



From farm to drinking water: fit for the future?

Improving governance conditions to better protect drinking water resources against agricultural pollution from nitrate and pesticides



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Over the last decades, nutrients and pesticides have proved to be a major source of pollution of drinking water resources in Europe. In response, the EU has developed an extensive policy framework, including directives to protect resources (Drinking Water Directive, Water Framework Directive and Groundwater Directive) and directives and policies to limit agricultural pollution (Nitrate Directive, Pesticides Directive and the Common Agricultural Policy CAP). However, the challenge to attain water quality objectives is still ongoing. The H2020 FAIRWAY project has identified necessary changes in policy implementation approaches and governance conditions at local/regional, national and European level.

This policy brief presents five key messages to help promote policy measures that need to be discussed and/or implemented.

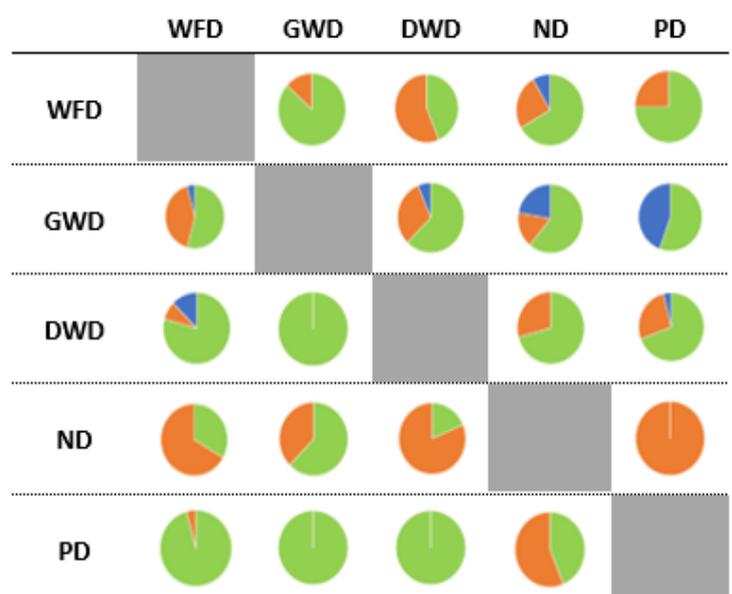
Coherence and consistency

Good drinking water needs a policy framework, including legal and economic instruments, that is firm and clear. Inconsistencies between directives, policies, objectives and requirements weaken their effectiveness. Alternatively, improving correlations and cross-referencing them strengthens the overall framework of policies and directives, making them more effective tools for protecting our drinking water resources.

Example

The thresholds set for manure application (Nitrate Directive) and groundwater quality (Groundwater Directive) are valued as a strengthening cross-reference. On the other hand, the mismatch in reporting schedules between these directives and the use of blanket rules for the application of manure at farm level can be regarded as blocking factors that may lead to overuse in vulnerable zones.

Research in the Fairway project has identified strengths and weaknesses in the legal and policy frameworks. The figure below presents analysed interactions between the five most relevant directives. Figure 1 shows the proportion of interactions between the requirements of each directive that respondents judged to be positive (green), neutral (orange) and negative (blue). Positive interactions support the realisation of objectives, whereas negative interactions may hinder this process. More neutral connections may become positive (strengthening) or negative (blocking) factors, depending on the choices made during the implementation phase, for instance on the level of integration of agricultural and environmental policies.



(Figure 1)

Related directives: Drinking Water Directive and Water Framework Directive

There is a gap between the risk-based approach to improve the quality of tap drinking water as adopted in the DWD and the wider goal to protect drinking water resources under the WFD. Many sources of pollutants in river catchments are not addressed at the tap in standards for safe drinking water. This gap also came forward in the evaluation of the Drinking Water Directive (98/83/EC) as an area for improvement. Therefore, a risk-based approach has been introduced.

Approaching the risk

The recent revision of the DWD (EU/2020/2184) introduces a risk-based approach from source to tap. The approach includes identification, assessment and management of risks, using the same methodology of 'Water Safety Plans' as the one introduced by the WHO (2009). This approach aims at strengthening the links between the DWD, WFD and the GWD. It also connects with WFD-methodologies regarding characterization of water bodies and pressures, risk-based monitoring and the objectives of Article 7 WFD. This enables authorities to concentrate on potential risks to water quality at the source and its catchment (Article 8, DWD) through to distribution, but also requires adequate programmes of measures to prevent and mitigate risks and monitoring programmes to identify effects of these measures. Timelines are being aligned to the WFD. Furthermore, monitoring should be risk-based, including possible emerging contaminants.

The WFD is not [yet] explicitly monitoring emerging contaminants. The revised DWD should be transposed by MS within 2 years from the introduction. The identified gap seems to be resolved by the revision of the DWD. However, the first DWD-data still need to be delivered at the formal end date of the WFD (2027). It therefore remains open to what extent these linkages will develop.

Potentially negative effects of the funding mechanism under the Common Agricultural Policy

Potential unintended negative consequences of the CAP's funding mechanisms on the protection of drinking water resources have been identified. For instance, the Basic Payment Scheme (BPS) linked with CAP and cross compliance requirements could mean that farmers are keeping land in production so that they can receive this reimbursement. In certain areas, farmers are spraying pesticide to remove weeds to make their land eligible under the BPS. This may result in an increased risk of pesticide run-off to the river. Additionally, the areas declared for the BPS are also used to calculate the farm's organic N-loading for the Nitrates Directive. For that reason, a farmer can legitimately increase the stocking density up to 170 kg/ha organic N, even though the land may not be able to support this agricultural intensity. Furthermore, farmers can also plough their grasslands within five years, to avoid their grasslands being considered as permanent grasslands in CAP, having to comply with stricter regulation. Ploughing of grasslands can strongly increase nitrate leaching. Thus, the funding mechanism and its implementation can have drawbacks that affect drinking water quality adversely. This is not in line with the objective of the CAP to support implementation of best agricultural practices and needs to be explored further.

Improve (policy) effectiveness through increased cross-referencing

The (cost-) effectiveness of the overall policy and legal framework is affected by implementation of directives and policies by Member States, the use of ambiguously interpreted key terms and the lack of clear cross-referencing across directives and CAP. There is a clear need to improve policy effectiveness and cost-effectiveness through increased cross-referencing across different directives and policies.

Focus and formulation

We suggest increasing the focus on the interdependence between the WFD, DWD, GWD, the ND and the CAP. For the protection of drinking water resources, these directives and the interplay with CAP play a major role. At present,

their connectedness is not formalised. Requirements from the DWD and GWD that relate to institutional frameworks could be included in the WFD as an additional component to consider. Article 1 of the WFD could be reformulated as requiring 'to establish a framework for achieving or maintaining good status of inland surface waters, coastal waters, transitional waters and groundwater, with reference to, and in collaboration with parallel frameworks put in place with the DWD and GWD'. In addition, Article 13.1 WFD could be amended 'to ensure that a river basin management plan is produced for each basin district lying entirely within their territory, including actions and objectives for ensuring compliance with the thresholds and requirements of the DWD and the GWD'. Similar adjustments could be made to articles referring to programmes of measures (e.g., WFD Article 11.1) to better reflect the interdependence of these Directives. As such, the programmes of measures developed and implemented under the WFD would be better harmonized with the thresholds and relevant requirements in the DWD and GWD, including time frames.

Improved effectiveness and cost-effectiveness can be achieved by aligning the funding mechanisms of the CAP with the objectives of the Directives (see textbox). Existing funding incentives may lead to competition between initiatives aimed at stimulating farming communities to become more economically sustainable and sacrifice environmental sustainable practices to engage competitively in markets. Issues of cross-compliance such as increasing pollutants to remain eligible for funding suggest a need for cross-referencing between the requirements of the CAP and other directives, such as the ND, the DWD and the WFD.

More specifically, market-based instruments are most effective within a framework that mitigates potential side-effects, such as 'perverse incentives' associated with increasing pesticide use to remain eligible for financial support. This, and other such 'perverse incentives', should be revisited and the introduction of guidelines or additional peripheral requirements for the CAP and RDR to uphold the underlying principles of other Directives, including the ND, such as Article 4.1 related to a code of conduct, is necessary to improve the effectiveness of the overall framework.

Capacity

Each directive addresses parts of the complex challenge to protect drinking water resources from agricultural pollution, while also enabling economic development for farmers. Good drinking water quality requires sufficient capacity at the local level to ensure that implementation of policies and laws results in consistent, coherent and effective local action. The EU legal and policy framework can support these local efforts and increase their impact.

Developing a common language: perceptions on implementation

A new methodology was developed to visualise how water and agricultural governance cascades down from the EU level to farm scale. The method specifically addresses agricultural pollution of drinking water resources, including an active engagement with local actors and a bottom up approach. The resulting complex data base containing multiple directives and their national and regional implementation was simplified to an innovative visual impression. This impression illustrates the complexity in a comprehensible and meaningful way, to contribute to impact and actions to either reduce the complexity or facilitate how to deal with it. It also shows how integration of different policies takes place at the local/regional levels. These visualisations help understand the anomalies between perceptions from local stakeholders and the intentions from top down. The cascades created can be different to the actual governance approach as perceived at official levels, since the cascades are based on different stakeholders perceptions. This may help shed light on weaknesses in the effectiveness of governance approaches and policy implementation. The method has highlighted the risk for core messages to become lost if they are delivered exclusively top down and by sector.

1 ISLAND TUNØ (DENMARK)

Long-term MAP experiences (since 1986) that have successfully protected and restored groundwater supplies from nitrate leaching on a small island.

2 AALBORG (DENMARK)

Science based dialogue between farmers and other stakeholders towards common understanding of actual risks and problems related to groundwater protection in a vulnerable region of Denmark.

3 ANGLIAN WATER (ENGLAND)

Social science lessons on the role of water catchment officers in reducing pesticide use by farmers. Area with high agricultural productivity and population density (high water consumption).

4 LA VOULZIE (FRANCE)

Eau de Paris promotes changes in agricultural practice in a joint approach with local farmers. Nitrate and pesticides use and their impact on water quality are closely monitored.

What is a Multi Actor Platform (MAP)?

A Multi Actor Platform is a more-or-less ongoing mechanism for actors from different sectors and levels, including farmers, advisors, drinking water companies, scientists and policy makers, (1) to meet regularly, (2) to foster the exchange of ideas and initiatives, (3) promote joint decision-making and (4) collaboration in a continuously evolving way (Acquaye-Baddoo 2010).



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9 DERG CATCHMENT

3 ANGLIAN WATER

2 AALBORG

10 VANSJØ

1 ISLAND TUNØ

8 PROVINCE OF OVERIJSEL

7 PROVINCE OF NOORD-BRABANT

4 LA VOULZIE

5 LOWER SAXONY

13 DRAVSKO POLJE

12 GIURGIU COUNTY

11 BAIXO MONDEGO

6 AXIOS RIVER

5 LOWER SAXONY (GERMANY)

Closing nutrient cycles on a super-regional scale efficiently and sustainably, export from farm manure surplus regions to arable farming regions, coordinated by the Federal Chamber of Agriculture.

6 AXIOS RIVER (GREECE)

MAP approach for a river basin area to raise awareness and build capacity on the impact of farming on water quality and offering solutions based on farmer's needs, to reduce pressures.

7 PROVINCE OF NOORD-BRABANT (NETHERLANDS)

Reduction of pesticide emissions to groundwater in catchment areas by demonstrating and applying new farming techniques, cooperation in the full food production chain from pesticides sales to supermarkets.

8 PROVINCE OF OVERIJSEL (NETHERLANDS)

Individual advice on agricultural management to dairy farmers in the recharge area of five vulnerable drinking water abstractions to reduce nitrate leaching and increase the profitability of the farms.

9 DERG CATCHMENT (NORTHERN IRELAND - IRELAND)

Transboundary catchment with pressures by pesticides use for removal of rushes, driven by farmers' concerns over eligible land for the CAP payments. Challenges regarding cross border management.

10 VANSJØ (NORWAY)

MAP established in 1999 by nine municipalities in the catchment. Measures to reduce nutrient loads from agriculture and dispersed settlements have improved water quality. Continuous focus on measures is needed.

11 BAIXO MONDEGO (PORTUGAL)

Closing organic matter loops to improve soil structure and fertility. MAP used to discuss strategies and support implementation of best practices, developing a common plan of action.

12 GIURGIU COUNTY (ROMANIA)

MAP initiated and financed by the national government to implement ND. Strong variety in farm size in Romania. Challenge to increase involvement of communities, large farmers and local church.

13 DRAVSKO POLJE (SLOVENIA)

MAP was established to improve trust between stakeholders and to promote the importance of nitrate leaching reduction in the water protection zone. Developing a shared problem perception and capacity building on effective and efficient measures for WFD and CAP cross-compliance.

Feedback mechanisms

Well-designed feedback mechanisms could support connections between local/regional challenges to improvements in the plethora of policy and legal instruments provided by EU and national government. These mechanisms should specifically include the intersectoral dependencies that promote water quality ambitions. The risk-based approach in the recent revision of the DWD is an example of such an improved interlinkage.

At EU level this need for improved interlinkages was recognized. The feedback in the working groups on the Common Implementation Strategy for the WFD and the evaluation of the DWD supported/reiterated the need for improved interlinkages (see Textbox). A joint exploration of solutions for barriers at the interfaces of these directives resulted in targeted cross-references in the revised DWD. Such a learning process could also be relevant for related directives and policies such as the Nitrates Directive and the CAP.

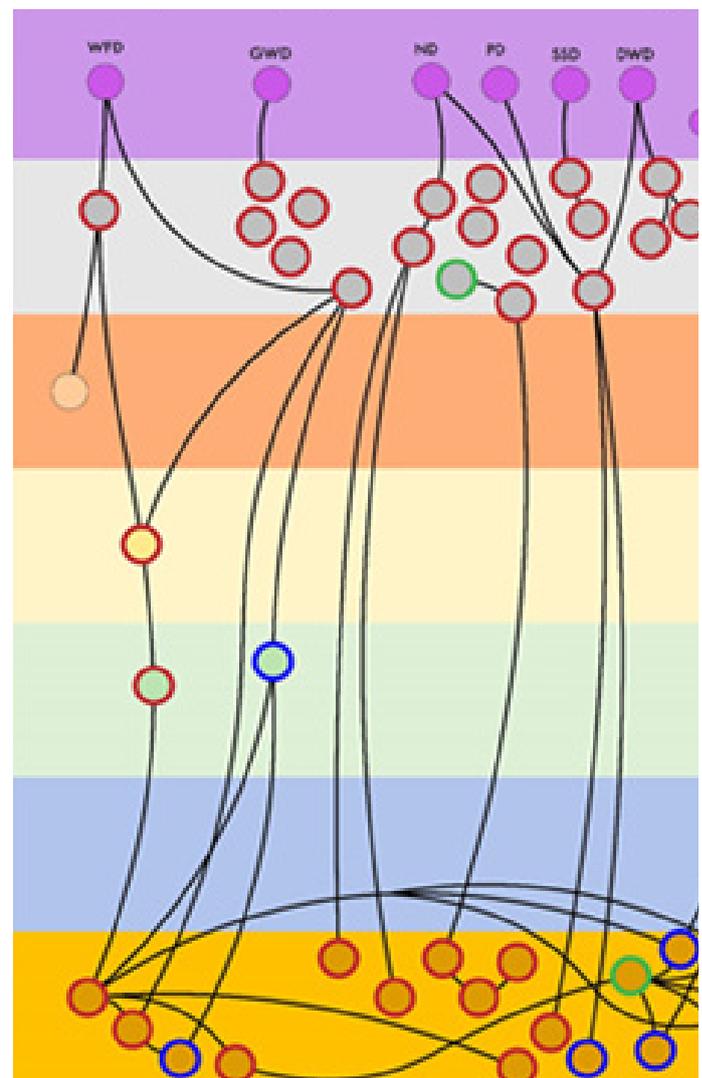
Intersectoral learning

Additional capacity (knowledge and means) is needed to improve the transdisciplinary and cross-sectoral approach, over scales and sectors. A combination of top-down and a bottom-up approaches will give extra impetus and improvement. The EU could support this process of capacity building by facilitating international and intersectoral learning.

Capacity building transdisciplinary, cross-sectoral approach

The complexities and inconsistencies of European legislation become most explicit at the local level. At that level cross-sectoral measures have to be implemented and executed, and effects are monitored. In some case-studies there is a plethora of arrangements at farm level that can no longer be obviously linked (directly) to national and EU legislation. The EC could support the development of effective local measures by providing guidance towards strengthening and explaining the role of intersectoral links/dependencies between the different directives that promote water quality ambitions.

Implementation could benefit from advanced cross-referencing: what implications carry decisions made in one domain for another domain? Improved guidance can provide practical solutions to existing and perceived inconsistencies. A more facilitated cross-sectoral approach to policy application at local level in a joint approach should be adopted to improve stakeholder networks. The EC could support implementation of directives by offering platforms for guidance and to exchange experiences from different levels and sectors. Examples include a range of experiences, including concrete experiences from implementation of abatement measures and how effectiveness and cost-effectiveness can be improved by governance, cooperation with farmers and adaptation to local conditions. This will facilitate interactions between stakeholders and between institutional levels and hydrological scales, achieving higher effectiveness as well as cost-effectiveness.

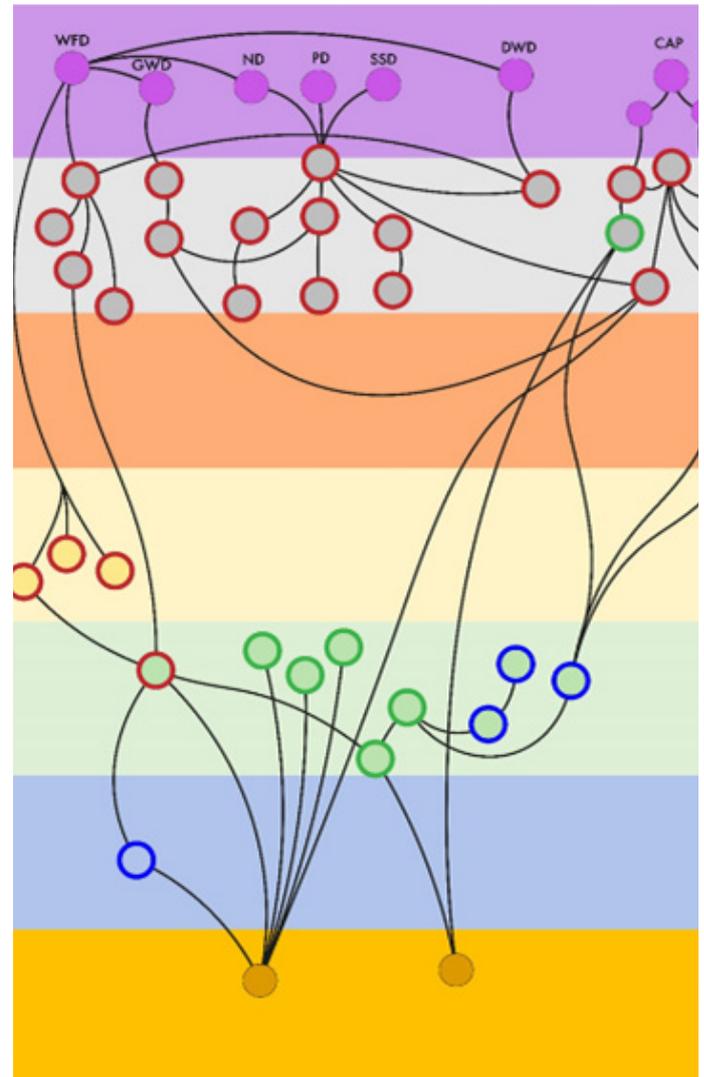
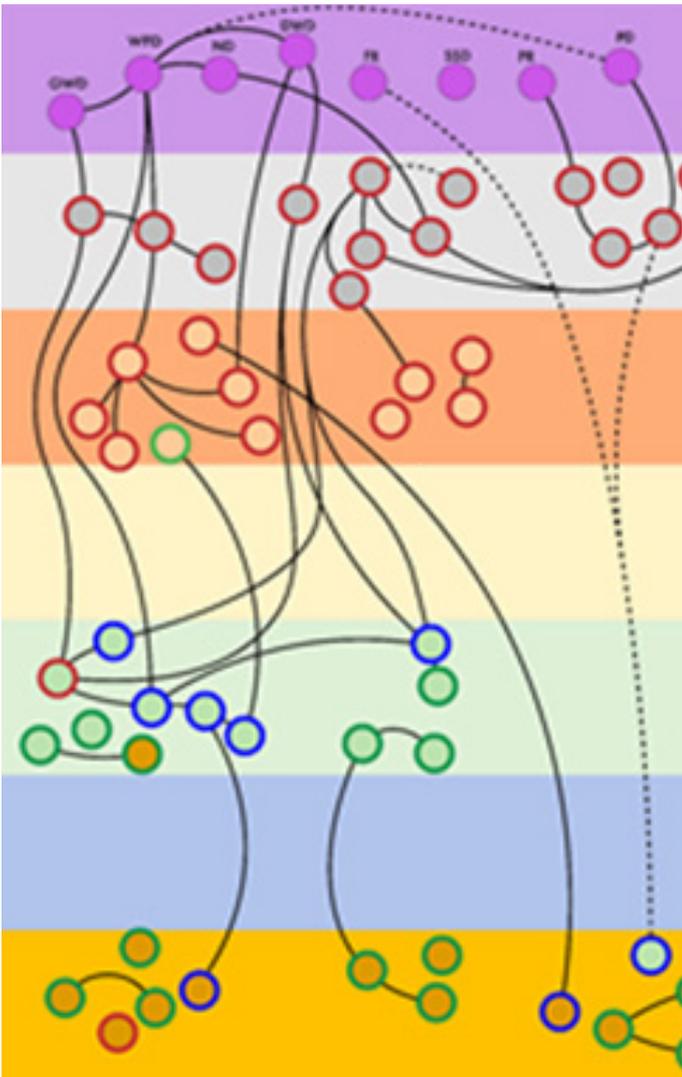
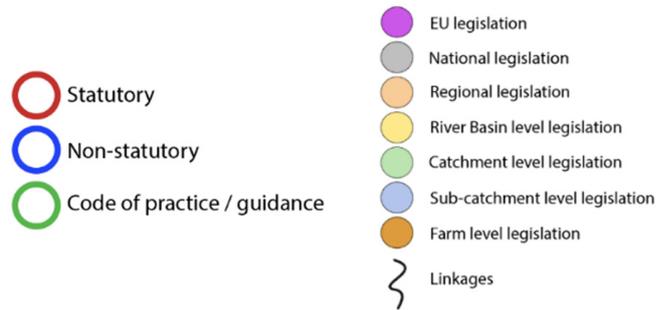


Incorporation

Economic pressure from agriculture severely limit local room to manoeuvre to further improve water quality. Measures mentioned by stakeholders as effective, like catch crops and buffer zones, will contribute to water quality improvement. However, what can be achieved in the local optimisation process is only a fraction of what can be achieved with more structural policy choices that reduce inputs and pressures at their source. In view of current policy initiatives such as the Green Deal and From Farm to Fork, the EU, its Member States and partnering states should incorporate the impact on water quality in assessments and policy choices on all levels.

WFD: Water Framework Directive
 GWD: Groundwater Directive
 ND: Nitrates Directive
 PD: Pesticides Directive
 SSD: Sewage Sludge Directive
 DWD: Drinking Water Directive
 CAP: Common Agricultural Policy (+ Pillar 1 & 2)

In the Farm to Fork initiative the EC stipulates that a sustainable food system is essential to achieve the climate and environmental objectives of the Green Deal (and upcoming Climate Directive). The initiative highlights this also as an opportunity to improve the incomes of primary producers and reinforce EU's competitiveness. Agricultural activity to date however, has been the major source of pollution of drinking water resources throughout Europe. Stakeholders in the Fairway case studies emphasized the tension between taking measures to protect water resources in the context of (small) economic revenues



for farmers. Creating a sustainable balance requires understanding of the impacts of complex political choices and the capacity and will-power to follow up on these impacts. The EC could support MS by embedding water objectives in planned provisions on integrated pest management and integrated nutrient management action plans, as well as facilitating a cross sectoral learning platform for this transformation that is beneficial to both farmers, consumers and the environment.

Cost-effectiveness of local interventions

Cost-effective nitrogen abatement for water quality protection requires implementation at low costs and with high pollution control effect. Cost-effective implementation of the plethora of EU directives and policies to protect drinking water sources from pesticides and nitrate can be achieved by a large number of measures and policy instruments. To achieve cost-effectiveness, it is important to identify barriers that can hinder implementation and increase the costs. Vice versa, it is important to retrieve information on potentials for good practices and the conditions needed. Farmer compliance is important to attain water quality objectives.

Inflexible

Command and control regulation is used for both pesticide and nitrogen management measures. This type of "hard regulation" has the drawback that it is not flexible and can be difficult to target, mainly because distributional effects like the 'polluter pays' principle, are not accepted. An exception to this are mandatory restrictions in groundwater protection zones. In those places mandatory restrictions can work, but experiences have shown that the necessary compensation to farmers can be difficult to negotiate. The economic instruments, often used as part of the CAP pillar I (cross-compliance, greening and the new eco-schemes) and CAP II (agri-environmental and climate schemes), are under revision and have been so several times since 1992. The assessment in the Fairway project shows that further revisions of the CAP are necessary as uniform payments and greening have shown to be ineffective in delivering environmental effects, while local adaptation and result-based schemes directed to the implementation of clear objectives indicates better effects and cost-effectiveness.

Catch crop cultivation

The experiences from Europe-wide studies on abatement measures used for drinking water resource protection, show that catch crop cultivation is one of the most cost-effective measures to reduce nitrogen leaching, compared to measures such as nitrogen fertilizer reductions and wetland restoration. For that reason catch crop cultivation is a widely applied measure in EU agri-environmental policy. Subsidies for catch crops, e.g. as agri-environmental schemes in CAP Pillar II, are important as incentives for uptake of this measure, but uniform requirements and compensations are not cost-effective as the required level of compensation to enrol voluntarily implementation differs between both farm types and regions. Farmers experiences in implementing catch crop cultivation are also varying explained by risk of reduced yield as well as risk aversion attitudes, increase of the costs of pesticides, costs of seeds, of equipment and labour. In some countries experiences indicate that regulations can result in incompatible management practices with regard to main crop and catch crop.



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