FERTINNOWA, a H2020 thematic network

Els Berckmoes

SCAR SWG AKIS
Lisbon
10 October 2017

Horizon 2020

FERTINNOWA's passport

- Type of action: Thematic network (CSA), Water 4b call 2015
- Transfer of innovative water technologies in fertigated crops
- Focus: fertigated crops (vegetables, fruits & ornamentals)
- Start: 01/01/2016 – 31/12 /2018
- 23 partners + 2 Linked third parties
  (9 EU Member States + South Africa)

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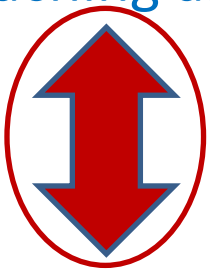
Why is there a need for a thematic network?

2012-2013: a European benchmark study revealed that :

1. growers struggle to
   - achieve sufficient and qualitative irrigation water
   - use irrigation water in an more efficient way
   - avoid run-off leaching and manage waste fertigated water.



2. knowledge & innovative technologies are available but are not implemented by the growers.

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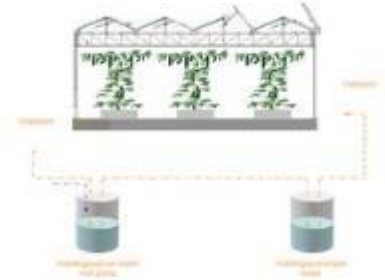
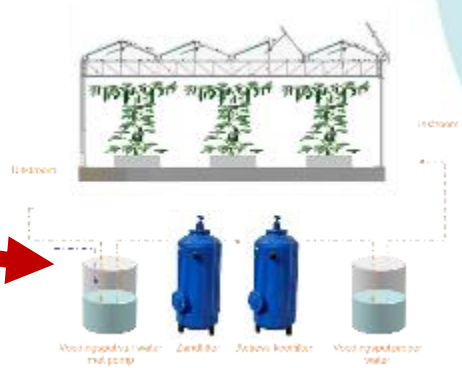
FERTINNOWA concept



Growers in country A
experience a water problem

Bottom-up approach

Number of possible
solutions available in EU



X 20 times all
over Europe

Could it work ? (technological,
socio-economic, regulatory?)

Step 1: mapping the current situation

- *369 grower's interviews* carried out in Europe & South-Africa
- 513 cropping systems

- Focus on:
  - Technologies applied
  - Technological, socio-economic and legislative bottlenecks & barriers regarding
    - water sources
    - water use efficiency
    - reducing environmental impact

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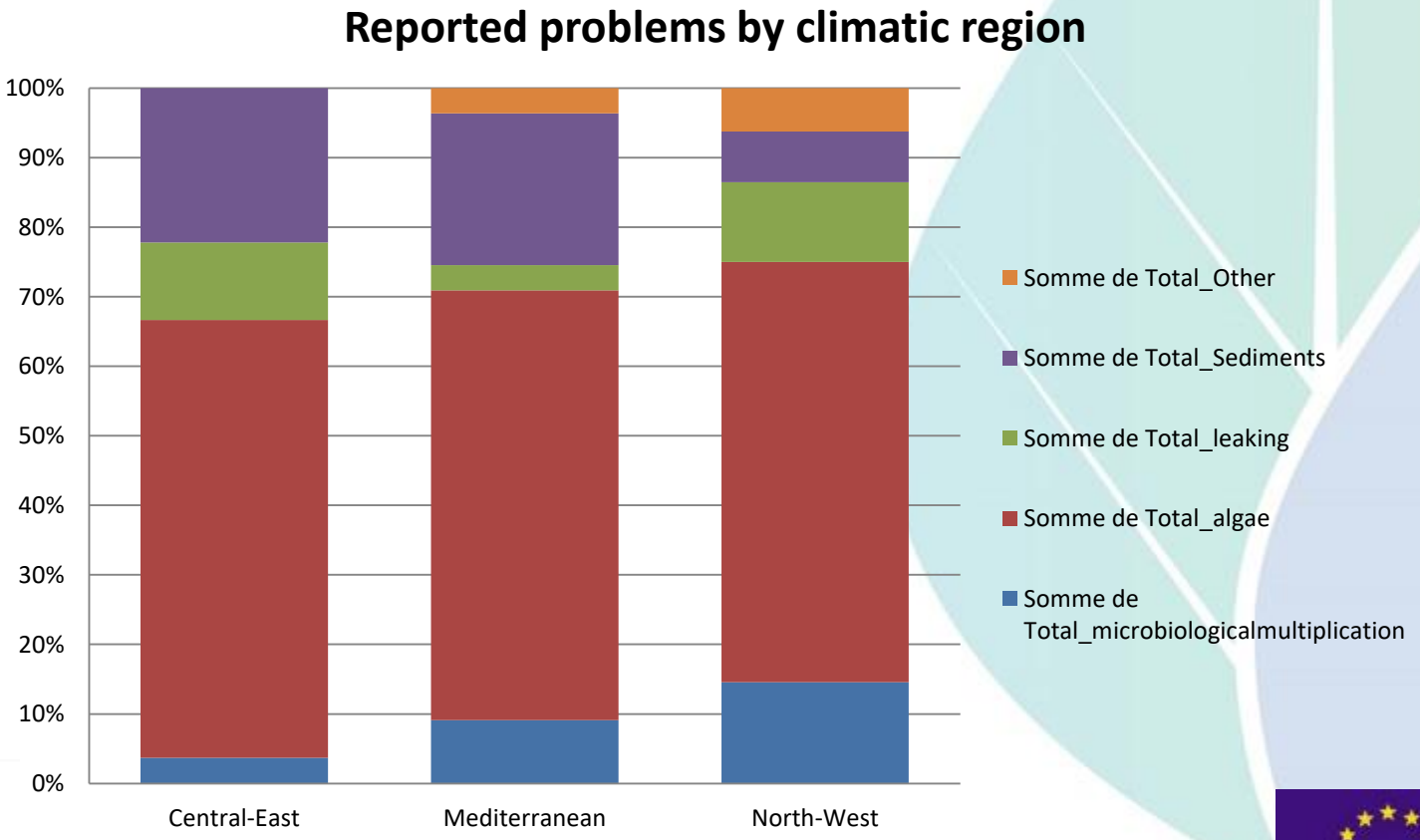
Step 1: mapping the current situation

- One of the outcomes: problems related to water storage



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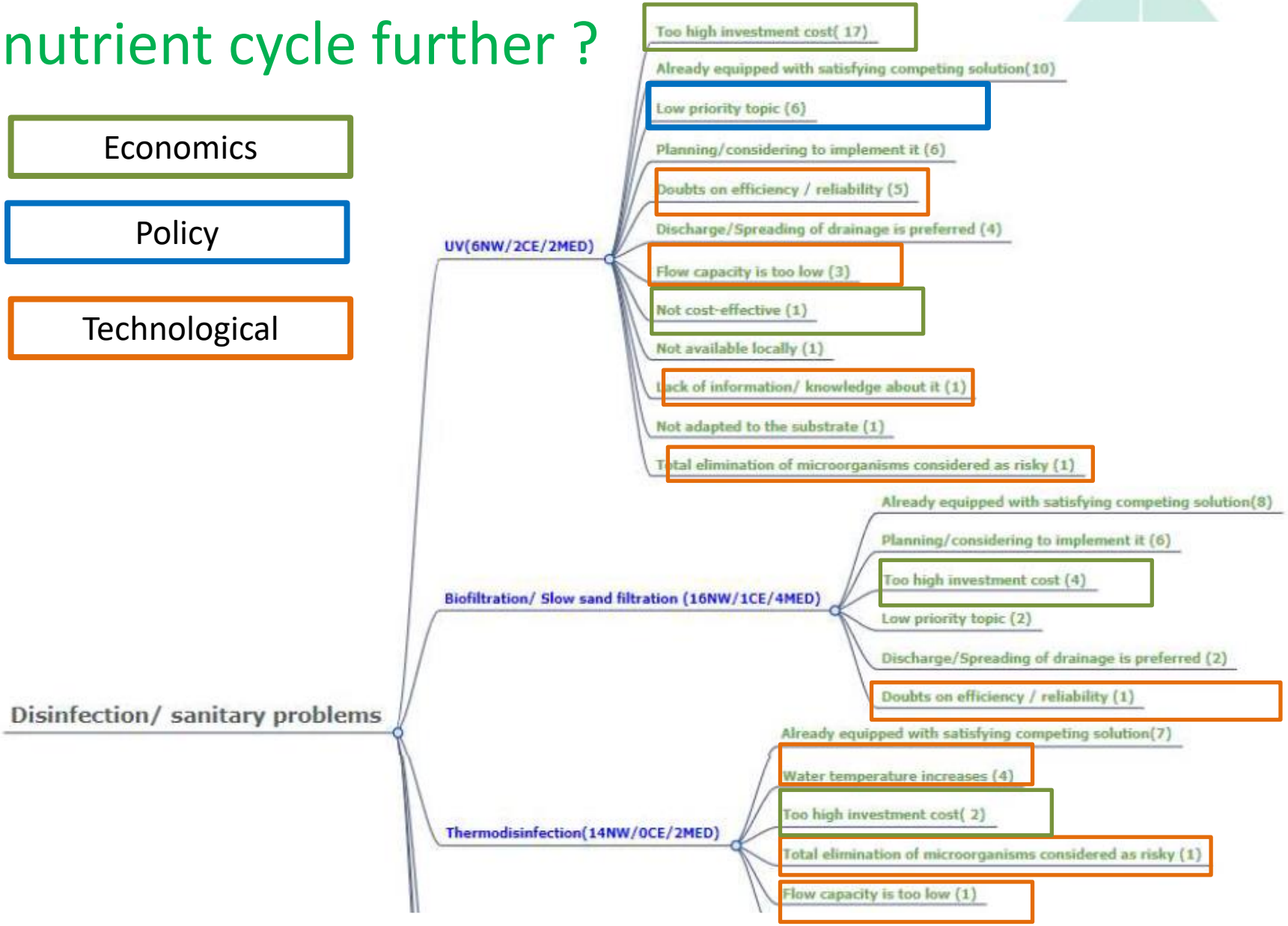
What keeps growers from closing the water and nutrient cycle further ?

Economics

Policy

Technological



Source: FERTINNOWA Benchmark study: Based on the answers of 369 growers

Step 2: evaluating the current situation

- 134 technological review documents = evaluation of the technology at different levels:
  - technological
  - socio-economic
  - regulatory
  - Regional

TRD titles	Algae control			Storage type A (<750m³ or < 150m²)		Storage type B (750-5000m³ or 150-250m²)		(>5
	Preventive/Curative	Green algae	Green-blue algae	installation	maintenance	installation	maintenance	insta
Algae control by chemicals: phosphorus fixation (FeCl, Al)	Preventive/Curative	yes	?		0,04€/100m³		0,04€/100m³	
Algae control by chemicals: lowering the pH	Curative	Yes	No, risk for release of		1,6/100m³ (H2SO4) -		1,6/100m³ (H2SO4) -	
Algae controle by chemicals: dissolved copper (Cu)	Curative	Yes	No, risk for release of					
Algae control by chemicals: oxidation (H2O2)	Curative	Yes	?		9,87€/100m³		9,87€/100m³	
Algae control by chemicals: cell wall damaging (NH4)	Curative	Yes	No, risk for release of					
Algae controle by use of liming (CaCO3)	Preventive	Yes	Yes		0,08€-2€/100m²		0,08€-2€/100m²	
Algae controle by use of Daphnia spp.	Preventive/Curative	Small species	Small species		0-? €/100m³		0-? €/100m³	
Algae control by use of bacteria	Preventive/Curative	Yes	?					
Algae control by use of fish	Preventive/Curative	Yes, filamentous algae	?	0,5-1,0€/100m²		0,5-1,0€/100m²		0 1,0€/
Algae control by use of straw bales	Preventive/Curative	Not all?	Not all?		0,25-0,75€/100m²		0,25-0,75€/100m²	

Group 7: Fertigation management – Nutrient addition equi
Addition of fertilizers by Venturi effect
Addition of fertilizers by injection pump (electric and hydraulic)
Automated injection equipment by Venturi effect based on EC and pH
Automated injection equipment with mixing tank based on EC and pH
Automated injection equipment based on quantitative addition
Automated mixing systems for reuse of drainage
Solubility of fertilizers
Preparation of concentrated solutions
Liquid versus solid fertilizers

Group 8: Fertigation management – Irrigation managemen
water balance methods
weather sensors
TRD Weather forecast related tools
DSS systems (crop water models)
deficit irrigation
partial root drying irrigation
remote sensing (reflectance) canopy sensr
subsurface drip irrigation
tensiometer
neutron probe
convention method (Auger)
humidity sensor (general)
water potential sensors (general)
Plant water potential (stem wil lost water potential)
TDR
Infrared sensor
capacitance probes (FDR)
digital ground-penetrating radar
granular matrix sensor = watermark
dendrometer (trunk/ stem diameter)
drain sensor (quantity measurement)
demand free system
plant weighing (Packet)
W.E.T. Sensor (Measures Water content, EC and Temperature)
slab balances (is more substrate moisture sensor?)
Pull stop sensor
Irrigation management with soil moisture sensors
DSS systems linked to sensors
Tanger Sensors
Sapflow Sensor

Group 9: Fertigation management – Nutrient management
N Fertilizer recommendation schemes - fruit trees
N Fertilizer recommendation schemes - vegetables
P Fertilizer recommendation schemes
soil analysis
Dutch 1:2 soil:water extraction method
soil solution analysis
EC measurement in soil
Real time analysis of nutrient solution in soil

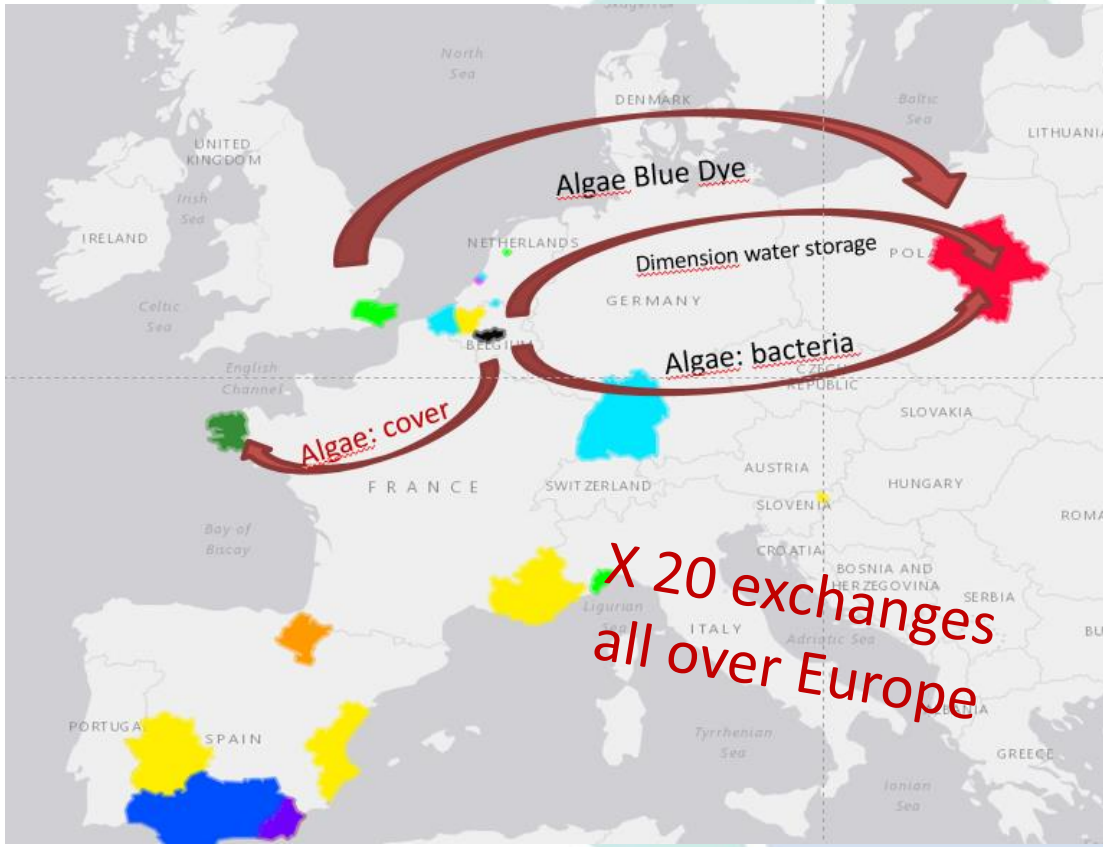
Step 3: solving problems by exchange of knowledge/technologies

1. What can we learn from each other ?

→ Collective consultations (growers, advisors, policymakers, industry, …)

→ Workshops….

2. Actual exchange of technologies from one region/crop/system to another in order to solve problems on a short term.



Increase nutrient use efficiency

New technologies (thinking out of the box)

Sustainable watersources

End of pipe solutions

DSS irrigation

Increase wateruse efficiency

Implementation water framework directive

Sodium removal

Filtration technologies

DSS fertigation

Algae

Water storage dimensions

Regulatory comparison

Irrigation communities

Salinity management

Nutrient recovery (N, P, …)

Limitations ground water

Water storage problems

Technological comparison

Economic comparison

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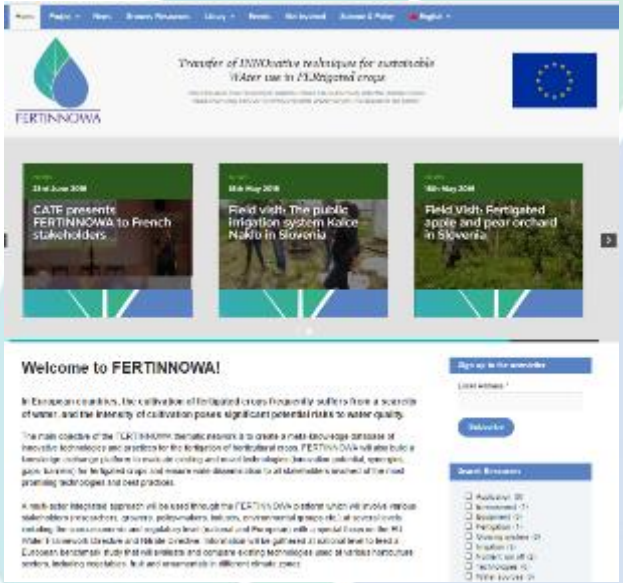
… and many more

Step 4: bridging the gap between knowledge and implementation

- Technology database (PA +TRD)
- Website www.FERTINNOWA.be
- E-newsletter (7 languages)
- Showcase events
- Workshops
- Articles on general and trade press



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FERTINNOWA behind the scene

What are the characteristics of the PS linked to water-related projects

- ✓ Consortium members:
  - ✓ are active in numerous water related projects
    - ✓ min. 31 linked projects before the start, now even more
    - ✓ Scientific to practical research
  - ✓ Have a broad network linked to water projects
    - ✓ attract other projects to FERTINNOWA

EIP Water newsletter !

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How can water-related projects participate in FERTINNOWA?

- ✓ Consultation for technology review (initiative consortium)
- ✓ Take part in the technology exchange
- ✓ Take part in the workshops, showcase events, final event, …

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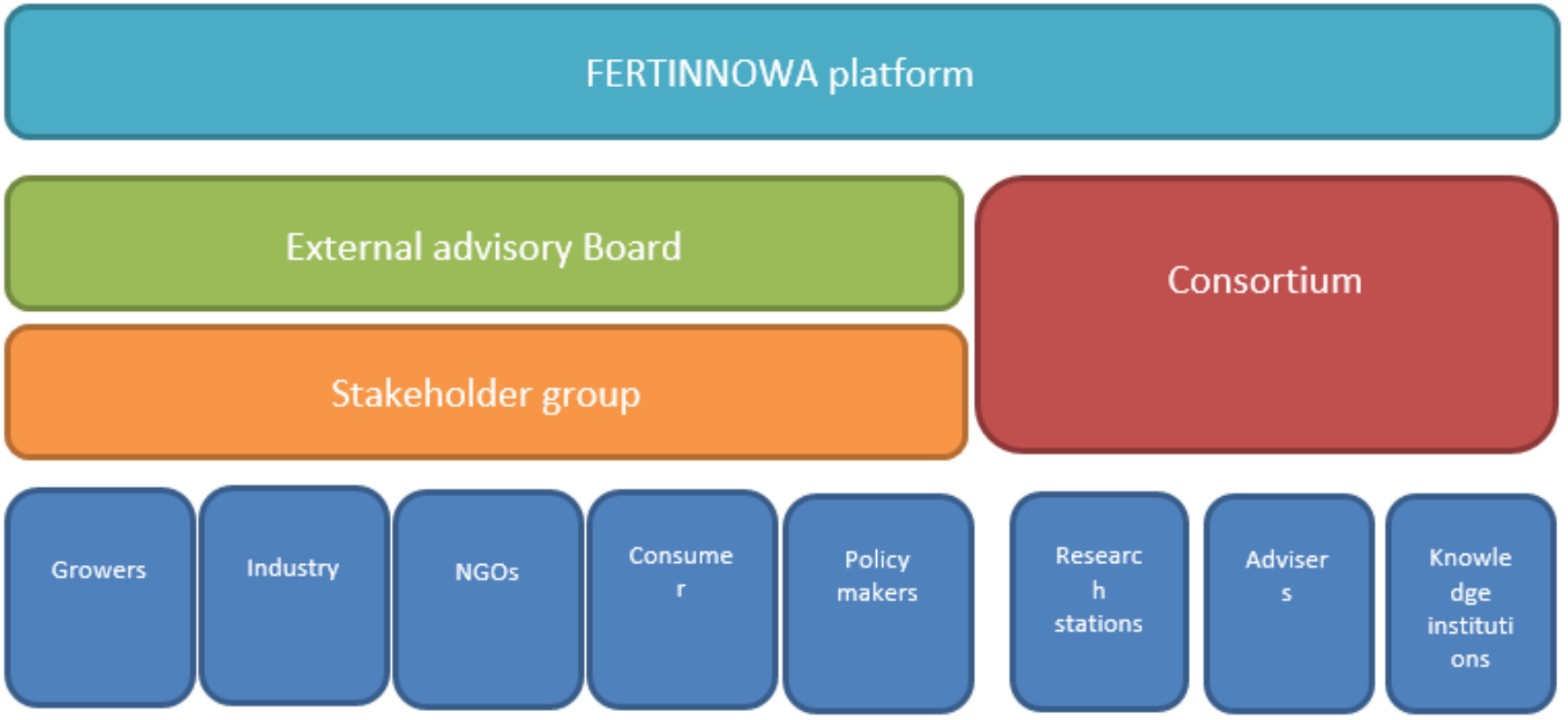
How do the different actors interact?



If we want to go for exchange … let's start with the consortium:

- Make all consortium members collaborate
- Make all consortium members exchange

Example 1: Benchmark survey

1. 369 growers were surveyed

2. Internal: +/- all consortium members involved

- ✓ preparation questionnaire: core group
- ✓ carry out survey: +/- all members
- ✓ processing data: core group
- ✓ review: all will have the opportunity

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Example 2: Listing the problems & solutions

- ✓ Internal: all members
- ✓ External Advisory Board workshop
- ✓ External: Workshop Brittany








Difficulties? Added value?

- All members are active in the core tasks:

  + Added value: high degree of interaction

  + Group spirit … let's go for it together

  ! Risk: high degree of interaction = risk for delays

  ! Risk: frustration if one partner doesn't go for it

What about the "missing" actors in the consortium ?

- growers:

  they want to share their vision but do not want to spent too much time.

- NGO & policymakers

  if you want close contact with the growers this is a bottleneck

- Industry :

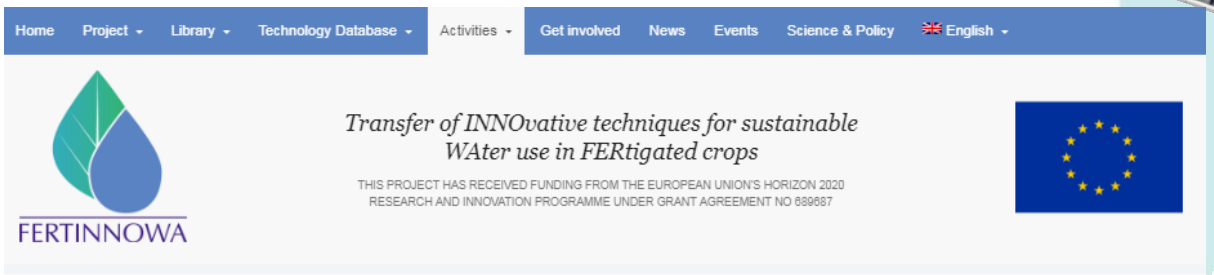
  challenge not to make it commercial in a thematic network

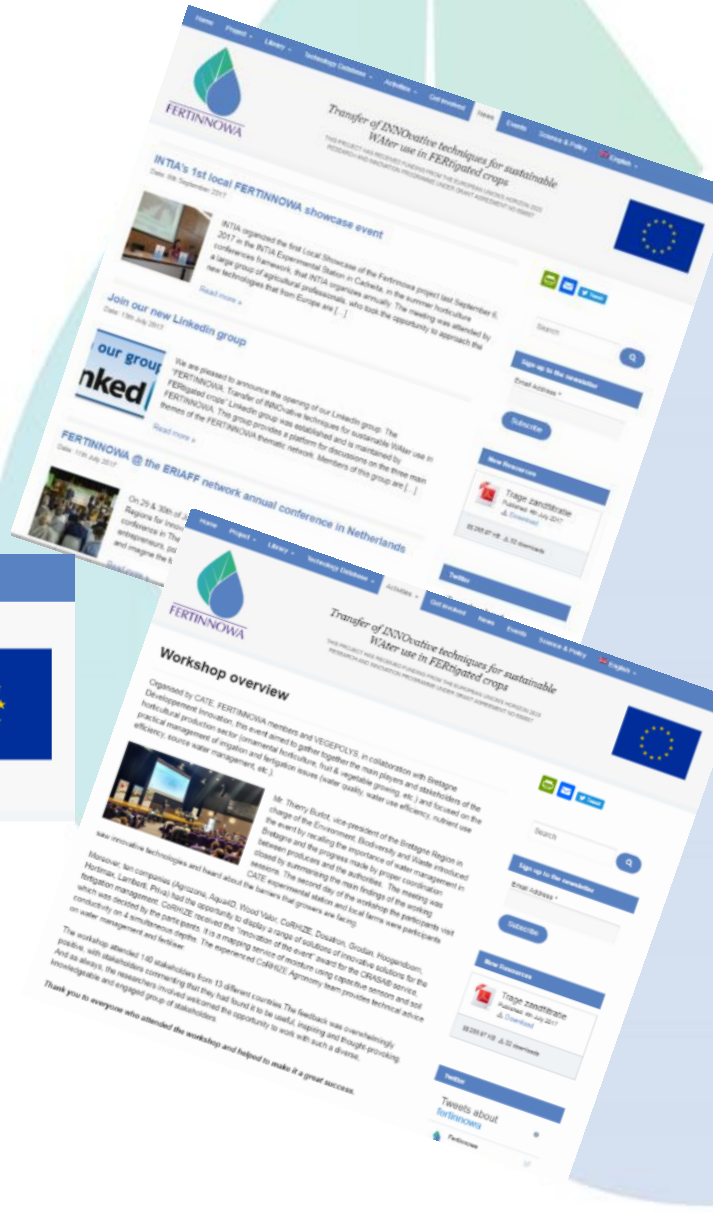
How to accelerate uptake ?

-

Website/Online presence (on-going)

- The website is live since April 2016 (www.fertinnowa.com)
- It is the focal point for informing about the project's objectives and methods and for publishing results
- It is continuously being updated and adapted as needed

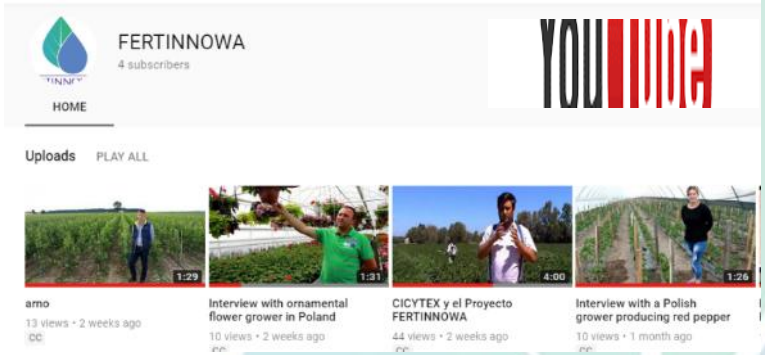


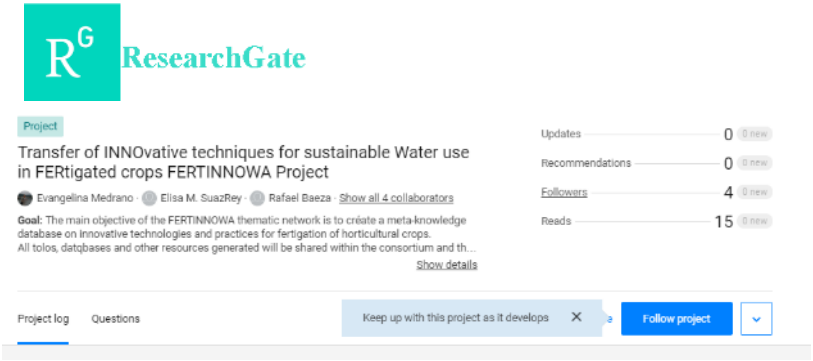


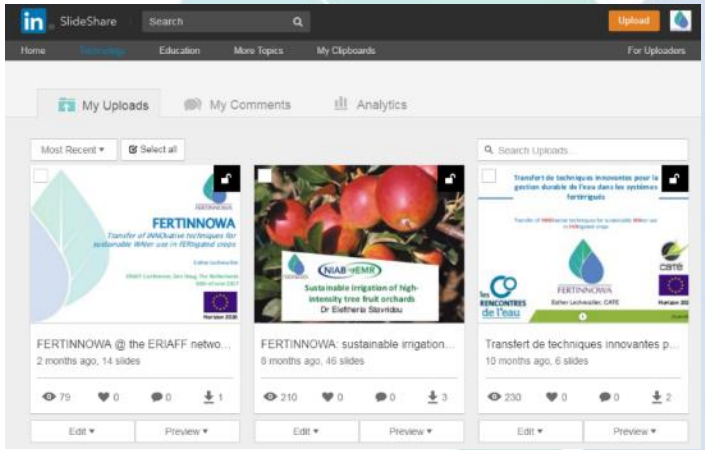
Partners' involvement: All partners

Website

Additional online presence





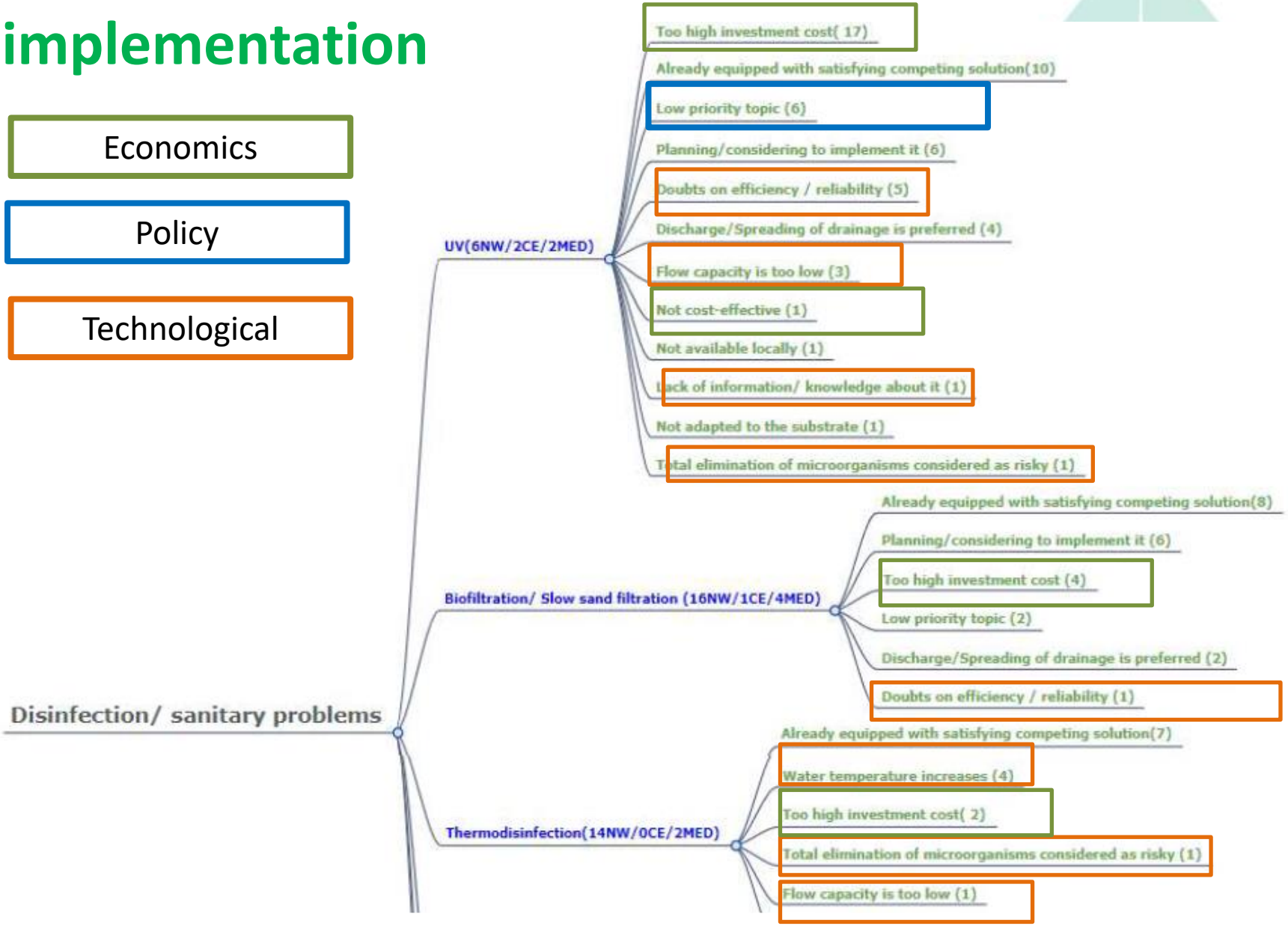


Know what keeps growers from implementation

Economics

Policy

Technological

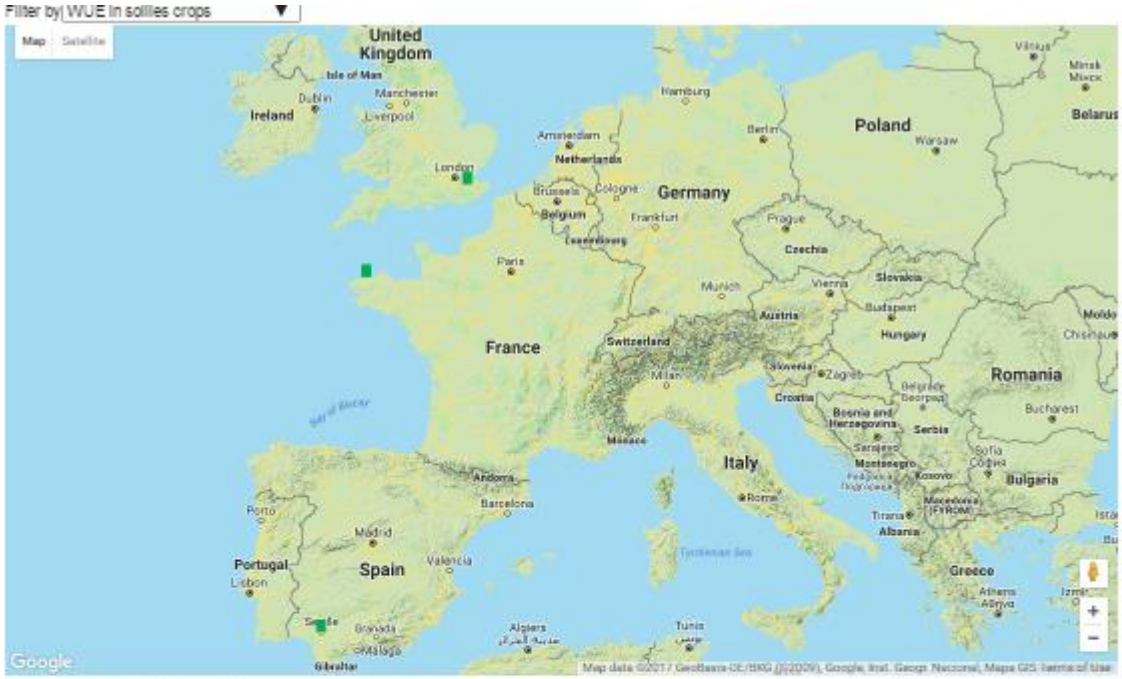


Source: FERTINNOWA Benchmark study: Based on the answers of 369 growers

Provide easy to use materials

TRD titles	Algae control			Storage type A (<750m³ or < 150m²)		Storage type B (750-5000m³ or 150-250m²)		storage type C (>5000m³ or >250m²)		
	Preventive/Curative	Green algae	Green-blue algae	installation	maintenance	installation	maintenance	installation	maintenance	Relevant technological knowledge required
Algae control by chemicals: phosphorus fixation (FeCl, Al)	Preventive/Curative	yes	?		0,04€/100m³		0,04€/100m³		0,04€/100m³	Protective clothes required
Algae control by chemicals: lowering the pH	Curative	Yes	No, risk for release of		1,6/100m³ (H2SO4) -		1,6/100m³ (H2SO4) -		1,6/100m³ (H2SO4) -	Protective clothes required, pH
Algae controle by chemicals: dissolved copper (Cu)	Curative	Yes	No, risk for release of							Protective clothes required
Algae control by chemicals: oxidation (H2O2)	Curative	Yes	?		9,87€/100m³		9,87€/100m³		9,87€/100m³	Protective clothes required
Algae control by chemicals: cell wall damaging (NH4)	Curative	Yes	No, risk for release of							Protective clothes required
Algae controle by use of liming (CaCO3)	Preventive	Yes	Yes		0,08€-2€/100m²		0,08€-2€/100m²		0,08€-2€/100m²	No
Algae controle by use of Daphnia spp.	Preventive/Curative	Small species	Small species		0-? €/100m³		0-? €/100m³		0-? €/100m³	Pumps in case water has to be removed,
Algae control by use of bacteria	Preventive/C	Yes	?							No
Algae control by use of fish	Preventive/Curative	Yes, filamentous algae	?	0,5-1,0€/100m²		0,5-1,0€/100m²		0,5-1,0€/100m²		Some knowledge regarding fish and harvesting fish , fish
Algae control by use of straw bales	Preventive/Curative	Not all?	Not all?		0,25-0,75€/100m²		0,25-0,75€/100m²		0,25-0,75€/100m²	No
Algae control by use of aquatic plants	Preventive	Yes	Yes	0-? €/100m³		0-? €/100m³		0-? €/100m³		How to grow aquatic plants in an optimal way? How to select the optimal plant types?
Algae controle by use of ultrasonic devices	Preventive/C	Yes	Yes for low	900 €	energy cost	1650-1950€	energy cost	1950-2540€	energy cost	No

Provide easy to use materials



Recovering and treating leachates

- Cleanleach European project IFAPA

Directions

Precision fertigation with sensors

- Demonstrate novel irrigation management techniques in soilless grown soft production

Directions

Transfer of INNOvative techniques for sustainable WAter use in FERtigated crops

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Application of technologies for efficient management of fertigati in greenhouse vegetable crops grown in soil

Fertinnowa partners	*Fundación Cajamar (FC) and Universidad de Almeria (UAL)*
Period	*2017-2018*
Farmers	*Research Centre of Fundación Cajamar and UNICA Group*
Exchange from	*Exchange from FC (irrigation control technologies) and UAL (nutrient control technologies)*
Location	*Paraje Las Palmerillas, El Ejido, Almeria (SPAIN) 36°48' N 2°43' W*
Objectives	• *To promote an efficient use of water and nitrogen in greenhouse vegetable crops grown in soil* • *To show different available technologies for irrigation management, including automatic control systems* • *To show different available technologies for the optimization of nitrogen nutrition*
Target	*Farmers, technicians, students*
Level	*International, National, Regional*
Accessibility	*The trial carried out at the Research Centre of Fundación Cajamar can be visited at any moment by arranging a visit to this station. Four practical seminars will be organized to explain the objectives and operating mode of the different technologies and to showcase them to growers.*
Contact	*juanjosemagan@fundacioncajamar.com* *mdoloresfernandez@fundacioncajamar.com* *rodney@ual.es* *mgallard@ual.es*

Project description

The main objective is to showcase different technologies useful for significantly improving water and nitrogen use efficiency in greenhouse vegetable crops, so that nitrate leaching can be minimized in a practical way. A combination of different technologies will be adopted for both irrigation control (PrHo DSS, electrotensiometers, IRRIX model and Irristrat software) and nitrogen management (VegSyst-DSS, suction cups, sap analysis, rapid on-farm analysis of nutrients, and the Apogee and

Provide easy to use materials

- Technology database
- Input are:
  - Technology review reports
  - Practice abstracts (100)
    - Ready for EIP-AGRI

!!Concern: avoiding advising technologies

Make sure growers will attend

- Local events
- International events equaly spread in EU
- Provide interesting technologies: technology market, eyecatchers
- Provide translation
- Provide field visits
- Final conference: selection of 30 growers can participate for free

Find out more during our Workshop in the Netherlands on the 15th and 16th of November 2017

WORKSHO
serie

Meeting growers' needs: Exchanging Technologies on Irrigation and Fertigation

15-16 November 2017
World Horti center, The Netherlands

FERTINNOWA is organising a workshop on technologies for the: water and nutrient use efficiency improvement, preparation of irrigation water, and reduction of emissions with impact on the environment. One-of-a-kind event as growers, advisors, industry, policymakers, local authorities and researchers will have the opportunity to interact directly together.

15 November 2017

Morning session:

12:45 – 13:15 Registration and welcome drink
13:15 – 13:30 Welcome and introduction
13:30 – 14:00 Outcomes of FERTINNOWA: Irrigation and fertigation practices and technologies all over Europe. How can we learn from each other?

Afternoon session:

14:00 – 15:00 Interactive technology tour 1 or Policy working session
15:00 – 15:30 Refreshment break at the technology market
15:30 – 16:30 Interactive technology tour 2 or Policy working session
16:30 – 16:50 Closing session with Innovation award ceremony
16:50 – 18:30 Networking drink at the technology market

8:00-13:30 Field visits

16 November 2017

Van der Lans: One of the biggest tomato growers. At the farm, you will find out more about the use of geothermics and the use of the sodium recover unit (SRU). The SRU unit is designed to remove sodium from the irrigation water.
Ter Laak Orchids: You will have a look at one of the most automatised production systems in horticulture

For more detailed information and please visit the event website:
http://www.fertinnowa.com/activities/meeting-growers-needs-exchanging-technologies-irrigation-fertigation/

This project has received funding from the European Union's Horizon 2020 research and innovation programme

A project supported by

AGROLINK
FLANDERS

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