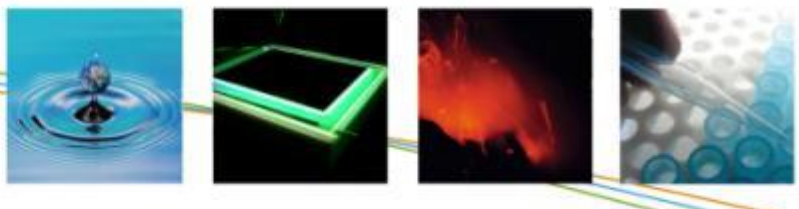
D6.4 WaterProtect roadmap for success based on case study results



CHANGE RECORD

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- VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK N.V. (VITO)
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Brussels, 30th September, 2020

T. Vereijken, rapporteur

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Contents

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Introduction

High-quality, safe, and sufficient drinking water is essential for life: we use it for drinking, food preparation and cleaning. Agriculture is the biggest source of pesticides and nitrates pollution in the fresh waters of Europe.

The overarching objective of WATERPROTECT is to contribute to effective uptake and realisation of management practices and mitigation measures to protect drinking water resources. Therefore, WATERPROTECT is creating an integrative multi-actor participatory framework that includes innovative instruments to enable actors to monitor, to finance and to effectively implement management practices and measures for the protection of water sources.

In close cooperation with actors in the field, at local and EU level, WATERPROTECT is developing innovative water governance models that investigate alternative pathways focusing on the 'costs of water treatment' to 'rewarding good water quality delivering farming systems'. Water governance structures are built upon cost-efficiency analysis related to mitigation and cost-benefit analysis for society and is supported by spatially explicit GIS analyses and predictive models that account for temporal and spatial scaling issues. The outcome is improved participatory methods and public policy instruments to protect drinking water resources.

WaterProtect Work Package 6: Upscaling to EU

Upscaling the results and outputs of the WaterProtect project to European level is an important component of overall aim to exploit solutions identified beyond the seven Action Labs. In order to facilitate this, the information needs to be applicable and communicable to potential end users at the regional level. This work package starts by setting the stage and exploring the playing field in terms of how stakeholders in Europe are adapting farming systems to ensure sustainable water management. Linking WaterProtect results to other best examples and using that information in the broader communication and dissemination of the project, will cause the project to have greater impact.

A comparison of the results and the process in the different case studies has been presented in D6.1: *'Complete comparative case study assessment'* (June 29th, 2018) which provides insights into governance strategies that work and can help improve water quality in other EU regions. The project wants to upscale the lessons learned to other areas of Europe via a blend of direct knowledge share through participatory and facilitated workshops and more broad information dissemination targeting relevant/interested stakeholders as key end-users, who need to be identified.

The identification of these key end-users is goal of deliverable (D6.3), which is not so simple as it seems. In the end, we are all end-users of the water we need. Nevertheless, in the frame of upscaling WaterProtect research results, deliverable 6.3 identified the most influential and relevant stakeholders that can upscale this WaterProtect roadmap (D6.4).

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The aim of a Roadmap

The aim of this task is to make information available that could result in the uptake of the solutions identified by the case studies. Building on the summaries and framework developed by the case study work packages (WP2-5), this task aims to complete a structured comparison of the results. In order to help aggregate findings, the WP leader will compare the results to the references identified in task 6.1 to help understand existing similarities and success factors for reaching the end goal of improving water quality.

A thorough comparison of the results and the processes in the different cases are be collated into a final roadmap highlighting the key principles and criteria for success to achieve water protection. This roadmap identifies key incentives that promote and barriers that prevent the uptake of best farming practices for ensuring water sustainability while providing important insights into good governance strategies, and methodologies developed by the case studies and in other areas of Europe to improve water quality in other EU regions.

Case Study Results

Deliverable 6.1 brings together 16 European Case Studies in Agriculture to build a comparative assessment of the case study findings, and to inspire the seven Action Labs in WaterProtect. The Action Labs are also described. The case studies have the following main targets in common:

- Prevention of the impact of human action in agriculture;
- Definition of impacts and water related risks;
- Development of mitigation measures; and,
- Emphasis on nitrates, crop protection residuals, water system stability, awareness.

In D 6.1, all case study descriptions are summarised in a similar way, to allow for comparison between the cases.

Due to factors such as the perceived complexity of agriculture as a sector, sustainable agricultural water management being a relatively new discipline, and geographical, respective cultural differences in Europe, a common successful approach has not been identified from the 16 cases studied. However, recurrent barriers and success factors have been found, which - when appreciated - will contribute to the increased success of implementation measures taken at European, national and local levels to prevent impact of human action in agriculture. The ones found most relevant are described below:

1. *Barriers for implementation of successful sustainable agricultural water management*

- A lack of data: a common need to measure and monitor the catchment much more intensively (‘data’);
- A lack of time: complex issues will arise that need to be overcome before continuation. The time to address these issues needs to be factored in to avoid frustration (‘time’);
- A lack of creativity: be flexible but persistent towards the common goal. Alternate between a focus on the goal and the roads ahead (‘creativity’);
- A lack of understanding: the need to act should be supported and understood. Communication and transparency are crucial (‘support’).

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The below presents an overview of the relevance of these barriers for each of the 16 cases.

	Case Study Barriers observed as a lack of:	Data	Time	Creativity	Support
1	EWS One-year pilot project Cyprus	√	√		
2	Sol et Eau en Segala, France	√	√		
3	UK Freshwater Partnership, Norfolk, UK.		√	√	√
4	Evian Naturel Mineral Water NMW1, France	√	√		√
5	Henniez Natural Mineral Water NMW2, France		√	√	√
6	Waldquelle, Urguelle, Naturquelle NMW3, Austria			√	
7	CVBB, Belgium		√		
8	Water Monitoring Project Grote Kemmelbeek (GKB)				
9	Cicindria catchment, Sint-Truiden Belgium	√			
10	High natural value farming in Maramures, Romania	√		√	√
11	Life ArtWet Project, Italy			√	√
12	VIVA "Sustainability and Culture", Italy			√	√
13	Action plan Soil & Water – Flevoland, The Netherlands	√	√	√	√
14	West Cork, Ireland	√	√		
15	Groundwater collaboration, Aalborg, Denmark			√	√
16	Odderbær Watershed - Odderbæk Steam Association			√	√

2. *Success factors for implementation of successful sustainable agricultural water management*

- Impacting case studies have a clear leadership, such as an industrial (chain-) partner ('leadership');
- A knowledge institute participating, building confidence ('R&D');
- Structural and organised knowledge exchange between experienced farmers and new initiative, to explain the added values 'between colleagues' ('exchange');
- Authorities, supporting the action and overseeing progress, gives the necessary status to the activities and opens doors for funding possibilities ('auth.').

The table below presents an overview of the relevance of these success factors for each of the 16 cases.

	Case Study Success factors observed:	Leadership	R&D	Exchange	Auth.
1	EWS One-year pilot project Cyprus	√	√	√	√
2	Sol et Eau en Segala, France	√	√	√	√
3	UK Freshwater Partnership, Norfolk, UK.	√		√	√
4	Evian Naturel Mineral Water (NMW1), France	√	√	√	√
5	Henniez Natural Mineral Water NMW2, France	√	√	√	
6	Waldquelle, Urguelle, Naturquelle NMW3, Austria	√			
7	CVBB, Belgium	√	√	√	√
8	Water Monitoring Project Grote Kemmelbeek (GKB)	√	√	√	√
9	Cicindria catchment, Sint-Truiden Belgium	√	√	√	√
10	High natural value farming in Maramures, Romania			√	√
11	Life ArtWet Project, Italy			√	√
12	VIVA "Sustainability and Culture", Italy			√	√
13	Action plan Soil & Water – Flevoland, The Netherlands	√	√	√	√
14	West Cork, Ireland		√	√	
15	Groundwater collaboration, Aalborg, Denmark	√	√	√	√

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16	Oddderbær Watershed - Odderbæk Steam Assoc.	√		√	

Recommendations for setting up Action Labs in other regions

Besides the recognised barriers and success factors, 6 areas of recommendations for setting up multi-stakeholder cooperation labs in agriculture were identified:

1. Civil society - although being a recognised stakeholder - is not usually seen as active participant in the projects. They could be very useful in dissemination and acceptance of results and measures found and so should be involved at an early stage.
2. Important building blocks for a well-functioning governance system should be appreciated and well defined. These building blocks are:
    - Clear roles and responsibilities allocated
    - A leadership role identified
    - Transparency
    - Stakeholder engagement
    - Coherence
    - Appropriate scale of the project

    Reference is made to the publication of WP 2 in WaterProtect (D2.1 Framework for developing and analysing water governance systems).

3. Participatory Monitoring:

- For effective participatory monitoring, awareness raising before the monitoring starts is a vital element for success;
- Authorities when overseeing the monitoring activities have a very positive effect on the success and impact of the monitoring efforts;
- Data sharing is considered an essential element. Several forms of data sharing have been observed: periodic monitoring and reporting, results published (realtime) on the organization's website, etc.;
- Active exchanges between regional initiatives alike increases the value of monitoring results enormously, and their broadened use for policy development, accreditation, reward schemes, investment decisions, etc. becomes more evident;
- Frequent visits of independent farmer advisers to the farms are extremely useful, and should be a structural element in the design of new cases.

4. Water stewardship schemes with a set of common indicators:

- A water stewardship guideline specifically developed for agricultural purposes would be a useful tool;
- The EWS European Water Stewardship Standard is seen as a useful collaborative tool to harmonize the actions of farmers on overall goals set forth by water authorities in the basin;
- The use of a set of common indicators should become a common practice in new cases.

5. Collaborative management tool:

- Real time monitoring to create evidence and responses when water quality issues arise is effective;
- (web-based) platforms for knowledge exchange created by the group members enhances exchanges of data and information;
- effective collaborative management tools exist, and so are online nutrient management tools – we wouldn't recommend a "one that fits all" tool, but work with familiar tools in the region.

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6. Good working cases are extremely important references for promoting and inspiring new initiatives. Farmers know what they currently have and tend to stick to that. They should be convinced by each other. The power of dissemination is in the exchange between farmers:

- contribution and dedication of a group of farmers to improve water management in the river basin is far more effective than single farmer implementation;
- Farmers typically want to receive coherent and exhaustive training on the content, the requirements and overall objectives;
- Farmers can prioritize their actions for water quality protection by identifying vulnerable areas at the farm and estimate the impact on potential destinations;
- Wider community involvement contributes to the long-term success of the case study;
- Success is achieved by applying a comprehensive and integrated approach to all interests and actions in the catchment linked to water management and protection, and mutual economic and social benefit;
- "Water Stewardship is the most effective path for sustainable water management";
- Communication of the results and the formation of end users (farmers), using a basic and comprensible language is mandatory".

The cases presented show that multi stakeholder cooperation for sustainable water management is an extremely effective tool for policy implementation in Europe. The recognition of barriers and success factors can avoid disappointment causing many worthwhile initiatives from stopping too early. When taken into consideration in the operation of the seven WaterProtect Action Labs these can become fruitful showcases of new policy initiatives.

Key end-users

The Water Framework Directive in 2000 was the start of a huge legislative programme to improve Europe's surface water qualities. We went from being used to seeing 'black water' in rivers to the current state, where water quality is usually good, and society increasingly even wonders how to further improve the ecological status of Europe's waters.

Agriculture, as one of the main users of fresh water has a vested interest in water availability and good water quality and is generally much aware of its main influence on the future quality of water. Farmers have a huge 'control panel' of variables at hand, to influence water related issues in their daily work in support of biodiversity and water quality.

The farmer's paradigm

Water is just a minor factor in all the daily matters a farmer has to deal with. His income depends on many uncertain factors, of which the availability of water is just one. The future water quality is probably even much less of his concern in the day-to-day decisions he takes in his work. Especially when it concerns groundwater - invisible and not very well understood – there is no urgency.

A wicked problem

Yet, it is obvious that the effects of what farmers do (or don't do) on water quality can have a very significant impact on the many parties in the food and water chains. Therefore, the management of water quality in agriculture is a so-called 'wicked problem': one party makes the decisions, has a major influence but is not compensated to do the right thing, yet many other parties are depending on his or her decisions taken and the (irreversible) effects of it.

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Society is beginning to comprehend the major importance of sustainable farming. Moreover, people are grasping that non-sustainable agricultural activities are often also irreversible, hence damaging our future. Farmers are experiencing this as a social pressure. Often farmers are very much willing to comply with sustainability principles, as much as reasonably possible. But here is an important issue: in the current price and volume-driven market conditions, crucial elements are missing for the farmer to do the right things in his work, such as:

- the compensation for his additional efforts;
- the education of what sustainable practices are;
- the cooperation with other parties in the chain; and
- recognition for his/her dedication.

Key end-users

Therefore, to get upscaling effects more quickly, key end-users of WaterProtect research results are probably not only the farmers, but the key end-users group need to include the farmer's chain partners who could offer to fill in these and other elements currently missing, to quickly build a better business model for the farmer and a more sustainable agricultural sector.

We have two types of key end-users:

1. **'*bottom-up*' key end-users**: grass root initiatives, local scale, many of which are like the case studies described in D6.1. These are the so-called 'Best Practice Measures Users' and benefitting organisations communicating the positive effects of BPMs and EWS schemes like for instance:

   a. The Skylark Foundation https://veldleeuwerik.nl/en/
   b. 'Boer Bewust' Initiative https://www.boer-bewust.nl/
   c. Capwasa https://www.ewp.eu/collective-action-partnerships-in-agr
   d. Dairyland Stewardship https://www.courage2025.nl/projecten/kringloop-zonder-grond
   e. Agricultural Sustainability Support and Advisory program. https://www.teagasc.ie/media/website/publications/2018/Agricultural-Sustainability-Support-Advisory-Programme-.pdf

2. **'*top-down*' key end-users**: at many different levels (EU networks, national networks, industrial federations, SDG networks, supermarkets, consumer organisations). Examples are:
   a. European Partners for the Environment www.epe.be
   b. Asvis http://asvis.it/asvis-italian-alliance-for-sustainable-development
   c. Coop Italy https://www.e-coop.it/web/guest?antiCache=1549034459031
   d. Eticae – Stewardship in Action http://www.eticae.it/
   e. Others, like: Biodiversity International, IBM food trust and TE-food, IIED, Conservation International, Finance Watch, University of Sorbonne, Just Transition Program, RFI, Caritas Internationalis, SGD Watch, V4SDG, etc.

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Both end-users together ideally represent the value-chain from which the additional elements - currently missing for the farmer - could be derived. Cooperation between the chain partners is therefore important, and could be organised, for instance to implement and maximise the upscaling effects of Waterprotect research results.

How to put this in practice is the central topic of this document: a 'Roadmap for upscaling WaterProtect research results in Europe'.

Two cases to illustrate the possible long-term effect when groups of key end-users are cooperating for sustainable agricultural water management practices are:

A. The implementation of Best Management Practices (BMPs), which WaterProtect is developing, involve the farmers directly. WaterProtect sucessfully supports European farmers to use these BMPs. However, although successful, the sphere of influence is limited to pioneer farmers who are willing by intrinsic motivation and financially able to structurally adopt the use of BMPs at their own expense. Most probably, many more farmers will have a long term interest to put these measures in place, when their sustainability efforts are translated into better prices from food processors and other compensation schemes that are required to compensate him. Public pressure should drive supermarkets and foodprocessors to adhere to these schemes.

B. In Europe, SDG networks are currently developing rather quickly out of established NGOs. Previously working individually on separated targets, in view of the SDGs a growing critial mass is now able to attract the serious attention of sustainable (often private) financiers gathering to bring adequate funds towards the realisation of the SDGs. These top-down end-users, - when involved - will have the purchasing power to change things at the farm level.

Upscaling WaterProtect results into the European Union will accelerate if the involvement of chain partners can be organised. If new initiatives trying to implement the new business models for farmers are involved. If educational organisations are involved to secure the 'future pioneer farmer' is aware and trained to manage water quality and to be compensated for these efforts.

As such, WaterProtect should maintain focus on the farmer, as key end-user for the upscaling of research results, but should also focus on top down chain partners, for instance the ones already demonstrating or piloting new business models for farmers. Some of them have been well described in the case studies analysed before. Besides, the ultimate key end-user (the consumer) should be actively involved. They have purchasing power to accelerate the implementation of compensating measures and set the new 'normal'. Finally, the unusual forms of cooperation in the frame of the SDGs will unlock interesting potential.

Regions

In the 7 Action Labs of WaterProtect, the regional success factors and bottlenecks are very different. Participatory workshops have shown this, and these factors will need to be addressed in the Roadmap for upscaling the Waterprotect results. In Eastern Europe for instance, coalitions at the bottom up levels are uncommon. Time should allow trust to develop and successful cases to be disseminated. In Southern Europe, the value of water (availability) is much developed, and we can build on this to accelerate the uptake of BMPs in the agricultural sector. In Northern Europe this awareness is much lower and should be developed. Top down end-users might have a greater role here.

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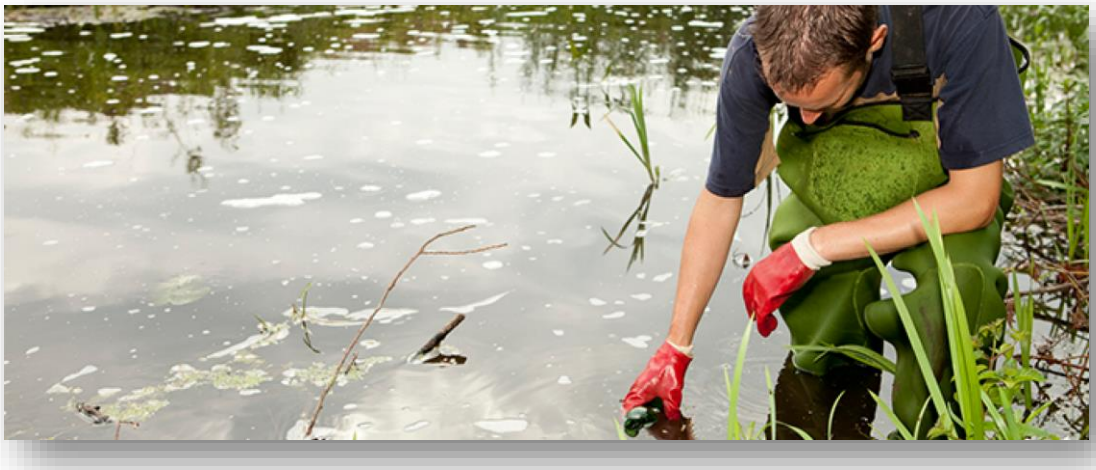
WaterProtect could start the upscaling by focussing on end-users in countries where Action Labs are active, which has the advantage of more known networks linked, and regional knowledge present. In addition, some countries could be considered to include where a current large impact can already be seen (for instance Germany and Netherlands). In parallel, it is advised to include an analysis step to evaluate in which countries the upscaling could be successful and feasible. To address also regional differences, upscaling regions include North EU (DK, NL, B, Irl), South EU (Es, It), East-EU (Pl, Ru).



The WaterProtect Roadmap: a four-staged approach

The roadmap contains four stages required to achieve the ultimate goal of a better water quality in Europe with sustainable agricultural practices. It is a long-term process, and the roadmap is therefore a living document, continuously updated to contain new insights and incorporating new research results. We start at the end: why are we doing this? Secondly, we focus on the tools, means and best practices: which tools, trainings, working methods do we need, and how to implement? Thirdly, the 'how' needs to be developed, resulting in new approaches, working methods, technologies; which is a core capacity of Waterprotect. This phase includes the assessment of new ways forward, requiring time, capacity and validation. Finally, in addition to the clear need, the tools, the best practices and the validations respective new ways forward, the fourth stage contains the organisational aspects: what make good projects perform well, improve and adapting to the changing mentality and consciousness of society. A good planning is a part of this fourth stage as well.

Stage one: have 'the why' clear

Case study results (ref. D 6.1: 'A complete cases study assessment') show clear potential to improve Europe's water quality using multi-stakeholder cooperation as an effective tool to achieve this goal. It is therefore important to maintain a clear objective for these efforts: why do we do this, is it achievable and what is our impact anyway? The upcoming evaluation of Europe's water legislation framework (i.e. The Water Framework Directive, The Urban Water Treatment Directive, and others) is essential to maintain these goals; not to allow delays or ways out to 'justify' current practices for only economic reasons, where these practices might create irreversible effects to water quality and biodiversity.

Research in Waterprotect and other resources show there is sufficient evidence to indicate that these current practices need to change. On the one side, the water quality objectives of the Water Framework Directive will most probably not be met within the legislated schedule i.e. 2027. On the

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other side, we face effects of our current practices, which seem to be irreversible effects. At the moment of writing, society is increasingly urging the agricultural sector and their chain partners (such as the food processing and drinks industry) to make the shift towards more environmental friendly ways of working, using best available measures, supporting biodiversity and avoid using those practices which are (potentially) damaging to nature, biodiversity and water resources. They visibly support the implementation of different, new working methods and best practices.

The rapidly developing consciousness and sensitivity of society can be seen as an important and powerful driver for short term change. If customers do not accept current working practices, they will not buy related products and markets will eventually be ruined. Customers increasingly demand clear evidence of good water management practices, beyond a label or a logo. The credibility criteria for sustainable agriculture have moved from 'window dressing', towards clear 'evidence based' practices. This will be the main short-term driver for the agricultural sector beyond any future (European) legislation to come. Legislation is expected to follow the trend, forcing the laggards to comply with the new standards of production, living and consumption. The forefront runners will already have moved ahead, because of their understanding that their ways of working will need to comply to the most advanced water stewardship standards.

This is also becoming more visible: multi-functional agriculture in The Netherlands has doubled its turnover in the last year, to reach 887 million euro in 2018, whereas 25% of the farmers have added 'other' tasks as nature conservation, education and on-site sales to their activities, and another 10% are expected to do so within the next 5 years[1]. New business models for farmers are being tested, to make their new way of working sustainable for them, and less dependent on mass production and price-based decisions.

Consequently, when 'the why' is clear, there is also no reason to delay the action. The focus will turn to the tools available at farm level to make this happen? We have arrived at stage 2: Tools, means and best practices – how can we learn from experiences in Europe?

Stage two: have 'The Methods' clear

The activities of the seven Action Labs in Waterprotect have already resulted in a long listing of current best measures, that can be adopted by farmers to increase the sustainable water use in the agricultural sector in Europe. When applied in multi-sectorial cooperation, the effects will influence and improve the performance of the food chain as a whole and is expected to last longer. The particularities of setting up these types of cooperation have been described in the previous chapters and related documents, including the success factors and potential barriers. The regional workshops of Water Protect have proven an excellent way to facilitate the inter-action, bringing partners together and start a hands-on way of working together.

Nevertheless, not all approaches and best measures works well everywhere. It becomes very clear that regional differences exist between north/south/east/west European regions which need to be respected. The bottom up introduction of multi-stakeholder cooperation will be able to address the regional differences, while creating the opportunity to celebrate the local effects of their joint efforts at the same time. European legislative ruling alone will not enforce the ownership that is needed to make the change.

[1] Presentation by Wageningen University and Research (WUR) on May 29th, 2019 at the 'Day of the Multi-functional Agriculture in Beesd, Netherlands: 'Turnover and impact of multifunctional agriculture'.

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Some similarities can be observed with the recognised need for European small and medium sized enterprises (SMEs) to cooperate, innovate, grow, and become a main driver for economic growth in Europe. In support of this, the European Cluster Policy has been developed. The creation of SME-led clusters is facilitated by the European Commission and is becoming a great success. The Innosup ('Innovation Support') programs are embedded in Horizon 2020 and use the cascade funding system, whereas the conditions and circumstances are totally defined by the respective clusters leading the initiatives. This form of European support (suggested name: '*Agrisup*') would be extremely effective for the agricultural sector as well, when developing multi-sectorial initiatives to change practices for better and more sustainable water management. One of the main barriers described earlier would be addressed.

In addition, besides distinguishing between regional characteristics (north/south/east/west) and organising structural (cascade) funding mechanisms to ignite the local actions and create cohesion, the communication of results achieved must be an integral part of the working method. Nothing works better than to 'show off' and demonstrate progress. Especially in the farmers' communities it is an important way of mitigating perceived risks and prove effects.

These elements mentioned here should be incorporated in a government's strategy that will work. A set of generally accepted, practical indicators should be reflecting the effectiveness of actions taken. These can provide a structure and a guide 'where to start best'. Ultimately, the indicators can be easily communicated and form a motivation to improve on them, in a periodic cycle (measure, review, act, improve). As part of Work package 7, these indicators have been developed and proposed in governance strategies.

Stage three: have 'The How' clear

In recognition that geographical zones in Europe are so different and in follow up of the regional WaterProtect workshops in Poland, Belgium, Denmark (ref. D6.3), three other practical workshops called '*Science, Water Governance and Policy Implementations: scaling up to European level*" have been organised in different European regions:

- Ireland (June 2019)
- Rumania (October 2019)
- Spain (November 2019)

The results from the workshops and lessons learned were used as input for the next workshop. A workshop typically starts by setting the scene, addressing local issues, exchanging experiences and initiatives, then followed by presenting the results of the regional WaterProtect Action Lab and concluded inviting Best Practices, local front runners and Communities of Practice to share their approaches.

Stage four: have 'The Organisation' clear

The workshop in Wexford, Ireland kicked off with the use of indicators, and checked the practical implications of using an indicator-based system for improvement of sustainable water use at the farm level. The usefulness of the indicators proposed were discussed, and suggestions welcomed.

A concrete outcome of this workshop was a suggested pilot action at multiple farms in Ireland, to test the suggested indicators in practice. An EWS-certified food processing industry was involved, which is experienced in sustainable water management and therefore familiar to work with indicators. Their

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involvement added value to the workshop to demonstrate the supply chain approach and involvement of farmers. The experiences of the pilot action are useful to adapt the indicators where necessary, and to provide input for the governance policies to enhance sustainable water use in agriculture in Europe.

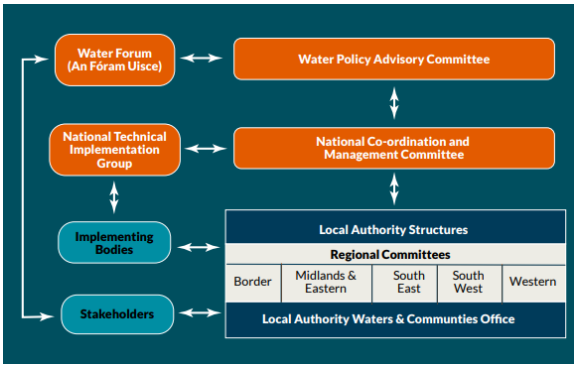
Uptake from the Irish WaterProtect workshop

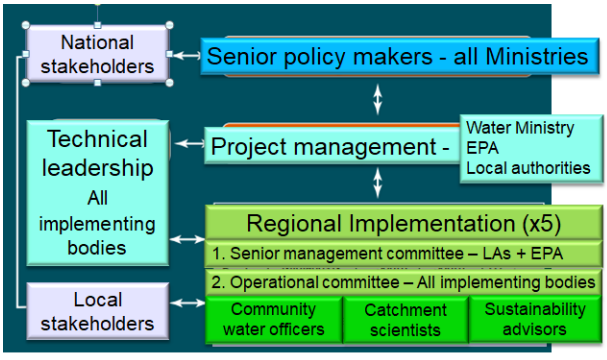
'Science, Water Governance and Policy Implementations: scaling up to European level"
(Wexford, June 18th, 2019)

This practical workshop was organised by the WaterProtect Irish Action Lab to exchange practical implications of sustainable water management and the use of voluntary systems. Some highlights are described in the section below.

In Ireland, the *Environmental Protection Agency* (EPA) actions address activities that could increase the risk of not achieving the WFD objectives. All waters should be managed together in an integrated way under the WFD.

Pesticides are regarded one of four main issues. Some basic measures implemented by EPA include: Drinking Water Directive, Nitrates Directive actions and sustainable use of pesticide actions. Supplementary measures included: River basin management planning approach, WHO Drinking Water Safety Plan Approach (Public supplies), LA Groundwater protection schemes and Group water scheme source protection plans. The new River Basin Management Plans contain these elements: robust evidence base, collaborative approach, local scale implementation, transparency, trust and a better governance. A scheme for stronger collaborative governance (left) could be implemented as (right):





The pathway for water bodies not meeting the objectives is as follows:

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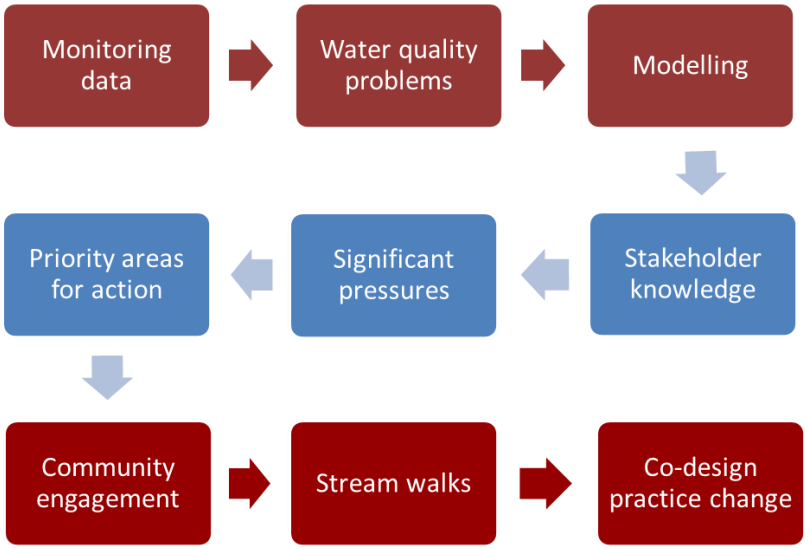

The new local boots on the ground targeting actions included 190 priority areas for action, 35 catchment scientists, 30 new farm advisors and 12 community water officers. These contain actors like WaterProtect consortium partner Teagasc, Local Authority Water Program and Dairy Sustainability Ireland.

One of the duties of EPA is to deal with Nitrates. Nitrate concentration is currently very low from the drinking water perspective and agriculture is the main source. The 4th Nitrates action programme is in place. Nitrates is mainly used in areas for action by Local Authorities and advisors.

As mentioned, a main area of importance for the EPA is to deal with pesticides where MCPA used for rush control is the main problem. National Pesticide and Drinking Water Action Group is currently in place, modelling is underway, leaflet is developed, intensive monitoring, specific measures being developed and there is support from the Agricultural Sustainability Support and Advisory program (ASSAP).

The challenges currently EPA meet includes an integrated catchment management approach combining drinking water and ecological status objectives, and all uses and beneficiaries of water.

The *Agricultural Catchment Program* (ACP) operates in six catchment areas where farming is the main land use. Run by Teagasc and funded by Department of Agriculture, Food and Marine, it was set up in 2008 to evaluate the Nitrates Directive regulations. The six catchments cover a range of physical settings and farming enterprises. The support and co-operation of 300 catchment farmers allows to monitor soils, weather, farming practice, groundwater and surface water. ACP also gathers information on farmers economic performance and by building up this information over the years ACP have learned how farming influence water quality and how regulation impact on farming.

The ACP provides detailed process-based understanding of nutrient loss from the agricultural landscape to waters, to facilitate the development of effective and targeted mitigation measures. Research findings are disseminated to ASSAP.

Glanbia Ingredients is the leading global dairy and nutrition group with 6000 employees, 4.7 billion Euro of market capitalisation, operation in 34 countries and generally consists of Glanbia performance nutrition, Glanbia nutritionals and Glanbia Ireland.

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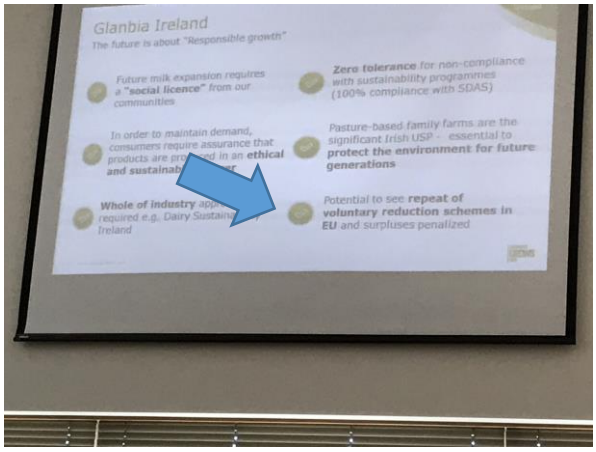
Glanbia Ireland has more than 1850 employees and its activities are mainly in providing fully integrated supply chain regarding agricultural inputs together with milk and grain processing. Its main interests are Interests in genetics, stevedoring, fertiliser importation and blending, Animal nutrition, veterinary products, malting, consumer grains, Butter Fat products JV. Glanbia Ireland is the first feed/ fertilizer producer, 1st branded dairy company and the 1st dairy processor in Ireland.

Glanbia Ireland has a big share economic contribution of dairy to the Irish rural economy. In 2018, Glanbia Ireland paid approximately €1 billion for milk, directly to 4,500 farmer suppliers across rural Ireland. In line with the growth in milk volume, Glanbia has invested €343 million in processing capacity, including investments in the Belview milk powder plant and in cheese processing in Wexford. Glanbia Ireland has a big impact on supplier growth as for example weekly processing capacity has been increased by 38 million litres/week since 2015.

The future perspective of Glanbia Ireland is market growth, (sustainability requirement, social licence) on-farm productivity improvement and the regulatory risk. Glanbia's future of responsible growth includes:

- *Future milk expansion requires a "social licence" from communities*
- *In order to maintain demand, consumers require assurance that products are produced in an ethical and sustainable manner*
- *Whole of industry approach required e.g. Dairy Sustainability Ireland*
- *Zero tolerance for non-compliance with sustainability programmes (100% compliance with SDAS)*
- *Pasture-based family farms are the significant Irish USP - essential to protect the environment for future generations*
- *Potential to see repeat of voluntary reduction schemes in EU and surpluses penalized*



Glanbia's point of future sustainability includes:

- *Protecting the environment - both on farm and in plant*
- *Securing the long term viability of our way of farming*
- *Providing the best in traceable products*
- *Giving back to the communities in which we work*

Glanbia has a collaborations to achieve its targets:

- *Environmental protection and economic competitiveness are equal and complementary*
- *Government and Industry collaborative approach to achieving WFD targets*
- *Supporting the farmers with dedicated ASSAP advisors*

ABP Food Group is one of Europe's leading privately-owned agribusiness companies. It is the largest beef processor in Ireland and the UK. The company also operates substantial renewable, pet food and protein divisions. ABP Food Group employs over 10,000 people and has 46 manufacturing plants in Ireland, UK, Denmark, Poland, Austria, Holland, France and Spain.

ABP Food Group is a founding member of Origin Green and the first food company to be awarded quadruple certification by The Carbon Trust. It has also been the first organization in Ireland awarded the European Water Stewardship (EWS) Gold Certificate.

Barry O'Donovan from ABP Food Group underlined how applying the EWS Standard across several sites in Ireland using EWS multisite scheme helped develop one management system across sites, streamline reporting

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procedures and ensure a higher performance level across the company. It also helped map water risks in the supply chain and engage with farmers. Mr. O'Donovan stressed that the push for water stewardship did not come from the government. It was initiative from the company. Answering the question if the companies were able to establish economic gains stemming from application of the EWS Standard, the representatives highlighted the savings in energy costs and reduced water treatment costs. Next steps will include the supply chain and farmers.

Central Solutions explained how their experience with promoting water stewardship in Ireland at both site and national level proved so far that unlike energy savings, the business case for water stewardship is not strong enough if it is only based on savings in the bottom line and needs to include action on minimizing risks as well as broader catchment benefits that good water stewardship can provide. In addition, the support schemes and additional incentives will be needed in order to drive the uptake of the water stewardship, and there is a need for additional tools, mapping and training to translate water stewardship principles at site level.

Uptake from the Romanian WaterProtect workshop

'Science, Water Governance and Policy Implementations: scaling up to European level"
(Maramures, October 2nd - 3rd, 2019)

ROMANIAN ACTION LAB

In the Maramures action lab in Romania, all farmers use primarily animal manure (i.e. solid manure, which comprises material from animal houses and consists of excreta mixed with the bedding materials e.g. straw) as fertilizer for their agricultural fields. In addition, there may also be varying amounts of slurry, which consists of liquid or semi-liquid excreta produced by livestock in a yard or areas of a building where there is little bedding used (e.g. passageways).

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Best Management Practices (BMPs)

In the Romanian Action Lab there are obligatory BMPs, in accordance with legislation for all farmers/agricultural exploitations, and some of them are fully implemented. Many farmers get subsidies and consequently have to also comply to eco-conditionality rules, such as:

- Incorporate organic manures immediately after application on cultivated land – *fully implemented*;
- Respect calendar for spreading of manure on the fields (temperature below 5 degrees; period November-March); respect the maximum quantity of N (max 170 KG N/ha in one year) – *fully implemented*;
- Temporary depositing on the field, taking into consideration proximity of waters or BMP 15: Manure platforms in the farms (diverse materials: wood, concrete etc) – *fully implemented*;
- Depositing manure on the field with taking into consideration certain distances from water courses for preventing pollution of water (min. 20 m from rivers, min. 50 m from wells/springs, min. 250 m from wells used for drinking water);
- Use of impermeable folia where the location of manure is possible to lead to water pollution (proximity of water courses);
- Grass buffer zones (strips of land covered with permanent vegetation located between agricultural land and watercourses and reservoirs);
- Directing manure towards special ponds (for sedimentation of organic substances for extraction of nutrients), for bigger agricultural exploitations.

General guidelines were given to farmers:

- Locate manure stores close to livestock housing and away from any watercourse or a well;
- A simple open-fronted store with a concrete base and impermeable walls should be sufficient for the storage of manure from animals kept by most households and small farms;
- Glass, plastic and other in-organic domestic waste must be kept separate from manure stores;
- Do not allow run-off from livestock buildings or manure stores to enter any drain, ditch, stream, river, lake, wetland or nearby well;

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- Do not allow any rainfall from roofs or yards to enter a manure store;
- Do not allow human waste from your toilet to enter a manure store!
- Consider composting solid manure by regularly turning it and mixing it with vegetable and crop waste**.**

At the level of a small rural community, especially from the mountainous areas, the most relevant instrument is to have awareness of the members of the community for the protection of the water for their own health, of their families and of the well-being tourists who are responsible during their staying in the area.

Water challenges in RO action lab:

- **drinking water – quantity problems** in summer season; need for improvement of water management system in Mara Valley catchment/RO action lab;
- **surface water – quality problems**, nitrate pollution is relevant for the area due to manure leakages from small scale farms, non-conforming use and storage of manure, lack of a centralized sewage system, residues resulting from the brandy (tuica) boiling, the faulty household waste management, diffuse pollution from the forestry sector; need for integrated efforts from stakeholders to reduce impact of nitrate pollution as well as to provide good practice examples for farmers.

Major findings after the workshop and discussions:

- Challenges in common understanding of some terminologies and their relevance, legislative context related to environment (between different environmental institutions);
- Defective information flow from institutions with environmental profile towards farmers;
- Constant, integrated, coherent awareness and information campaigns in the field of good agricultural practices is highly required; need to include in such campaigns multiple stakeholders providing information to farmers;
- Difficulty in implementation of regulations in the field of the nitrates (for farmers); no constant advisory service for farmers in the territory;
- The importance of cooperation between the state institutions that have responsibility in the field of management of water resources;
- Lack of coordination and correlation of environmental information between state institutions with environmental profile;
- Existence of overlaps of competences and a tendency to delegate responsibilities between

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various state institutions whose object is to protect the environment;

- Need to identify approaches to support the locals in greening their actions (good agricultural practices, as well as economic activities);
- Not all farmers understand the importance of limiting nutrients in the environment and their negative effects on health;
- Farmers who are aware of the benefits of living in a healthy and safe environment have stated that they want to work in accordance with European standards, but they do not have sufficient financial resources to do so;
- Decision makers and community leaders from RO action lab are aware of the risk of nitrate pollution and aware of need for integrated effort for improvement of water quality (surface water quality) but also improvement of water management at RO action lab level;
- Community needs to become more aware of reducing nutrients to surface waters; awareness raising is a powerful instrument that needs to be continued. 'Ecologic', as manager of ecotourism destination together with local community leader (priest and coordinator of local youngster's club) is animating the community via various types of information and awareness campaigns on related environmental aspects.

Next steps:
Develop, agree action plan with recommendations for water management improvement in the Rumanian action lab. The **Driver for action is ECO MARAMURES, (**ecotourism destination in the

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area, financial resources secured by Ecologic for development of area until 2023**),** **www.ecomaramures.com.**

Recommendations for water management improvement:

- Constant multi stakeholder communication and cooperation;
- Feasibility study to provide long term actions for enabling sufficient water quantity;
- Constant monitoring of water quality;
- Improve management of water supply system (trainings for personnel, technical investments);
- Impose to all consumers (at local level) a metering water system;
- Operationalize sewage system;
- Allocate financial resources for setting up advisory services for the benefit of farmers;
- awareness-raising and education campaigns;
- Increasing the role of voluntary best management practices (development of some compensation schemes at local level);
- Provide easy to use best practice examples (manure storage platforms).

Uptake from the Spanish WaterProtect workshop

At November 21st, 2019 WaterProtect organized its Spanish Workshop at the historical water production site of the local water company Aigües de Barcelona. Experts and WaterProtect partners working in the Lower Llobregat Action Lab presented the local situation and challenges and the developed strategy to make the water supply and system more sustainable and resilient to climate change.

The historical water production site of the local water company Aigües de Barcelona

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The participants to the workshop were welcomed by Antonio Martínez Flor, the Deputy Mayor for Territorial Policy and Space of Cornella de Llobregat, and by Jordi Martin, the Head of Water Quality Management at Barcelona's Waters company Aigües de Barcelona.

Climate and land use change

Antoni Munné, Head of the Department of Water Quality and Control of the Catalan Water Agency described the current situation in Catalonia where the water demand is closing in on the total annual water availability, which makes the water system in the region vulnerable. This vulnerability is growing since 'the average temperatures are rising, and statistics show that the rainfall is decreasing 3% every decade. Furthermore, the flow of some rivers has dropped 7% due to the changing land use.'

Vinyet Solà, Responsible for Water Quality of CUADLL (the Water Users Community Organisation), and Anna Casanova, Technician of CPABLL (the Agrarian Park Consortium), both partners in WaterProtect, presented the water network in the Baix Llobregat Agrarian Park. This agrarian park (3,489.83 hectares) was created in 1998 with the will to preserve its economic, ecological and landscape heritage. It is one of the oldest and most fertile agricultural areas in Catalonia and it supplies the local (but also international) markets with fruit and vegetables.

Participatory monitoring and modelling

Miren López de Alda, Scientific Researcher at IDAEA-CSIC, presented the main results of the participatory monitoring carried out in the context of the project with regards to the main pesticides and the source (mainly urban) of the nitrates polluting the area.

Enric Queralt, Technical Director of CUADLL, stressed the importance of the developed monitoring system for groundwater and surface water quality for the farmers in the Lower Llobregat area. The new water database GISEL and the new numeric model will be capable of simulating the water quality and quantity in the area. 'As of 2020 we will be able to simulate the effect of different measures on water contamination, the effect of use of reclaimed water, and also the impact of climate change on the water system.'

Water reuse

Jordi Martin from Aigües de Barcelona informed the workshop participants about the challenge to develop water reuse in the region. About 50% of the discharged wastewater goes directly to the sea. This shows the potential that water reuse has.

But water reuse remains very challenging since a wide range of parameters needs to be monitored to guarantee safe use. The qualitative requirements for reuse depend on type of use in the area: farmers, industry... they all have different imperatives. At the same time, we still have to work on the acceptance and raise trust among the re-users.' (see also 'A Sanitation Safety Plan (SSP) for use of regenerated water in agriculture in the Baix Llobregat').

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Best management practices

This was followed by a presentation by Elena Isla from CPABLL on water protection best management practices that were promoted with farmers in the action lab. After that there was a presentation by Nicoleta Suciu of the Università Cattolica del Sacro Cuore in Italy showing the challenges and WaterProtect activities in Val Tidone, the Italian action lab. The workshop was closed with a round table and Q&A for all experts. All presentations are available on www.cuadll.org.

In the afternoon, the WaterProtect consortium visited the Baix Llobregat Agrarian Park and had the opportunity to see which the main challenges are concerning water management in the area as well as different types of farmers' exploitations.

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Conclusions: Experiences from WaterProtect Actions labs, adding to success factors

In Work package 4 of WaterProtect (Best Management Practices) the general aim was to review and evaluate current farming systems as well as develop strategies that optimise the delivery of good water quality within the case study areas, taking into account cost-effectiveness of management practices. Important factors to evaluate were in "information about what measures and best management practices towards protection of water resources from agricultural pressures are already implemented within the catchment and what are steering mechanisms of these, such as governance structure and incentive measures". These experiences are described in D4.6: 'Summary of BMP Issues for consideration of WP6', dd 31st January 2020. These experiences are adding reality to the roadmap for success: usually not all elements of the roadmap are in place and consequently initiatives fail long lasting success. This is where European policies become important, to overcome (temporary) issues causing market failures in agriculture, causing unsustainable practices leading towards long lasting negative environmental impact. Throughout this work in WP4 it became indeed apparent that 'many actions although designed and needed to be taken at local scales, require changes in regulations or organisation at higher than a local level'. This further may cause 'programmes of actions/measures to be often too general to address issues at local levels and are not applicable in practice'. This causes management not effective as actions may be taken not there, where they are needed. As a result, implementation of BMPs are not lasting, causing disillusion and in itself good programs are stopped.

"The inclusion of society in decision making process can be very beneficial for the effectiveness of actions. Farmers and stakeholders from our action labs who actively participated in the WaterProtect project were more open for discussions and more willing to take actions since they were aware of the problem, which was not the case before we started WaterProtect. It is essential to convince the farmers to take action". This element found in WP4 is a main key success factor to overcome periods where actions do not seem to have the anticipated effect in the short term. Here, the dissemination of results and the awareness raising activities are examples of tools to overcome the periods of insufficient success. New participants, or perspectives might initiate new paths to move forward. In addition, strengthening control systems in some areas in Europe will be necessary to get the application of Best Management practices a common practice.

A control system can be a main driver of success. "The success of local actions is more likely to sustain when several common drivers for sustainable water management exist… There is only one source of water and it is in the common interest to protect this resource, which drives efforts of all farmers in the catchment. Often a strong driver apart from a controlling system does not sufficiently exist, and then it is more difficult to get the farmers to unite and do the right thing". Drivers for change however can have multiple forms. Next to, for instance compensation schemes, social drivers are very effective. A leader in the form of a major client, or a colleague farmer successful in turning towards sustainable farming can make the difference, causing a tipping point to be reached for the region.

Moreover, "more sustainable food production entails an additional price and it is necessary that consumers and the entire food production chains become aware of this and pay this additional price for these more sustainable products to keep sustainable farming economically viable'.

The described roadmap for success has many steps, and each of them seem to be critical for a long-lasting assurance of high levels of (ground) water quality. In parallel to the implementation of best management practices, market circumstances must enable farmers to take these steps and afford them. Awareness raising at consumer level therefore seems to be just as important as awareness raising for farmers.

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Annex 1: Agenda Irish Workshop '*Science, Water Governance and Policy Implementations: scaling up to European level*".

17th June 2019
Venue: Council Chamber, Wexford County Council, Y35WY93 Carricklawn, Wexford, Ireland

Case study Ireland and examples from Europe
09.00 – 09.15: "Welcome and *Introduction"*
09.15 – 09.45: Jenny Deakin, EPA, *"Irish strategy for action"*
09.45 – 10.00: Brendan Cooney, Wexford County Council *"Local Authority perspective"*
10.00 – 10.15: Edward Burgess, Teagasc, *"Agricultural Catchments Programme: Science into policy"*
10.15 – 10.45: *Coffee*
10.45 – 11.00: Per-Erik Mellander, Teagasc, *"WATERPROTECT: Wexford catchments, Ireland"*
11.00 – 11.30: Ruth Hennessy AWPRO/ASSAP, *"National water quality improvement strategy"*
11.30 – 11.45: Anker Lajer Højberg, GEUS, *"WATERPROTECT: Hagens Møllebæk, Denmark"*
11.45 – 12.00: Ellen Pauwelyn, Inagro, *"WATERPROTECT: Bollaertbeek catchment, Belgium"*
12.00 – 12.15: Donnacha Doody, AFBI, *"FAIRWAY: River Derg Catchment Case Study""*
12.15 – 12.45: Leanne Roche, DG Environment, *"European perspective"*
13.00 – 14.00: *Lunch*

Scaling up to European level
14.00 – 17.00: Tom Vereijken, EWS, "*Introduction*"
Water Stewardship in Ireland: representative from Central Solutions
Sustainable water use: Barry O'Donovan, ABP Food Group
Discussion on the use of indicators to improve sustainable water use on farms
15.00 – 15.20: *Coffee*

18th June 2019
09.00 – 12.00: WaterProtect Core Group Meeting in Teagasc, Johnstown Castle, Co. Wexford
12.00 – 13.00: *Lunch*
13.00 – 16.00: Field visit to Castledockerell and/or Ballycanew catchment

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