



Working group on “Water relations & Irrigation”

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Lleida, February 5, 2015





A voluntary network of EU research institutions and extension services, created in 1992 to facilitate international cooperation among fruit researchers (<http://www.eufrin.org/>)





- EUFRIN is structured in Working Groups dedicated to specific research aspects (E.G. variety evaluation; tree crop load control; fruit quality; water relations and irrigation etc.)
- WGs meet annually or bi-annually and compare/discuss results; devise and plan coordinated trials
- WG participation is open, free of charge and not financed.



The Water Relation and Irrigation WG

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- A map of Europe with pink dots indicating the locations of the member institutions. The dots are located in France (two), Italy (three), Spain (two), Portugal (one), Germany (one), and Norway (one).
- INRA-Montpellier (FR)
 - INRA-Avignon (FR)
 - Association climatique moyenne Garonne- ACMG (FR)
 - GRCETA (FR)
 - CEHM (FR)
 - University of Basilicata (IT),
 - CRA-SCA, Bari (IT)
 - University of Pisa (IT)
 - University of Bologna (IT)
 - CSIC-Sevilla (ES)
 - IRTA-Lleida (ES)
 - ISA – University of Lisbon (P)
 - Agroscope (CH)
 - University of Ghent (BE)
 - Golan Research Institute (IL)
 - University of Hohenheim (DE)
 - Norwegian Institute for Agricultural Research (NO)

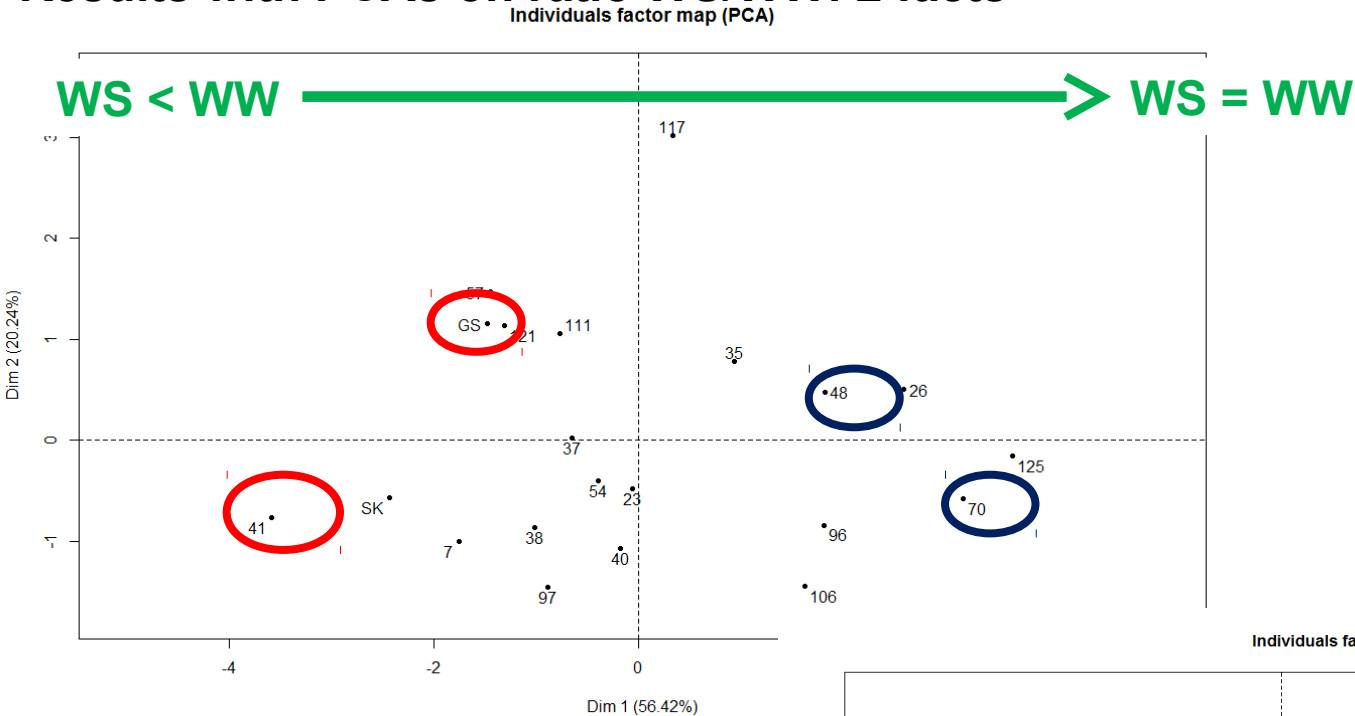
Main needs and problems related to EU fruit productions addressed within the WG

- Water scarcity/quality
- Heat stress
- Uncertainty in irrigation scheduling
- Optimization of water supply to save water and limit pollution
- Climate change and potential shift in the cultivation areas for the different species
- Maintenance of “terroir”
- Re-calculation of K_{cs} for fruit species

***Some approaches and
expertises to face such needs
and problems***

Genetic improvement of varieties/rootstocks

Results with PCAs on ratio WS/WW: 2 facts

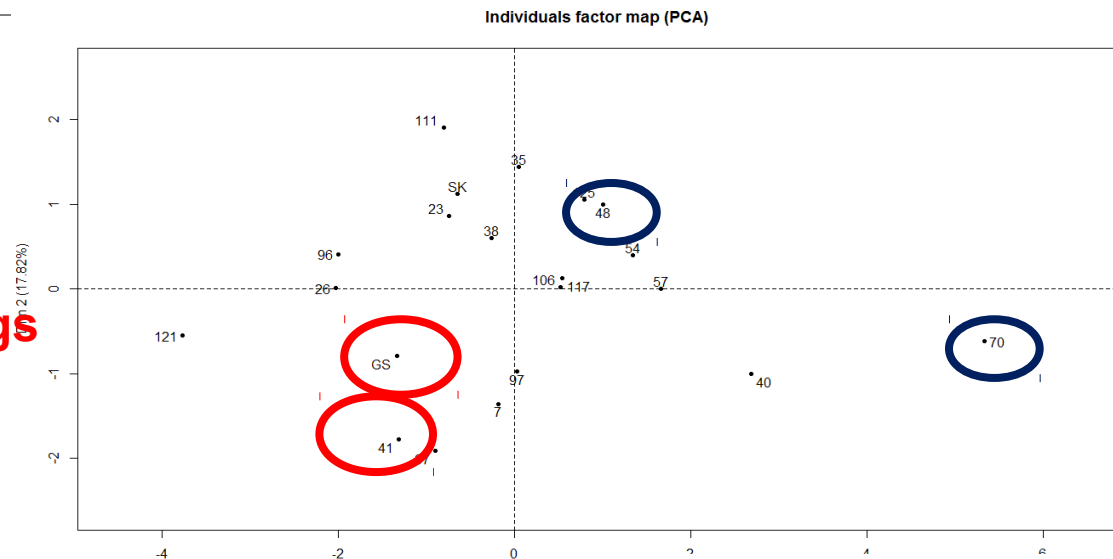


In the two periods:

Strong decrease of growth and gs

Low decrease of growth and gs

(1st and 4th quartiles on ranked genotypes on Dimension 1)



PE Lauri– INRA (France)

Innovative cultural practices to preserve soils / overcome soil deficiencies

Effect of soil management on soil water holding capacity



Soil hydraulic conductivity



B Dichio Univ. Basilicata (Italy)

Plant-based sensor for the real time detection of water stress



Sap flow



Dendrometers



Leaf patch clamp probes

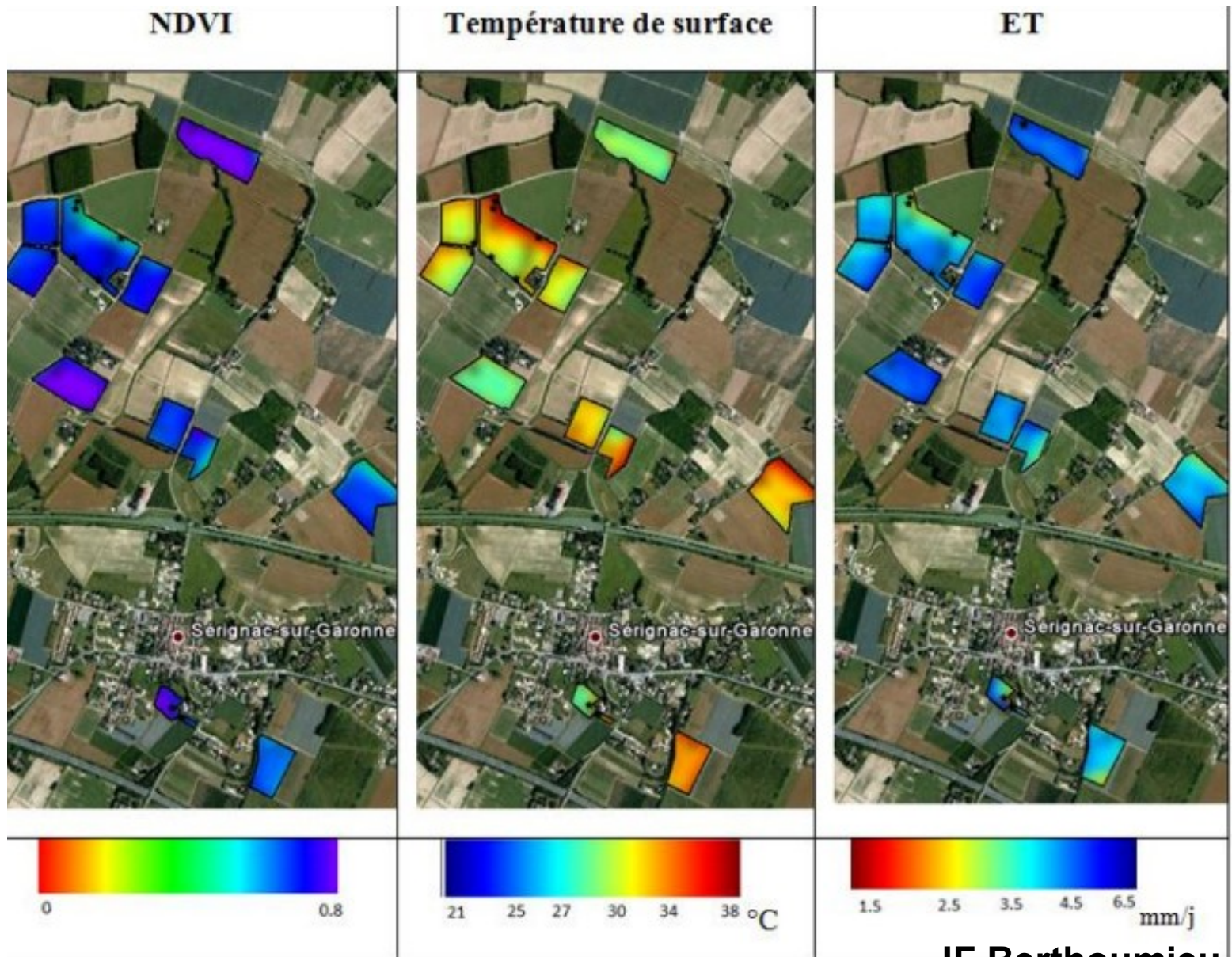


Traditional indicators



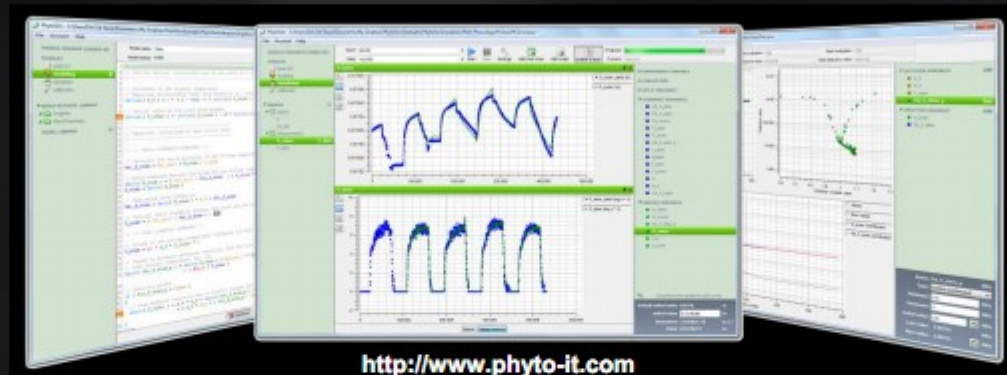
E Fernández– CSIC (Spain)

Remote sensing



PLANT MODELLING: sophisticated models are developed as avenues for improving our understanding on how plants respond to changes in the environments they inhabit

PhytoSim

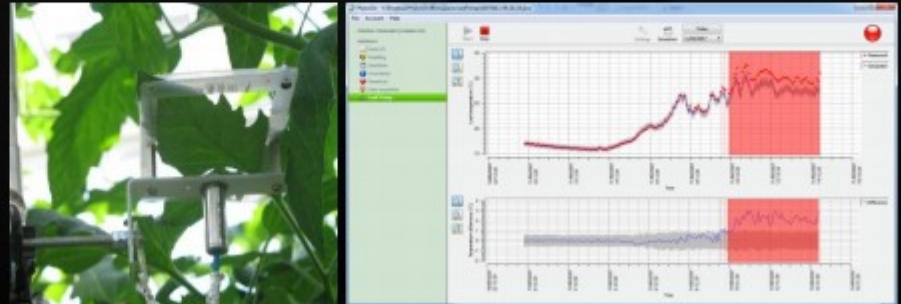


DEVELOPMENT OF NEW PLANT-BASED CONTROL & STRESS DETECTION SYSTEMS

Plant-based irrigation scheduling



Plant-based stress detection (LeafTemp)



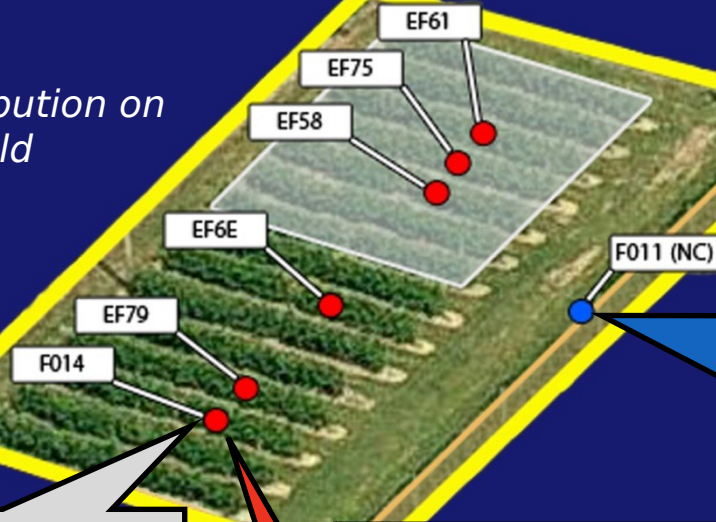
Laboratory of Plant Ecology • EUFRIN • 18-19 October 2012



K Steppe - Univ. Ghent (Belgium)

Decision support systems

s distribution on
the field



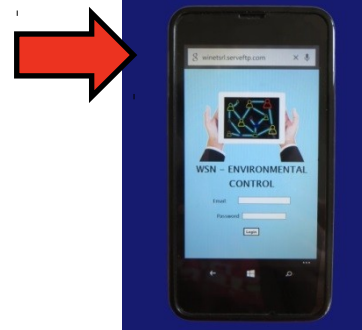
Fruit gauge



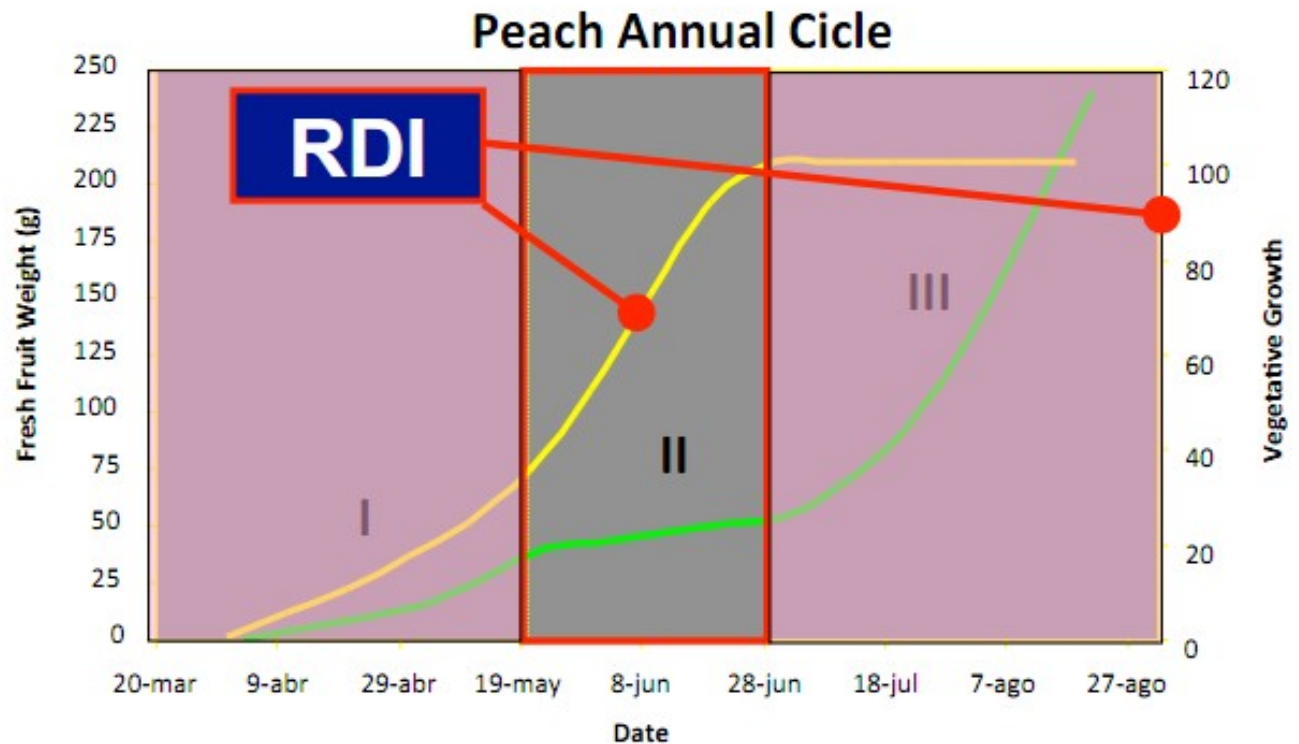
Transceiver node



Network coordinator



RDI Strategies



Lysimetric Techniques

Orchard Water Requirements



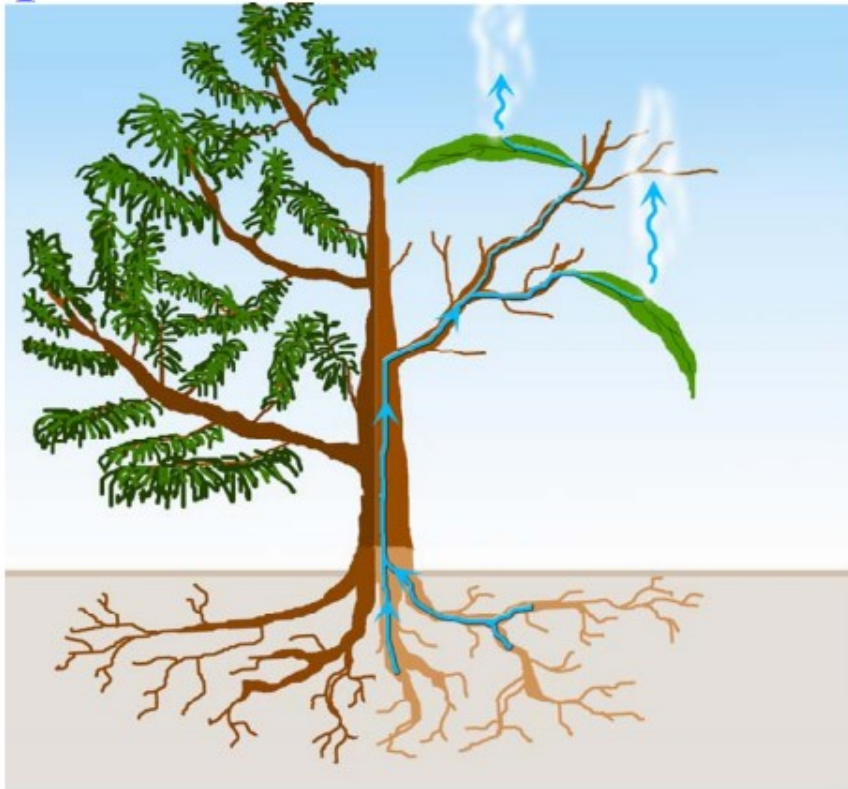
Apple



Pear

$$ET_c = ET_o \times K_c \text{ (FAO method)}$$

Optimization water use in Agroecosystem



$$\text{WUE} = \frac{\text{Biomass (Kg)}}{\text{Irrigation Water (m}^3\text{)}}$$

$$\text{EWUE} = \frac{\text{Marketable Yield value}}{\text{Irrigation water}}$$



The main WG activities

ANNUAL MEETINGS:

Montpellier, France (October 2012)

Bologna, Italy (November 2013)

Lleida, Spain (February 2015)

DOCUMENTS SHARING (Drive space)

**SURVEY ON THE MAIN PROBLEMS /NEEDS related
to EU orchard water management**

**OTHERS to be developed
(e.g. interactions with stakeholders)**

The main WG outputs :

- Prompted by AREFHL, in 2013 the WG prepared a **positioning document** describing the main **water-related issues** the EU fruit sector is called to face



EUROPEAN FRUIT RESEARCH INSTITUTES NETWORK

WATER MANAGEMENT FOR THE EUROPEAN FRUIT SECTOR WITHIN H2020 A POSITIONING DOCUMENT

By

The EUFRIN[®] Working Group on “Water Relations & Irrigation”

- In 2014 the **positioning document** was presented to several EU stakeholders who endorsed it.
- More than 30 **endorsements** from 7 different EU/Extra EU countries were collected.

The main WG outputs :

Based on the contents of the Positioning Document the WG prepared a **Research Topic** to be considered for possible inclusion in the next **H2020** Work Programme

At the beginning of 2014, the H2020 topic was submitted by the members of the EUFRIN board (from different countries) to their NCPs along with the list of stakeholders endorsements

Also EUFRIN in collaboration with AREFHL and Freshfel developed a Strategic Innovation Research Agenda, which included this and other 4 topics