



eip-agri
AGRICULTURE & INNOVATION



EIP-AGRI Workshop

Connecting innovative projects: Water & Agriculture

FINAL REPORT



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Introduction

Water availability for agriculture production and water quality are major concerns in Europe. Water shortage is already limiting crop productivity in some regions. With climate change, negative effects or water shortage will worsen and affect larger areas. The **EIP AGRI Focus Group (FG) "Water and Agriculture – adaptive strategies at farm level"** (2015-2016) was created, in part, to identify practices to confront these challenges and to discuss the steps needed to reach technically and economically viable solutions that are also environmentally friendly. The environmental challenge is a significant one as water quality is under continuous risk because of unsuitable practices and overuse. Furthermore, although agriculture is a major user of water, other users strongly compete for this natural resource; so, its management, use and protection require wider considerations beyond agriculture.

Managing water scarcity and quality is the focus of numerous Operational Groups¹ (under the Rural Development Programmes¹) and Horizon 2020¹ (H2020) research projects that are currently dealing with water in agriculture. This issue is also often addressed in projects and actions dealing with environmental problems, for example within the LIFE¹ Programme for the Environment and Climate Action. Because of the nature of water, some challenges require actions and coordination at the scale of a whole region. In these cases, INTERREG¹ projects offer the possibility to explore regional policies and find solutions.

To date, more than 65 Operational Group (OG) projects are dealing with water related issues in Europe. The majority of these projects focus on efficient and profitable irrigation or on proper management of agriculture systems to protect groundwater. Others focus on water reuse through treatments or purification, or on the management of water resources across disciplines and spatial and administrative scales. Often, these areas overlap and the OGs search solutions and innovations across a wide range of fields. Furthermore, some of these solutions could come from projects addressing the environment (LIFE), large territories (INTERREG), or within EIP WATER¹ Action Groups.

The EIP-AGRI Workshop 'Connecting innovative projects: Water & Agriculture' brought together Operational Groups and other type of projects financed under other policy areas, giving them the possibility to exchange experiences, learn from each other, find common solutions, and establish new partnerships. Furthermore, the experience in hot spot regions with severe limitations due to water scarcity and deteriorating quality offered models to be followed or to be avoided by others.

The workshop was organised by the European Commission Directorate General for Agriculture and Rural Development and the EIP-AGRI Service Point with support of the Andalusian Regional Ministry of Agriculture, Fisheries and Rural Development and the Spanish Ministry of Agriculture, Fisheries, Food and Environment.



Workshop participants on the field trip

¹ See Section 9 for brief description, acronyms and links to corresponding web pages

Aim and approach of the workshop

The **general objective** of the workshop was to promote cross-border knowledge exchange and networking among the various actors in Operational Groups working on water-related innovation in agriculture across Europe. It was also to facilitate cooperation of these OGs with H2020 research projects and thematic networks and, for the first time in this type of workshop, with agri-environmental projects and actions (ie. LIFE projects, and EIP-WATER Action Groups) and water-related projects on broader territorial level (ie. INTERREG).

The **specific objectives** of the workshop were:

- ▶ Connect Operational Groups with each other relevant research and innovation activities;
- ▶ Exchange good practices;
- ▶ Identify common challenges and explore potential solutions;
- ▶ Establish potential new partnerships; and,
- ▶ Promote continuous cooperation beyond the workshop.

The workshop programme included presentations and interactive sessions on technical as well as organisational issues of Operational Groups and other innovative projects. The interactive sessions included:

- ▶ A poster session to learn about each other's projects;
- ▶ A break-out session to identify common challenges in projects and potential ways to overcome them;
- ▶ An open space session to explore specific collaborations; and
- ▶ Field visits of practical examples in commercial and experimental farms.

Nearly 80 participants from 12 countries attended the workshop, including farmers, advisers, researchers and representatives from managing authorities, co-operatives, enterprises and NGOs, and 6 members of the EIP-AGRI Focus Group 'Water and Agriculture' of which four are involved in OGs.

Most participants were members of one or several of the following types of projects:

- ▶ 34 Operational Groups (8 ES, 8 PT, 7 IT, 5 NL, 3 DE, 1 BE, 1 SE, 1 FR)
- ▶ 5 Horizon 2020 projects (Water2Return, FAIRWAY, RichWater, and two other using multi-actor approach: FATIMA, Landmark)
- ▶ 2 Horizon 2020 thematic networks (FERTINNOWA, EUFRUIT)
- ▶ 1 IoT European Large-Scale Pilots Programme (IoF2020)
- ▶ 3 LIFE projects (AGROgestor, Aquemfree, REAGRITECH)
- ▶ 2 EIP WATER Action Groups (Renewable Energy Desalination, SPADIS).
- ▶ 1 INTERREG project (NUTRINFLOW)

The description of most participating OGs and projects can be viewed [here](#).

The workshop was held in Almería (Spain) on 30-31 May 2018. The programme can be downloaded [here](#).

Almería – a suitable backdrop for the workshop. This province went from being one of the poorest regions in Spain to economic boom due to the development of a major agro-industrial cluster producing and marketing off-season irrigated vegetables. The farmland is divided into small-scale farmers with a high rate of adoption of sophisticated technological innovations, many to address water limitations. The rapid development of agriculture in this area was accompanied by a fast-growing demand for underground water (as rainfall is extremely low) and rapid decrease of the water table level. Water scarcity is the major limitation of horticulture production in Almería, thus using water very efficiently and finding alternative sources, including desalination, have become major objectives in the region.

Setting the scene

Participants were welcomed by Concepción Cobos – Andalusian General Secretary of European Agrarian Funds, and Anikó Seregélyi – European Commission (EC) DG Agriculture and Rural Development. In her introductory speech, Ms Cobos highlighted the importance of irrigated agriculture in Andalusia - it occupies 25% of agricultural land but represents 55% of the agricultural production value - and the success of the first Andalusian RDP call for OGs. After welcoming the workshop participants, Ms Seregélyi explained the reasons for the workshop and drew the link between other EIP-AGRI networking activities preceding the workshop.

Five further presentations set the scene for the workshop. Gerard Shortle – EC DG Environment and Carlos Mario Gomez – University of Alcalá, Spain, introduced the LIFE Programme and EIP WATER and its action groups, each providing the context and showing the relevance of these programmes for the workshop objectives. Ms Seregélyi presented the overall context and the state-of-play of the EIP-AGRI, and introduced Operational Groups, H2020 multi-actor projects and thematic networks and EIP-AGRI Focus Groups (FG). Helena Gómez-Macpherson gave an overview of the EIP AGRI FG 'Water and Agriculture – adaptive strategies at farm level' that ran from 2015 to 2016 for which she was coordinating expert. Raquel Bravo Rubio – representative of the Spanish Focus Group on 'Water management, energy and environment' presented this pilot initiative that has adapted the EIP-AGRI FG approach to deal with national specific challenges, in particular, the increase on energy use associated to the modernisation of irrigation systems. The presentations can be downloaded [here](#).

Esther Koopmanschap, workshop facilitator, explained the programme of the workshop and used an interactive method to identify the different workshop participants by background (farmers, researchers, advisers, representatives of OGs, research projects, etc). Then, selected participants were interviewed to introduce the different types of projects present at the workshop²:

- ▶ **Operational Group – Irrigation efficiency in vineyards.** Xavier Bordes and Joaquim Bellvert explained how the know-how from researchers, fine-tuned in commercial conditions, has enhanced vineyard water productivity and berry quality by adjusting management to spatial variability, and integrating remote sensing, crop simulation models and vine physiology.
- ▶ **Operational Group – Fertile circularity.** Toon Hulshof explained how dairy farmers are trying to apply the fertile circularity approach and use water quality sensors for more sustainable water and soil management. After 3 years they are using fewer external nutrients and getting better quality products.
- ▶ **H2020 multi-actor project – FATIMA.** Anna Osann pointed out that coordinating different types of partners was not difficult as they were collaborative and well organised. Farmers have benefitted by having access to new advisory services that facilitate the improvement of irrigation scheduling.
- ▶ **H2020 Thematic Network – EUFRUIT.** Brunella Morandi introduced the bottom-up approach behind a thematic network. Project partners gather available knowledge, rather than generating new knowledge, working in small groups and focussing on advisory. *She suggested considering new thematic networks for hot topics identified at the workshop!*
- ▶ **LIFE Project – AGRO-gestor.** Marta Goñi's project builds on the results of a previous one, this long-term angle means they have been able to develop a webGIS platform for the collective management of water.
- ▶ **INTERREG project – Nutrinflow.** Ari Kultanen explained this project is a transnational effort to protect the Baltic Sea using practical and low-cost innovations that reduce the flow of nutrients into this sea.
- ▶ **EIP WATER Action Group – SPADIS.** Carlos Mario Gomez introduced the main goal of this action group: to go a step ahead in water pricing by developing tools and a database that facilitate decision-making. They are also working on creating a drought insurance for irrigation.

² See Section 9 "Definitions" for brief descriptions of programmes and type of projects.

Learning about other activities – The poster session

The poster session was the chance for participants to discover new projects and exchange experiences. Practically all participants involved in projects had prepared a poster to present the project’s main objective, and describe briefly the approach and actors involved. In four rounds, the posters were presented on screens located in a large room. A booklet containing the posters and the lists of posters in each round was distributed to all participants, so they could identify the ones they were most interested in. The booklet is available [here](#).



Tweet by David Lozano during the poster session

Participants appreciated the opportunity to learn about other participants activities and enthusiastically interacted with other colleagues. The projects addressed different goals but they could be grouped under four main themes: water quantity (mostly on how to irrigate more efficiently), water quality (mostly on good agricultural practices to avoid pollution), water reuse (or water treatments for being reused in agriculture) and multiscale integrated management of water. Examples of topics being explored by participating Operational Groups are listed in the [annex](#).



Participants present their projects to each other

Field visits – Practical examples

Four field visits were organised according to the four main thematic areas. The next day, workshop participants were asked from each field trip to report back in the plenary what innovative solutions they have seen during the field visits.

A. Field visit “Water Quantity” to Las Palmerillas (Fundación Cajamar) and IFAPA Research Centers. The visits could be summarised by the following key words: **Environment** (semi-arid area with over-exploited water resources); **Irrigation** (for sustaining productions and reclaiming the water out-flows); **Productivity** (research and innovation to implement high technology in farms); **Workshop** (a real field laboratory with producers, researchers and investors, for example, for adopting sensors to facilitate irrigation scheduling); **Agrosystems** (combining water requirements and environmental issues); **Technology** (software and electronic sensors for precision irrigation); **Economy** (the economic returns to the farmers is a main objective of the Fundación Cajamar); and **Regional** scale (reliable innovative solutions with site-specific character, as demonstrated by IFAPA).



...and the keywords spell EIP WATER!

B. Field visit "Water quality" to Caparrós Nature and Bio Campo Joyma Companies. The visit to [Caparrós Nature](#) was focused on the hydroponic production of vegetables in greenhouses with permanent control of the recirculating nutrient solution. They are part of four Operational Groups (one of them on 'Calculation and validation of a protocol to assess the water footprint in fruit and vegetable products') and part of the Bioplan project which aims at promoting functional biodiversity to foster the biological control of pests. Bio [Campo Joyma](#) produces organic vegetables and manages the water with special care to control diseases and increase the quality of products. Products look the same as non-organic



C. "Water reuse" - IFAPA and Las Palmerillas Research Centers. Visited projects included: a) [CLEANLEACH](#) that recovers and treats the drainage from hydroponic greenhouses (combination of a slow sand filtering system and constructed wetlands with Vetiver, Bulrush, Yellow iris or Glaswort plants, plus carbon); b) Optimisation of irrigation uniformity and water dosage for the production of greenhouse crops and water-use efficiency; c) Optimisation of a blend of desalinated sea water and underground brackish water for high water-use efficiency and profitability; d) PURASOL, that optimises the purification treatment of animal slurries using microalgae and bacteria; and, e) [SABANA](#), that aims at developing a large-scale integrated microalgae-based bio-refinery for the production of biostimulants, biopesticides and biofertilisers.



D. "Multi-scale integration" - Biosabor Farm. [Biosabor Farm](#) runs activities on innovative biocontrol of pests, management of water resources in organic agriculture by using desalinated water and rainwater, and on increasing biodiversity and improving landscape by growing native plants on water basins - this in turn increases water oxygen content and reduces copper consumption.

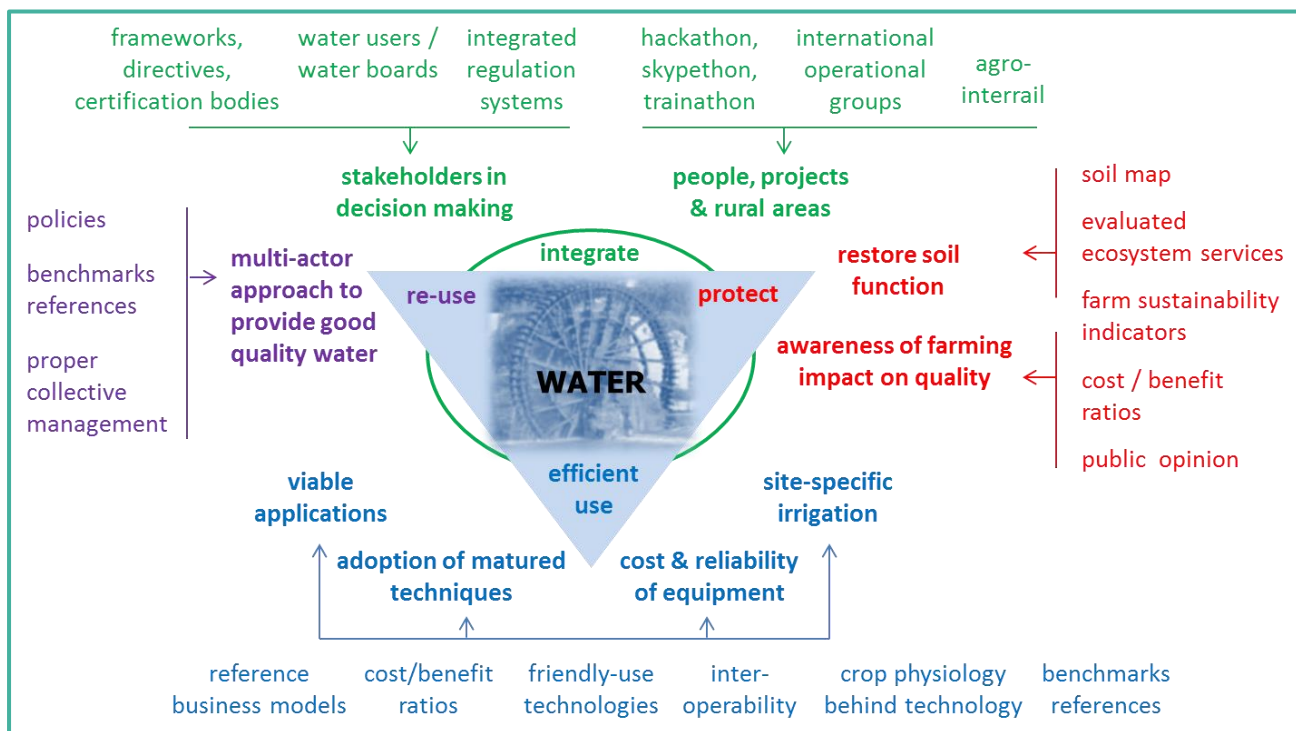


Identifying common challenges and opportunities

In the break-out session, participants were assigned to small working groups of 4-6 people (interested in the same thematic topic) to firstly reflect on the challenges they face within their projects and to prioritise these challenges so that they could select one which is faced by most of their projects. Secondly, they identified the supporting and limiting factors affecting this main challenge, and discussed activities that they could be carried out to address the challenge. At mid-session, pairs of groups merged to continue the discussions in larger groups, complementing their expertise.

Two of the identified priority challenges for using irrigation water more efficiently were related to improving the adoption of technologies, and reducing the cost and increasing the reliability of irrigation equipment (see next figure). On the other hand, two of the other challenges were the result of new advances in science and technology. They were about improving the viability of applications in which big data of different sources are used and improving the viability of irrigation management according to spatial variations using remote sensing (Sentinel, aircrafts, drones) and soil and crop models. Similar elements drive the solutions to these four challenges, such as having a transparent crop physiology basis behind the technologies and transparent cost/benefit ratios and performance benchmarks for a better understanding of associated benefits. Key elements for the economic success are also the development of "user-friendly" technologies, with proper interoperability and to have business models as references. More extensive multi-actor and fine-tuning research, as well as pilot demonstrations and training, may be needed to address these drivers.

To avoid water pollution, the identified priority challenges were: to increase awareness of farming impact on water quality and to restore soil function to farm plots so that the system can return cleaner water than it receives. Both challenges require the recognition of valuable soil ecosystem services and the availability of farm sustainability indicators (soil fertility, C footprint, costs, nutrient lixiviation) to support these services, and adopting the idea that the farm will be there for future generations. Adapted nutrient balance, conservation agriculture and use of organic fertilisers could be evaluated in terms of improving soil fertility but, in general, farmers want specific solutions for their farm and not general recipes. Once the benefits are clearly evaluated, sustainability bonus payments could then be considered.



Priority challenges which were identified and the proposed avenues to address them

The main challenge for the treatment and provision of good water that can be reused in agriculture which was identified was the adoption of a multi-actor approach in projects and actions than address this topic. This process is made easier when proper collective management and supportive policies are in place and when benchmarks of collective irrigation systems are available to provide concrete recommendations and targets.

In order to integrate water management across scales, two priority challenges were identified: the participation of all relevant stakeholders in the decision-making for water-related issues and the connection of people, projects and rural areas. An integrated management requires a balance between competition and common interests so that agreed solutions are decided. The participation of stakeholders is facilitated by the availability, on one hand, of legal frameworks and certification bodies and, on the other, of water user associations and water bodies. Unfortunately, integrated regulated systems in former Rural Development Groups³ may not be working anymore. Studies on best practices of different governance models for water use are needed. Regarding the general challenge of connecting people and rural areas, some innovative approaches were suggested for addressing it, in particular, the creation of international OGs, hackathons, skypethons and trainathons to build trust and the possibility to do an agro-interrail.

Exploring further specific collaborations – The open space session

Before the meeting and during the workshop, participants proposed collaborating actions to be discussed during the open space session. The suggestions were presented and 9 groups were formed around the following topics:

1. ICT/data as a transversal topic
2. Repository of software tools
3. Benchmarking for water & energy efficiency of collective irrigation
4. Research results: integration to policy
5. Future development in R&D
6. Links to WSSTP water and agriculture initiatives
7. Collaboration between universities & agri-businesses
8. Drivers to compare with governance structures in an integrated approach
9. Establish buffer zones/strips

The main outcomes of the discussions in the open space topics (during and in discussions continued after the meeting):

ICT/data as a transversal topic to improve efficient use of water. The future of farming sustainability will have a digital base. The application of ICT in agro-systems is a challenge because of the different areas of scientific knowledge involved. Nevertheless it is possible with sustained collaboration. Proposal: coordinate EIP-AGRI groups to cross-pollinate with ICT-Agro initiatives.

Repository of software tools. Software-platforms for irrigation refer to centralised tools based on high-powered servers and designed as web-services. The main idea is to develop free, user-friendly, web-based, customisable applications, which have replicable user-interfaces and use known European databases (soils, climate, satellite images). The following steps could be considered: consolidation of a software repository group and better definition of objectives; specification of levels of software scale applicability (territorial, farm); identification of software models and solution to be used as modules; identification of projects with similar features; develop ideas for the user-interface. A Focus Group on European web-based-app could be created.

Benchmarking for water & energy efficiency of collective irrigation systems. Benchmarking is needed for characterising collective irrigation systems in term of their efficiency using water and energy, and includes sustainable planning in the short, medium and long term. This will help to have target references and to

³ See Section 9 for brief description, acronyms and links to corresponding web pages

understand reasons behind best and worst performing systems. Proposed ideas include: the identification of critical points in research (in terms of water and energy efficiency assessment); test methods, under development on on-going projects, for water and energy diagnosis of collective irrigation systems (e.g. OG-AGIR, LIFE-AGROgestor); promote and test on a large set of collective irrigation assessment systems.

Integration of research results into policy. Solid results from research should be the base of suitable policies. In order to achieve and keep this link, it is necessary to strengthen the collaborating relationships and direct links, improving channels of communication and the exchange of experiences, involving high ranked policy officers and having business as an interface. The ideas proposed include the identification of critical points in research (in relation to policy); more involvement of the business sectors; and benchmarking for obtaining references that can be used for policy development.

Future development in R&D on water issues. There are similar problems about water in agriculture in many European regions and better interaction is needed: include multiple actors with common problems, multidisciplinary (including social innovation), app to facilitate interaction, demonstrations. It is proposed to build groups at European level ready to act and apply to calls. This is happening already for the Mediterranean region in the frame of the PRIMA initiative.

Links to WSSTP water and agriculture initiatives. The Water and Agrifood working group of the WSSTP platform search to quantify farm "hydrological" eco-services derived from good agricultural practices, and disseminating them. It is proposed that this working group be strengthened with new members for real effective networking.

As well as during the open space session, other specific collaborations were discussed during free time:

- ▶ Exchange visits between Belgium and Spanish colleagues trying to combine data to get some general results applicability of infrared thermography for irrigation scheduling.
- ▶ Thematic network FERTINNOVA and the Water and Agrifood working group of the WSSTP platform are exploring a potential cooperation taking advantages of the work performed within the network.
- ▶ Italian and Portuguese colleagues are exploring the possibility to introduce fruit gauges into a future system for the precise irrigation of fruit crops.
- ▶ Italian colleagues of different OGs are exploring the development of strategies to increase fruit quality and storability through the correct modulation of the water input during the season.
- ▶ Hungarian, Spanish and Portuguese colleagues are exploring agro-pesticide modelling for lake and river water quality and forest fire prevention.
- ▶ A Dutch participant considers that the approach used in this workshop could be applied in The Netherlands to support the functioning of 30 projects that are about to start.

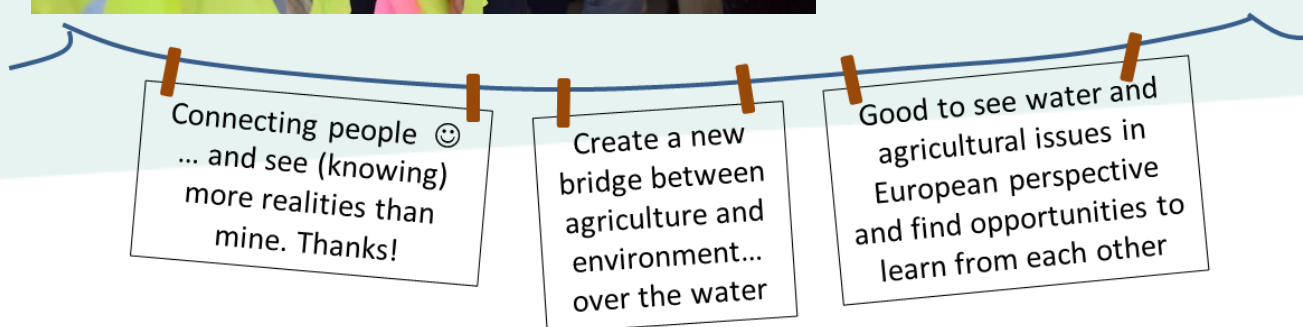
"During this workshop I am exploring with Spanish and Portuguese colleagues agro-pesticide modelling for lake and river water quality and forest fire prevention; I hope we can cooperate in the future"
B. Fulop, Hungary

Follow-up

On the last day, participants were asked "What will you do next? What will you take home?" About a third highlighted the relevance of making new contacts and the potential for new collaborations, including among OGs. Many participants also appreciated finding out that they share the same goals and challenges with many others. They could therefore discuss experiences and possible solutions with clear understanding of conditions. Others appreciated learning about new issues and complex interactions around water scarcity and quality and about the advanced systems visited in Almeria. Some participants left with clear future actions in mind such as informing their OG farmers or organising a hackathon for a project. Partners also provided some suggestions for improvement: facilitate the participation of more farmers and not to forget their goals, longer poster sessions to interact with more projects, longer meetings and having more events of this type in an interactive format.



Participants share what they will do after the workshop



Connecting people 😊
... and see (knowing)
more realities than
mine. Thanks!

Create a new
bridge between
agriculture and
environment...
over the water

Good to see water and
agricultural issues in
European perspective
and find opportunities to
learn from each other

"After the experience in this workshop and being together exchanging experiences about farming and water, I consider that this approach could be applied in The Netherlands to help the better functioning of 30 projects that are about to start."
J. Laumans, The Netherlands

Brief description of programmes and types of projects

EIPs (European Innovation Partnerships) are a new approach to research and innovation that bring together all relevant actors at EU, national and regional levels, in areas in which intervention is clearly justified and where combining efforts will achieve the target more efficiently. There are five EIPs including EIP-AGRI and EIP WATER.

EIP-AGRI (EIP for agricultural productivity and sustainability) works to foster competitive and sustainable farming and forestry and brings together innovation actors (farmers, advisers, researchers, businesses, NGOs and others) at EU level and within the rural development programmes. EIP-AGRI is run by DG Agriculture and Rural Development with the help of the EIP-AGRI Service Point.

EIP-AGRI Service Point acts as a mediator within the EIP-AGRI network, enhancing communication and cooperation between everyone with a keen interest in innovating agriculture. The EIP-AGRI Service Point organises and supports the EIP-AGRI Focus Groups.

EIP-AGRI Focus Groups (FGs) are temporary groups (duration of one year) of selected experts to explore practical innovative solutions to specific problems in the field, and to draw on experiences derived from related useful projects. FGs also discuss and document research results, best practices and identify needs for further research to solve the specific problems. The **FG "Water and Agriculture – adaptive strategies at farm level"** (2015-2016) is one of the 31 FGs currently organised.

EIP WATER aims to facilitate, support and speed up the development and deployment of innovative solutions to water challenges and to create market opportunities for these innovations. DG ENV acts as a facilitator of the process, and provides a link with EU funding mechanisms and relevant policies.

EIP-WATER Action Groups are multi-stakeholder groups working to develop, test, scale up, disseminate and stimulate the uptake of innovative solutions to water-related challenges by the market. They are at the core of EIP WATER and form the central element of the partnership's implementation phase.

Horizon 2020 (H2020) is the largest source of public funding for research and innovation from the European Commission. It has a budget of around €3.7 billion for **H2020 Projects** addressing the Societal Challenge 2 (SC2) on 'Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy' for 2014-2020.

H2020 Multi-actor Projects (interactive innovation) prescribe the involvement of actors with complementary types of knowledge (scientific and practical) in order to better target the needs of end-users and improve impact (real application of the results).

H2020 Thematic Networks (interactive innovation) bring people from both science and practice together with the aim of collecting existing scientific knowledge and best practices which are close to being put into practice, and translating this knowledge into easily understandable end-user material (e.g. leaflets, guidelines, videos).

H2020 Fast Track to Innovation (FTI) is a fully-bottom-up innovation support programme promoting close-to-the-market innovation activities open to industry-driven consortia that can be composed of all types of participants. It can help partners to co-create/test breakthrough products, services or business processes under the European Innovation Council (EIC) pilot.

INTERREG - funded by the European Regional Development Fund (ERDF) - is one of the key instruments of the EU supporting cooperation across borders through project funding. Its aim is to jointly tackle common challenges and find shared solutions in fields such as health, environment, research, education, transport, sustainable energy and more.

IoT (Internet of Things) European Large-Scale Pilots Programme includes the innovation consortia that are collaborating to foster the deployment of IoT solutions in Europe through the integration of advanced IoT technologies across the value chain, demonstration of multiple IoT applications at scale, in a usage context and as close as possible to operational conditions.

LIFE is the EU's financial instrument supporting environmental, nature conservation and climate action projects, and has as general objective contributing to the implementation, updating and development of EU environmental and climate policy and legislation. DG Environment and DG Climate Action manage the LIFE programme.

EIP-AGRI Operational Groups (OGs) consist of several partners with a common interest in a specific, practical innovation project. The people involved in the Operational Group should be from a diverse combination of practical and scientific backgrounds (farmers, scientists, agri-business and others). Rural Development Programmes can finance the projects run by OGs with the goal to find solutions to a practical problem.

Rural Development Programmes (RDP) refers to the programmes drawn up by EU Member States or their regions aiming at improving the economic, social and environmental conditions in rural areas, and based on the needs of their territories.

Spanish National Focus Groups - funded by the Spanish Ministry of Agriculture - are multi-actor groups formed in Spain following a similar approach as in EIP-AGRI FG but at national scale and in Spanish. The first Spanish FG addressed water management, energy and environment.

Further reading

For more information, look at the presentations and workshop documents:

<https://ec.europa.eu/eip/agriculture/event/eip-agri-workshop-connecting-innovative-projects>



Workshop conclusions

ANNEX

Examples of Operational Groups which were at the workshop

A. Quantity

- improving irrigation efficiency through:
 - selecting the most appropriate timing and irrigation system, and better adapted rootstock;
 - adopting subsurface drip irrigation and conservation agriculture;
 - improving scheduling using:
 - thermal sensors in potatoes;
 - computer application to apply FAO water balance;
 - decision support system (DSS);
 - real time monitoring of soil and crop status and weather conditions;
- adopting site-specific irrigation using:
 - infrared thermography and traditional soil-based approaches concepts;
 - remote sensing and spatial variability;
 - using geo-referenced soil data in central-pivot systems;
- controlled drainage for controlled soil moisture;
- controlled traffic farming for reducing soil compaction and increase access to soil water;
- on-farm innovative systems for the efficient collection, storage and use of water for livestock.

B. Quality

- developing crops of low N footprint,
- preventing water pollution through:
 - the use of multifunctional buffer zones;
 - developing agricultural practices that increase soil organic matter;
 - improving management of slurry to reduce N excretion in pig farms in land under conservation tillage;
 - adopting fertility circularity and use of water quality sensors.

C. Reuse

- nutrient removal of nutrient-polluted water using innovative plant species;
- water treatment with activated carbon obtained from agricultural wastes;
- platform to promote the use of regenerated water in agriculture.

D. Integration across scales

- organising a task force national programme for improving water quality and availability;
- improving district water management by:
 - focusing on socioeconomic and environmental sustainability and regional competitiveness;
 - efficient use of water and energy;
- improving management of water reservoirs through local data and meteorological forecasts;
- improving management of treated water through better evaluation of resources.

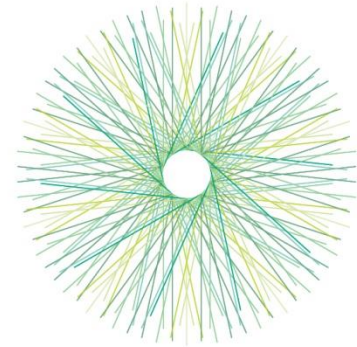


The European Innovation Partnership 'Agricultural Productivity and Sustainability' (EIP-AGRI) is one of five EIPs launched by the European Commission in a bid to promote rapid modernisation by stepping up innovation efforts.

The **EIP-AGRI** aims to catalyse the innovation process in the **agricultural and forestry sectors** by bringing **research and practice closer together** – in research and innovation projects as well as *through* the EIP-AGRI network.

EIPs aim to streamline, simplify and better coordinate existing instruments and initiatives and complement them with actions where necessary. Two specific funding sources are particularly important for the EIP-AGRI:

- ✓ the EU Research and Innovation framework, Horizon 2020,
- ✓ the EU Rural Development Policy.



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