INVITATION

Regional cooperation for innovation on water management in horticulture

Inform – Prioritize - Collaborate

Brussels; March 18th 2015

Introduction and objectives

The workshop is focused on innovative approaches on water management in horticulture: open field and protected production. The aim is to facilitate the uptake of measure under the Rural Development in the new programming period, as well as to use the opportunities offered by the European Innovation Partnership on Agricultural Productivity and Sustainability (EIP Agri). Particularly, it will highlight cooperation of EU-regions in setting priorities for innovation on water use and emission reduction from horticulture. It will help to connect potential stakeholders around project ideas, to bring together research and practice.

The overall challenges addressed are water quantity issues due to drought and water stress, enforced by climate change, as well as surface- and groundwater quality issues due to nutrients and pesticides emissions through the water pathway from horticulture. The outcomes of the workshop are expected to provide solutions that could feed into the currently ongoing preparation of the 2nd River Basin Management Plans under the Water Framework Directive.

The workshop look into possibilities how to improve existing growing systems by application of innovative technology to increase water and nutrient use efficiency and to decrease losses of nutrients and plant protection products. This concerns both soil grown and soilless cropping systems. This will be complemented by giving insights how new cropping systems could be designed to solve intrinsic water use problems. For example, for soil grown crops it is virtually impossible to close the water cycle, but when innovative growing systems are developed that are soilless, closure of the water cycle comes in reach.

Target groups

- European Commission DG AGRI, DG RTD, DG ENV, DG ENT;
- National/Regional authorities (Ministries of Agriculture, Managing Authorities, Innovation and Research Agencies);
- Growers and other representatives from business and (other) industry;
- Suppliers and advisory services;
- Horticulture related clusters and innovation agencies;
- Experts from research organisations.

1 This workshop can only be attended by invitation
Programme Workshop March 18th 2015 (Brussels)

8.30 Walk in

9.00 Session 1 – Opening and welcome

9.30 Session 2 – Instruments for innovating the EU horticultural sector towards a higher level of sustainability and resource use efficiency and making use of cooperation of Regions

11.00 Coffee break

11.30 Session 3 – Introducing the challenges and suggestions for actions; & voting for actions within the challenges to set the priorities for Session 4

13.00 Lunch break

14.00 Session 4 – Break-out session in 2 rounds with challenge-subgroups, specification of actions:
   o Brokerage between regions willing to cooperate on these actions within the RDP programmes (e.g. through EIP Operational Groups, art.35), Structural Funds and EU Projects (Horizon 2020 and LIFE);
   o Identify (other) stakeholders and leads;
   o Output of the Break-out session is a presentation (Session 5) which is also a draft for a final paper for EU Policy makers.

16.00 Coffee break

16.30 Session 5 – Summary report results challenge-subgroups

17.15 Session 6 – Conclusions

17.45 Closing

Instructions

The workshop is intended to focus on actions on the most relevant innovation challenges (including opportunities for innovation) in water use and emission reduction from horticulture, and to allow highly interactive contributions of participants. Due to limited time it is impossible to cover all relevant aspects during the workshop. Therefore, we ask registering participants to provide the organizers with a feedback on the most relevant challenges which should be debated during the workshop. Please select up to 4 innovation challenges out of the 8 pre-selected challenges outlined in Annexe I during your registration. Thereby you help to define in a participative way the 4 main challenges to be debated in more detail during workshop session 3. This interactive session will identify the most relevant innovative actions/tools for each of the selected challenges, and will prepare session 4 that is a brokerage event to facilitate cooperation on specific actions/tools.

Deadline for selection is set at February 18th 2015

REGISTER AT: https://www.webropolsurveys.com/S/8B53598301498704.par
Annexe I

Brief outline of the proposed innovation challenges to be discussed at the workshop

General remarks

The defined innovation challenges below have common backgrounds in general societal challenges. Most important challenge connected to the theme is the availability of sufficient good quality fresh water as well to use in horticultural production as in what is leaving the production system. Other important societal challenges are sufficient food production of good quality for a growing and urbanising world population, mitigation of and adaptation to climatic change, protection of biodiversity and improving resource use efficiency, especially for non-renewable resources (P, fossil energy).

Next to the specified challenges below, there are overall challenges connected to all themes. These ‘overall challenges’ should be taken into account when discussing the specific challenges and necessary actions:

- In many cases the development of new technology is needed.
- Assessment of sustainability of the implemented solutions (technologies, strategies), is necessary to promote products produced applying these innovations. Improved methodology is needed.
- While the main focus of the challenges is to improving resource (water, nutrient) use efficiency and decrease emissions, adoption of strategies and technology is improved when combined with increased production and product quality (including nutritional/nutraceutical/organoleptic properties and shelf life).

The eight pre-selected innovation challenges (the list is not in a priority order):

1. Strategies and tools for sufficient good quality input water
   Good water quality is a condition to enable optimal crop production and quality. Therefore in some cases water sources should be pre-treated to remove unwanted elements such as organic matter, salts (NaCl), iron and bicarbonate. Subsequently, elements must be added and pH adjusted as required by a specific crop, plant stage and climate. In recirculating cropping systems additional technology is needed for e.g. disinfection and adjusting nutrient levels. Different strategies should be adopted to tune water quality, crop, and cropping system. By doing so, the need to discharge is prevented, which results in a dramatic improvement of water (and nutrient) use efficiency and decrease of emissions of nutrients and PPPs. Cost effective technology is needed to keep the supply water at the required quality level, and should be integrated. Energy use and by products (waste like brine) should also be taken into account.

2. Decision support systems and application techniques for efficient irrigation and fertilization
   Large improvements in water and nutrient use efficiency can be made by adoption of more efficient application methods for irrigation and fertilization. Methods and techniques should be appropriate for a given cropping system, and attention should be paid to correct operation and maintenance. Land cultivation should be in line with the irrigation method applied.
Adoption of improved decision support systems, monitoring techniques and the integration of new technology can further improve water and nutrient efficiency and reduce emissions. The combination of sensor information (crop, soil and or water), weather data, including forecasts, models can deliver more accurate advice to growers about an efficient and precise irrigation, fertilization and crop management, and provide scenario analyses for decisions at farm level. The technology is available but often yet not integrated and ready for easy use by growers. Making the right combinations of the technology supports irrigation and fertilization strategies of growers, including profitability options.

3. **Sustainable, water and nutrient efficient, cropping systems**

Instead of improving the water use efficiency and reduce the emissions of a cropping system, it might be more effective on the long term to redesign certain growing systems and solve intrinsic water problems. For the new cropping systems a set of demands are described, among which are efficient use of water and nutrients and zero emission. Assessment of total sustainability of the new cropping systems is important.

4. **Strategies and tools to manage water availability and quality at the watershed and farm level**

Regional water management by governments is often done at the scale of watersheds. The amount of water in a watershed has to be divided among its users and a limited emission of nutrients and PPP is tolerated from a watershed. Cascading of water use, improving water capture at the regional level, use of grey water from household or industry in cropping can improve water and nutrient use efficiency on the regional level and reduce emissions. Development and testing of new strategies is necessary, thereby integrating grower’s needs as relevant stakeholders, also considering environmental and socio-economic dimensions.

At the farm level water capture in wet periods makes the farm less dependent on other external water sources as well in greenhouse horticulture as in open field horticulture. Especially rainfall capture is important because of the high quality with respect to horticultural demands. In some regions water capture is well organized. In protected cultivations collection and storage of evapotranspired water from the crops is a source for good quality water. However, many greenhouses and open field growers are lacking water capture and storage capabilities. Appropriate and innovative systems and strategies have to be developed and implemented at farm level, also considering cost and benefit issues.

5. **Strategies and tools to reduce the environmental impact of PPP and nutrients on surface and ground water**

Plant Protection Products (PPPs), originating from horticulture, occur in too high levels in surface and ground waters throughout Europe. As a result registration of several previously authorized and also new PPPs for horticulture is at stake. In order to meet the demands of the WFD of good ecological water quality, the emission of PPPs has to be prevented or removed from discharge and leaching water.

To increase awareness and gain clues for solutions, more insight is needed in the relationship between application and emission of PPPs. In order to prevent emission, discharge strategies have to be developed, or discharge has to be prevented. As an end-of-pipe solution PPPs can be removed. Technologies used for drinking water and sewage water treatment are available, and
are being evaluated for use in horticulture: oxidation technology (ozone, peroxide, UV and combinations of those), adsorption (active carbon), filtration (reversed osmosis), and biological breakdown. These technologies might also be used for purification of supply water (pathogens, growth inhibitors, non-proprietary PPPs). The challenge is to develop sustainable, robust and cheap installations and strategies for purification at farm or regional level.

To reduce the emission of nutrients, water and nutrient use efficiency strategies identified by multi-criteria assessments should be implemented. Also purification technology can be applied at farm or regional level.

6. Water and nutrient efficient, salt tolerant, and resilient crops and varieties

Next to improving the conditions, also the crops can be improved such that water and nutrient use efficiency is improved and that they are tolerant to less optimal conditions (higher salinity levels e.g.) This can be obtained by revisiting genetic resources and breeding to more robust varieties, and by introducing new low water and nutrient demanding crops. New genomics tools and crop simulation models can be used to understand the molecular, physiological and developmental determinants of variation in drought, salt tolerance and water and nutrient use efficiency.

7. Strategies and tools for sustainable soil and substrate management

Good soil conditions improve water and nutrient use efficiency because of e.g. better root growth and higher water holding capacity. This leads to better and unhampered crop growth with less risks of pests and diseases and therefore less input of plant protection products, better infiltration and capture of water and storage of significant amounts of CO2. Site specific management options should be carefully planned. Soil quality can be enhanced by better soil tillage and organic matter management in combination with a well-designed crop rotation and management.

Better knowledge of physiochemical characteristics of the root zone is fundamental for an optimized irrigation and fertigation in both soil and soilless cultivations, also when organic and chemical amendments are added to soil or substrates. This approach will also reduce costs and increase production.

8. Cooperation with other users on water and nutrient (re)use in (peri-)urban horticultural regions

Cooperation between horticulture companies and other parties on water and nutrient issues in a regional context: capture, storage, purification, cascading of water, and reuse and regaining of nutrients, and cooperation with urban parties (industries, households) as well as other rural and agricultural parties (livestock).

Areas utilized for urban horticulture are increasing. These areas, previously used only for social purposes (recreational or social inclusion), are now utilized for food production destined to self-consumption or to develop short food supply chains. Urban horticulture is important at providing ecosystem services, related to urban climate and to a better management of rainwater and runoff. In particular urban allotments increase permeability in areas where the soil sealing is very high. A good management of urban allotments (choice of vegetables, utilization of organic waste, water use) involves direct environmental and economic benefits.