Analysis and recommendations on the level of integration of water and agricultural policies in the case study areas

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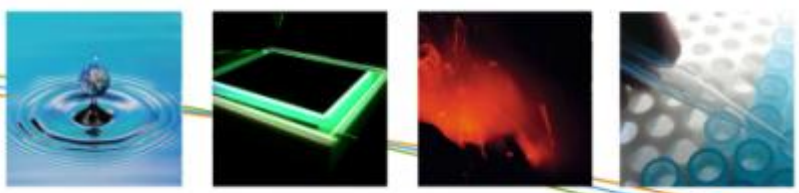

CHANGE RECORD

Version	Date	Description
V1	July 2018	General outline of the report and guiding questions
V2	17 January 2019	Draft report
V3	29 January 2019	Final report

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1 Scope and policies covered

1.1 Background and identification of the relevant policy architecture

The purpose of this report is to provide guidelines and policy recommendations that stimulate coherence and synergies between agriculture and water related policies. The ultimate general aim being to incorporate sustainable water management into existing farming systems and land management. The report has the ambition to promote into policy processes (i.e. Common Agricultural Policy review) the lessons learned in the study areas, to contribute to integrating the goals of Water Framework Directive (WFD) and general principles of sustainable water and land management.

The report looks at the relevant water and agriculture related instruments and policies to identify the policy-related driving factors that influence water quality in the case study areas. The analysis is based on the work performed in the specific case study work packages of the project (WP 2-5). The assessment considers the critical success factors that enhance the effective integration of water concerns in agricultural practices, including the contribution of agricultural policies and regulatory frameworks, in the case study areas.

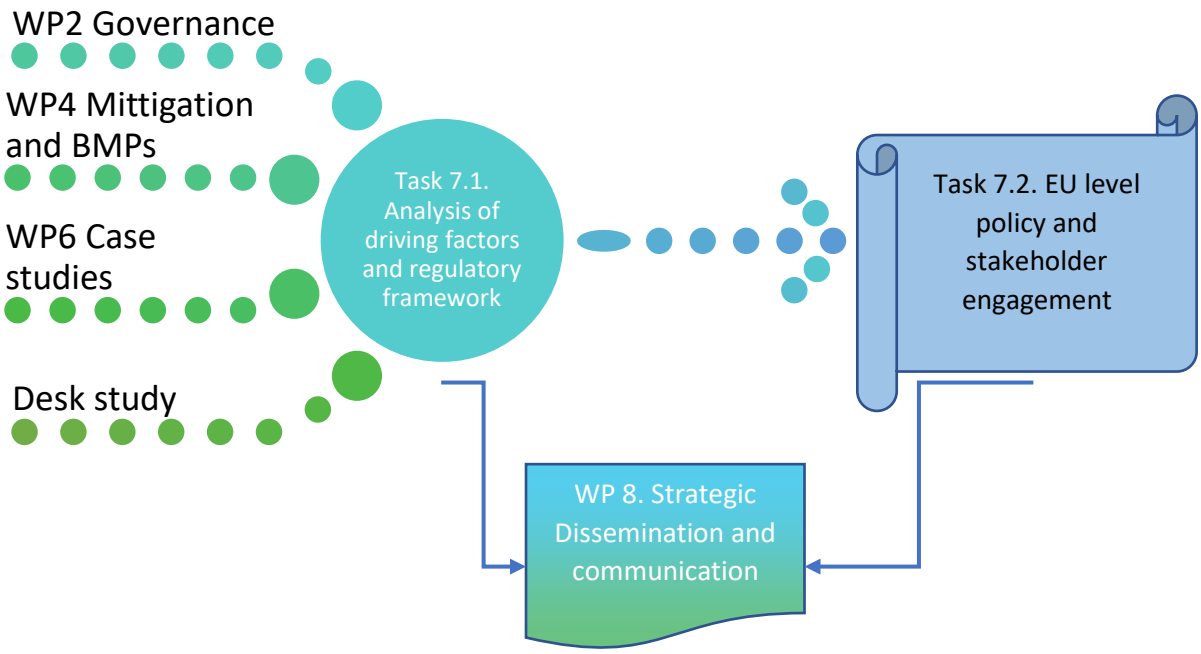

Figure 1: Links and correlations between tasks and work packages in WaterProtect

The report produces a set of policy development and implementation recommendations, based on the lessons learned for the specific pedo-climatic and socio-economic conditions in the case study areas.

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The report will contribute to building a better framework for the science/policy interface and aims to facilitate the adoption of the WaterProtect recommendations in EU policy and at national level. The policy recommendations are based on both, the interaction with relevant stakeholders at Action Lab and at European level and the specific real-life assessments made in the study areas.

Agriculture and water management go hand in hand, and within the EU policies related to these two sectors, there are many opportunities for synergies and reinforcements. However, the water and agriculture EU policies also have individual objectives and different implementation mechanisms which creates fluctuations in the depth and coherence of their coordination.

The first element worth noting is that CAP is a fully integrated policy, meaning that all decisions are taken at EU level while member states have little room for flexibility in the implementation, except for the measures under rural development pillar. Consequently, the EU legal framework is built on directly applicable regulations. On the other hand, environment policy integrates more of the subsidiarity principle, agreeing on major policy goals at EU level, while giving the opportunity to member states to decide on the ways to achieve those goals, through Directives - the legal instrument allowing such levels of flexibility in the implementation.

The main policy instruments related to water that are to be considered here are:

- EU Water Framework Directive (WFD), adopted by the European Parliament and Member States in 2000
- Directive 2007/60/EC on the assessment and management of flood risks requires Member States to assess if all water courses and coast lines are at risk from flooding and to take adequate and coordinated measures to reduce this flood risk
- Drinking Water Directive mandates minimum health standards in water intended for human consumption, making linkages with other water-related policies
- The Groundwater Directive complements the Water Framework Directive (WFD) and sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater.

As indicated by the EC staff working document " Agriculture and Sustainable Water Management in the EU"[1], the Common Agricultural Policy (CAP) 2014-2020 prioritises the 'sustainable management of natural resources and climate action' through a variety of complementary policy instruments: cross-compliance, the green direct payment, and rural development support measures.

In our analysis we will be focusing our attention on the cross-compliance requirements and on the measures included in the rural development plans that have a direct impact on water.

Directive 128/2009 for the Sustainable Use of Pesticides (SUD) is an important instrument to help achieve good water status, although broader in scope, it includes relevant measures aimed at protecting the water resources by restricting the use in certain areas and by implementing buffer zones and other measures to reduce run-off and leaching.

Nitrates Directive has also had a measurable effect on the reduction of pollution from agricultural nitrogen. The Nitrates Directive, although included in the EU water policy, is included for the purpose of this analysis in the policy frameworks that directly set rules for the agricultural activity.

[1] SWD(2107) 153 final

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As described below, several other EU policies have a rather indirect impact on water and will not be considered in this analysis. The recent EU circular economy package includes provisions like the rules for water reuse or the new rules on fertilisers that open the door to a different approach in water and nutrient management.

According to the latest evaluations, water stress already affects one third of the EU territory all year round. The European Commission has estimated that between 1976-2006 the water shortages have had a cost of over EUR 100 billion. In the "Blueprint to safeguard Europe's water resources"[2] of the European Commission in 2012, the potential of water re-use has been clearly identified.

The growing demand for water in agricultural, industrial and urban uses and the climate change impacts put continuous pressure on the EU's freshwater resources. In 2015 the Circular Economy Action Plan[3] of the European Commission, identifies water reuse as one of the priority areas and commits to develop a legislative proposal on the Minimum requirements for the reuse of water for irrigation and groundwater recharge. It is currently estimated that the potential for water reuse in Europe is around 6 billion m^3/year with a potential impact estimated at 5% - 10% reduction in water scarcity.

In 2018 the European Commission has issued a proposal for a Regulation on water reuse (COM(2018) 337 final)[4]. The proposal defines minimum requirements for water reuse in irrigation depending on the food crop and the irrigation technique and prescribes measures for risk management to protect public health and the environment. Although, not yet in force, hence outside the scope of our evaluation, this regulation will have an important role in ensuring synergies and coherence between agriculture and water management.

Related to this proposal, a report[5] commissioned by the Committee of the Regions in 2018, states that water reuse takes place in the EU, particularly for irrigation in agriculture and aquifer recharge, this practice remains limited with differing concepts, principles and procedures applied in the different Member States. It is estimated that the differences of water reuse legal frameworks across the EU may affect the free movement of agricultural products irrigated with treated waste water. The report notes that currently only five countries have compulsory standards on water reuse, respectively – Cyprus, France, Greece, Italy and Spain, while in Portugal the water reuse standards become binding only when included in water reuse permits.

In our assessment too, Water Reuse Regulation , currently under discussion , is of crucial relevance in Mediterranean Areas. For instance, in Spain, there is already national legislation (Royal Decree 1620/2007) covering this issue. The new European legislation will, if approved in the current proposed form, bring some additional elements related to the requirements for monitoring, the implementation

[2] European Commission, 2012, Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A blueprint to safeguard Europe's water resources, COM/2012/0673 final

[3] European Commission, 2015, Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Closing the loop - An EU action plan for the Circular Economy, COM/2015/0614 final

[4] European Commission, 2018, Proposal for a Regulation of the European Parliament and of the Council on minimum requirements for water reuse, COM(2018) 337 Final, 28.5.2018.

[5] Committee of the Regions, 2018, Water Reuse – Legislative Framework in EU Regions, Catalogue number: QG-06-18-232-EN-N; ISBN: 978-92-895-0997-8; doi:10.2863/846239

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of risk management plans for the reuse of water and in implementing actions to provide information to the public.

Another piece of legislation that can play a role in water management and agriculture is the Habitats Directive. Protection of habitats and the nexus with agriculture is of great relevance in the EU, and particularly in the Mediterranean Areas, where water scarcity is structural. For instance, harmonizing the water use for irrigation with the protection of wetlands and other wildlife areas (i.e., Doñana National Park, Tablas de Daimiel National Park; Ebro Delta, etc.). Another issue is the implementation of new irrigation plans in dry areas of natural protection.

Improved soil and optimal nutrient management promoted by the climate policies aimed at reducing GHG emissions could also positively impact on water quality and quantity used in agriculture. The targets on food waste will also potentially have a positive impact on water consumption, hence reducing various pressures on the water resource.

Other issues might also be considered to have an indirect impact, for example climate changes impacts on EU agriculture, with particular attention to local specificities along Europe, leading to potential land use changes (i.e., the foreseen increase of water scarcity and extreme events –droughts- in the Mediterranean area might lead to changes in the crops).

1.2 Methodology and policy evaluation framework

The value added of the current report consists in providing a clearer picture on coherence, coordination and the level of interaction between policies and the resulting positive or negative impact on the protection of water resources. Naturally, in the process, the report is also looking out for opportunities for future improvements. Analysis and evaluations on the individual effectiveness of mentioned policies in achieving their set objectives is outside the scope of this work.

This report focuses on two fundamental questions:

1. What are the interactions between the various policies as well as the coherence, exchange of information and coordination at the implementation level?
2. How the guidelines, requirements and rules in various policy instruments are translated to the farmer level?

The policies will be evaluated on the following criteria:

- ✓ Effectiveness of the exchange of information and interaction
- ✓ Coherence of the requirements, rules and guidelines (as percieved by the farmer)
- ✓ Relevance of the implementation mechanism in relation to the objectives
- ✓ Added value of coordination and synergies between policy areas

The partners that participated to the elaboration and drafting of this report have considered a couple of policy analysis methodologies. The decision was to approach this analysis using as the basis the policy cycle. Hence, the choice was to structure the evaluation arround the main stages of the policy cycle and to collate the information available in other WPs and the expert evaluations provided by partners in the Action Labs to this structure.

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The policy cycle based assessment has at the center the policy instruments, hence facilitating the formulation of specific policy suggestions and recommendations. Other methodologies (i.e. DPSIR) have at the center the characterisation of the state of resources, while the policy framework analysis is included as a response to the various pressures. It was considered in WaterProtect research group, that this might create difficulties in establishing correlations describing the effectiveness of various policy tools in delivering the expected impact on water resources.

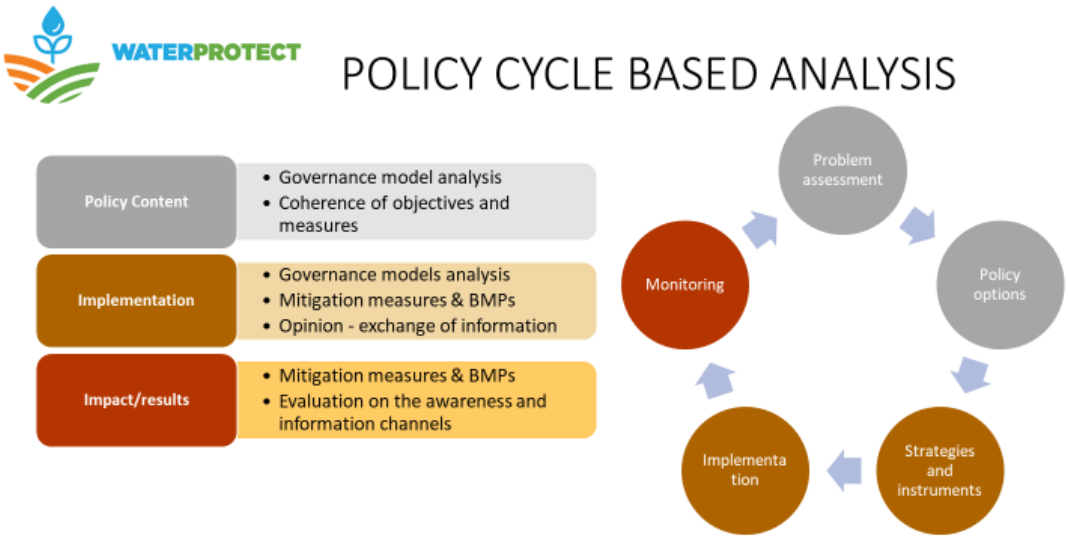

Figure 2: Policy cycle based analysis used by WaterProtect

The evaluation of the water and agriculture policies coherence, coordination and interaction has included an extensive literature review on existing relevant reports and policy documents produced at EU level and/or commissioned by EU institutions. Additionally, information was collected from the seven Action Labs of the project and previous analysis from the WP 2 and WP4 of WaterProtect were used to inform the policy analysis

The seven Action Labs (case studies) of WaterProtect cover different climatic conditions, different types of farming systems, different legal frameworks, larger and smaller water collection areas. Each Action Lab has chosen, based on the local specificities and pressures on water resources, to focus on nitrate pollution or pesticides. Hence, each Action Lab will be giving a different weight on what is considered relevant policy framework. For instance, the Belgium Action Lab has focused on pesticides, and did not discuss the nitrates directive and fertilizer legislation in the report. Romania and Poland chose to look at nitrates while Italy and Spain evaluate the situation taking into consideration both categories of pollutants, with emphasis on evaluating nitrates sources in the latter (isotopic determination to assess WWTP or agricultural amendment origin).

Availability of information or data on the efficiency and effectiveness of individual policy instruments in the Action Labs was also a concern. Hence the group opted to base the assessment on expert opinons and to collect information on the integration of water and agriculture policies in the Action Labs using a structured set of 10 key questions:

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Key question 1	**Describe, in your expert opinion, the complexity of the national regulations that are transposing the water policy related EU directives?**
Key question 2	**Do transposition instruments provide specific additional requirements /standards of water in agriculture in addition to those specified at EU level?**
Key question 3	**Does the implementation of water policy require the farmers to collaborate or exchange information with other actors that are in charge of water management?**
Key question 4	**Rural development Plans - Does you national or regional rural development plan SWOT analysis include a separate section on water resources and the interaction with agriculture? Do they have specific objectives on water protection?**
Key question 5	**Do the Rural Development plans use information from the monitoring activities under the ground water Directive and/or the Drinking water Directive? What are the main elements identified?**
Key question 6	**Are the Rural Development Plans correlated with the River Basin Management Plans (RBMPs)?**
Key question 7	**Is there any exchanges of information or common action between the National Action Plans (NAP) developed under the Directive for sustainable use of pesticides (especially the measures to prevent run-off and leaching and those for buffer zones) and the water Directive and/or the Drinking water Directive?**
Key question 8	**At farmer level in the Action Lab, the rules, guidelines or management practices to protect water resources are they coherent? How are they presented, is there any cooperation between various institutional actors in providing a clear message?**
Key question 9	**How is the adoption of mitigation measures and BMPs in each action lab encouraged by the water related and agriculture policies?**
Key question 10	**For each Action Lab, how is the potential for uptake of BMP influenced by the policies currently implemented?**

Table 1: Key questions used in collecting information from the WaterProtect Action Labs

For the evaluation, the report also builds upon the information collected in WaterProtect in other work packages:

- WP2 on the governance of water resources: to characterize the policy instruments, actors and implementation arrangements;
- WP4 on the BMPs and the current and future potential impact of the policies on the uptake of these BMPs.

Information collected from the Action Labs will be complemented with desk research on various studies adressding policy integration and coherence.

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1.3 Possible interactions within the intervention logic for water and agriculture policies

The intervention logic describes the way various elements of a policy aim at influencing the target groups towards achieving common objectives. The EU policies are developed in an intervention logic that seeks to combine various policy instruments and secure synergies to achieve a multiplier effect on the ground.

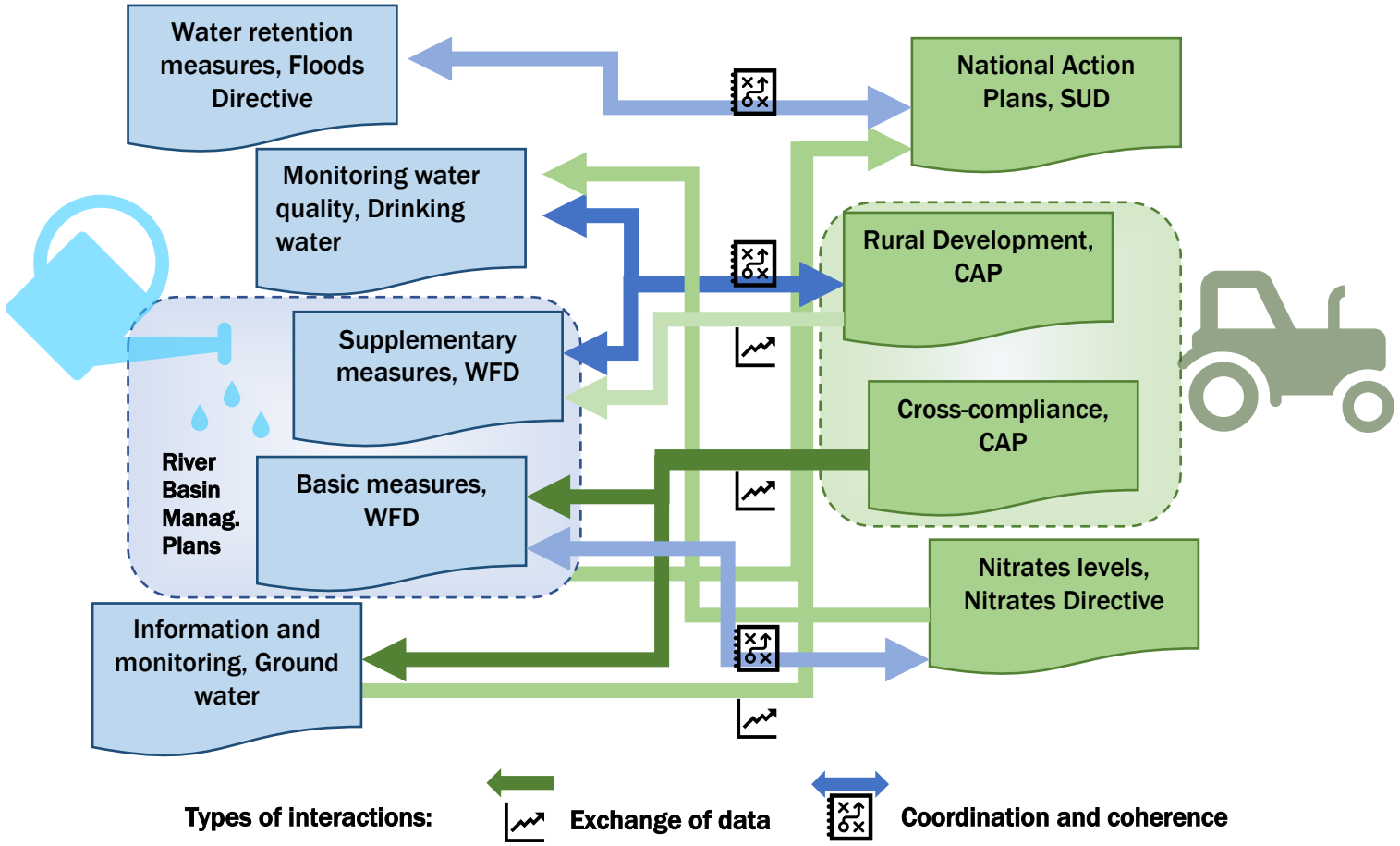

Figure 3 : Opportunities for interactions and exchange of information between various EU water and agriculture related policy instruments

However, the reality is much more complex in the territories where various specific conditions, administrative organisation or local culture and ways of working can facilitate or hinder such policy interaction. In the graphical representation above, we aim to identify major possible and useful interactions between policy implementation instruments and to assess what is the intensity and effectiveness of these interactions in the case study areas (Action Labs).

NOTE: For this evaluation we look only at the interactions between water and agriculture policies, ignoring the interactions between instruments in the same policy category. Also, although, we are fully aware that from a legislative point of view, both SUD and Nitrates Directive are policy instruments aiming at environmental protection, because these instruments are targeted at farmers; impose direct limitations to the agricultural activity and they are part of the cross-compliance system, they are considered as part of the agriculture related instruments.

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2 Coherence of the EU policies

Recognising the importance of interaction between agriculture and water policies for the sustainable management of water resources, the European Commission has published in April 2017 the commission staff working document "Agriculture and Sustainable Water Management in the EU"[6]. The document identifies that agriculture and water related policies play a substantial role at global level for the achievement of the Sustainable Development Goals.

The staff working document clearly identifies the objective to coordinate and ensure synergies between water and agriculture related policies. However, bottlenecks are also identified in ensuring efficient coordination of these policies, namely being generated by the progress in the implementation of the WFD at local level but also structural issues related to governance, economic impact and difficulty of behavioural change in water use and management.

In the above-mentioned document, the Commission has identified several areas, where increased cooperation could improve the sustainability of water management and agricultural production: policy implementation; governance structures allowing effective coordination; investment support instruments to comply with EU objectives and effective use of the existing knowledge base to innovate further towards water sustainability in the agricultural sector.

In our evaluation we have strived to reflect, even if in an empiric way, these opportunities for better coordination of the water and agriculture policies. At Action Lab level, we have looked at the policy implementation instruments and governance structures, to understand in practical terms if the water-agriculture nexus is considered and common objectives are set and promoted. Access to information about water management related challenges – at local level- and potential solutions are an important aspect reflecting the current use of the existing knowledge base, including specific local or traditional knowledge but also the innovative solutions and approaches.

The focus of the WaterProtect project on participatory governance at local level highlighting best practices but also bottlenecks and difficulties, allows an informed overview on how opportunities for better agriculture and water management coordination are exploited and what can be improved.

2.1 Water challenges in Rural Development Plans 2014-2020

In September 2016, the rural development plans (RDPs) approved by the member states for the period 2014-2020, have been assessed in a report[7] contracted by the European Commission as to establish to what extent they have considered the water related concerns. As the report describes, more than 90% of the RBMPs adopted under the WFD identify agriculture as one of the major pressures on the water resource. In addition to the basic measures under the WFD, the supplementary measures play a key role in reliving the pressure of agriculture on water. For the implementation of such measures many countries or regions rely on the resources available under the Rural Development Plans of the Pillar II of the CAP.

The report aims to assess the extent to which RDPs integrate water issues, and fund measures that can lead to an improvement in water status. This report examines whether RDPs go beyond

[6] European Commission, SWD (2017) 153 final
[7] UC12064/15955-G September 2016 © European Commission 2017 6

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compliance and offer incentives to promote good practice that can help ensure waters are restored to good status. However, this is not an exhaustive evaluation, since this report is based on quantitative statistics compiled on 52 RDPs (out of 118), covering a total of 129.3 million ha of agricultural land, including 6.6 million ha of irrigated land, and 113 billion Euros of planned public spending.

The report identifies that 87% of reviewed RDPs refer to the WFD in the SWOT chapter, while 33% of RDPs mention the FD. Most RDPs (65%) refer to the river basins relating to the RDP area and report water bodies failing good status and 54% of the RDPs clearly indicate that the information used came from the most recent Article 5 characterisation. However only 4% (2 out of 52 RDPs) mention the targets set in RBMPs for reaching good status for the next deadline in 2021.

The SWOT analysis of the RDPs is one of the core instruments for establishing programming priorities, hence the report concludes that for most of the RDPs evaluated some level of coordination takes place at the priority setting phase between the rural development actions and the water management concerns. However, in general, the RDPs do not discriminate the assessment and do not propose targeted measures for the three categories of objectives of WFD: ecological, chemical and quantitative management.

Regarding the measures – intervention strategy – of the RDPs regarding water, the report concludes that: “RDPs promote improved water management in general, they do not systematically present a stated objective to specifically support the implementation of the WFD and FD “. However, an important number of measures included in the programs have great potential to reduce pesticides and fertilisers pressures from agriculture (optimisation of product application; green infrastructures; land use management like green cover, buffer strip) and to improve on water use efficiency. The report also indicates, that: “financing of new infrastructure for flood protection, irrigation and land drainage can potentially result in the deterioration of the status of water bodies, especially when the cumulative impact of such projects is not assessed.”

About the resources budgeted in the RDPs, the analysis concludes that an important proportion of the rural development budget is allocated to relevant measure groups, hence the resources are appropriate to achieve the set objectives, although it would be desirable to have a better targeting of the measures towards WFD objectives.

In general, the report considers that:

- rural development programmes have an improved level of integration of rural development objectives with water management issues,
- the rural development plans are proposing a logical structure: identified pressures in the SWOTs - priorities set out in the strategy - measures funded,
- majority of RDPs reviewed explicitly promote improved water management in general,
- additional efforts are needed to optimise the contribution that RDPs can make to support the reaching of WFD good status and reducing flood risk,
- using data from RBMPs, there is an opportunity to increase future spatial targeting of RDP measures,
- information on flood risk and the FD is only reported in few cases, and that the focus is not on increasing the overall resilience of farms and rural areas, but on disaster recovery,

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- RDPs could do more to promote Natural Water Retention Measures (NWRM) to protect and restore the morphological quality of water bodies and reduce flood risk,
- additional context and target indicators are needed to fully track how the RDP water-related measures contribute to the implementation of the WFD.

2.2 Water and Cohesion Policy coherence

In 2017, the European Commission has contracted a report[8] to evaluate the contribution of the Operational Programmes under the Cohesion Policy to the achievement of the objectives of the EU Water Policy, specifically the Water Framework Directive and the Floods Directive. The report looks at how the authorities and stakeholders in member states have decided to allocate resources under the Cohesion Policy to contribute to implementing measures that would favour the achievement of the objectives of the two directives.

The report concludes after the evaluation of 73 Operational Programmes and 18 Cooperation programmes, that the measures included therein contribute substantially to the achievement of the objectives of WFD and FD. It is estimated in the report that for the period 2013-2020 the evaluated member states had allocated a total of EUR 14.7 bln to measures aimed at water management. The biggest share of these allocations is meant to address waste water treatment, while water conservation amount to about 20% and measures aimed at providing drinking water for the population are allocated about 12% of that amount.

For the flood prevention measures, the most common being technical or infrastructure related measures, the total identified allocation exceeds EUR 5bln. Green infrastructure, natural water retention or eco-based solutions are included as flood prevention measures in most of the Operational Programmes assessed in the report.

The Operational Programmes assessed under the report included references to the provisions and objectives of WFD and FD, taking them into account in either water management measures, climate change adaptation measures, renewable energy measures or in investment meant to prevent floods.

The report identifies that many Operational Programmes mention various good practices and innovative solutions in their approach to water management and flood prevention, supporting measures with the use of green infrastructure, eco-system approach, and natural water retention measures. Good practices and innovative solutions promoted through the measures include:

- restoration of wetlands and floodplains;
- reuse of waste water;
- innovative water saving measures;
- rehabilitation of water bodies through a systemic eco-approach;
- promotional and awareness-raising activities;
- afforestation;
- enhancing soil retention capacity;
- inclusion of flood risk issues in spatial plans;
- enhancing institutional capacity of public authorities;

[8] A. Markowska, M. Gancheva, European level report: Evaluation of the contribution of Operational Programmes to the implementation of EU water policy, Report Reference: UC12474.01 March 2017

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- research studies, including studies on climate change impacts and risks of floods;
- development of ICT solutions both for water management and for flood prevention;
- information sharing among authorities (especially in the Cooperation Programmes).

Many of these measures are suitable to be promoted for implementation using agricultural policy measures, specifically rural development.

2.3 CAP impact on water

Starting from the assumption that the quantity and quality of water are some of the most relevant environmental and economic concerns in agriculture, recently the European Commission has launched a roadmap[9] for the evaluation of the impact of the Common Agricultural Policy (CAP) on Water.

According to the documentation published: "The evaluation should provide a full view on how the CAP instruments are performing against the objective of sustainable management of natural resources and climate action as regards sustainable water management in terms of quantity and quality. The evaluation will contain a description of the different ways in which the CAP instruments influence these parameters. In the assessment, specific attention will be put on the interrelation between agricultural legislation and the relevant environmental legislation that have an impact on water status (e.g. the Water Framework Directive, Nitrates Directive and the Sustainable Use of Pesticides Directive)."

The evaluation will cover all CAP instruments under the 2014-2020 CAP with a specific focus on the direct payments support schemes as well as the Rural Development measures. The evaluation will also look at the internal coherence of the whole CAP with regard to sustainable water management.

Based on a solid and rigorous analysis the evaluation will have to provide answers for the five evaluation criteria: effectiveness, efficiency, relevance, coherence and EU-added value in order to make founded judgements available and to put forward reasoned conclusions for the further development of the CAP in respect of a long term sustainable management of agriculture with the focus on water management.

The evaluation will start in 2019 and be complemented by several stages of consultation of expert groups, citizens and stakeholders. The roadmap is expected to reach its conclusions in the first quarter of 2020.

[9] https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-5223861_en

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3 EU policies implementation and strategic framework at national level

3.1 Complexity of the national implementation framework for EU water related regulations

The implementation of the EU legislation at national level is often influenced by the political context, administrative or organisational specificities, history or culture. Here are some examples of implementation arrangements that impact on the effectiveness of policies and on their coordination and coherence at national, regional and local level.

3.1.1 Polish Action Lab

From the 1st of January 2018 the new Water Law Act applies, which fully implements EU directives in the field of water governance and introduces significant changes to the organisational structure of institutions responsible for water management in Poland. Such changes include: moving responsibilities for water management between different ministries, introduction of a new state-owned company called the *Polish Waters*, revision of river basin districts, introduction of water fees, etc.

In addition, further changes to related legislations were introduced, or are in a process of being agreed. This for example concerns the organisational structure of the Inspectorate of Environmental Protection and its divisions responsible for controlling the state of the environment and implementation of BMPs.

Not all areas of water management have been agreed yet and are fully operational. Changes that have been introduced to the law have generally little implementation on the ground yet, mainly due to the lack of executive regulations being agreed, hence it is difficult to describe the existing governance model in a comprehensive manner.

The most important change of the system is amassing of all rights and responsibilities for water governance into one organisation called the *Polish Waters.* The *Polish Waters* is no longer a governmental administration, it is a state-owned company with a public legal person status with authorisation to undertake administrative decisions. Before these new regulations, responsibilities were split between three separate levels of governmental administration at national, regional (province) and local (commune) levels. Supervision of the *Polish Waters* lies within responsibility of a ministry responsible for water governance (Ministry of Water Management and Inland Navigation).

The *Polish Waters* is financed mainly from water fees and has a very large spectrum of responsibilities at different areal scales. For that reason, *the Polish Waters* include operational authorities at state, regional and local levels respectively. These are the National Water Management Board, Regional Water Management Boards, Management Boards of Catchments and Water Supervisions.

The Ministry of Water Management and Inland Navigation, as a competent state authority in matters of water governance, is also responsible for developing programmes of measures (PoMs) to decrease water pollution with nitrates originating from agricultural inputs. From the 1st of January 2018 these measures apply to the entire area of Poland (previously only ca. 5% of the country – the Gowienica

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catchment was included) and shall be enforced based on an executive regulation by the Cabinet. The programme of measures was officially published on the 12th of July 2018.

On a local level, communes are local authorities responsible for water supply for the commune's inhabitants as well as wastewater facilities or, if not available, control of proper wastewater management by individual users.

Water producers are companies that belong to local authorities. They are established to produce water and ensure its good quality and quantity. According to recent changes to water regulations, water abstraction licences are given based on decisions of respective (depending on an amount of water to be abstracted) either River Basin Management Boards or Management Boards of Catchments.

For all communal water intakes it is required to undertake a risk based analysis within its zone of contribution/recharge zone, aimed at identification of hazards to the quality of abstracted water, resulting from land use and land development. Such analysis has to be undertaken by water producing companies using hydrogeological or hydrological methods and is submitted to a respective province governor. Based on results of the risk analysis, a water producer or, in case a water producer have not done so – RBMB/MBC, can apply to a province governor for establishing a protection zone (PZ) for an intake, where special rules of land management apply. PZ are legally established by the power of provincial law; however they need to be consulted with respective RBMB/MBC. Cost of establishment of a PZ, as well as compensations for restrictions to land use resulting from implementation of a PZ lay within responsibilities of a water producer.

3.1.2 Italian Action Lab

Regarding the water/agricultural regulatory framework the Italian case analysis must take into account the following defining elements:

- a territory characterized by a very articulated natural hydrographic network and by a particularly complex orography;
- a very extensive artificial water network, especially in some regions, which modified the natural hydrographic network and the relative availability of water resources according to the territorial distribution of demand;
- is the European country where the most amount of tap water is consumed: between 2014 and 2015 every Italian citizen consumed 243 litres of public water a day, more than double the European average (120 litres) (source European commission RIF 2018 1011STO15887: 19-10-2018)
- a complex administrative organization;

Below a description of the main difficulties that have led to some inefficiencies and ineffectiveness of policies related to water and rural development in Italy.

From the river basin concept to the river district concept: In Italy, in advance of European regulation, in 1989 the national Law 183/1989 already established the Basin Authorities, introducing for the first time in Italy the principle according to which the protection of the soil and of water resources must take place not on the basis of administrative boundaries but on the scale of the basin catchment. The national, interregional and regional catchment areas and the respective Basin Authorities were

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established. More in details were established 6 National Basin Authorities (Po, Adige, Upper Adriatic, Arno, Tevere, Liri-Gariagliano and Volturno), 16 Interregional Authority (11 on the Adriatic side, 5 on the Tyrrhenian side) and all watersheds that do not fall into the previous categories were classified as Regional (as Sicily).

From the conceptual point of view, for the first time, planning and programming were entrusted to an entity (Basin Authorities) whose territory had been delimited not on political basis, but with geomorphological and environmental criteria.

The Legislative Decree 152/1999 "Provisions on the protection of water from pollution", transposes the community directives 91/271 on urban wastewater treatment and 91/676 on the protection of waters also against pollution by nitrates from agricultural activities and re-organises and extends the legislation on the protection of water from pollution by introducing, among others, vulnerable areas (for nitrates, plant protection products, drought and desertification) and sensitive areas.

The Water Protection Plan (or Piano di Tutela) was adopted by the Regions, which are primarily responsible for the survey of the quality of the water bodies and for the indication of the necessary interventions and priorities, which must then be submitted to the binding opinion of the Basin Authority.

From an administrative point of view, the Basin Authorities, established by law 183/89 "*on the soil protection",* articulated by River Basin, certainly constitute the Italian reality closest to the territorial and administrative design of the Districts, that will be required in the Water Framework Directive.

Indeed the 183/1989 introduced for the first time the concept of river basin as "The territory from which the rain or melting waters of snow and glaciers, flowing to the surface, are collected in a given watercourse directly or by means of tributaries, as well as the territory that can be flooded by the waters of the same course water, including its terminal branches with the mouths at sea and the maritime shoreline facing ".

Directive 2000/60 introduced, as the main physical unit for the management of river basins, the concept of the river district as an "area of land and sea, consisting of one or more neighbouring hydrographic basins and their respective groundwater and coastal waters. ".

Thus the concept of a water catchment area in the year 2000 with the WFD passed from *a physical entity of territory*, within which it was necessary to provide unitary and coherent planning and programming, to the concept of *hydrographical district as a physical unit* that could involve the unification of basins neighbours in relation to the need to manage and rationalize the water resource (thus the possible unification of river basins between which surface or groundwater interchanges could occur).

In view of this technical foundation, Legislative Decree 152/2006 which implemented the WFD (directive 2000/60/EC) has made a series of mergers, cancelling all regional and interregional basins and subdividing the national territory into macro areas.

Until 2017, the Basin Authorities could be considered as planning and not management bodies. The Basin Authority has the task of defining on a basin scale the objectives and priorities that the regions must consider for the preparation of protection plans (Article 44 of Law 152/99).

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So, in our reality the Regions played the prominent role, and are protagonists of the governance of water resources. After 17 years from the Water Framework Directive 2000/60 / EC, the year 2017 represents for Italy the year of implementation of the new district governance with the establishment and operational start-up of the new district basin authorities. Law 22 December 2015, n 221 has ordered the amendment of several articles of Legislative Decree 152/2006, in particular Articles 63 and 64. The new discipline of the district basin authorities contained in the "so-called Collegato Ambientale", made available to the Ministry of the Environment the regulatory instruments to finally implement the reform of district governance on water and soil.

On February 17, 2017, the Decree 294 of October 25, 2016 entered into force (Official Gazette of February 2, 2017) and all Basin Authorities expressed in the 183/89 were abolished as required by Law 221/2015 A long-awaited reform since the Legislative Decree no. 152/2006 (the so-called Environmental Code), which implemented the WFD (directive 2000/60 / EC) in Italy and which regulated expressly in the art. 63 and 64 regarding the establishment of the district Authorities, remained for various reasons rejected.

This has led to inevitable voids of power and, at the same time, overlaps of skills that have in fact further weakened the entire institutional set-up.

In synthesis: the main problems in Italy concerning the integration of water resources policy in agriculture is given by the different territorial level of reference to which policies operated. Regarding water resource, since 2000, the only reference should be the river basin district and its sub-basins, but only in 2017 was realised the implementation of the new district governance and operational start-up of the new district basin authorities; the sustainable management of resources in agriculture, which still represents a major focus of rural development policies, follow a regional programming and, therefore, lose sight of a number of issues due to the presence of inter-regional river basins.

3.1.3 Irish Action Lab

The following sections aim to elucidate the complexity of the national regulations and frameworks in Ireland that are responsible for transposing EU water policies into law. This assessment focuses on how these policies are implemented with respect to the agricultural sector and the levels of coherence and synergy present.

Organisational framework

An overview of the organisational framework surrounding the regulation and management of water resources in Ireland with respect to agricultural production is presented in Figure 4. The Figure illustrates a tiered approach, beginning with the relevant government departments and state enforcement bodies (colour coded red e.g. Environmental Protection Agency and Pesticide Control Division) responsible for transposing EU water policy into practice.

Irish Water[10] (blue) is the national water services utility responsible for the provision of drinking water and treatment of wastewater in Ireland. Irish Water (a subsidiary company of Ervia) is regulated by

[10] Irish Water (2018) About Irish Water. Available at: https://www.water.ie/about-us/our-company/. (Accessed 12th October 2018).

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Commission for Regulation of Utilities (CRU) for economic matters, while the EPA is the environmental regulator which sets standards and enforces compliance with EU and National Regulations for drinking water supply and wastewater discharge to water bodies. The EPA liaises with the Health Services Executive in matters of public health (Irish Water, 2018). This is discussed below with respect to pesticides.

Green boxes represent various research and advisory bodies. Teagasc, the Agriculture and Food Development Authority, is the national body providing integrated research, advisory and training services to the agriculture and food industry and rural communities. The Agricultural Catchments Programme, run by Teagasc and funded by the Department of Agriculture, Food and the Marine, is a multi-disciplinary team evaluating both the environmental and economic effects of the Nitrates Directive and developing science-based solutions for Ireland's water quality challenges.

Governance structures aimed at improving water quality have evolved significantly in Ireland in recent years. The Local Authority Waters Programme, previously called the Local Authority Waters & Communities Office, is a shared service working with Local Authorities and State Agencies to develop and implement River Basin Management Plans in Ireland, as required under the EU Water Framework Directive. The programme consists of two teams; Communities Team and Catchment Assessment Team, both of which operate from 13 different Local Authority centres across the country. The Communities team works with communities to encourage and support actions to protect and improve water quality locally. The Catchment Assessment Team will carry out assessments to get a more detailed understanding of the issues impacting on water quality in the priority Areas for Action. It will set out and give a timetable for the measures to be used to address issues identified.

The new Agricultural Sustainability Support and Advisory Programme (ASSAP)[11] has been established in conjunction with this to provide free direct advice to farmers operating in the areas for action (Glanbia, 2018). The figure proceeds to and concludes with the consumers, namely householders and farmers (grey), and various other industry groups including the Irish Farmers Association and Co-operatives (orange).

It must be noted that while this diagram conceptualises the structures in Ireland, it is by no means exhaustive. While linkages and channels between bodies are illustrated, in practice, interaction and communication is likely/possible between all groups listed.

[11] Glanbia (2018) Agricultural Sustainability and Support Advisory Programme (ASSAP). Available at: https://www.glanbiaconnect.com/farm-management/detail/all/agricultural-sustainability-and-support-advisory-programme. (Accessed 12th October 2018).

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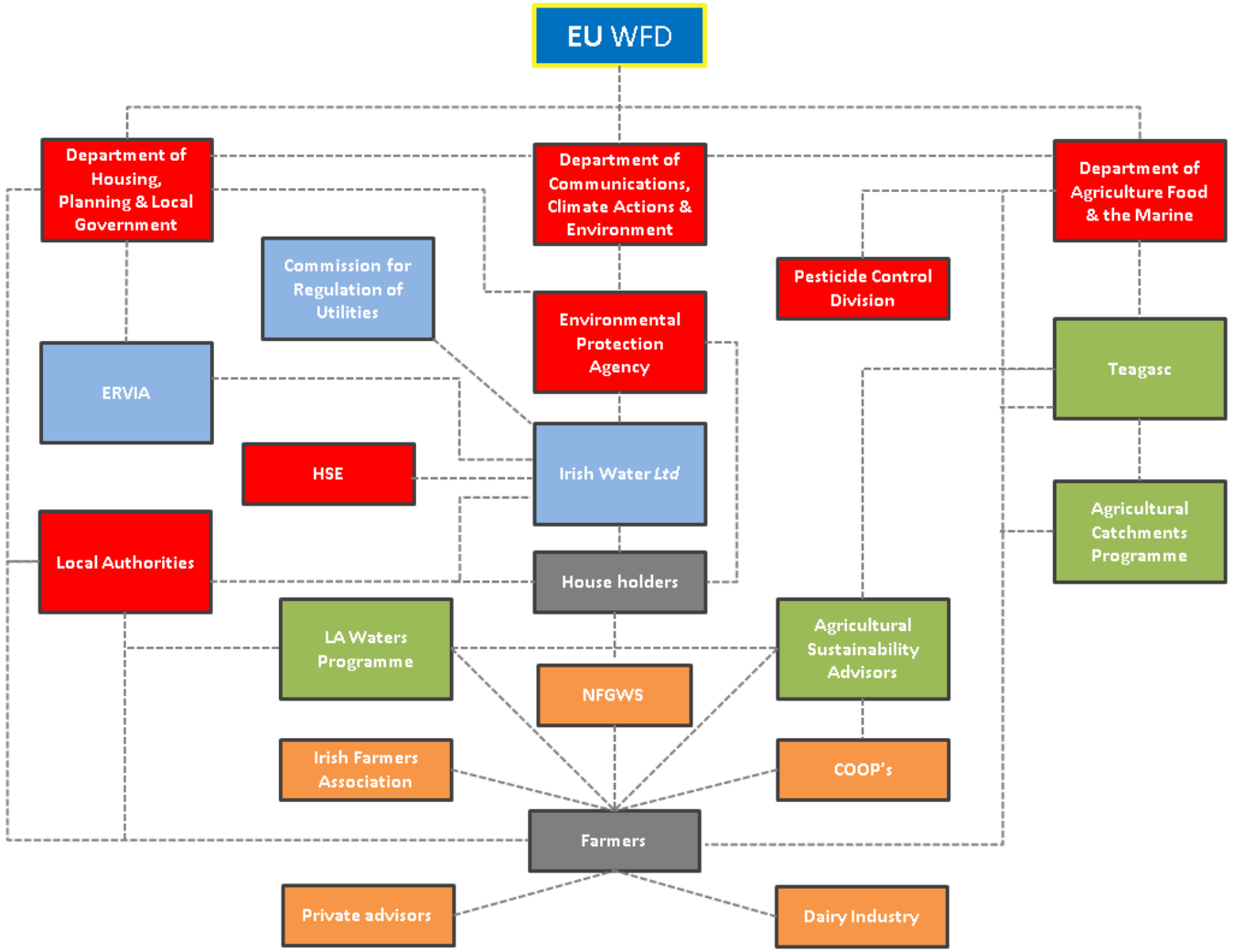

Figure 4: The organisational structures surrounding the regulation and management of water resources in Ireland with respect to agricultural production

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Pesticides: regulations and enforcement

In Ireland, with respect to pesticides, the European regulations and directives are implemented via number of statutory instruments, as reviewed by the DAFM[12] (see Table 1).

Table 2. European legislation and the measures for implementation in Ireland (after DAFM)

E.U Regulation / Directive	Implementation in Ireland
Regulation (EC) No. 1107/2009	Statutory Instrument No. 159 of 2012
Sustainable Use Directive 2009/128/EC	Statutory Instrument No. 155 of 2012
Regulation (EC) No. 1185/2009	Statutory Instrument No.159 of 2012
Directive 2009/127/EC	Statutory Instrument No. 310 of 2011
Regulation (EC) NO. 396/2005	Statutory Instrument No. 565 of 2008

In Ireland, Pesticides are regulated by three divisions of the Department of Agriculture, Food & the Marine (DAFM). These divisions are the Pesticide Controls Division (PCD) (see Figure 4) and the Pesticide Registration Division (PRD), collectively known as the Pesticide Registration and Controls Divisions (PRCD), and the Pesticide Control Laboratory (PCL). Their primary aim is to ensure the safe use of pesticides in order to protect the health of people, wildlife and the environment.

Specifically, the PCD is responsible for implementing the regulatory system for plant protection products (PPPs). The PCD is also responsible for the national regulations controlling pesticide use. The PRD is made up of five expert units consisting of the Chemistry Unit, Ecotoxicology Unit, Efficacy Unit, Environmental Fate and Behaviour Unit and the Toxicology Unit. The units evaluate pesticides with respect to their impact on human and animal health and the environment, to ensure that they are safe for use. The PCL monitor pesticide residues in food and feed to ensure that food on the Irish market is safe to eat and complies with legislation. If residues detected in food are considered to be harmful to the consumer, the produce is removed from the market and may be destroyed if necessary.

In Ireland, information on pesticide products and their approval status can be obtained from the national registers for plant protection and biocidal products. The product registers contain details of authorised PPPs for sale and use on the market in Ireland.

Water quality monitoring

In response to the European Communities (Drinking Water) (No.2) Regulations 2007 (S.I. 278 of 2007), the EPA produced a guidance for Water Services Authorities (WSA) on the legislative requirement for their monitoring of pesticides in Public Water Supplies[13] . Under regulation 3(1) the EPA is defined as the supervisory authority for all public water supplies supplied by WSAs. All Water Services Authorities (WSA) are required to monitor (sample and analyse) public water supplies subject to approval and enforcement by the EPA. Note, this structure is highlighted in Figure 4.

[12] Department of Agriculture, Food and the Marine (DAFM) (2018), Review of the Irish National Action Plan for the Sustainable Use of Pesticides (Draft) Available at: http://www.pcs.agricul ture.gov.ie/sud/reviewofnationalactionplanforthesustainableuseofpesticides-2018/ (Accessed 12th October 2018

[13] Environmental Protection Agency (2010) A Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies. Johnstown Castle: Wexford

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Measures to reduce pesticide concentrations in the raw water should be taken, where practicable, including enforcement of the pesticide regulations in conjunction with DAFM and education of pesticides users. It is also recommended that the WSA consult with the Pesticide Registration and Control Division (PRCD) of the Department of Agriculture, Food and the Marine (DAFM) with regard to the usage of pesticides in the catchment. The WSA must notify the EPA of the non-compliance.

While WSAs are required to monitor public water supplies, the EPA carries out routine monitoring of streams, lakes, rivers and groundwater across Ireland. The EPA produces a series of reports pertaining to drinking water supplies (results from WSAs) and the implementation of the national monitoring programmes for streams, lakes, rivers and groundwater in accordance with its statutory responsibilities.

3.1.4 Romanian Action Lab

The River basin management plans dictate the actions to be carried out in each region and action implementation fall under the responsibility of National Administration “Apele Romane”, with its subsidiary regional branches.

At national level, the principles of water protection against nitrate pollution from agricultural sources comply with Directive 91/676 / EEC - the Nitrates Directive. The Commission for the Implementation of the Action Plan for the Protection of Waters against Nitrate Pollution from Agricultural Sources consists of specialists from the Ministry of Environment, Ministry of Waters and Forests , the Ministry of Agriculture and Rural Development and the Ministry of Health..

The National Administration "Apele Române" (ANAR) manages the waters in the public domain of the state. ANAR also implements national legislation on the sustainable management of water resources and the conservation of aquatic ecosystems and wetlands in line with EU requirements.

In each county and in Bucharest there is an Environmental Protection Agency (APM) and a National Environmental Guard (GNM) County Commission. Each of these units has inspection and control responsibilities in accordance with the environmental protection law and the organizational and operational regulations in force. These environmental inspectorates are needed to evaluate compliance with the requirements of the directives and to take coercive measures.

APIA (Agency for Payments and Intervention in Agriculture), AFIR (Agency for Rural Investment Financing), ANF (National Phytosanitary Authority), ANSVSA (National Sanitary Veterinary and Food Safety Authority) have the obligation to inform farmers about the observance of the nutrient reduction measures.

National Agency for Agricultural Consultancy (ANCA) together with the County Directorates for Agriculture and Development Rural (DADR) offer consultancy and information to farmers on how to implement the requirements of the good agricultural practices code.

Agricultural lands are monitored with regard to the level of nutrients in soil and the amount of fertilizer applied, but the network between the stakeholders performing monitoring and control is deficient; in addition laboratory equipment and sample collection are too old and insufficient.

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3.2 Coherence and coordination of the national transposition legislation

Key question 1: Describe, in your expert opinion, the complexity of the national regulations that are transposing the water policy related EU directives? *Aspects to consider: how complex or simple is the regulatory framework; how coherent are the provisions; are there any contradictions that you are aware of; how clear are the objectives and the means to achieve them; are they communicated "as one standard" to the farmers or on the contrary the communication is fragmented between various regulations.*

In general, the implementation arrangements for the EU water policy at national, regional and local level are judged to be complex. Such arrangements are very much influenced by the administrative organisation of each country and by the history of water regulation, but also by the culture of participatory policy making and public consultation.

Provisions and national level requirements on water protection are considered to be generally coherent and no contradictions between objectives or measures for their implementation were identified. However, the complexity of the implementation arrangements translates into a difficult communication on the objectives and the related means or measures in place for their achievement.

Here are some examples of issues in application of Directive 2000/60 / EC in **Italy**, as highlighted by the European Commission, in the EU Pilot case 7304/15/ENVI, where clarifications and information were asked on the following issues[14]:

- Insufficient coordination in the implementation of the directive

The European Commission raised doubts about the existence of an appropriate coordination mechanism to ensure that the objectives of the directive are pursued throughout the river basin district, as required by Article 3, paragraph 4 of the Directive. According to the European Commission, the assessment of River Basin Management Plans (RBMPs) would show significant differences in the implementation of the Directive within the different Italian river basin districts, with important differences in the approach followed by the regions for implementation some key points of the Directive, such as the assessment of pressures and impacts, monitoring programs, the modalities with which the objectives and programs of the measures were established.

- Incomplete monitoring and incomplete assessment of the status of water quality

In Italy, monitoring activities are organised on a regional basis; therefore, the inclusion of a substance in the monitoring list depends only on the decisions of the regional authorities responsible for the monitoring activity. But our agriculture also varies a lot across the territory. In general, agriculture cannot be defined ''regional'', high regional variations in crop distributions occur throughout Italy. This ''regional'' crop variability is strongly related to differences in climate which greatly influence the type of pest to be controlled (and the type of PPP to be used). Knowledge of the regional characteristics of the territory and of the type of crops are therefore key parameters for a correct planning of a national reliable monitoring.

[14] (from http://www.senato.it/japp/bgt/showdoc/17/DOSSIER/0/1044946/index.html?part=dossier_dossier1-sezione_sezione14-h2_h216)

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Finally, a preliminary set of information are needed to plan monitoring campaigns, both for selecting pesticides to be included in the list of monitored substances (leaching potential, loading rates, availability of analytical techniques) and to define the number and the spatial distribution of sites to be monitored and the sampling frequency (hydrogeology, agronomic practices, climate and soil properties). However, such information is not always easily available. In addition, the high economic costs of monitoring often limit the density of monitoring sites and influence a proper implementation of monitoring plans. (A.Di Guardo et al 2016)[15]. However, it should be considered that, according to the WFD, monitoring programs should be aggregated considering the River Basin Districts. The assessment by the European Commission of the RBMPs would have revealed important shortcomings in monitoring programs aimed at defining the status of water quality, in accordance with Article 8 of the Directive, which requires States to draw up programs to monitor the state of to define a coherent and global vision of the state of the water within each river district.

In Belgium, knowledge on water policy and agriculture related requirements is very dependant of the background of the stakeholder and how familiar he/she is with legislation and regulations related to agriculture and water. The protection of water from PPP pollution is, in general in all evaluated Action Labs, laid down in several laws at national and regional level, each of which generates a series of obligations in terms of monitoring, standards, reports and mitigation measures. The complexity of the application of these obligations calls for harmonisation. The objectives and the means to achieve them should be clear and feasible for all actors.

In general, water authorities do not talk about water quality measurements or regulations to farmers directly. They publish on their website or disseminate information through farmers associations and farmers advisory services. These stakeholders bring the message to farmers in form of meetings and publications. In the case of the Belgian Action Lab, for example, with the exception of the results of the water quality measurement and the obligation of 1m buffer strip along water courses, most of the requirements are not communicated directly to farmers.

For stakeholders, especially farmers, it is difficult to have a holistic image on the status of the water resources and to be completely and timely informed on the available actions and measures that can be implemented to improve their status. Communication is often fragmented between the different water policy areas and instruments and it often relies on passive communication (websites, reports) and the use of informal channels (advisory services, associations).

The WFD was a true change of paradigm in the water legislation. As such, some of the mechanisms foreseen (Public Participation, etc.) took time to be assimilated and were not exempt of public debate. After ca. of 20 years, nowadays we are in the “third round” of River Basin Management Plans (RBMP), it seems that the process has become smoothed and is well accepted by the citizens. However, still contradictory situations occur between local agricultural policies (i.e., irrigation plans) and WFD implementation.

Participatory approaches are implemented in all Action Labs as required by the WFD, but awareness amongst farmers on the status of the water resource and the ownership of the process varies greatly. If in some cases management of water resources is delegated at local level, in other cases the management and consulatation of stakeholders is done at higher levels of agregation, regional or

[15] A. Di Guardo, A. Finizio, A moni-modelling approach to manage groundwater risk to pesticide leaching at regional scale. Science of the Total Environment 545–546 (2016) 200–209

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national. There is no single recommended solution, but the objective should be to ensure proper participation of stakeholders, efficient flow of critical information and involvement in the decision making process of all stakeholders, including farmers.

The Danish water regulatory framework is to a large degree influenced by EU regulation, in particular the water framework directive (WFD), the directive on drinking water quality, and the groundwater directive. The directives are implemented mainly through three laws and their associated statutory orders: 1) The law on water planning, 2) The law on water supply and 3) the Water sector law. There is not a direct one-to-one translation from the three directives to the three laws, but the laws and regulatory demands are relatively straightforward to understand. However, to obtain a full overview of the content of each law and the specific connection between the national demands and the European directives is an expert matter.

In the laws the objectives are stated rather clear and each law specifies the mean to achieve the objectives. The municipality is the local responsible for the implementation. One of the specific demands is the development and implementation of the water action plan. This plan is to be developed in an open and transparent process.

For each of the 23 main river basins in Denmark there has been appointed member of the so-called Water Councils. They are made in order to assure public participation in the water planning process and to serve as an advisory board for the planning authorities. The Water Councils also serve as communication forums between stakeholders and authorities. As farmers and farmers' associations are represented in the Water Councils they also have a platform to be well informed about water planning. As the overall demands for water are part of the water action plans it is fair to say that the objectives of laws are mainly communicated as one standard.

In Romania, water management is done in an integrated manner (quantity-quality, surface-underground) on the level of hydrographic basins. At the level of each hydrographic basin (or, in some cases, groups of hydrographic basins) there is a basin management directorate of water management that makes effective management of water resources, according to the basin programs set out in the basin management plan. In line with the requirements of the Water Framework Directive, GD no. 1212/2000 was approved stating the organization and functioning of the River Basin Committees.

In Romania the general legislation and regulatory framework for water management is the Environmental Protection Law no. 137 of 1995 and the Water Law no 107 of 1996, with subsequent amendments. Additional rules and regulations are included in secondary legislation in the field, including rules on the protection of water sources, obtaining water-related permits or complying with notification obligations, investigating the pollution of groundwater and remediation thereof, etc.

Meetings are held in the Committees by Basin in order to consult interested stakeholders and the public on their activities in the context of the implementation of Basin Management Plans.

Nevertheless, in Romania, consultation is still a process that needs to be learnt and few people were interested to participate in the consultation, mainly specialized NGO's or directly interested stakeholders and less other categories like farmers. Compared to the 1st planning stage for the RBMP, the second one involved more instruments for capturing citizen's interest.

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Key question 2: Do transposition instruments provide specific additional requirements /standards of water in agriculture in addition to those specified at EU level? *Aspects to consider: What are the main additional requirements? and if, additional requirements are established in a consultation process with the stakeholders or are they top-down?*

EU Directives are completed by local state legislation. For instance, in Spain is of paramount relevance the legislation regulating the use of reclaimed water in agriculture (Royal Decree 1620/2007). Whereas European Legislation constitutes the basic pillar of legislation in member states, it is transposed and implemented by local structures. For instance, the River Basin Management Plans (RBMPs) and Programmes of Measures (PM) required by the WFD, are developed and managed by the water authorities and are obviously specific for each basin.

In other countries too, there are a number of requirements in relation to use of water in agriculture mainly connected to the EU directives. These demands are rooted to the EU legislation and pertain to e.g. protection of groundwater, buffer zones around water bodies, and management of water.

In Italy, in general additional regional requirements usually are decided top-down, generated by the territorialization of critical issues linked to the water resource, done with the use of pressure indicators, GIS and cluster analysis

In Italy, in 2013 an interesting work was conducted by INEA[16] to bring the WFD measures closer to the territory and to link them to the specific critical issues to be solved. The study offers a tool to support policies, which integrates the needs of agriculture with the objectives of the WFD and vice versa and that allows the Regions, in drafting of the Rural Development Plans (Piani di Svuppo Rurale), to integrate the EU environmental objectives in a more targeted way. The results of this study assist in the identification of measures linked to territorial needs increasing, on the one hand, the degree of effectiveness of policies, and on the other, the attractiveness of the measures to the farmers.

One proposed option is to identify a set of multi-objective measures, which can have positive effects on the environment from several points of view. For this purpose the document suggest to adopt a holistic approach, taking into account the combined agronomic and environmental aspects, also taking advantage of the technical assistance systems available for farmers.

In the Belgian Action Lab, there are additional requirements/rules on water use on regional and local level. For example, In some regions water boards are active (so called 'Polders'), and farmers have to ask for permission to use water. There are also several additional regulations on the use of pesticides and the prevention of the water pollution. In the national approval process for plant protection products, additional conditions for use of certain products can be imposed based on the surface / ground water monitoring data (Eg. for the active product Terbutylazine a grass buffer strip of 20m along the watercourses is required in Belgium since this product is very often found in water courses above the standards).

The government (FAVV) can control if the conditions for use of the products are met. Other additional requirements are introduced by commercial quality standards for farmers such as Vegaplan and Global GAP. Independent inspection bodies control farmers if they meet the quality standards. Since

[16] Territorial analysis of critical issues: tools and methods for the integration of water policies - INEA 2013 MiPAAF - Project "Monitoring and addressing of the irrigation sector planning in relation to the Water Framework Directive 2000/60 (DQA) and the trend of climate change"

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many distributors demand compliance with these quality standards, in Flanders 77% of the farmers met the Vegaplan standard.

For the Danish Action Lab, the additional requirements/rules are mostly monitored and implemented through the agricultural policies and the attached monitoring mechanisms. Some spatially differentiated national policies are also implemented through the regulation concerning approval of livestock productions. For example, surface water policies are implemented at the level of smaller catchments averaging 1 500 hectares in area.

Key question 3: Does the implementation of water policy require the farmers to collaborate or exchange information with other actors that are in charge of water management? *Aspects to consider: What kind of information exchange or consultation takes place? And if there is a formal evaluation where the agriculture sector is assessed on the performance?*

High amount of data regarding water quality are currently routinely collected and in the last decades by various institutional actors. There exist data regarding microbiology and physical-chemical and quality-related parameters. However, there are current gaps in data sharing: although legislated parameters are shared among different institutions, the inclusion of research project results in a common database and open access of not regulated parameters is still not implemented. Research data are only available through scientific publications or project reports.

In Spain, public participation mechanisms foreseen in the WFD include all end-users and stakeholders (the farmers, among them). Their requirements and interests are gathered by the water authorities, and finally harmonized and reflected in the respective River Basin Management Plans, which are submitted to the Parliament for discussion and approval.

According to the Spanish Water Act, agriculture practitioners may organize themselves as “communities of users” under the supervision of the water authority. Water uptake concession permits are issued by the water authority to the community of users. Among other duties, they must monitor their water use (mostly in quantitative terms, but also qualitative) and even pay for the use and maintenance of public infrastructures.

In Poland, public participation is generally poor. Although public data is free of charge and available on request, its accessibility to farmers is limited. This is mainly due to the fact that farmers do not know water monitoring data exists and that they can have access to them. Public authorities do not provide open assistance to this information, do not distribute monitoring data. Although there are public consultations organised during developing RBMPs these are mainly done by various institutions and authorities, research groups, but rarely with the involvement of the society at large.

For the Italian Action Lab the Piacenza Consortium plays an important role in the territory for water managements and sustainable agriculture, responding to the challenges of climate change supporting as possible modern irrigated agriculture (stimulating the adoption of high efficiency systems) and infrastructure. Problems related to water management are not related to the lack of dialogue between the parties, since this aspect is already rooted in the local culture.

One of the main limiting aspects, is the complex and antrhopized environment where the return to original naturalness is not conceivable nor feasible. Water management and irrigation is a crucial service for the community. It is no longer possible to deal with "environmental challenges" as

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independent issues. It is essential to adopt a multidisciplinary approach and should not be overlooked aspects that can strongly influence the efficacy of the process as:

- the cultural background and the ability to operate in the territory,
- the degree of difficulty of the environmental challenges,
- the responsibility that is not currently shared between the parties involved.

In Romania, farmers do not have access to a database on environmental conditions and standards. As part of public consultations on Hydrographic Basin Management plans for example, all interested people are welcome to participate. There are some official meetings at county level, publicity on EPA and National Administration Apele Romane web pages, but no real consultation reaches farmers.

In Belgium, meetings are organised between water policy makers and (agricultural) stakeholders. However, further enhancing open communication and exchange of information should improve the situation, but not only from the farmers, also the water policy makers and water companies need to collaborate and exchange information.

3.3 Effectiveness of exchange of information at the strategy development phase

Key question 4: Rural development Plans- Does you national or regional rural development plan SWOT analysis include a separate section on water resources and the interaction with agriculture? Do they have specific objectives on water protection?

In Italy, the Emilia Romagna Region selected and involved an ex ante evaluator from the early stages of the development process of the 2014-2020 RDP program. An analysis was carried out on the socio-economic context, agriculture and rural territories, aimed at identifying the intervention needs in preparation for the definition of the Rural Development Program of the Emilia-Romagna Region 2014-2020.

The analysis, that include also SWOT analysis, was carried out with specific reference to the six priorities of rural development and the related focus areas[17]. RDPs often show SWOT analysis that is generic, often without a clear hierarchy of relevance, with the consequent statement of generic objectives and the definition of performance indicators that are difficult to measure.

Problems in the application of the Rural Development Plan (RDP) mainly relate on the fact that multiplicity of objectives requires a multiplicity of instruments; measures that provide investment support, require much more complex procedures than measures that make contributions for easily verifiable prerequisites. Targeted and tailored actions have however, high management costs, high implementation times and requires, in particular at regional level, skills of all those involved in governance and therefore the ability to define clear, and easily measurable objectives, the ability to concentrate resources on these objectives in a consistent manner, and the ability to learn from the results obtained to adjust the strategy in progress.

For the Spanish Action Lab, the Regional Rural Development Plans in Catalonia (2014-2020) includes the priority number 2 aimed at improving the viability of farms and agriculture competitiveness of all

[17] The latest version (7.1) of 02 February 2018 can be downloaded from the site of the region http://agricoltura.regione.emilia-romagna.it/psr-2014-2020/

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types of agriculture in all regions and promote innovative and sustainable agriculture (concerning soil and water resources).

Soil and water management is fundamental in maintaining diversity and protecting biodiversity and influences water and land resources. In recent years in Catalonia, as well as in Spain as a whole, many figures have been defined to protect the natural environment, the affected areas have been established, and many plans have been made for their protection.

The Regional Rural Development Plan SWOT analysis includes a section on water resources and the interaction with agriculture. Based on this analysis the plan identifies needs and objectives:

- Need 06-Invest in infrastructure to ensure the viability and sustainability of agricultural and forestry production, POINT• 5A) Greater efficiency in water use in agriculture; efficient water management and optimization; irrigation potentials in the Mediterranean area are necessary to maintain a viable and competitive agrarian sector, while also guaranteeing the environmental sustainability of investments and territories.
- Need 18-Promote the management of natural spaces, and the active management of species, habitats and landscapes; Priorities / Areas of interest. POINT• 4B) Improvement of water management, including the management of fertilizers and pesticides.

In short, the measures of the RDPs are directed to the sustainable use of water resources, and to the improvement and reduction of the inputs that involve the phytosanitary and fertilizers management, in order to comply with the Water Framework Directive.

In the case of the Belgian Action Lab too, the environment was a discussion theme in the SWOT-analysis an important topic was 'agriculture and environment' and water (quantity and quality) is mentioned several times.

The Danish Rural Development Plan 2014-2020 do include a dedicated section on management of water resources in the SWOT-analyses. However, here and throughout the plan have a stronger focus on surface waters than on groundwater. For example, it is acknowledged that other measures can have a positive effect in relation to focus area on better water resource management, but the only measure where protection of the drinking water and the groundwater resource is explicitly mentioned is for the afforestation measure. Also, the Danish Rural development has not activated M12.3 payments providing compensation payments on agricultural land affected by river basin management measures.

Based on the Polish „Rural Development Plan 2014-2020" SWOT analysis included a separate section on water resources and the interaction with agriculture. It is worth noting though, that with respect to water resource as for irrigation purposes mainly surface water resources are considered. Groundwater resources occur with respect to water pollution problems.

In objective 4.2.3 of the document, which deals with sustainability of agriculture with respect to climate change and natural restrictions as well as protection and improvement of groundwater quality, a specific objective on better water management including changes in fertilisation practices and the use of pesticides was identified. The need for undertaking actions towards restricting the negative impact of agriculture and sewage water systems in rural areas and necessity to promote investments in this area is highlighted.

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In Romania, there is no separate section on water resources and interaction with agriculture within National Rural Development Plan (NRDP) 2014-2020. Within NRDP 2014-2020 there is a SWOT analysis containing information on the following pillars: socio-economic situation, sectoral level and environmental situation. In this context of environmental situation, it provides: analysis of freshwater and underground resources in Romania. (pg. 64-65), strengths (Good level of quality of water resources).

Weaknesses are identified, such as: limited access to centralized public drinking water and sewerage networks in rural areas or limited water resources unevenly distributed associated with the increases of occurrence of drought (under environmental section of the SWOT).

As threats it is mentioned the accentuation of the negative effects, particularly on water resources, resulting from: the misuse; risk of punctiform pollution; eutrophication of wet habitats and increased GHG emissions as a result of the increased number of animals in individual households and reduced number of facilities and equipment for manure management.

As opportunities there is no direct target for water related aspects, unless we consider: the use of innovative technologies that would provide an efficient management of natural resources and overcoming the risks associated with climate changes, as an opportunity that includes water domain.

The objectives of the NRDP 2014-2020 include sustainable management of natural resources and tackling climate change. This is a cross cutting objective and makes thus reference to water aspect as well, but in a more general broader context.

The SWOT analysis conducted as part of Irish Rural Development Plan 2010-2014 (RDP)[18] draws on a range of information both from within the Department of Agriculture, Food and the Marine and the Department of the Environment, Community and Local Government and from external bodies and documents. The SWOT analysis makes several references to water resources under various subheadings and a specific subsection on “Agriculture and Environment”.

The SWOT analysis makes specific reference to the River Basin Management plans (under WFD) as a means for improvement. The analysis also acknowledges that behavioural and cultural changes are required at farm level to adopt new practices.

With respect to opportunities, the plan states a suite of targeted measures to improve fertiliser/manure efficiency which would contribute to protecting water quality and climate action. A specific reference is made to the work being done by the Agricultural Catchments Programme in Teagasc. Under the threats heading, the RDP acknowledges that as farms get more intensive and specialised there is a risk that this production is gained at the expense of the environment and may have negative environmental impacts.

[18] Rural Development Programme (RDP) 2014-2020. Available at: https://www.agriculture.gov.ie/ruralenvironmentsustainability/rurald evelopmentprogrammerdp2014-2020/. (Accessed 12th October 2018)

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Key question 5: Do the Rural development plans use information from the monitoring activities under the ground water Directive and/or the Drinking water Directive? What are the main elements identified?

The general assessment is that the Rural Development Plans do make use of the information collected in the implementation of the water related policy instruments. In general, this is done at a higher integration level and contextualising the information into the specific objectives of rural development.

The type of data used is not homogenous in the EU, some countries make use of general statistical data, some explore the monitoring data in detail while others integrate such data with specific assessments and evaluations done by recognized national or local organisations.

The adoption of the Water Framework Directive at the end of 2000, originates and conditions a major change in the concept of management, protection and planning of the use of water. In this context, the Regional Development plans in Spain are using statistical sources and specific reports or studies to specify their contents. Monitoring data gathered by the water authority (through surveillance, operational or research monitoring) are available to the public through the River Basin Authorities (Confederaciones Hidrográficas).

In Belgium as well, the information from the water monitoring activities, mainly surface water, are taken into account in order to determine which measures will be subsidized via the rural development plans and which projects will be funded by the rural development plans.

In Ireland, the RDP uses information from the national monitoring programme carried out by the EPA. For instance, analysis notes that there are on-going water quality issues in certain sensitive catchments and there is a need to address biodiversity loss and water quality in sensitive areas. Furthermore, it states that while nitrate levels are low; they are not decreasing while it is also expected that the number of farmers requiring derogations will increase.

For the Emilia Romagna Region, where the Action Lab is located, protection of the environment is a strategic element of the entire program and was pursued in all the lines of intervention and in all the priorities. The plan makes reference in particular to preservation of biodiversity and ecosystems, the protection of surface and ground water quality, as well as the conservation and improvement of soil quality.

The RDP in Denmark does refer to monitoring results on water quality. However, the main focus is on surface waters while in Denmark the drinking water supply comes mainly from the groundwater. The context indicators also specify the current share of the groundwater being of high, medium and poor quality at the level of measure points.

The Polish rural development plan (national scale) refers to results of the WFD monitoring with respect to surface and groundwater monitoring. However, the description of results is very synthetic and presented in bullets points giving only aggregated information:

- Total available resources of free draining water in Poland are nearly 2 times smaller than in Europe (5l/s/km2 vs. 9,5 l/s/km2);
- Average rainfall is 600 mm;
- Groundwater static resources are estimated at 6000 mld m3;
- Some 50% of river flow drains from groundwater;

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- There is high spatial and time variability in water availability with the smallest amount being available in the central Poland;
- Water quality is considered, along with high spatial and time variability, as limiting factor of water availability;
- Systematic decrease in untreated sewage from households and industry discharge to surface waters has been noted due to actions undertaken towards improving eutrophication of waters and the Baltic Sea;
- Results of water monitoring undertaken within the National Water Monitoring Programme in years 1988-2018 prove systematic decrease in concentrations of N and P in river waters and decrease of amounts of N and P discharged to the Baltic Sea in waters of Vistula and Oder.
- 22,7% of natural surface water and 32,5% of changes surface waters within the Vistula River Basin was in good status in the 2010-2012 assessment. In the Oder River Basin the respective statistics were 37,7% and 23,9%.
- With respect to groundwater, 80% of sampling locations showed good quality with 81,8% of sampling points with low concentrations of nitrates and only 7,1% with high nitrate concentrations.
- Sources of biogenic substances are related to both agricultural activities and sewage.
- For 2012-2016 in total 48 NVZ were established, which accounted for 4,46% of the country area.

Analysis of the Romanian NRDP shows that some data is being used when analysis of current situation is performed for achieving specific needs of the measures (within SWOT analysis, environmental conditions).

Key question 6 : Are the Rural Development Plans correlated with the River Basin Management Plans (RBMPs)?

When it comes at evaluating the coherence between Rural Development and RBMPs, again, the level of integration varies between countries. However, in general, the two programming instruments seem to be generally corelated.

The Rural Development Plans actually refer to municipalities and counties, so the river basin management plans are within these areas. In the document published relative to the Rural Development Program 2014-2020, in the section on Diagnosis of water resources, the following figure shows where the different hydrographic basins of Catalonia are visualized. The Spanish Action Lab would be included in the water management of the Ter-Llobregat-Besos System.

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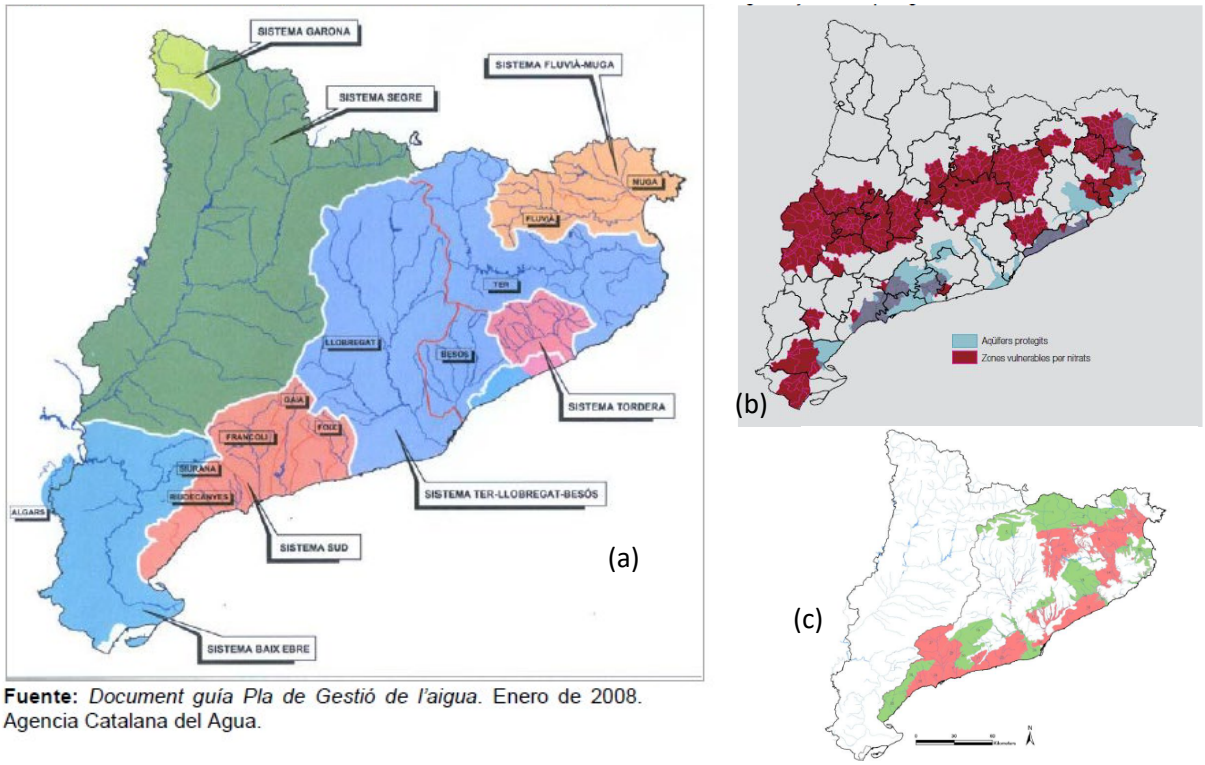

Fuente: *Document guía Pla de Gestió de l'aigua*. Enero de 2008. Agencia Catalana del Agua.

Figure 5: Hydrographic basins (a); nitrates vulnerable zones (b) and status of ground water (c) of Catalonia

In the document published relative to the Rural Development Program 2014-2020, Diagnosis of water resources section, the information used regards the distribution of vulnerable areas by nitrate contamination from agricultural sources and protected aquifers.

The Plan goes on to include subsidies in the set of agri-environmental and climate measures that propose compensation depending on the degree of implementation of: integrated production; alternative systems to the chemical fight (reduction of use of phytosanitary products); fertility management; ecological production.

In the case of fertilization, the focus is on the monitoring and control of the amount of nitrates in the soil throughout the different stages of crop development for greater optimization of its use as fertilizer and therefore a decrease of the losses towards the environment (soil, water and atmosphere). Therefore, subsides are focused to control a good use/quantity of nutrients (chemical fertilizers, organic, water). Also, the quality of irrigation water is an input that is controlled, for example, in the ecological and integrated certification and the inspectors request analysis of the water used for irrigation.

In Belgium, in the Rural Development Plans measures to improve water management, quantity and water quality are supported and promoted, which are also one of the aims of the river basin management plans.

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For the Italian Action Lab, several articles of the Rural development regulation[19] were of interest from the perspective of integration with the management plans pursuant to the Water Framework Directive. Regarding the territory in which our Action Lab is included, the great challenge that the competent Ministries, the Po River Basin Authority and Regions had to face concerned the implementation of what was included in the Program of Measures (PoMs).

In view of the important deadlines set by the WFD, an Integration of the Po River Management Plan (PdG Po) measures with the 2014-2020 Rural development Plans was done to focus on the points of interaction between agricultural and environmental policies, related to the management of water resources, and which also involve biodiversity and the use and protection of the soil. An operational programming initiative has been launched with the main purpose of making a global survey of the measures already in place in the period 2009-2015 and providing indications on the timing and on the methods of implementation of the interventions, as well as on the costs and sources of financing of the specific measures in the Po river Management Plan (PdG).

In addition, the Water Balance Plan (PBI) for the Po River District, the section on Use of water in agriculture in the Po district, assesses the efficiency of water use in agriculture aimed at studying how, at the district scale, the use of the resource takes place: how much is the irrigation requirement, how much water is taken, in what portion the needs for Irrigation use is satisfied by the amount collected, to what extent the constraint of the ecological flow in the source water bodies is respected

For Denmark, the river basin management plans are mentioned directly in the SWOT-analyses as part of defining the needs. The other references are more general to the Water Framework Directive. Likewise, in Ireland the SWOT analysis makes specific reference to the River Basin Management plans (under WFD) as a means for improvement.

Polish river basin management plans are mentioned in the water section of the SWOT analysis Identification of needs, where general information about RBMPs is provided. The strategy section of the RDP includes further references, to:

- improve water quality linked to reduction of pressure from agriculture and rural sewage systems and therefore are linked to priorities of WFD.
- to promote sustainability in agriculture, including ecological agriculture. This refers to optimal fertilisers use, that prevents nutrients leakage to groundwater and as such is considered a mitigation action that should be included in river basin management plans.
- develop technical and sociological infrastructure in rural areas. This refers to improvement quality of life in rural areas and includes improvement of sewage systems and as such links to river basin management plans.

There is only a brief mentioning in the Romanian NRDP 2014-2020 for river basin management plans, within SWOT analysis, environmental conditions. The information relates to: distribution in hydrographic sub-basins, general data on chemical state of the basins, assessment of surface and underground waters in Romania (good, moderate or poor quality), on nitrates, vulnerability on nitrates.

[19] EU Regulation 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development, Title III, Support for rural development

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In 2013 Romania has decided to apply an action program for protection of waters against pollution caused by nitrates from agricultural sources at the level of the entire territory. The fact that about 80% of animals-cattle, sheep, pigs, birds are in individual households, whose functioning is not depending on getting the environmental agreements and do not have facilities for storing manure is an important risk factor not only for water pollution but also for the increase of the levels of GHG emissions. Areas vulnerable to nitrates from present or historical agricultural sources are present in 255 localities from Romania.

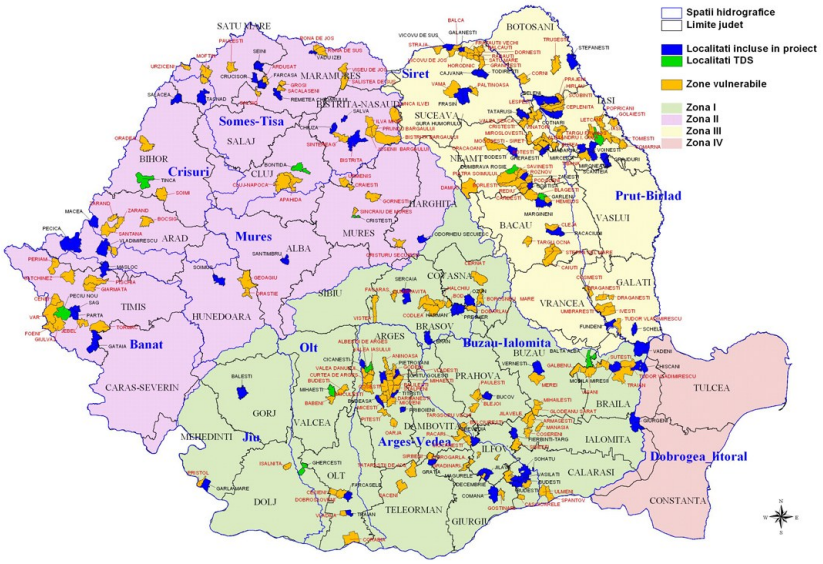

Figure 6: Areas vulnerable to nitrates in Romania, (source: Integrated nutrients pollution control project, http://www.inpcp.ro/)

Key question 7 : Is there any exchanges of information or common action between the National Action Plans (NAP) developed under the Directive for sustainable use of pesticides (especially the measures to prevent run-off and leaching and those for buffer zones) and the water Directive and/or the Drinking water Directive?

National action plans adopted by Italy as required by SUD Directive 2009/128/ECcontain quantitative objectives, targets, measurements and timetables to reduce the risks and impacts of pesticide use. In the Italian NAP particular attention is reserved to water resources and recommendations are made for taking appropriate risk mitigation measures[20] on the territory to avoid pesticides contamination of water resources.

National pesticides monitoring plans could be very helpful in setting appropriate and context specific mitigation measure; but the main limitation is linked to the informative content of the data obtained by the monitoring approach. Monitorings are carried out by Regions at regular intervals; series of both spatial and temporal data are available and published in national environmental reports such as the Italian Environmental Protection Agency (i.e. ISPRA, 2016).

[20] An inventory of the risk mitigation tools for pesticides being implemented is reported in the recent work (2017) of Commissione Consultiva Fitofarmaci on the basis of the work done by Allix et al in the framework of MagPie project: www.setac.org/magpie and Commissione Consultiva Fitofarmaci (dic 2017)

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However, this data represents only a snapshot of what is happening (in terms of concentrations) at the moment of sampling. In the last years several attempts to use pesticide monitoring data alone or in combination with predictive models have been proposed for setting risk mitigation measures to preserve aquatic systems (Finizio et al., 2011; Bozzo et al., 2013; Di Guardo and Finizio, 2016).

As stated in the latest report of Commission (COM 587/2017[21]) on the implementation of SUD, the Italian action plans "suffer from delays, are developed mechanically to strictly comply with a pre-set list of measures, resulting in minimal changes in practices and with not sufficient impact to preserve or restore water quality ".

In Spain too, there are exchanges of information between the National action plans developed under the SUD and water Directives. There is an active cooperation between Agriculture and Water Authorities as regards to information exchange on the use of plan protection products and the implementation of BMPs in order to prevent water pollution and protect aquatic ecosystems. The efficiency of such collaboration varies among the river basins.

In Belgium, there are exchanges of information between the National action plans developed under the SUD and water Directives. The Belgian NAP includes in a chapter dedicated to 'protection of the aquatic environment and drink water', which makes compulsory several measures to prevent water pollution with pesticides, such as:

- obligation of minimal buffer strip for spraying,
- obligation of using drift reducing nozzles,
- obligation of taking erosion prevention measures on erosion sensitive fields,
- rules on filling and cleaning places for sprayers,
- communication and dissemination of BMP to prevent water pollution by pesticides,
- water quality monitoring.

The NAP also includes the obligatory spraying licence and trainings for professional users, sprayer inspection and discourages pesticide use by private individuals. In Belgium, implementation of Integrated pest management is mandatory. Some requirements, such as the obligation of drift reduction nozzles, are implemented through the IPM-regulation. Each farmer has to comply with the IPM regulation. Therefore, IPM checklists are introduced and each farm is inspected on the implementation of IPM checklist by independent inspection bodies.

For the Danish Action Lab, the 2017-2021 Action Plan includes new requirements in relation to handling of pesticides and cleaning of equipment near water drillings.

In Romania there is exchange of information between national action plans developed under the Directive for sustainable use of pesticides and the water Directive and/or the Drinking water Directive.

In Ireland, the NAP makes clear references to water quality and the WFD (Section 4.d). Eleven specific actions are listed in the NAP for the protection of water. This includes the establishment of a National Pesticides and Drinking Water Action Group which aims to achieve the standards set by the Drinking

[21] Report from the Commission to the European Parliament and the Council on Member State National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides COM/2017/0587 final

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Water Directive through collaborations, tracking progress and ensuring appropriate measures are taken into the River Basin Management Plan.

Another specific action mentioned under the NAP is the use STRIPE (Surface water Tool for Reducing the Impact of Pesticides in the Environment) as an initiative which incentivizes farmers to adopt the use of spray drift reducing technology. When using STRIPE (and other best practice measures), there are three scenarios whereby the prescribed buffer zones can be modified and reduced. These are as follows: 1. When using DAFM approved drift reducing nozzles; 2. When using reduced application rates and 3. When using DAFM approved drift reducing nozzles and reduced application rates

Compliance indicators for the water quality NAP section includes water quality monitoring as part of the national programme as well as compliance during DAFM farm inspections.

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4 Implementation

4.1 Coherence of the requirements, rules and guidelines

Key question 8: At farmer level in the Action Lab, the rules, guidelines or management practices to protect water resources are they coherent? How are they presented, is there any cooperation between various institutional actors in providing a clear message?

In the case of the Belgian Action Lab, farmers receive information mainly from the farmer associations and farmer advisory centres. They try to make the guidelines and management practices clear and feasible in practice, which is not always possible since the legislation is not always coherent. For example, the definition of water course is different, which makes the obligation of the 1m buffer strip along water courses very difficult and confusing. There are also many and complicated regulations and thus many information on all these different topics for farmers, which makes it even more confusing.

It would be helpful if a clear and unambiguous message is to be provided by all actors. The measures should be selected in an open and constructive dialogue, which takes into account aspirations but also limitations and difficulties. The measures should be feasible in practice and if the measure involves extra costs without any return on investment for the farmer, financial incentives should be provided. Cooperation between various institutional actors to provide funding for these measures could prove to be very helpful in the implementation

The farmers in the Danish Action Lab receive information from different sources, the main ones being the municipality and the farm advisory services. We do not have information that indicates incoherent rules, guidelines etc. But the different actors of course have different objectives and task, where the municipality provides information on action plan, the advisory services more targeted provide information on BMPs and mitigation measures. The latter is to a very high degree supported by the national advisory service.

The designation of the water extraction zone in the action plans has caused, and still causes, some confusion. The areas currently included in the legislation are commonly agreed to be incorrect and new research about an alternative delineation are quite unsure. This causes some confusion amongst the farmers not knowing if they have to change their practices and which fields could be affected.

In Poland, it is estimated that knowledge about the need for water protection in the action lab is very poor and farmers do not receive a coherent information about water quality and quantity issues. There is no or little cooperation between various institutions. However, based on interviews with farmers in the catchment, farmers reveal interest in water quality, which they would like to incorporate into their field management (adjustment of quantities of fertilizers/PPP used).

In general, implementation of best management practices in the catchment seems not to be a result of care for environment and water protection in particular but is an obligation for farmers to receive direct payments (economic factor). Farmers indicate that they implement BMPs mostly for productivity reasons like the best effective fertilizer and PPPs use, but not exactly to protect water quality. In general, although farmers do participate to trainings, they do not evaluate them as effective.

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There are various materials issued by Ministry of Agriculture in Romania (e.g. farmers guide on Eco conditionality, 2018) as well as some leaflets[22] related to standards. The leaflets are also sent to each county in Romania to Agriculture Directorates where experts do have some meetings in the field with farmers to disseminate information.

There is certain degree of cooperation, for example when local NGOs implement initiatives/projects related to good practices in agriculture/rural development/protection of natural resources there are experts from Agricultural Directorate that are also involved, either by providing input on dissemination materials, or participating in certain workshops for discussion and sharing information to farmers.

In the Italian Action Lab farmers receive information from different sources at different levels. Information on water quality and monitoring are available on the institutional website (ARPA) but this is not used or known by the farmers. It has become apparent in the WP2 analysis, that from the governance point of view, the monitoring results are not used to communicate with the farmers.

Information on sustainable use of pesticide and specific guidelines are available on the web site of the Ministry of Agriculture. Information on best management practice and mitigation measure and IPM are also provided by the Servizio Fitosanitario Regionale and farmers association. It is worth noting that best management practices and mitigation measures are included in the list of training objectives of the National Action Plan. However, courses are not organised with demonstration activities in the field, so a shift from a formal theoretic training to a training system more perception-oriented and context-specific is needed to ensure better impact in protecting water.

Also, the National Rural Network (NRN) has carried out some thematic meetings between GO (Operational Groups) with the aim of facilitating the comparison and interaction between the selected partnerships throughout the national territory, thus promoting the exchange of transregional knowledge and stimulating dialogue between the different actors involved. The impact or effectiveness of these activities at the moment have not been evaluated by our Action Lab.

4.2 Areas for improvement for the implementation mechanisms and water governance systems in the case study countries

This chapter builds on the detailed analysis performed in WP2 of WaterProtect (see WP2 deliverable reports for further detailed reference) and gives a summary of the opportunities for improvement governance of the water quality problem related to agricultural pollution in the action labs. The assessment is based on the information provided by the Action Lab leaders on the water quality problem in their action lab, the relevant actors, the governance strategies and some process factors (see deliverable 2.1 – Framework for analyzing and improving water governance systems). The areas for improvement of the governance are hence identified after defining in each case study area, the challenges in water protection; the actors and their relations and the different strategies actors currently using with various degrees of success.

Opportunities to improve data and information on the water management problem

Data collection in countries is in general based on the Water Framework Directive reporting requirements. Monitoring of water quality is judged to be going well in all action labs and sometime

[22] The documents are available on webpage: http://www.apia.org.ro/ro/materiale-informare-anul-2018

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responsibilities are shared between different actors, in general a governmental organisation and/or the water companies.

The main conclusions is that in many action labs, the monitored knowledge is scattered as each agency/organization takes the responsibility for their own data management (collection and sharing). As governance improvement opportunity many Action Labs indicated the integration of all the data and the need for their public availability as a clear action point for the future.

Opportunities to raise awareness on the water management problems

Even if the data is intended to be openly available (in the majority of cases data is accessible for the public and/or other organizations via websites or publications), it does not mean that people are aware of the existence of the data or can do the interpretation of the data. At the moment, there are little or no experiences with participatory monitoring or citizen science in the action labs (except those conducted for research).

Some monitoring data are difficult to interpret by the main actors. While data show exceedance of certain active substances of plant protection products, farmers are mostly familiar with the trade names of PPPs and not their active substance. Furthermore, the exact causes of the problem (point, drift, run-off pollution) are not always clear from the data.

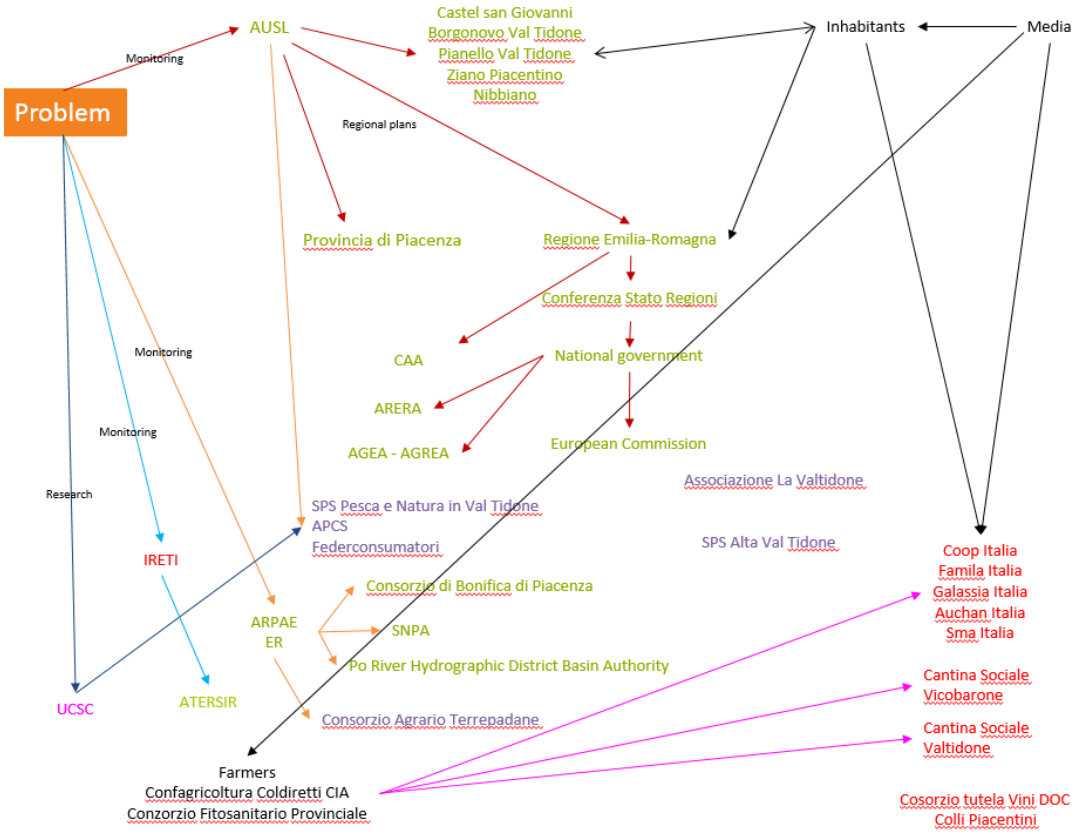

Figure 7: Awareness and channels of communication for the actors in the Italian Action Lab of WaterProtect

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Note: as indicated in the graphical representation, the evaluation of governance has concluded that the farmers are not aware of the water related problems. Monitoring results are not appropriately communicated to farmer.

Therefore, there is an opportunity to for targeted communication on local water quality data in an accessible and easy to use format. This will improve awareness and justify certain actions or requirements.

Motivating actors to address the problem

All actors have some benefits when good water quality is achieved. However, the benefits and costs of reaching a good water quality are not always evenly distributed. Hence, there is an opportunity to work on a rigorous sharing of burden between actors in balance wit their direct and perceived benefits. Efforts should be distributed also according to the role and capabilities of each actor group to address: organizational/policy aspects; regulations and controls; incentives; communication and education.

Farmers are expected to implement improvements or changes in their agricultural practices in order to address water quality problems. However, they are not always convinced that the changes are necessary; appropriate for their farm or that changes will generate better water quality. Hence, there is an opportunity to further motivate farmers to implement the required measures. In many cases this is related to providing technical assistance; administrative assistance (e.g. to request funds) ; fiscal/tax assistance or some organizational assistance for doing this.

Opportunities to improve coherence of strategies to address the water problem

Regulation is the main instrument in most Action Labs and is typically enforced directly by a complexity of governmental organizations. For certain categories of measures financial incentives or compensation for additional costs incurred are provided to farmers. There is an opportunity to further involve directly through participatory governance other categories of actors. In parallel to the contribution to the decision-making process, drinking water companies; input companies or other local companies could contribute to support economically through incentives addressing the water challenges.

Some Action Labs have noted that there is the feeling that policies pay little attention to practices and difficulties at the local level, causing frustration with local actors. In other cases, it can be difficult for local actors (farmers, local companies, inhabitants, etc.) to keep up to date on the many regulations they have to respect.

As a general observation, water management suffers due to lack of commonly accepted protection goals. Different actors have different perceptions regarding the water quality; drinking water companies monitor indicators that may impact the drinking water quality, however these indicators are different from those of interest for environmental purposes or agricultural activities.

Opportunities for inclusive stakeholder engagement

The most common actors within this process are different administrations, water user associations and drinking water production companies. Civil society actors (inhabitants, farmers, local businesses, schools, etc.) are often less represented and lack relevant and/or sufficient information. Even tough,

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there are public consultations whereby all stakeholders have access to the draft policy document and can submit comments/suggestions, often it is pointed out that not all information is presented in a digestible format.

It is thought that, in general, the level of trust between farmers and governmental (environment) organizations is low, which creates additional barriers in establishing common protection goals. Although consultation of local stakeholders is compulsory in the planning process, such processes enjoy little interest and people involved generally find it complex and therefore rather inaccessible and non-transparent. The harmonization of different (and often opposed) water stakeholders' interests is still very difficult to achieve.

Improving on leadership, clear roles and responsibilities

It has been identified that in certain Action Labs the control on the application of certain measures (i.e. buffer zones) is not clearly defined. In some cases, there is an overlap between the role of the agriculture control authorities and local authorities in relation to enforcement of the Nitrates Directive measures. Hence, both organizations are conducting farm inspections for compliance, often using divergent approaches.

Governance analysis has revealed that in some Action Labs actors await for the others to take the necessary actions. Often, a leader for cross-sectorial coordination to ensure a good integration of the activities is missing. Although the legislation provides for opportunities for water management, implementation of good practices is often lagging behind due to lack of leadership.

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5 Impact/results

5.1 Policy related driving factors in adoption of best management practices and mitigation measures

In WP4, Task 4.2, of WaterProtect the project (see Deliverable 4.2.) gathered information on existing mitigation measures and BMPs assessing in the same time farmers' willingness to implement additional, innovative measures, depending on costs and benefits. Information collected covers different climatic conditions, different types of farming systems, different legal frameworks, larger and smaller water collection areas.

Based on the conclusions of the report produced by WaterProtect under this task, we can build on it towards the identification of the following policy related driving factors that influence the uptake of BMPs and MMs in the Action Labs :

- Since the types of pollutants selected for the study varied between case studies to reflect conditions characteristic to catchments strict comparison between how the policies are stimulating uptake of BMPs in action labs is very difficult.
- Often reduction of water pollution can be achieved by changes in behaviour of operators, other BMPs require new or improved technologies or infrastructure, which is more expensive. Hence coordinated implementation of policies that favour increased awareness and communication have the potential to stimulate adoption of certain BMPs.
- BMPs which are currently implemented and those that were deemed to be implementable offer clear benefits to farmers. Farmers indicate that they implement BMPs mostly for productivity and incentive reasons.
- It is apparent that implementation of BMPs and MM depends on many factors, including those of economic, social and natural origins. Policy implementation instruments taking into account socio-economic limitations have a better chance to generate positive behaviour.
- Small scale and simple measures are already implemented or have a big potential to be implemented. Larger and more expensive measures are more difficult to implement.
- The obligatory BMPs included in the implementation of water and agriculture policies frameworks have a good level of uptake by the farmers. However, the types of such measures vary between countries, the same as perception of effectiveness and usefulness of different BMPs. Even within one country, depending of the context (i.e. intensive agriculture or agricultural land in the metropolitan area of large city whit high water consumption for urban and industrial uses, etc.) they can be different.
- Measures perceived as being beneficial for farmers (giving long term financial benefits) had relatively high potential for implementation. For example the use of GPS technology in farming show high potential for implementation (Ireland, Poland, Denmark). However, the initial investment is quite important and financial incentives would be necessary to increase their implementation.
- Implementation of measures that require land area, such as for example vegetated buffer strips at the edge of a field or within a field, are not welcomed by farmers due to loss of land for agricultural production.
- It should be highlighted that in many cases showed farmers to be open for cooperation and expressed their interest in obtaining more information about specific BMPs or how to mitigate defined problems.

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For an overview of the impact of the implementation of existing policies in the Action Labs and their effect on stimulating adoption of BMPs or MMs, here are some elements to be considered:

Table 3: Overview of the impact of existing policies in the Action Labs and their effect on adoption of BMPs or MMs

Action Lab	**Obligatory BMPs or MMs as per national legislation**	**High implementation rate for the following non-obligatory BMPs/MMs**
BELGIUM Study focused on PPP.	crop rotation, trained sprayer operators, use of approved PPPs, calibration of sprayers, proper storage and disposal of PPPs and containers, use of drift reducing nozzles	Plant cover in autumn and winter, planning and organizing spray activities, improving soil management to increase the water holding capacity of the soil, safe storage of sprayers, prevention of an overflow and foam escape during filling
IRELAND Study focused on PPP and nitrates.	High implementation of obligatory BMPs except for “Manure store with tank”	Fertilizer program; Liming; Only use approved PPP and comply with all their conditions of use; Soil analysis for pH, nutrients or organic matter; Safe disposal of spraying liquid residues ; Professional support in selection of appropriate PPP
ITALY Study focused on PPP and nitrates.	Do not spray no spray zones and other non-target areas; Use inspected sprayers; Calibrate sprayer for the appropriate and optimized application of PPP; Grass buffer zones; Store PPP within lockable rooms/containers or cupboards; Seal and secure partly used containers/packages immediately after use.	Soil analysis for pH, nutrients or organic matter; Establish retention structures (vegetative ditches); Do not spray no spray zones and other non-target areas; Use drift reducing nozzles; Estimation of nutrient content of organic manures (hydrometer for slurry); proper PPP Storage; Seal and secure partly used containers/packages immediately after use.
POLAND Study focused on nutrients.	None obligatory BMPs at the time of survey. On the day of 5 June 2018, the Council of Ministers of the Republic of Poland adopted the regulation establishing the "Program of measures to reduce the pollution of waters with nitrates from agricultural sources and preventing further pollution" for implementation and throughout the whole country. The implementation of the regulation imposed an obligation on farmers (in selected cases) to apply the following measures: Avoiding the application of chemical fertilizers and manure during high-risk periods; Manure store with tank and Fertilizer program.	Professional support in selection of appropriate PPP; Calibrate sprayer for the appropriate and optimized application of PPP; Avoiding the application of chemical fertilizers and manure during high-risk periods; Liming; Safe transport of PPP; Store PPP within lockable rooms/containers or cupboards; Do not spray no spray zones and other non-target areas; Soil analysis for pH, nutrients or organic matter; Plant cover in autumn and winter; Nutrient balance on farm and/or field level; Incorporating organic manures immediately after application on cultivated land; Crop rotation and its role in rebuilding and preservation soil organic matter.

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ROMANIA Study focused on nutrients.	Incorporating organic manures immediately after application on cultivated land;Avoiding the application of chemical fertilizers and manure during high-risk periods; Grass buffer zones between agricultural land and watercourses and reservoirs; Depositing manure on the field with taking into consideration certain distances from water courses for preventing pollution of water ; Use of impermeable folia where the location of manure is possible to lead to water pollution (proximity of water courses); Temporary depositing on the field, taking into consideration proximity of waters; Directing manure towards special ponds (for sedimentation of organic substances for extraction of nutrients), for bigger agricultural exploitations.	Conservation tillage and Plant cover in autumn and winter.
SPAIN Study focused on PPPs and sources of nutrients (isotope analysis of N species).	Avoiding the application of chemical fertilizers and manure during high-risk periods; Optimize irrigation timing and rate; BMPs related to the Integrated Pest Management (IPM) System are mandatory.	Ensure the sprayer operator is adequately trained and prepared for Plant Protection Product (PPP) use; Only spray when weather and field conditions allow safe and effective PPP use; Adequate cleaning of sprayers to minimize the amount of spray remnants; Rectify/Adjust any equipment problem immediately; Seal and secure partly used containers/packages immediately after use; Do not spray no spray zones and other non-target areas; Only use approved PPP and comply with all their conditions of Use; Store PPP within lockable rooms/containers or cupboards; Choose a safe filling and cleaning place for the spraying equipment and Clean and safely manage empty containers/packages, seals and caps.
DENMARK Study focused on nutrients.	Fertilizer program; Incorporating organic manures immediately after application on cultivated land; Injection, trailing shoe or band spreader used for slurry; Avoiding the application of chemical fertilizers and manure during high-risk	

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	periods; Cover crops and Covered manure storageBMPs:	

5.2 Impact of the policy implementation on uptake of BMPs and MMs

Key question 9: How is the adoption of mitigation measures and BMPs in each action lab encouraged by the water related and agriculture policies?

In the Spanish Action Lab, there is a clear relationship between encouraging BMP's and the objectives of the agricultural policies and water policies, because it is thought that a better quality of irrigation water would contribute to the development of agricultural activity in the area since water is necessary for crop production. In fact, availability of water resources is conditioning the development of agriculture and the competitiveness of agricultural enterprises.

Different projects regarding BMP implementation generated by the water related policies (aquifer recharge through injection of reclaimed wastewater or infiltration of river water; upgrade of drinking water treatment plant to reduce water salinity by osmosis, upgrade of WWTP to generate reclaimed water) provide useful information for evaluating the impact of the implemented BMP in water quality. The aforementioned BMPs are still being monitored when in use. Their findings are taken into account when deciding about future expansions or modifications of the assessed practices.

In Spain Action Lab, Consorci Parc Agrari del Baix Llobregat (CPABL) is encouraging a lot the BMP's, promoting innovative and sustainable agriculture (concerning soil and water resources). The tool used by CPABL is "The Management and Development Plan of the Baix Llobregat Agricultural Park". This plan basically aims to consolidate the agricultural area and enable better farm incomes by increasing the efficiency of infrastructures and general services and promoting production and marketing systems that are adapted to marked needs. The implementation of this Management plan must be carried out in harmony with nature and open to gaining awareness of it.

In Belgium, the implementation River basin management plans encourages the adoption of two main mitigation measures for preventing water pollution by PPP: obligation of the 1m buffer strip along water courses and encouraging the implementation of erosion mitigation measures. The CAP and the Sustainable use directive stimulate the adoption of more than 10 measures, out which some are compulsory: obligation of the 1m buffer strip, sprayer inspection, disposal of empty packaging, drift reducing nozzles and encouraging erosion measures, buffer strips (crop rotation, larger than the obligatory 1m buffer strips, cleaning- and filling place for the sprayer. Thus, important measures are common and integrated in both policies.

For the Danish Action Lab, it is difficult to distinguish between BMPs generated by either water related or agricultural policies, as regulation and support schemes to a great extent are integrated across these policies in Denmark. A fourth of the 12 BMPs included in the survey in the Danish Action Lab are today directly supported by schemes under the Rural Development Programme (Constructed wetlands, Set-aside and Afforestation). A third of the BMPs are partly or fully linked to general regulation or as green demands for agricultural support (N-balances, Reduced N-quota, Precision farming, and Energy crops).

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In Poland, mitigation measures related to water policies are those related to Nitrates Directive. This was implemented to the Polish law through the Programme of Measures (compulsory) and Code of Good Agricultural Practice (voluntary).

Farmers are incentivised to adopt mitigation measures through the system of agricultural subsidies and programmes for farmers. In order to receive payments, farmers shall respect a set of rules. Farmers not respecting EU law on environmental, public and animal health, animal welfare or land management will see the EU support they receive reduced. Farmers receive direct payments eg. Greening have to fulfil criteria such as maintenance of wetlands and buffer zones and rules unders cross compliance, including requirements relating to Programme of Measures. Additionally, in Rural Development Programme farmers receive payments for plant cover in autumn and winter (catch crops) and separation of pastures from water courses and reservoirs under the "Modernization of Farms".

According to the questionnaire undertaken in the catchment the following BMPs are implemented in the catchment by obligatory Programme of Measures (water related policies):

1. Fertilizer program
2. Incorporating organic manures immediately after application on cultivated land
3. Injection, trailing shoe or band spreader used for slurry
4. Avoiding the spreading of chemical fertilisers and manure during high-risk periods
5. Grass buffer zones
6. Manure pad with tank for leachate or tank for liquid manure

According to the questionnaire undertaken in the catchment the following BMPs are implemented in the catchment by Code of Good Agricultural Practice for voluntary use (water and agricultural policies):

1. Nutrient balance on farm and/ or field level
2. Crop rotation for rebuilding and its role in rebuilding and preservation soil organic matter
3. Plant cover in autumn and winter (catch crops)
4. Separation of pastures from water courses and reservoirs

Out of 18 BMPs in Romanian Action Lab, most of them are encouraged by both water and agricultural policies (15 BMPs). The other 3 BMPs mostly relate to agricultural policies (Adopting phase feeding, Phytase supplementation, computer feeding programs). Most of BMPs are included within Code of Good Agricultural Practices for Pollution Prevention with nitrates in waters from agricultural sources for the use of the farmer, which is part of the Action Plan for the Protection of Waters against Pollution with nitrates from agricultural sources[23].

In the Italian Action Lab the BMPs adopted are mainly pushed by the implementation of the Sustainable Use Directive (Directive 2009/128/EC) and the National Action Plan, that includes several compulsory measures to protect biodiversity, aquatic environment and drinking water.

[23] Government Decision no. 964/2000 on the approval of the Action Plan for the protection of waters against pollution by nitrates from agricultural sources; this GD no 964/2000 transposes the Council Directive 91/676 / EEC of 12 December 1991 concerning the protection of waters against pollution with nitrates from agricultural sources - the Nitrates Directive

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The actions set out in the Plan are consistent with the provisions of Directive 2000/60/EC. A system of compulsory certified training for professional users, distributors and advisors is established. The system covers both initial and continuing training.

To protect the quality of drinking water, in the safeguard zones used for the abstraction of drinking water the Regions and the Autonomous Provinces, with the Water Protection Plan and with the River Basin Management Plans have defined specific requirements to replace and/or restrict the use of pesticides likely to contaminate drinking water and of those products found through environmental monitoring activities.

Regarding the Voluntary accompanying measures in the national action plan is clearly stated that the Regions and the Autonomous Provinces shall put in place appropriate tools to support, within the Common Agricultural Policy (CAP) the application of techniques and practices to improve environmental quality of the aquatic environment and protect it from pollution due to pesticide drift, run-off or leaching.

Key question 10: For each Action Lab, how is the potential for uptake of BMP influenced by the policies currently implemented?

In Belgium, some of the measures are obligatory and implemented. However, the implementation of measures can be stimulated by financial compensations for famers. These financial compensations are especially necessary for important measures to prevent pollution of the water courses by PPP, which include high costs for farmers without generating any income for them.

But if the conditions for financial incentives/compensations for measures are too strict and/or the funding is relatively small, not many farmers will be stimulated to take measures (f.e. strict conditions for investment fund for farmers from the rural development programmes for filling and cleaning places for the sprayer). There are also different projects funded by government, trying to stimulate the implementation of best management practices to improve water quality.

In the Danish Action Lab, as mentioned above a large share of the BMPs are already supported by RDP schemes or integrated as conditions for support, indicating a positive policy effect on uptake. None of the BMPs are directly negatively affected by policies, though some of the BMPs like afforestation and set-aside are negatively affected by the general incentive to maintain land in farming.

In Spain, at the national level the RDPs influence the implementation of the BMP with its financial subsides. The implementation measures for the current policies are integrated in a local multi-stakeholder strategy. In the Baix Llobregat Action Lab, CPABL is carrying out The Management and Development Plan of the Baix Llobregat Agricultural Park.

One of the five priorities of this Management and Development Plan is about achieving efficiency regarding the infrastructures and general services of the agricultural area. In this context there are the objectives to improve the quality of irrigation water and the efficiency of distribution networks. Also other objective is to improve the efficiency of the drainage network.

So, the framework of the actions that are carried out by CPABL in the Baix Llobregat Action Lab is this Management and Development Plan. It is considered that this is an interesting tool to put into practise the BMP's concerning water and agriculture policies.

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For the Polish Action Lab, as the currently obligatory Programme of Measures was introduced after the questionnaire in the action lab had been taken it is hard to say yet how it influences the potential uptake of BMPs. Nonetheless, it seems to be true that obligatory POMs are generally being implemented by farmers as they are required to be so for the purpose of the cross compliance and subsidies.

BMPs included in the Programme of Measures must be implemented by all farmers. For some measures a transition phase for implementation is defined. Storage of solid manure is obligatory on manure pads with a surface that allows them to be stored for a period of 5 months, farmers must adapt to the new requirement by December 31, 2021 or December 31, 2024 depending on the size of the farm. Non-obligatory BMPs are generally poorly implemented.

Generally, the potential of implementation best management practices is not related to policies, but to individual benefits and responsibilities that farmers must fulfil.

There is a good policy context and good potential for up taking some of the BMPs in RO action lab. For example, within NRDP 2014-2020, it is stipulated that subsidies or other financial assistance may be provided if, in certain conditions, depending on the number of animals, the farmer will construct/use cover manure storage system.
Other BMPS that are facilitated by policy context:

- 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).
- Temporary depositing on the field, taking into consideration proximity of waters or BMP 15: Manure platforms in the farms (diverse materials: wood, concrete etc.).
- Grass buffer zones (strips of land covered with permanent vegetation located between agricultural land and watercourses and reservoirs).
- Incorporate organic manures immediately after application on cultivated land.
- Directing manure towards special ponds (for sedimentation of organic substances for extraction of nutrients), for bigger agricultural exploitations.
- Respect calendar for spreading of manure on the fields (temperature below 5 degrees; period November-March); respect quantity of N, max 170KG N/ha in one year.

In Italy, some common actions and measures as training, storage, equipment inspections or respect of no-spray zones are in place in nearly all Italian regions, but their effectiveness cannot really be assessed since there are insufficient data to understand if they implemented properly by all the farmers. Some measure or best management practice are discredited by farmers for various reasons:

- are not always consistent with the crop management and local context;
- are not always compatible with farmers' work plan and local specificity;
- their impact is not guaranteed, farmers need more information;
- are not economically feasible.

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6 Conclusions and policy development recommendations

6.1 Stakeholders' view on the role of EU policies and in addressing drinking water management challenges

European dialogue on sustainability of the farming sector is currently marked by the discussions on the new EU multi-annual financing framework and implicitly by the discussions of the role, scope and focus of the Common Agricultural Policy (CAP). In parallel, discussions are conducted on the review of several water related policy instruments and the adoption of new frameworks, like the use of treated water in agriculture.

WaterProtect has been conducting a series of activities to evaluate, analyse and replicate governance models that address water management and agricultural activities. Equally, the partners have studied the policy and legislative frameworks in seeking to integrate water management concerns with agricultural policies.

Believing that the findings and the analysis produced in our project need to be discussed and contextualized with the stakeholders, we have worked together with the project FAIRWAY to organize on the 7th of December 2018, in Brussels a large consultation. The objective was to seek pathways for integration and building synergies within EU policies to address water management challenges.

The conference organised at the premises of the Permanent Representation of Slovenia to the EU, has seen a very good participation (52 attendees) from all stakeholders categories, representing the farming sector (COPA-COGECA); agri-business industry (ECPA, Fertilisers Europe); water industry (EurEau; EFBW), research community, policy makers (DG AGRI, DG ENVI, DG Research, Ministry of Agriculture Slovenia) and other interested parties.

The discussions with the stakeholders were consistent and will be reflected in detail in the policy analysis report produced by WaterProtect. The main points to be extracted from the debate are:

- Water and agriculture stakeholders are all keen and ready to engage in developing and deploying solutions for better water management

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- Bottom-up initiatives driven by the agricultural input providers (i.e. fertilisers, pesticides) already exist to stimulate adoption of best management practices, but there is also a call for more training to farmers for implementation;
- Smart farming is an area where further solutions can be developed;
- The new CAP implementation mechanism, through the National Strategic Plans is an opportunity to promote tailor-made solutions to the water management challenges at national, regional and local level;
- It is important for the farming community that monitoring of the status of the water resources recognises the progress that was made to incentivise farmers to further take additional measures;
- Water industry stakeholders are calling for a long-term approach for the management of the water resources since pollution impact can be felt for decades;
- Good examples of cooperation between farmers and water industry already exist throughout Europe, their results should be disseminated
- The EU policies are evolving to take into account these new realities of the interactions between water and agriculture and they provide new opportunities and tools for action.

WaterProtect will organise two other similar policy conferences during 2019 and 2020 (dates to be announced) and they will feature the following themes:

- Main elements for a long-term strategy for the drinking-water management involving farming systems and land-use management
- Local policies, initiatives and partnerships making a positive contribution to the drinking water management involving farming systems

Stakeholders attending the event and the representatives of the two scientific projects have committed to continue the important dialog on developing and promoting solutions to enhance the synergies between water policies and agricultural policies at EU, national and local level.

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6.2 Policy development recommendations

Based on the overview provided by this report, WaterProtect project makes the following policy development recommendations:

1. The strategic planning under the new CAP needs to be fully exploited to ensure coherence of objectives for water management and agriculture and to allocate much needed resources so that farmers can make a positive contribution to sustainable water management.

2. The EU policy architecture that governs the water and agriculture areas is complex, partially due to the historical evolution of the two EU policy areas, partially due to the complexity of challenges these need to address. Proposals that have been launched (i.e. Water Reuse Regulation) or the strategic planning included in the new CAP will add to the complexity of interaction, but also creates new opportunities.

3. Coherence of water and agriculture policies at EU level is recognized as an area where improvement is needed. Several actions have been taken at political and technical level, but there are also further opportunities for improvement. The EU should exploit the cycles of policy revisions to better integrate objectives and create mechanisms and structures of coordination.

4. For a more integrated and consistent water and agriculture policy impact, it is recommended to establish an institutional coordination mechanism at EU level which will not only harmonize water and agriculture policy objectives and implementation instruments, but also take into account emerging challenges related to climate change and Sustainable Development Goals. In general, water and agriculture policy objectives are coordinated, and implementation instruments somewhat work together, but many things remain to be improved.

5. Various models of varying complexity exist in the Member States for the implementation for the two policy areas. Member States should strive to streamline the implementation structures and procedures based on sound governance concepts that ensure the involvement of all concerned stakeholders and provide opportunities for contributing to long term sustainable management of water resources that takes into account the needs and potential contributions of agriculture.

6. Future new or improved policy implementation approaches in both areas – water and agriculture – should state the need for further exchange of information and data between the various programmatic and enforcement instruments and structures. Results of controls over agricultural activities will have to influence priorities in water management and, equally, information on water quality and quantity issues, should be better transferred to the farmers.

7. Promoting multi-stakeholder partnerships and participatory water governance models are recommended. The value added is generated by: their capacity to easily transfer information on the water management challenges, collaborative development of solutions, capacity to address local specificities and limitations and can create synergies with other action areas.

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However, the building of such governance structures and partnerships requires efforts in building trust and requires partners to commit resources.

8. Proactive provision of information on the challenges in water quality and their potential cause are essential to ensure awareness at farm level and understanding of the positive contribution farmers can make. Currently, information is often unclear, scattered or not easily accessible. In many cases farmers rely on informal channels (farmer associations, media, extension consultants, etc) to obtain such information.

9. The positive contribution to sustainable water management of agriculture, including through implementing BMPs and MMs should be evaluated, recognized and communicated. A set of indicators that highlight the contribution agriculture has into water management (able to capture positive and/or negative trends) will help involvement of farmers and will stimulate ownership of the process.

10. Perception on costs vs. benefits of implementation of various BMPs or MMs have an important impact on the willingness of farmers to implement them. Hence, direct information, know-how and as well as support for actual investments needed for implementation of will play a key role in the future uptake of such measures by farmers.

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