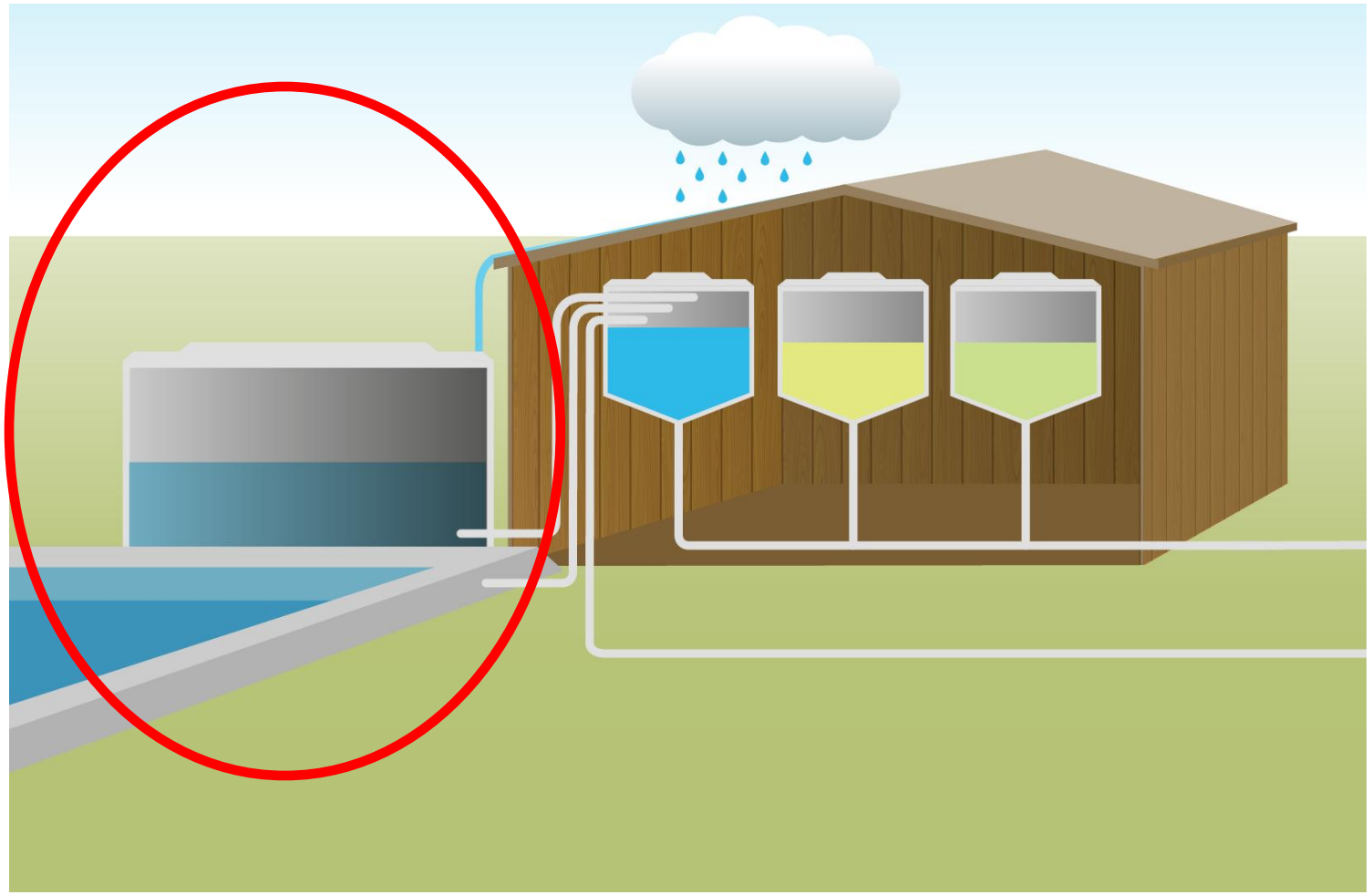
Provision of water



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Provision of water

Borehole

River

Mains

Rain

Recirculated

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Provision of water

- Collection of rainwater (misconception that this is free due to investment required) and condensed water.

Provision of water

Minimise losses by evaporation (covers, underground storage)

Type of cover	Small:25 m2	Medium 250 m2	Large: 500 m2
Fixed steel cover	100 E/m2	Not available	Not available
Fixed permeable plastic cover	10	6	5.5
Floating permeable cover	20	9	9
Floating balls	16	15	14

Minimise losses by drainage (lining storage basins)

Total
includ
costs

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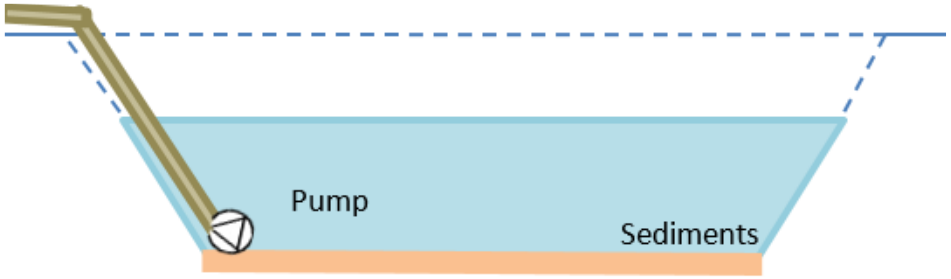
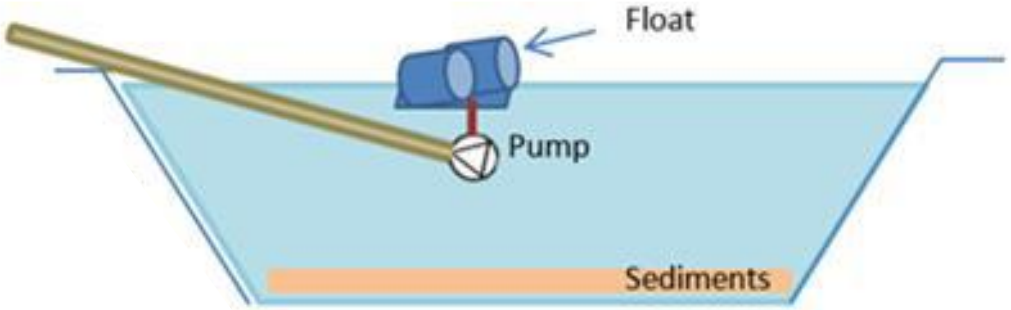
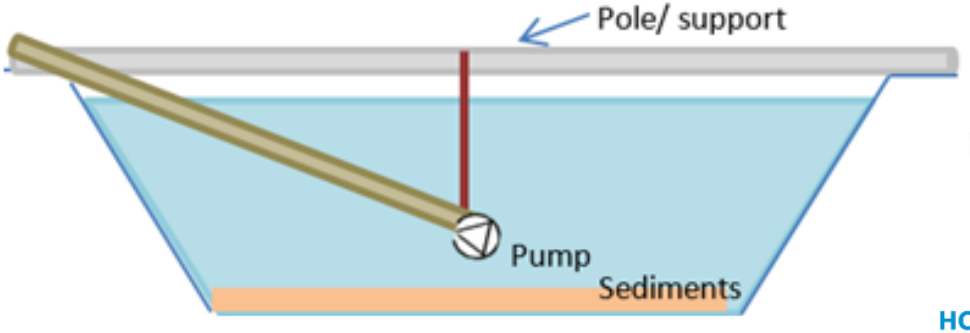
Provision of water

Floating pumps have advantages over housed or submerged pumps







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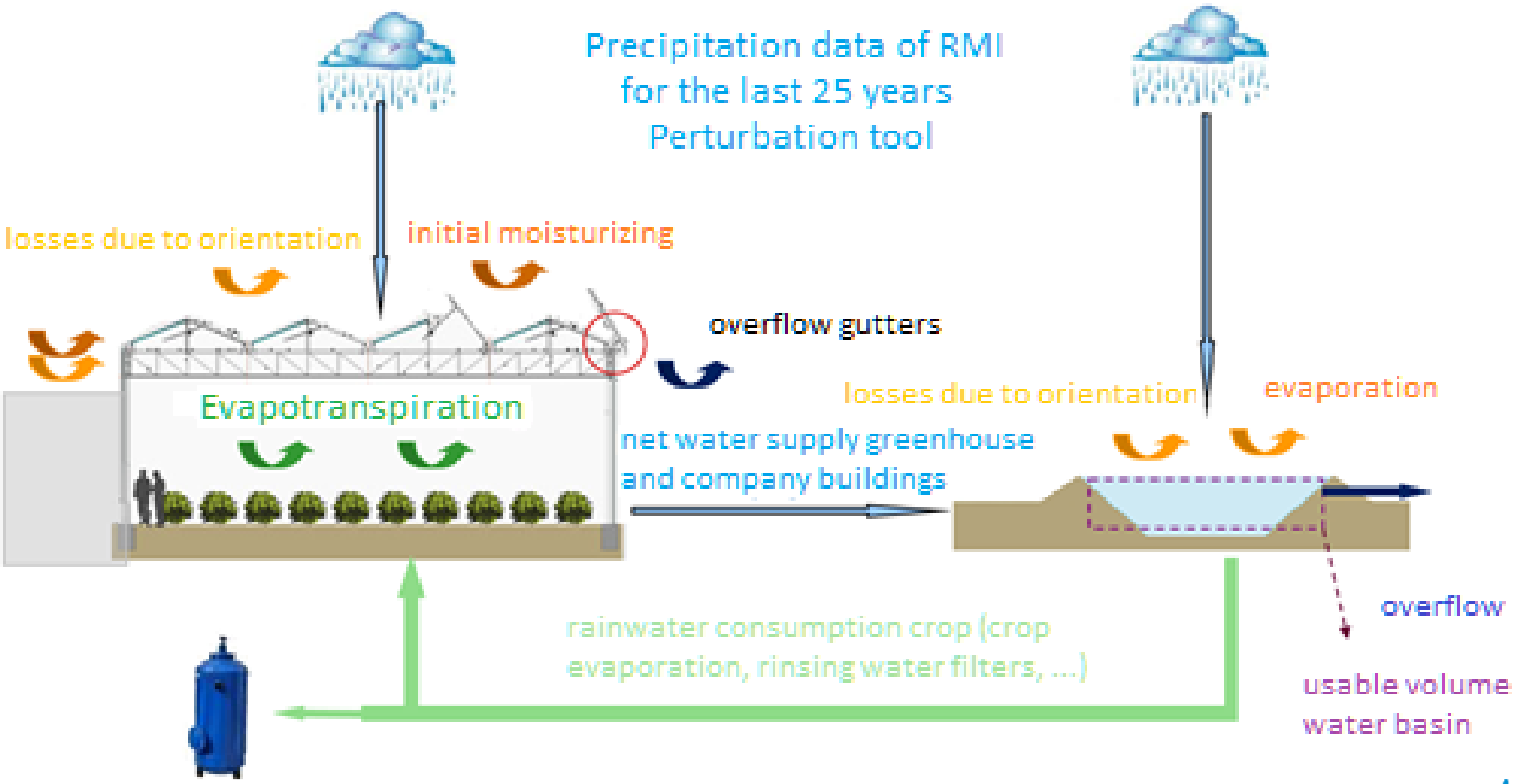
Provision of water

- Tools for calculating the dimensions of water storage facilities.



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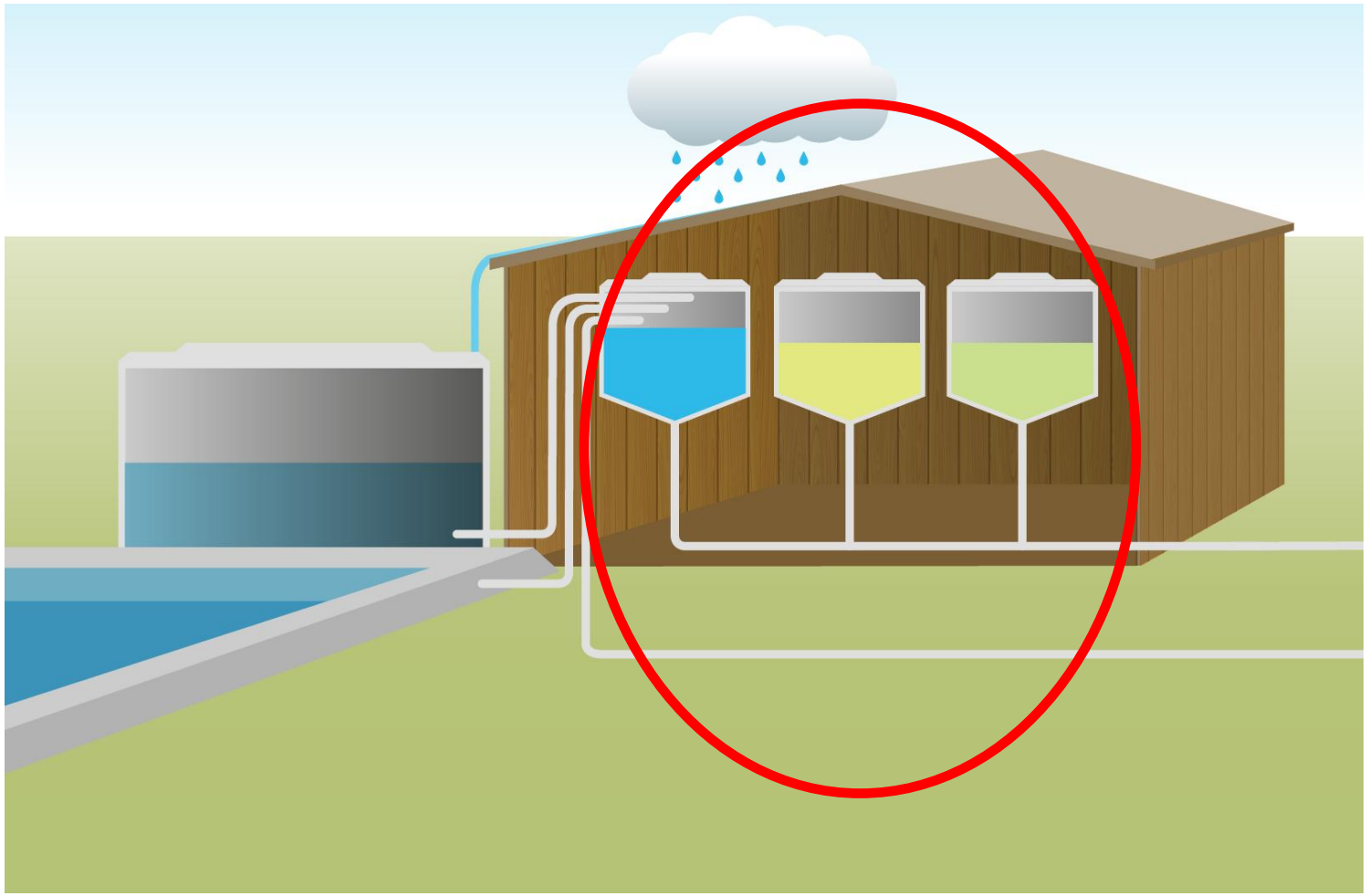
Optimising water quality



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Optimising water quality

1) altering chemical composition – reverse and forward osmosis, ion exchange, electrophysical precipitation, electrodialysis, nanofiltration, alkalinity adjustment

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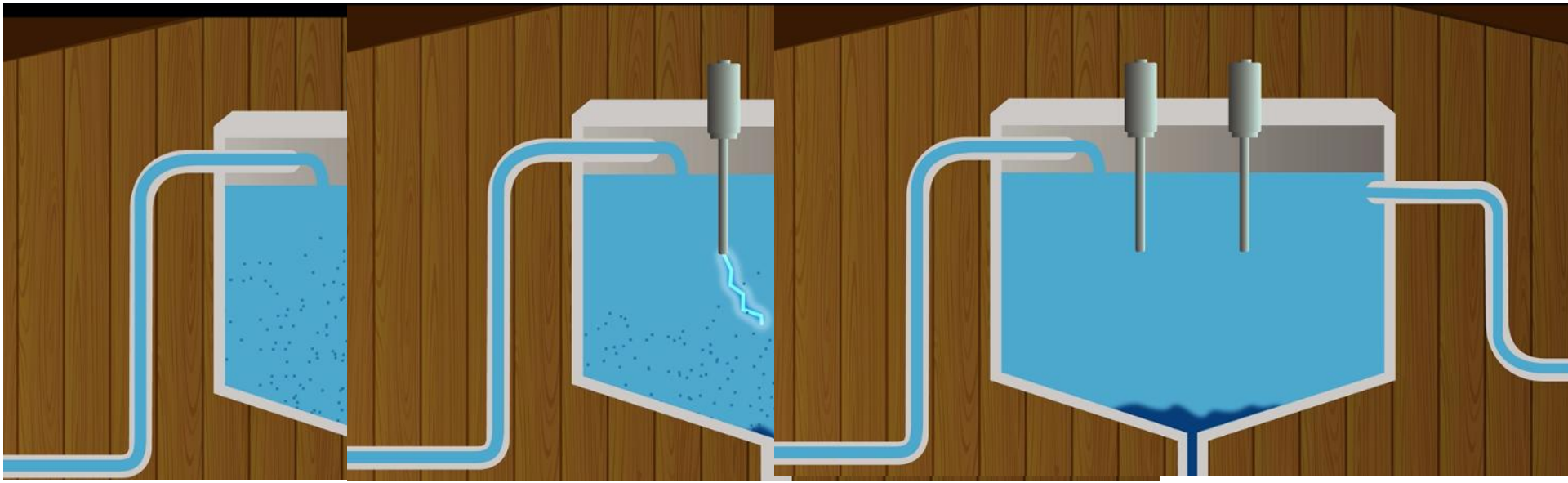
Optimising water quality

1) altering chemical composition – reverse and forward osmosis, ion exchange, electrophysical precipitation, electrodialysis, nanofiltration, alkalinity adjustment



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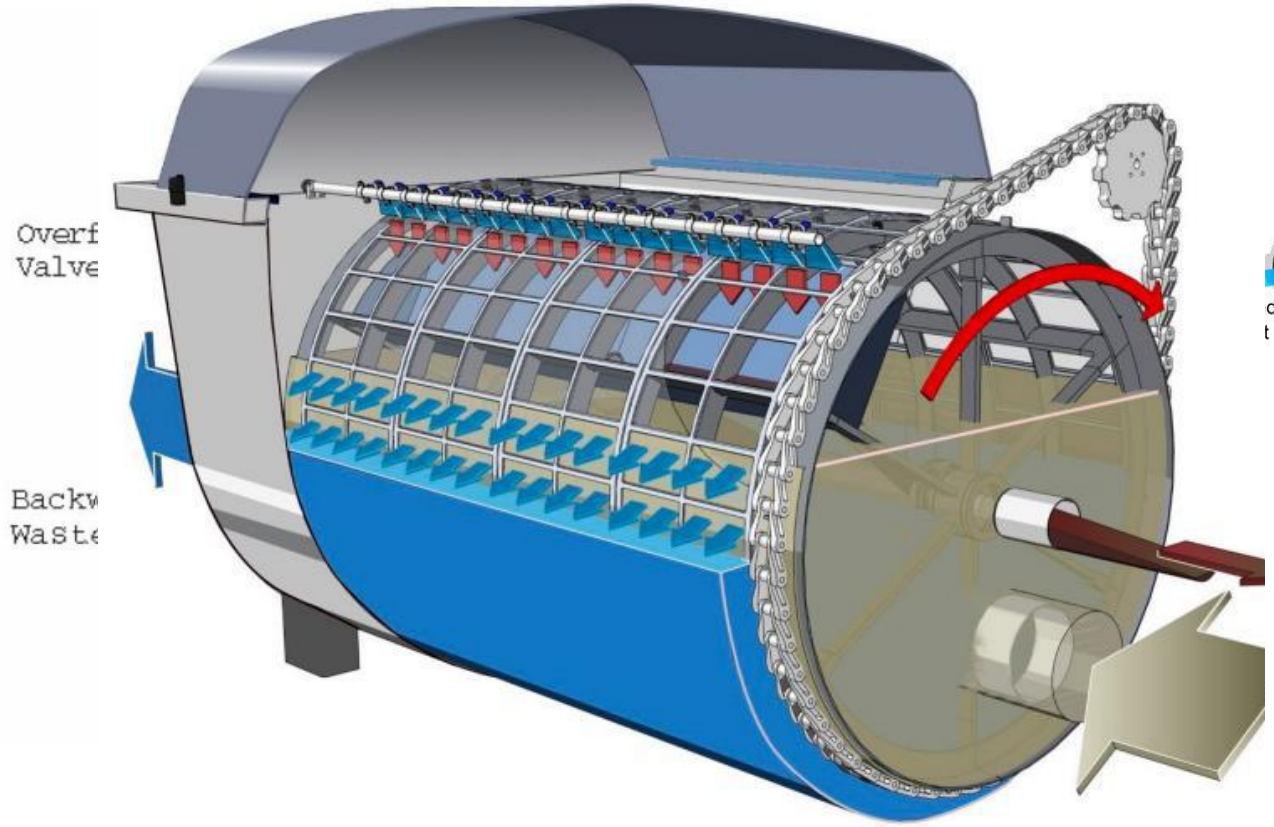
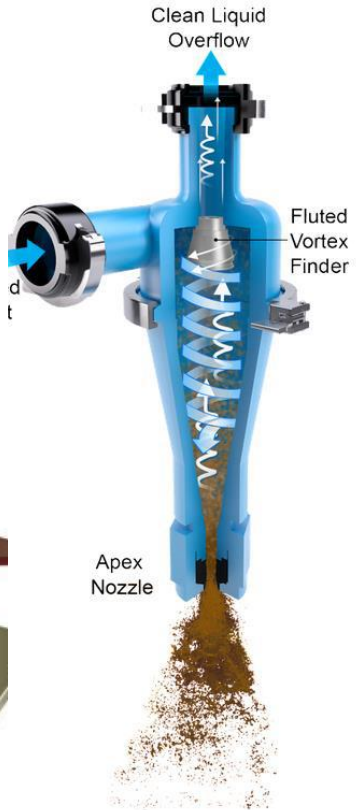
Optimising water quality

- 2) particle removal – wide variety of filtration methods: sieve bend screen, band, cloth, disc, drum, hydrocyclone, micro, ultra, rapid sand, automatic self-cleaning filtration.





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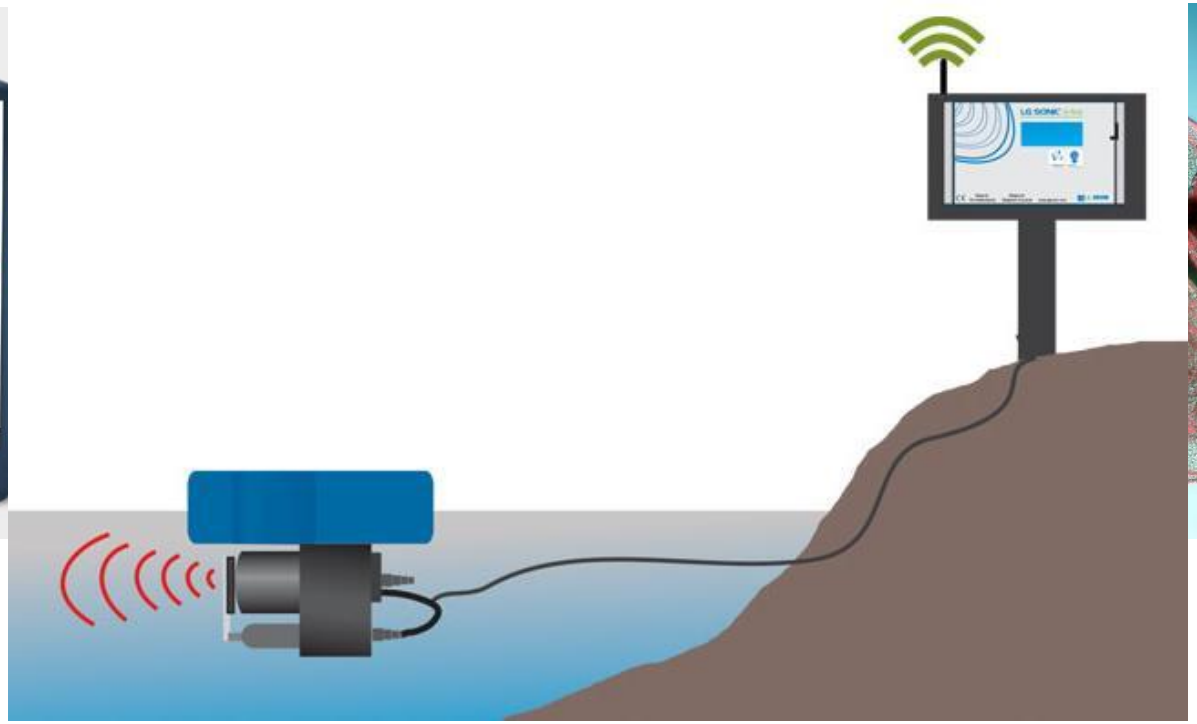
Optimising water quality

- 3) algal removal – Chemicals, aquatic plants or fish, bacteria or enzymes, blue dye, introduced water fleas, water movement and ultrasound technologies



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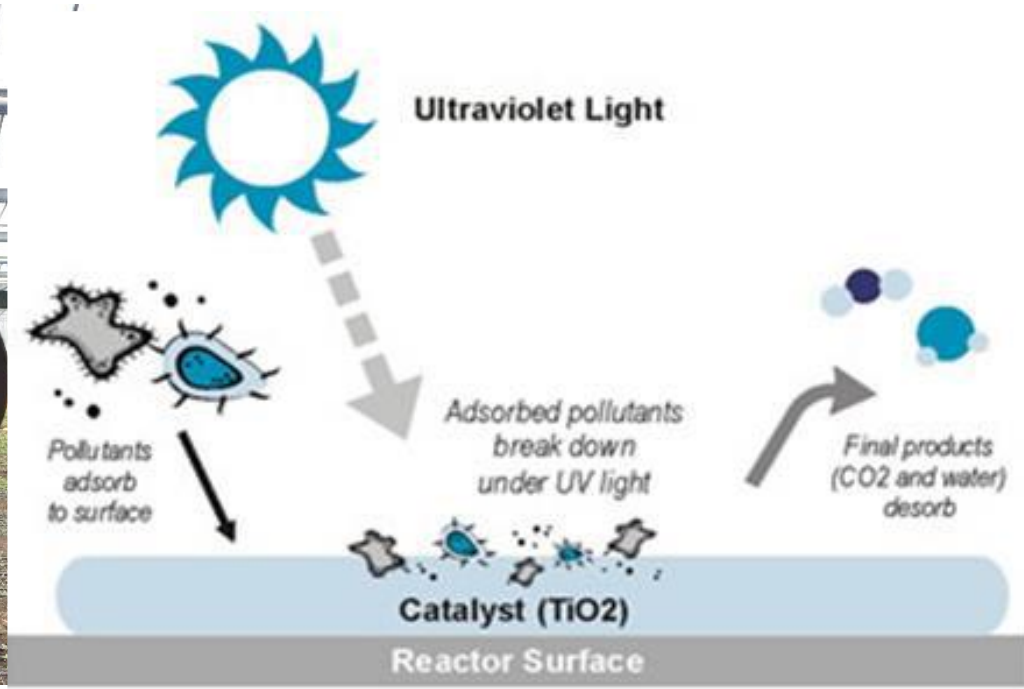
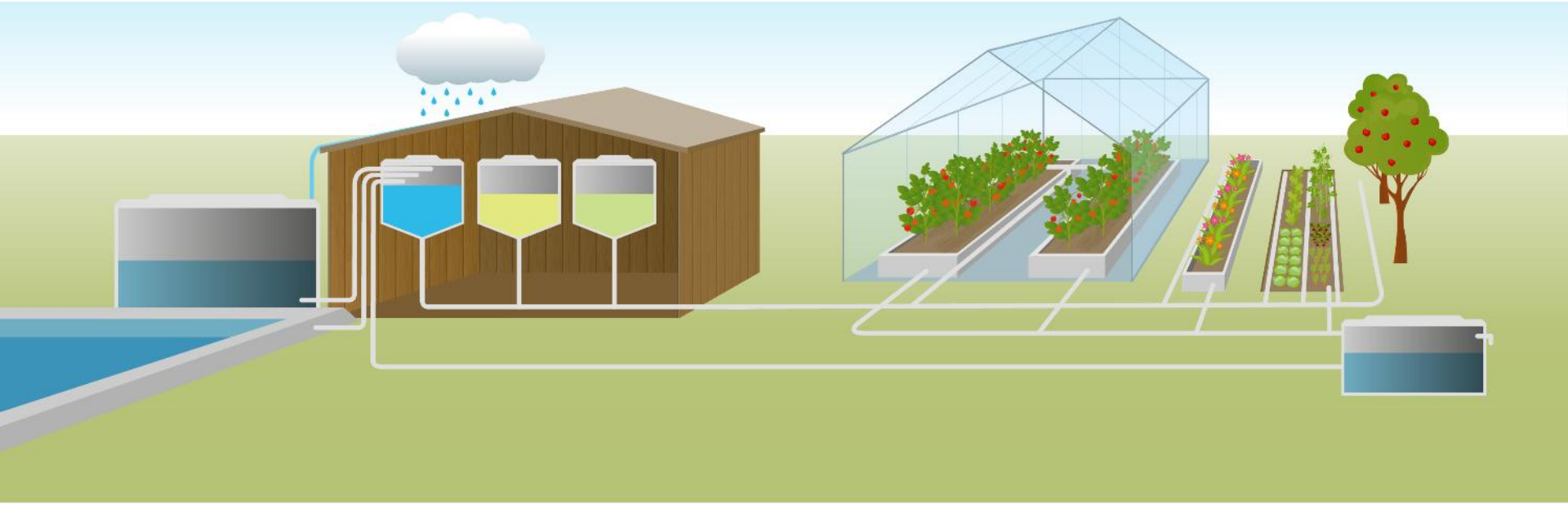
Optimising water quality

- 4) disinfection – chemical addition (peroxide, chlorination, acid), filtration systems (sand, biofiltration), physical (thermal disinfection and ultraviolet disinfection), and physio-chemical processes (photocatalytic oxidation, ozonisation, ionisation procedures)



Fertigation equipment



Fertigation equipment

High cost

Medium cost

Low cost

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Fertigation equipment

High cost

Medium cost

Low cost

Fertigation equipment

High cost

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Low cost

HORTICULTURE

Fertigation equipment

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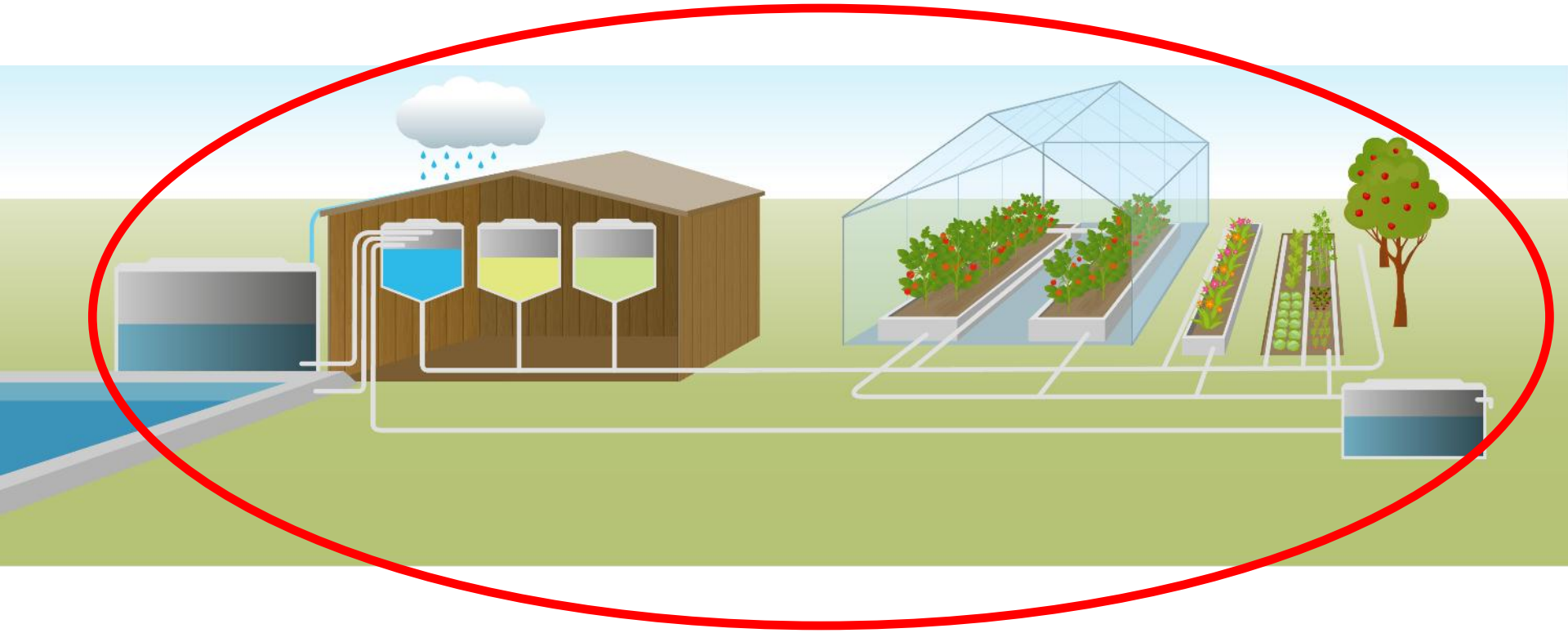
Fertigation management



Fertigation management

- Overall systems
- Retrospective crop use
- Anticipate crop use
- Assess soil water status
- Crop water status
- Decision support systems

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Fertigation management

- Traditional fertiliser recommendation schemes
- Soil/growing media analysis (and soil-water extracts)
- Leaf tissue/ plant sap analysis
- Optical sensors for crop nitrogen status
- Choice of fertiliser (slow release, organic fertilisers)
- Salinity management – agronomic approaches, sensor approaches.

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7.5.8. Description of the regulatory bottlenecks

7.5.8.1. Brief description of the European directive and implications for growers at European level

- Directive 2008/98/EC on wastes
- Directive 1999/31/EC on landfill of wastes
- Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste

7.5.8.2. Implementation at the country level

- Directive 2008/98/EC adopted in Italy through the Legislative Decree n° 205 on 03/12/2010
- Directive 1999/31/EC adopted in Italy through the Legislative Decree n° 36 on 13/01/2003
- Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste adopted in Italy through the Legislative Decree n° 133 on 11/05/2005

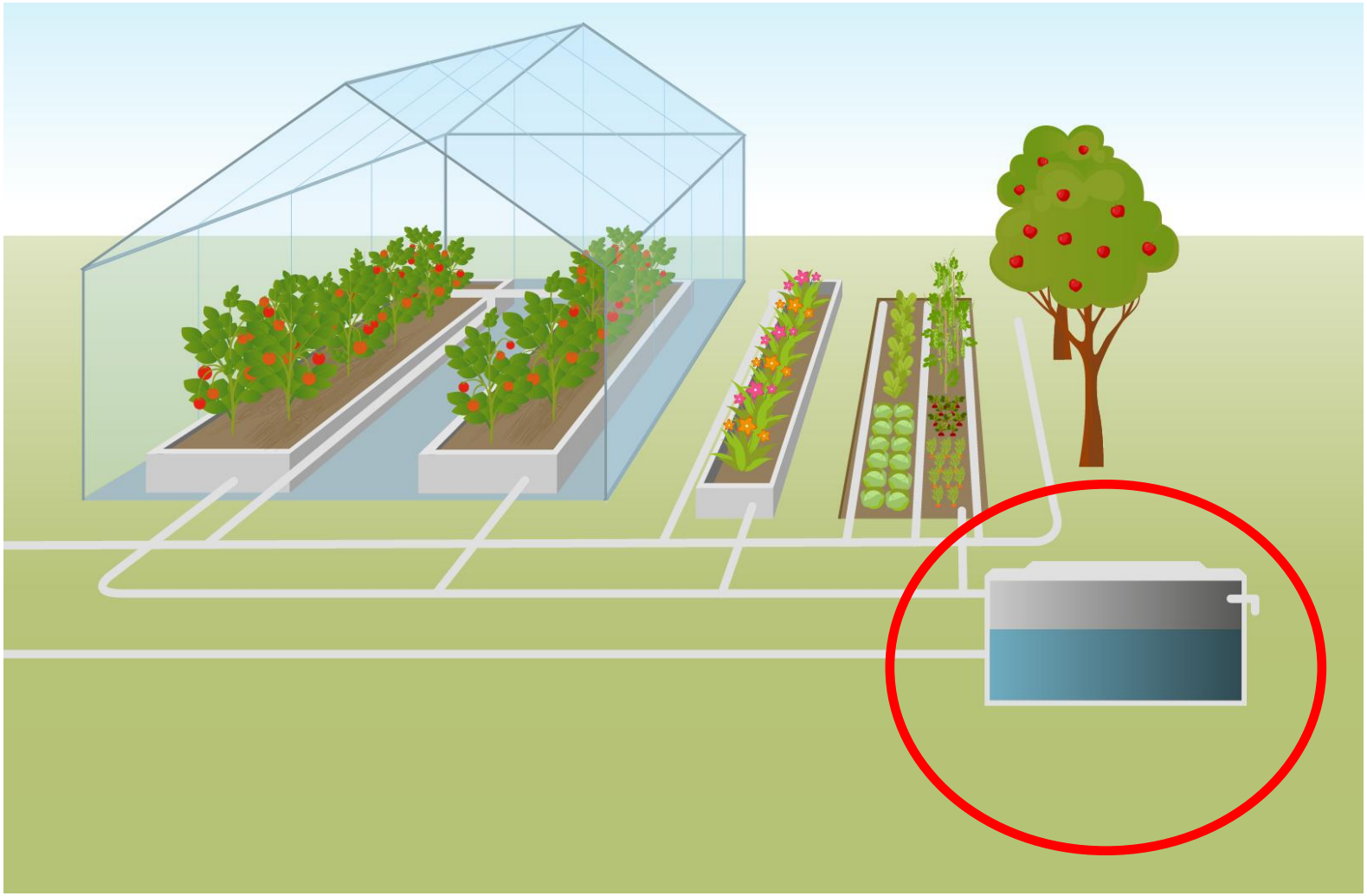
7.5.8.3. Implementation at the regional level

- Resolution n° 14 on 25/03/2015 of the Regional Council with regards to waste management

7.5.9. Brief description of the socio-economic bottlenecks

The main issue related to the market introduction of the innovative micro irrigation pipes and drippers could be its cost compared to current polyethylene systems. The difference in the final cost is mainly attributed to the price of the new additives: it was demonstrated that

Reducing costs and environmental impact



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Reducing costs and environmental impact

- Constructed wetlands, use of duckweed

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Reducing costs and environmental impact

- Newer: adsorption media for phosphorus

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Fertigation bible

- Gives overview of the technology
- Costings
- Advantages and disadvantages
- Whether commercialised
- Supporting systems
- Legislation

- www.fertinnowa.com
- georgina.key@ahdb.org.uk