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AGRICULTURE & INNOVATION

Circular horticulture

How to increase circularity in protected horticulture?

Protected Horticulture can ensure high quality production and contribute to global food security. Furthermore, protected horticulture (growing in greenhouses) provides significant opportunities for 'circular' production to use resources more efficiently. This includes recycling, across different levels, from individual farms to regional level.

Greenhouses can help support circularity because they have:

- potential for high productivity with reduced water and agrochemicals use per unit of production
- a production capacity per ha up to 10-15 times higher than open field farming
- great potential for the recycling of water and nutrients

The Focus Group on "Circular Horticulture – how to increase circularity in protected horticulture" looked at examples of good practice of circularity in protected horticulture and how these could be transferred to other situations to benefit the wider sector. It also looked at success and fail factors for circular approaches in horticulture, identified knowledge gaps and possible future research needs with practical impact.

The main challenges identified by the experts are:

- Increasing availability of resources, both in quality and quantity, and in particular water at both farm and regional scale. Secondary water sources like drainage water, condensation water from roofs can increase water availability at farm level. Water can be reused according to a cascading principle and can feed different processes (horticultural or other) closely located to each other, even without the need for further treatment.
- Fostering the association of stakeholders to form clusters to increase circularity in protected cultivation systems: these include greenhouse design and construction companies, horticultural farm input suppliers (seeds, fertilisers, biocides, growing media), ICT (Information and Communication Technologies) companies, greenhouse advisers, horticultural associations, agri-food processing and marketing chains, retailers, supermarkets, consumers, researchers, policy makers, governments and non-governmental organisations.
- Assessing the level of technology in existing greenhouses, and support technology transfer from experimental to commercial farms, bearing in mind tradeoffs between technology and workforce: Hi-tech greenhouses may reach high levels of circularity but their investment costs are high too, while in low-tech (low investment cost) greenhouses, it is more labour intensive to reach a certain level of circularity.

"We should ask ourselves if technology is the solution, or is it entrepreneurship ? We should stimulate other farmers to act as entrepreneurs. How can growers improve themselves ? Innovative farmers are ambassadors."

- Patrick Lemmens, farmer in the Netherlands, member of the Focus Group Circular horticulture -

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Ideas for Operational Groups

- develop and test alternative and renewable growing media
- develop and test new rainwater storage systems
- urban farming, finding ways to integrate greenhouses in city buildings
- documenting experiences related to circularity in protected cultivation systems- 'Seeing is believing'
- support data analysis and focus on the development and evaluation of indicators of greenhouse systems performance
- find ways for farmers to cooperate in biomass/vegetables logistics
- mixed farming and bio-digestion of manure and use of biogas to heat greenhouses

Research needs

- social / economic science approach: consumer views and role in supporting circularity in horticulture
- dynamic biomass streams: biomass mapping of the main horticultural products in Europe, analysing the logistics, streams, potential and risks
- development of new and adapted crops for circular horticulture systems, for instance crops which are more tolerant to salinity
- low cost technology solutions for water and nutrient measurements
- alternative constituents for growing media
- novel and economic or low-cost solutions for water storage
- biodegradable materials for greenhouses

More ideas for Operational Groups and research needs available in the Focus Group report

More information

Focus Group webpage	EIP-AGRI factsheet: - circular economy - water & agriculture - fertiliser efficiency	Inspirational ideas: - Tomato grower and fish farmer create profits through water re-use and energy exchange - Towards a circular horticulture system - Aquaculture + hydroponics = aquaponics
Focus Group report		

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