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Guidance for administrations on making WFD agricultural measures clear and transparent at farm level

This guidance document is being developed through a collaborative programme involving the WFD Common Implementation Strategy (CIS) partners. The guidance includes results from the discussion that took place at the CIS workshop on "Clear measures for farmers" on 6 April 2011, Brussels and from the comments and examples received from the partners and the SCG. The preparation of the guidance is supported by Ecologic Institute, Berlin

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Content

- 1. Why a guidance on making WFD agricultural measures clear and transparent at farm level? 4
- 2. Member State perspective: national administrative approaches..... 7
- 3. River Basin Authority perspective: administrative approaches for making measures operational 12
- 4. Farm-level perspective: clear measures required to protect water bodies. 25

List of abbreviations

AEM	Agri-Environmental Measures
CAP	Common Agricultural Policy
CIS	Common Implementation Strategy for the Water Framework Directive
DWPA	Drinking Water Protected Areas
GAEC	Good Agricultural and Environmental Condition
GEP	Good Ecological Potential
GES	Good Ecological Status
GS	Good Status
MS	Member State
ND	Nitrates Directive
NVZ	Nitrate Vulnerable Zone
PoM	Programmes of Measures
RBD	River Basin District
RBMP	River Basin Management Plan
RDP	Rural Development Programme
RBN	River Basins Network
RDR	Rural Development Regulation
SMR	Statutory Management Requirement
WFD	Water Framework Directive

1. Why a guidance on making WFD agricultural measures clear and transparent at farm level?

The Water Framework Directive (WFD) entered into force on 22 December 2000, thereby establishing a framework for Community Action in the fields of Water Policy to prevent further deterioration and to protect and enhance the status of all waters. In making Community Actions operational, environmental objectives are to be achieved by implementing necessary measures to prevent deterioration, to protect, enhance and restore waters with the aim of achieving a “good status” of all community waters by 2015. Exceptionally and according to the WFD provisions, this deadline may be extended up to 2021 or 2027, but suitable measures have to be put in place from 2012 onwards.

Agriculture continues to exert a significant pressure on surface and groundwater in most European regions¹. Agriculture has been identified as a major source of pollution and over abstraction and is partly responsible for habitat degradations. However, agriculture plays also a positive role in providing public goods, including environmental quality. It provides, among other things, an important potential for problem-solving in water protection and has already significantly contributed to this aim.

The Water Framework Directive requires that Member States (MS) identify water bodies which currently do not meet the good status requirement, causes of not meeting this requirement and necessary measures to bring these water bodies to good status by 2015. River Basin Management Plans (RBMPs), which have had to be prepared by 2009, and their Programmes of Measures (PoM) are a central tool in this process. By May 2011, 20 countries had adopted their River Basin Management Plans.

As stated in Article 11.3 of the WFD, the PoM is expected to include both mandatory and voluntary measures. In addition, measures are divided into basic and supplementary measures. Basic measures are described as minimum requirements that include relevant existing EU legislation (e.g. the Nitrates Directive), controls over abstraction of surface and groundwater, controls over practices influencing source and diffuse emission of pollutants and require measures to implement applying the cost recovery principle. In addition to these basic measures, and if necessary to achieve the objectives of the WFD, the Member States have identified 'supplementary measures', whose definition is left to their discretion in line with Article 11.4 of the WFD. These supplementary measures can also be mandatory by their nature.

After the adoption of the RBMPs, the challenge for the Member States and the River Basin Authorities is now to make the measures that have been identified in the PoMs operational before the end of 2012 as stated in Article 11.7 of the WFD.

A basic precondition to make the agricultural measures in PoMs operational at farm level is that the measures that farmers should adopt are clear and transparent. This includes that farmers clearly know what they need to do to protect water resources and if they are required

¹ <http://ec.europa.eu/environment/water/quantity/pdf/summary050510.pdf>

and/or incentivised to carry out the necessary adjustments in their farming practices. Measures and other requirements should be made as concrete and specific as needed.

Also the need to ensure a proper administrative follow up of the implementation of the WFD necessitates to identify clearly WFD measures at farm level. As stated in the WFD, the responsible body for the application of the rules should be the WFD competent authority that has been identified in the planning process. Whilst the competent authority has the main responsibility at the River Basin District level, a proper administrative follow up covering all the levels require participation of other administrations, agencies and stakeholders.

Above mentioned tasks benefit from the fact that there is a long tradition of water management across Europe and water policy is not new in the EU. For example, water administrations are developed entities that have a long history and solid establishment and many important WFD measures, including mandatory ones, are already in place. In the context of the WFD transposition into national legislation, that was due in 2003, Member States developed further administrative provisions that cover many issues that relevant to agriculture, such as water abstraction, wastewater discharge, controls on diffuse pollution or physical modification of water bodies.

The aim to make WFD agricultural measures clear and transparent at farm level benefit also from many other earlier efforts and studies. For example, potential WFD agricultural measures have been identified very comprehensively by the JRC and the River Basins Network (RBN) and through a study led by DG ENV. All this information has been compiled in a Catalogue of Measures (CAOM)². The River Basins Network is also further specifying the key measures in the CAOM through its new mandate (2010-2012).

Given that national planning is often driven from the EU, it has been recognised that coordination across sectors and directorates that can influence on agricultural pressures on water bodies is important also at EU level. Further harmonisation of the WFD with other key EU policies would be beneficial and would support greater join up of national level planning within Member States. There is also a similar need to develop further cross-cutting issues and synergies between different instruments of EU's water policy and this work has already been started within the process of the Common Implementation Strategy for the WFD (CIS).

Aim of the guidance

The aim of this guidance is to support the national and river basin management authorities in making agricultural measures in the PoMs operational. Specifically, the guidance will identify and discuss administrative principles, methods and tools for implementing measures at farm level, as well as the different communication and decision support tools that help to provide clear and transparent information to farmers and follow up to the WFD competent Authorities. The focus is on the agricultural related measures of the PoMs, but many of the issues are relevant to other types of measures as well. However, details of technical aspects of the implementation of various measures are excluded from the guidance.

² <http://rbn-water-agri.jrc.ec.europa.eu/>

Guidance as a toolbox

It is important to emphasize that the complex diversity of farming structures, institutional arrangements, environmental conditions, and sources of environmental pressures on waters in European regions necessitates a flexible approach. No one-size-fits-all solutions exist. To ensure effective support to farmers, the need for individual approaches for different regions and different farms must be kept in mind. This guidance aims to identify a toolbox of methods and specific tools that authorities can adjust to fit their individual circumstances.

Specific characteristics that will influence the selection of appropriate methods and tools include many different parameters from the type of environmental pressures to address to the level of IT knowledge of the farmer.

A combination of the different methods and tools as well as a tailored approach in terms of environmental, economic and social dimension will be needed to successfully address the challenges in river basins.

The following three sections will elaborate these methods and steps to take at national, river basin and farm level, recognizing that some overlap may exist between different levels and that authorities' responsibilities vary between Member States.

2. Member State perspective: national administrative approaches

Although the River Basin District (RBD) is often the primary level for WFD planning in Member States, national and sub-national administrative tools have also a significant role in making the PoMs operational at farm level. National or federal level legal regulations, economic incentives and informational instruments give general constraints and also facilitate the implementation of PoMs. The implementation of PoMs and the achievement of WFD objectives require national level commitment not only within water administrations but also within administrations of other sectors, including agriculture.

Member States need also to closely monitor whether the objectives are going to be achieved or not. This includes investigation of the causes of the possible failure and establishment of necessary additional measures. The first interim report describing progress in the implementation of the planned PoMs should be submitted within three years of the publication of each RBMPs. As mentioned earlier, the PoMs should be operational by then as well.

Therefore, it is recommended to discuss, identify and agree on key national political decisions and administrative approaches to be followed after the adoption of the RBMPs.

In this section, several principles are outlined that can facilitate making agricultural measures operational at farm level through national level planning.

Enhancement of co-operation between relevant national administrations and with stakeholders (planning, budget and monitoring)

Member States are responsible for the selection and design of national level instruments, including, for example, the Rural Development Programmes and further specification of cross compliance. Thus, Member States decide on a set of measures that are available at the RBD level to tackle agricultural pressures.

In order to ensure that all relevant administrative sectors take into account the implementation of the WFD and that synergies between different objectives are achieved, close cooperation between water planning authorities and other sectors is needed. The agricultural sector is one of the key sectors, but not only, to be involved in this integrated planning. Experiences reveal that a cross-sectoral and integrated approach in planning, designing and selecting measures is more effective and efficient.

The preparation process of the RBMPs have helped to identify relevant administration and stakeholders to be involved in the coming implementation of the PoMs and it gives a strong basis on which to build further work. Appropriate administrative arrangements are already in place, also for international river basins, and sectors to be involved are known as a result of RBMPs' review of the environmental impact of human activity, economic analysis of water use and consultation process.

This joint planning effort is often cost-effective in terms of funding but also in terms of achieving multiple environmental objectives. A collaborative and targeting funding process on behalf of the involved authorities saves often resources and may even be a prerequisite to provide adequate funding (in terms of the overall amount) or to maximise the benefits from

existing funding for the objectives set-up and measures developed in the RBMPs. Moreover, it can also prevent double funding.

In addition to the joint planning, an evaluation of possibilities and gaps of existing administrative approaches, for example, legal, economic and informational measures, in the different sectors (in particular agriculture and water) is recommended. This evaluation is needed in order to find out what extend the existing administrative approaches are able to deliver WFD objectives and how the existing administrative approaches could and should be improved. Relevant instruments to be evaluated are those that may have a direct or indirect positive/negative effect on the water status. Similarly to the enhancement of co-operation, existing RBMPs give a strong basis to evaluate what can be achieved through existing administrative approaches and what needs to be developed further in order to meet the objectives. Depending on the level of detail in the preparation process of the RBMPs, this may require a further assessment of relevant information and, for example, amelioration of national level aggregations and summaries of the RBMPs. After the evaluation of possibilities and gaps of existing administrative approaches there is a need to find a common agreement on how to proceed with identified key development areas such as funding of the implementation of RBMPs.

Involvement of all affected stakeholders (farmers, NGOs, water customers, business sector) in the discussions on how to reach the good ecological status targets and other objectives e.g. drinking water protection (set by the WFD) should be continued at all spatial levels, from the national to the farm level. This also includes transparent stakeholder participation in the more detailed planning of making PoMs operational. While focusing on agricultural measures, it is of most importance to engage and maintain a good relationship and exchange with the organizations and unions that are representing farmers.

Best Practice Example: Engaging national level administrations and stakeholders (Finland)

The Finnish Government's decision to adopt RBMPs in December 2009 required that a more specific national implementation program had to be drawn up in a broad collaborative process by the end of 2010. One of the aims of this Programme for Implementation of RBMPs was to engage all relevant nationwide administrations and stakeholders whose contribution and financing are needed in the implementation of PoMs. The content of the national implementation programme is summarized as follows:

- Sectoral summary of measures and policy instruments, including financing, needed to meet WFD objectives
- Financial and political instruments and other prerequisites for the implementation of identified measures
- Roles and responsibilities of different bodies (administrations, research institutes and private operators, including farmers)
- Implementation timetable and prioritization of the measures (at general level)
- Monitoring of the implementation programme

In February 2011, a Government's resolution agreed on the adoption of the Programme for Implementation of RBMPs for the period of 2010-2015 including e.g. targeted national level principles of actions needed in different sectors to meet the WFD objectives. This resolution would not have been possible without a broad dialogue with various government sectors and

stakeholders. The dialogue in the agricultural sector included both high-level and expert-level negotiations with the relevant ministries, the central farmers' union and representatives from the relevant regional administrations. The main identified instruments include allocation of funding, development of legislation and other policy instruments and R&D.

Based on the national implementation programme regional administrations have now launched regional collaborative processes on the implementation of measures.

Potential policy actions to take at national level

Developing national implementation rules and strategies

One of the main principles of the WFD is that it sets out common default environmental ecological objectives but leaves a great deal of flexibility to Member States on how to achieve them. In addition to the River Basin District (RBD) level planning, there is often a need to agree on and develop national level rules and priorities to facilitate the implementation of the PoMs. This is of most importance for pressures that have been identified as key pressures at national level and are cross-sectoral by nature. In developing such rules and strategies, the following elements are relevant:

- Evaluation of possibilities and gaps of existing administrative approaches, e.g. legal, economic and informational instruments
- Finding and implementing synergies between sectors, including interplay with EU regulations
- Setting up / agreeing on an implementation plan including priority catchments (France, Scotland) or agriculture as a priority sector, if appropriate
- Ensuring coordination between national and regional/local level. For example, land use planning responsibilities and competences are often at regional/local level, but national coordination may also be needed due to the significant influence of land use planning on several agricultural measures.
- Finding and developing further financing options. Relevant authorities at national level can enhance the implementation of appropriate measures by finding synergies between different state aid instruments. Moreover, it may be relevant and possible to enhance the development of new funding structures, such as public and private partnership, at national level.
- Public-private partnerships have successfully been applied in several countries. Even though public-private partnerships are rarely implemented at national level they can be promoted by national level actions. In France, the example of cooperation between a private water company and farmers in the area of Vosges illustrates possibilities for local level initiatives. In this case, the cooperation between different stakeholders led to the creation of financial incentives to encourage farmers to abandon intensive farming, thus helping to protect the water resources.³

³ Perrot-Maître, D. (2006) The Vittel payments for ecosystem services: a “perfect” PES case? International Institute for Environment and Development, London, UK.

Making full use of water protection measures available under the current CAP

The Common Agricultural Policy (CAP) exerts significant influence on farming practices and offers one of the most relevant tools to reduce harmful effects of agriculture on European waters. The CAP increasingly contributes to water protection, in particular farmers must now comply with cross compliance which includes different water related provisions.

Nonetheless, there is still a need and possibility to analyze several CAP related provisions and regulations, at national level and in cooperation with agricultural and water management sector, whether they can be better directed to mitigate adverse effects of agriculture on European waters. Individual Member States have still some flexibility in their adoption of the provisions of the first pillar and especially in their adoption of rural development programmes. The following list gives some examples on how the current CAP could be used to better contribute to meeting WFD objectives:

- Re-specifying the GAEC requirements (on the basis of a common framework of standards) to meet the objectives of the WFD.
- Granting support to specific types of farming which are important for the protection or enhancement of the environment (art. 68 of Council Regulation (EC) No 73/2009).
- Taking full advantage of agri-environmental measures under Article 39 of the Rural Development Regulation (RDR).
- Making use of Article 38 of RDR that offers support to farmers in order to compensate mandatory measures resulting from the implementation of the WFD.
- Implementing other relevant measures of Axis 1, Axis 2 and Axis 3 of Rural Development Programmes, as identified and described in the final report on the "WFD and Agriculture Linkages at the EU Level"⁴.

Pros and cons of bottom-up and top-down approaches to planning and implementation

With regard to the different approaches to planning and implementation a distinction between bottom-up (local to national) and top-down (national to local) approaches can be made. Experiences in Member States show that both bottom-up and top-down approaches can work for example in engaging relevant administrations and stakeholders. The following paragraphs and Table 1 will highlight differences and points to take into account when planning these approaches.

Bottom-up approaches involve stakeholders directly in the planning process of a measure. This benefits the target group, here the farmers, which will have acquainted themselves with the issue and developed knowledge and ownership of the measure at an early stage. This can lead to better implementation as the measures take into account local needs and aim at concrete and practical actions.

⁴ Dworak, T., Berlund, M., Liesbet, V. et al. (2009) WFD and Agriculture Linkages at the EU Level, Summary report on an in-depth assessment of RD-programmes 2007-2013 as regards water management, Final report. Accessed at: http://ecologic.eu/download/projekte/1900-1949/1937/final_report.pdf

Top-down approaches can have a benefit of keeping a better overview of the general objectives of the WFD and thus adopt more precise methodological approach. Especially at national and regional level, the top-down approaches allow the setup of more uniform measures which render implementation and monitoring easier. Thus, this approach fits well for measures that are widely applicable. In addition, top-down approach does not necessarily require so much administrative and other resources at local level.

Finally, a combination of both, the top-down and the bottom-up approaches can often be most effective for the development and drafting of measures at farm level to protect water. While a bottom-up approach will be needed to involve and engage farmers and select the measures most likely to be implemented, a top-down planning and prioritization is likely to be necessary to ensure achievement of the WFD objectives.

The pros and cons of bottom-up and top-down approaches discussed above, are summarized in Table 1.

Table 1: Pros and cons of bottom-up and top-down approaches to planning and implementation

	Bottom-up	Top-down
Pro	<ul style="list-style-type: none"> • Active involvement more likely • Strengthens the basis of support among farmers • More easy to take into account local situation • More concrete measures/actions possible • Farmers willingness to participate/apply their entrepreneurial skills is better addressed • Simplify and reduce the administrative burden in the long term 	<ul style="list-style-type: none"> • Potential to better methodological approach (HMWB,GEP, CEA, disproportionally) • Level of ambition remains more clear • Uniformity in measures • Level playing field for all farmers in a member state • Enables regional / basin level targeting
Contra	<ul style="list-style-type: none"> • High level of ambition and broad scope of WFD can get out of sight • Finding compromise with local actors becomes more important than achieving objectives of WFD • Concepts of WFD (HMWB, defining GEP, cost-efficiency analysis, disproportionality analyses) are difficult to take into account • Too detailed approach to get a clear 	<ul style="list-style-type: none"> • Public participation more difficult • Taking into account of local situation is more difficult • Measures are too abstract, which disturbs making PoMs operational

	Bottom-up	Top-down
	overview <ul style="list-style-type: none"> • Commitment from farmers can be poor if the approaches are voluntary 	

As mentioned earlier, several conditions and requirements must be fulfilled to enable a good joint and integrated planning process and there is no one-size-fits-all solution. Each river basin is different, has specific environmental characteristics, farming practices and different practices for water protection already in place. The economic and social situation of farms also needs to be taken into account, to cover all aspects of the measures being put in place and to avoid having a negative impact on farmers' income. In addition, transparency, a spirit of openness and cooperation will help to mutually develop measures and to work out a toolbox of measures that can meet individual demand and provide reliable funding.

It has already become clear that for a successful implementation of PoMs, participation of stakeholders is a highly important aspect. Public participation can be ensured, for example, through sharing the diagnosis of water resources, facilitating the expression of stakeholders, promoting contractual approaches, complementary to mandatory measures and developing a realistic economic evaluation of the impact of measures. The establishment of cooperation alliances led by commissioned advisors bringing together farmers, administration and other stakeholders at the local level has proven effective. One of the challenges is that the most effective and necessary approaches in terms of environmental outcomes in order to achieve the WFD objectives, are not always the most popular among all stakeholders and that some resistance towards additional measures may occur. However, this should not mean that the most effective measures are not adopted but rather that work needs to be done to ensure common understanding on how to implement such measures.

3. River Basin Authority perspective: administrative approaches for making measures operational

The first cycle of the WFD and the implementation of the PoMs will harmonise and strengthen the implementation of agricultural related measures that are focusing on water protection. This guidance draws on the experiences and approaches of the WFD implementation within many River Basin Authorities across the EU. Moreover, relevant individual experiences outside the WFD implementation are also shared.

Several methods have been successful in reaching out to farmers and thereby also fostering the aim to make PoMs operational. Here, three main activities from the River Basin Authority perspective are discussed: the planning process for making agriculture measures in PoM operational, the selection of appropriate funding mechanism and monitoring activities.

Planning for how to make agriculture measures in PoM operational

In some RBMPs, agriculture measures have been detailed to a certain extent: they are, for example, already very clearly specifying land management measures under their PoM (for example, buffer zones, wetlands, cover crops, conversion of arable land to grassland) and some also go as far as indicating the level of uptake needed. But in others, the PoM remains a strategic document and does not contain all details of what needs to be done to implement specific measures at farm level. It simply lists the general delivery mechanisms (for example, the main measures) and needs additional specification, e.g. regarding the specific actions and timescales involved, to make it operational as requested by WFD Article 11.7. This may entail more detailed sectoral actions, specific projects, planning documents, rules or regulations and so forth. In this respect the WFD is not different from other environmental Directives (for example Birds and Habitats Directives on which Natura 2000 network is based).

Best practice example: “plateforme sur l’eau” agreement in the Rhin-Meuse River Basin (Eastern France)

The agreement was signed in April 2011 between the WFD competent authority, the water agency, the local authorities and the farmers’ representatives. It is an additional document to the PoM and further specifies the objectives for the agricultural sector and the means to achieve them in link with the national strategy on environment (agreed through the “Grenelle de l’Environnement” national consultation process).

In this document measures are further targeted to areas where the good status of water is challenged by agriculture, e.g. priority catchments for drinking water. The measures include conversion to permanent pastures, conversion into organic farming (20% of UAA in France in 2020), an ambitious implementation of the GAEC on buffer strips, the introduction of low input crops, the use of alternative techniques to pesticides (mechanical weeding, biological pest control), reduction of 50% of the pesticides before 2018 (“Ecophyto 2018”), an implementation of RDPs in link with the water status, land use measures such as land exchange between farmers or land purchase by local authorities. The agreement runs until the end of 2012 and a committee involving all partners is ensuring its proper implementation.

In making PoMs operational, the objectives and requirements needed to achieve the outcomes must be very clear. There is a need to determine what baseline (basic measures e.g. those in under Nitrates Directive, GAEC and other legal requirements) and which additional measures will contribute to achieving the objectives. Elaboration of these requirements has already been done in RBMPs, but there may be a need to go further into detail depending on the approach chosen in the preparation of the plans.

Putting the PoMs into operation should be a collaborative process with input from stakeholders to identify effective solutions to address the scale of the issue. WFD competent authorities should continue to take full advantage of the stakeholders groups created during the preparation of the RBMPs. One of the most relevant co-operation needed at regional level is the co-operation between WFD competent authorities and regional agricultural authorities. This is of the utmost importance when making the WFD measures operational at farm level as well as in the process of controlling these measures. In some cases, there may be a need to develop further regional and local structures. In Mediterranean areas, for example, the irrigation networks are nowadays often managed in a collective manner (e.g. by Syndicated Associations of Owners or Regional Development Societies). This collective approach allows a better water management, and to organize the sharing of water in period of water scarcity. While putting the PoMs into operation, it is recommended to take a full advantage of these kinds of collective structures in which farmers are also involved.

Best Practice Example: “Agri-Mieux” (France)

The “Agri-mieux” programme (previously known as “Ferti-mieux”) co-operative agreements in France aim to improve and protect water quality without generating income loss for the farmers. The programme was launched by the National Association for Agricultural Development, in cooperation with governmental and agricultural organisations such as the Ministries for Agriculture and Environment, the Chambers of Agriculture and water utilities.

The agreements mostly consist of providing communication and technical assistance and are non-binding, voluntary programmes, which do not involve compensation.

By adopting the label Agri-Mieux, farmers take action to change the use of fertilizers among other measures. The incentives for farmers to participate consist of a label awarded to groups of farmers in a region engaging in voluntary action to protect water resources. The activities have resulted in up to 40% reduction in fertilizer levels in the water after the application of measures.

These programmes successfully fostered better integration of agriculture in the local politics of water. They initiated cooperation between the agricultural and water stakeholders, in the phase leading up and during the labeling process. Several measures such as wide manure spreading and composting of manure were successfully implemented. The strong involvement of farmers, the effective communication between farmers’ organisations, the administration and water scientists have allowed to find new ways to maintain and improve water quality without leading to income loss for farmers. The functioning and success of the “Agri-mieux” programmes is transmitted from farmers to farmers, through “Transfer farms”, which act as best-practice examples and offer four days of open days and training a year.⁵

⁵ <http://www.cra-lorraine.fr/fichiers/plaquette-agrimieux.pdf>

Include targeting of measures at sub-basin / regional level

The RBD/regional level is the primary planning level within the national planning framework to make the PoM operational at farm level. In order to better specify and target the measures, many RBDs appear to develop operational plans for measures at a sub-district or catchment or water body level, e.g. in Germany and in Scotland. The latter, for example, plans and implements measures both at national level and at priority catchment level as explained in the example below.

Measures can be prioritized and targeted at sub-basin or regional level (or another smaller appropriate hydrological unit) based on their potential effectiveness for the given area in terms of the objectives that they address and the type of farming that is dominant in the area. In addition, multi-objectives or benefits delivered by the measure can serve as a criterion that will ensure synergies with other environmental targets.

Local level planning (e.g. developing guidance specific to the local demands or farm level plans detailing individual measures for farms) also further foster the implementation and uptake of measures. Local level planning can be resource intensive, but efficiency can be improved without compromising the quality or uptake of information, for example, by grouping farms based on farming characteristics, administrative units and/or sub-catchments. The adoption of a regional or sub-basin approach based on environmental characteristics is important to render measures more applicable and realistic for the different ecological conditions throughout the EU. It is equally relevant to focus on the characteristic of the agricultural practice. For example, in areas with intensive livestock different measures would apply than in areas where arable farming is dominant.

Further identification of pollution sources may also be needed in order to target measures at a regional or sub-basin level. For example, having a clear understanding of the most important source for eutrophication will enable the selection of suitable measures to counteract the negative effects. Here, it is important to focus on the sub-basin or regional/local area, as pollution can originate from a very restricted area and thus concentrating the application of measures on the main source will create effective results with least effort (for example erosion risk maps and P-index can be used to evaluate areas where the risk of P load is increased).

Finally, as the example of Lower Saxony in Germany has shown, it can be helpful to develop a toolbox of available measures while leaving it up to the regional or sub-basin level to decide which measures they choose. Flexible approach allows adapting the measures applied and adopted by farmers to the specific needs of their activities. Slightly similar approach is in place in Finland where they have introduced a comprehensive set of conductively incentivised measures at national level. Then additional regional or river basin scale planning is used to target these measures, such as wider buffer zones and wetlands, effectively. The regional or river basin level planning is serving as a starting point for more detailed level planning at local and finally at farm level.

Best Practice Example: Managing diffuse pollution in Scotland⁶

Scotland's approach to managing diffuse pollution can serve as a useful example with regards to combining a national approach with sub-basin targeting as well as combining a variety of tools and measures (regulatory and voluntary) to achieve desired objectives.

In 2010, the Scottish Environment Protection Agency (SEPA) started a new programme of rural diffuse pollution work to help deliver the objectives outlined in the recently published River Basin Management Plans (RBMPs). An important part of this work was the establishment of a stakeholder group, at the Scottish Government's request.

A two tiered approach has been developed to target protection and improvements to water quality: 1) A national campaign of awareness raising, guidance and training; 2) A targeted 'priority catchment' approach with a sequential process of evidence gathering, awareness raising, and farm visits to identify hotspots, target measures and provide one to one advice on measures.

Within the context of the national approach a range of actions are utilized, including sending letters to land managers, releasing press articles and publishing articles with partner organisations. Language is important and environmental improvements need to be driven by business efficiency.

The 'Priority Catchment Approach' aims to reaching the required environmental objectives through a combination of evidence gathering, awareness raising and one-to-one visits to support land managers in protecting and improving water quality. At a farm-based level, catchment specific farmer events, press releases, radio interviews, postcard invitations for events and twitter are made use of. Catchment walks to identify risks and diffuse pollution hot spots have been very important in getting land managers to understand both the nature and extent of the problem. Revisits will be used to follow-up progress on the farms.

The main mandatory measures are The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (known as CAR) and the Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations.. Within CAR are a set of simple 'General Binding Rules' covering the main risks to the water environment from rural (not just agricultural) land use.. Implementation of these regulations is based on advice and guidance. Alongside mandatory measures, a set of voluntary measures, guidance documents and tools are employed to assist farmers in reaching their aims, such as the codes of good practice that are both sector and pollutant specific, demonstration farms and tools for nutrient management supported by training. The Scotland Rural Development programme is also a key measure with funding available for a range of water quality improvement measures that go beyond the statutory good practice baseline. Facilitating prioritisation, targeting and catchment wide coverage is important for the cost-effective delivery of measures within RDP

⁶ Scotland have published a supplement to the RBMP 'The Rural Diffuse Pollution Plan for Scotland' which describes this work in detail

http://www.sepa.org.uk/water/river_basin_planning/diffuse_pollution_mag.aspx . You can find more information on the diffuse pollution priority catchments under http://www.sepa.org.uk/water/river_basin_planning/dp_priority_catchments.aspx

Setting up a clear timescale for the PoM

It is recommended to set up a clear timescale and targets for the PoMs and monitoring of the progress. If it becomes evident that targets are not on the way to be achieved, then further actions should be considered, including an increased level of requirements. This issue could be addressed, for example, by including "Plan B" or fall back option into the planning.

Selecting funding mechanisms

The Water Framework Directive necessitates that the “recovery of costs for water services” and the polluter pays principle should be taken into consideration when deciding upon funding and payments. Article 9 of the WFD states that Member States must ensure an adequate contribution of the different water uses to the recovery of the costs of water services. In complying with this obligation, Member States may take account of the social, environmental and economic effects of the recovery, as explained e.g. in the CIS Guidance Document on Economics and the Environment⁷.

Water-friendly farming practices require often investments or may entail a shift in agricultural practices, leading, in some cases, to loss of income for farmers. This brings to a need to ensure that appropriate incentives exist to support changing practices and that the opportunity costs of applying measures to protect water are, where appropriate, covered by sufficient payments. In addition, the farmers that adhere to all existing requirements should be encouraged to continue good practices. These encouraging incentives together with tailored, targeted and cost-effective measures are crucial elements of putting measures into operation at farm level.

Based on many experiences, farmers’ engagement in voluntary schemes is more likely if they can clearly see the benefits of these schemes and if the payment structure is acceptable. For example, the payments should not only aim to cover income losses and investments but also maintenance and administration. Moreover, the payments should be aimed to be as tailored as possible (location specific), to be secured for medium term and to be suitable for the new CAP requirements. Also, creating opportunities to get payments for multiple ecosystem services may act as a good incentive.

Various types of funding mechanisms are available, some already well developed, others still under development. These mechanisms can be divided into different sections, including measures initiated by the public sector (government or a regional or local administration), private measures, and market mechanisms. Examples include:

- Rural development measures, including agri-environment schemes: to make these measures more effective, it is important that River Basin Authorities together with Rural Development authorities consult farmers and farmers’ organizations to reach a common understanding on the requirements and the payment system before the implementation of the measures.
- Structural Funds, such as European Regional Development Fund (ERDF) , and Cohesion Funds can provide support to meet WFD objectives, as some of the

⁷ WFD CIS Guidance Document No. 1. Economics and the Environment – The Implementation Challenge of the Water Framework Directive

projects funded under these schemes are linked to water protection. Especially ERDF have and can be used to this purpose but also the Cohesion Fund can finance, for example, projects involving the environment and transport infrastructure, in particular, in the least prosperous Member States.

- Private funding (initiatives) and public private partnerships can be provided by various bodies and combinations of bodies, such as trusts, foundations or organized citizen's groups. Potential collaboration can be made, for example, with hunting and/or fishing associations and with other bodies who are benefitting from the planned measures and could act as sponsors. There are several options for sponsorship that may help in reaching the WFD-objectives: for example land could be bought and taken out of production, or a payment could be given for having a certain type of production or use. In addition to private funding, also public private partnerships can serve as a potential funding mechanism for improving water quantity or quality, for example, under the form of payments for ecosystem services. Although private funding and public private partnerships are often limited to small scale and specific cases, there are examples where they have worked, in particular, in the cases where water suppliers or other water users have had a specific interest in maintaining water quality and quantity. In the Vosges area (FR) , a water company has established contracts with farmers to reduce nutrient use. Another example is a so called Landscape Funds in the Netherlands which consist of payments made in connection to buying a house in a rural area. The additional payments are stored in a fund that will be used for maintaining the landscape⁸.
- Innovative Payments for Ecosystem Services have been studied in detail in the Netherlands, and applied under the Catalogue of Nature Restoration Services (Catalogus groenblauwe diensten)⁹. The Catalogue was approved in 2008 under the EU state-aid rules and serves as a toolbox with new instruments for water management. It facilitates innovative practices at different administrative levels to help farmers and collectives to implement water protection measures. In addition to the Catalogue, a study was conducted to identify other innovative economic instruments are applied to stimulate agricultural water management measures schemes for payment for ecosystem services. These arrangements are voluntary and on top of the regular Catalogue and other current policies. The general characteristics of the payment schemes are that often, payments are aimed at initial investments, for maintenance, or for depreciation of value, but not for ecosystem services. The payments depend on regional circumstances, and there is often no direct link between financing sources (demand) and ecosystem provider (supply).¹⁰
- Auction approaches and tendering systems are currently studied and under development in many countries. Water quality tenders are used to reveal the opportunity cost of changing agricultural practices to help policymakers understand

⁸ www.nederlandmooi.nl; www.streekrekeninghetgroenewoud.nl/

⁹ Catalogus Groen Blauwe Diensten, <http://www.groenblauwediensten.nl/pages/home.aspx> (only available in Dutch)

¹⁰ Arcadis,2010. Verkenning innovatieve economische instrumenten voor agrarische watermaatregelen: Overzicht van praktijkstudies, Rijkswaterstaat Waterdienst http://www.helpdeskwater.nl/publish/pages/26880/verkenning_innovatieve_economische_instrumente_n_voor_agrarische_watermaatregelen_overzicht_van_praktijkstudies_2010.pdf

the potential costs of misallocating public resources and to design better ways of achieving water quality improvement. Countries are experimenting with various tendering systems, which may led to positive results. Examples include pilot projects of auctions in Germany, such as the Nordheim project in North-Rhein-Westfalia and the “Bluehendes Steinburg” project¹¹. However the pilot projects also illustrate several risks: after several auction rounds, farmers cooperate and agree on prices, especially if the number of potential participants is too restricted. In those cases the economic advantages of the system disappear. In addition, it has proven to be difficult to find an appropriate verifiable indicator, on which the tendering system could be based upon. Also these measures are not always the most appropriate for water management as a greater heterogeneity exists initially leading to more important cost differences than in the case of biodiversity.

- Outcome-based payments have also been tested and developed with an aim to reward ecological services in agriculture. The intention is to overcome the disadvantages of existing programs through designing the payment scheme to be more based on market mechanisms, such as supply and demand to measure the transaction cost for farmers. Outcome-based payments are potentially an innovative funding mechanism that may prove cost-effective for agri-environment schemes. In Germany, outcome based approaches have been successfully implemented for biodiversity and water protection to increase Nitrate efficiency. This is the case for example in Lower Saxony¹².
- Taxes levied on farming community and using revenues for environmental purposes or foster applied research. Taxes can be effective, but it is again recommended that representatives from the farming community should be involved in planning of taxes and deciding on the use of the revenues in order to get a general acceptance for the system. Challenges include that taxes are not necessarily properly reinvested and there may become some counter-productive effects in these kinds of fiscal measures. For example, Sweden applied a nitrogen tax between 1994 and 2009, but the tax was abolished in January 2010 because it was perceived to reduce the competitiveness of Swedish farmers (no other MS had a similar tax in place), the use of mineral fertilizers had declined and the tax was not addressing the nitrogen pollution from livestock sources. Another example is from German where levies on waste water and in some cases on water use, have been applied. The levied taxes are reinvested to pay for measures to reach WFD objectives, for example through agri-environment schemes.¹³ Similarly, in France Water Agencies collect fees based on extraction and discharges from users (domestic, industrial, agricultural) part of which is redistributed to the farmers, for example for the protection of water quality and drinking water in catchment areas, under the condition of changing agricultural practices and the implementation of agri-environmental measures (e.g. conversion to organic farming

¹¹ For more information on the “Bluehendes Steinburg” project in North-Rhein-Westfalia please visit: http://www.nlwkn.niedersachsen.de/live/live.php?navigation_id=8247&article_id=45185&psmand=26

¹² http://literatur.vti.bund.de/digbib_extern/bitv/dk038383.pdf

¹³ For an overview of water abstraction fees in Germany: http://www.netzwerk-laendlicher-raum.de/fileadmin/sites/ELER/Dateien/05_Service/Publikationen/LandInForm/PDF-Downloads/LandInForm_2009_4_Fokus.pdf, pages 22-23

and 30% reduction in the use of pesticides). In particular, this is done through a levy on pesticides used in part to fund the plan to reduce the use of phytosanitary products in France (“Ecophyto 2018”). In Portugal, there is a law¹⁴ aiming to recover costs of water services including levies on water use and wastewater discharges. The revenues are intended to be used for the improvement of water use efficiency, water quality and associated ecosystems.

- In relation to water quantity, subsidies for investments on hydraulic networks, in order to save water (channels modernization, storage of water) can be granted. In the region of Flanders, a levy on the abstraction of groundwater is set, as a function of the quantity of water available in the groundwater body. In the Netherlands, the provinces impose a groundwater levy on groundwater extraction. The money from this levy is earmarked for anti dehydration studies and measures. In addition to the groundwater levy, Netherlands also apply a groundwater tax the revenues of which go directly into the state budget. The groundwater tax is meant to reduce the use of groundwater and by doing that stimulate sustainable use of groundwater sources.¹⁵

Best practice example: The role of water users association in the modernization of an irrigation district, Mula Spain

In the Mula River Basin district, co-operation with water users associations has been used to promote WFD economic principles (incentive pricing, cost recovery and polluter-pays-principle) and cautious management of water resources. Mula County is characterized by low precipitation and high evapotranspiration. All rights for groundwater and surface water are owned jointly by all farmers in the Water Users Association. The financial management of the irrigation cooperative works as follows:

- Each farmer has a water account in which all water allocation and withdrawals are indicated
- Each farmer has his own water account book, where the use of water and fertilizer is registered.
- The water quota is allocated to each farmer based on water availability and can change in each month
- Farmers can also exchange quotas among them, within the irrigation area.
- The water utilities association is responsible for allocating the quotas correctly.
- Quotas that are not used are returned to the association and individual farmers do not pay for them, but are not compensated for unused quotas.

¹⁴ Regime Económico e Financeiro dos Recursos Hidricos” - REF - Decree-Law 97/2008

¹⁵ Rob van der Veeren, 2011. Financing Water Resources Management in the Netherlands, final report OECD, http://www.helpdeskwater.nl/publish/pages/26880/final_version_report_oecd.pdf

Environmental monitoring to support the selection of measures

The WFD requires that the implementation of PoMs and their effects are monitored. In addition to more traditional water status monitoring that has to be carried out for the WFD to control whether additional measures are needed to meet the objectives, there is a need to monitor or analyze farm level issues as well. This farm level monitoring and environmental data collection and the communication of data to the farmer directly is very important and can be a strong and transparent element to support the need to take further action. The direct communication of results to farmers assists them with the implementation of measures and also offers the opportunity to monitor the awareness of farmers. Finding out whether information is available to farmers about possible measures, what measures they have already put in place, and whether the information provided adds to changing their behavior is important for further implementation.

Best Practice Examples: existing monitoring activities

- Denmark has run a monitoring programme for over 20 years in six small (5 – 15km²) representative agricultural catchments. The monitoring includes annual interviews with farmers to gather information on relevant farming practices as well as quantitative monitoring of N and P concentrations in soil water, drainage water, upper ground water and stream waters. Farm interviews are conducted each autumn by staff from agricultural advisory services and farmers' participation is voluntary. The data are combined through modeling to calculate nutrient balances and leaching levels and have been used over time to document the effects of various agri-environment measures. In the past, this monitoring supported the implementation of national environmental water action plans and has continued to provide useful information to inform the selection of farm level measures. In the future, the Agricultural Catchment Monitoring Programme will still provide the necessary information on interpreting agricultural data. However, it is expected that more focus also will be placed on the utilisation of the agricultural registry data (e.g. data from obligatory fertiliser accounts) as these are geographically distributed thus allowing interpretations at various scales.
- Prioritized monitoring efforts: In Germany, two sets of monitoring points are selected - 250 sampling points and a separate network with 'suspicious' points to monitor the effectiveness of measures.
- The assessment of the effects of single (or more) measures or a mix of measures can be done through water quality monitoring, but has proven to be sometimes rather difficult and work-intensive. Farm-level monitoring can help in this in many respects. For example, potential nutrient leaching can be estimated by soil monitoring and simple soil analysis methods. In Finland, for example, such a method is recommended as part of the agri-environment programme.
- The Netherlands has a database¹⁶ with measures and their impact. In addition, a tool to assess effects of different measures to achieve GES exists¹⁷. In this tool, a connection with recent/actual monitoring data is made.

¹⁶ www.informatiehuiswater.nl

- In Sweden, there is a specific pesticide monitoring programme that has been carried out in small agricultural catchments. The programme is part of a larger programme focusing on nutrients. The programme includes also regular assessment of changes in attitudes and on-farm practices.
- The Walloon and the Flemish Regions of Belgium have a system based on leachable nitrogen to follow up the impact of nitrates directive action programme. In both regions, the results of the leachable nitrogen monitoring in autumn are used as an instrument in control policy for the Nitrates directive action programme.
- Combining monitoring and modeling approaches (e.g. analysis of the transport and the retention of nutrients in river systems and examining management alternatives such as MONERIS in Denmark and Germany) in policy preparation can help to address existing and evolving environmental pressures as well as to provide valuable arguments for stakeholder communication and the uptake of voluntary measures by farmers.
- In 2008 Ireland established an Agricultural Catchments Programme in order to monitor the effectiveness of measures contained in the Nitrates National Action Programme, which in turn is the main agricultural element of the PoMs. Six agricultural catchments which cover a range of important agricultural typologies have been instrumented to monitor N and P sources and loss pathways to surface and groundwater bodies. Biophysical data is being combined with a socio-economic evaluation of farmer attitudes and an intensive advisory service is a critical linchpin of the programme. This monitoring programme is providing a comprehensive hydrological, ecological, economic and attitudinal baseline for Irish agriculture under current regulatory standards.
- Finland surveys the effectiveness of the measures applied under the agri-environment scheme. The regularly conducted research includes among others monitoring of changes in agricultural practices, use of nutrients and changes in biodiversity.
- The England catchment sensitive farming delivery initiative monitors the take up of farm advice measures that reduce agriculture's impact. This can be linked to monitoring and modeling results in order to show the impact of advice measures on water bodies.

Best Practice Example: monitoring of irrigated agriculture in the Ebro Basin (Spain)

In Spain the monitoring and implementation of measures in irrigated agriculture are highly relevant to good status objectives. One of the key issues is the monitoring and management of leachable waters from irrigation that carry concentrated quantities of nitrates and salts. In large irrigated districts, most of these waters are collected by the drainage system and discharged into streams and rivers. In the Ebro River District, major sub-basins were selected where there is a significant predominance of irrigation. In these areas a special network of Water Effluents from irrigation has been implemented, monitoring the daily flows circulating and the content of salts and nitrates. This network provides global data for every water district annually covering the efficiency of water use and the effluent of pollutants per hectare. The network has been implemented in close collaboration between users, involved

¹⁷ <http://public.deltares.nl/display/KRWV/KRW-Verkenner>

in farmer and irrigator associations, researchers and administration. The collaboration of irrigation communities is increasing the effectiveness of the monitoring effort through exchange of information. Currently, the Ebro River Basin network monitors five basins that represent a total of 215,000 hectares or 22% of irrigated area.

The PoM of the Ebro River District includes several measures to diminish the amount of water effluents from irrigation, increasing efficiency, also by reusing the leachable waters within the irrigation district, and as a result reducing the total exports of diffuse pollutants into the water bodies."

The monitoring is an important and essential element to support and assist the selection and implementation of agricultural measures of the PoMs. As always with regard to monitoring activities, quality assurance and quality control remain equally important. In agricultural water protection, there is a particular challenge of a need of a long time-span in detecting the impact of the evolutions of agricultural practices on water quality. The combined use of monitoring and modeling and better targeting of the monitoring efforts are good examples of developing further monitoring activities and tackling some of the existing challenges. In France for example, several areas were identified as being prone to water scarcity ("Zones de Répartition des Eaux") and more emphasis has been put on monitoring these areas. Studies to follow up on the water resources and use were set up and certain volumes were allocated to each water user (for drinking water, agriculture and industry). These studies, analysed at river basin level and presented in a transparent process of the stakeholders during a consultation process, defined the ecological flow to reach the WFD objectives.

Setting up a proper enforcement system

Water policy is not new in the EU. There is a long tradition of water management all across Europe. Water administrations are developed entities that have long history and solid establishment. This fact is reflected in a developed system of water management on which the WFD builds. The controls over the administrative regime to use water, discharge waste water or modify water bodies are in place in the Member States.

The WFD provides further developments and harmonisation of requirements and its legal implementation has already, in most cases, been done in the period 2003-2009 in the context of the transposition of the WFD, either by law and/or regulations. In order to properly implement WFD it should be ensured that enforcement systems fully apply to measures at farm level.

The issue of enforcement system was discussed in the CIS conference on "application of EU water policies at farm level" (Louvain-la-Neuve 2010) and the following ideas were discussed:

- Mandatory measures and voluntary measures have both to be controlled in order to make sure that they are implemented properly
- A significant control rate for mandatory measures for farmers and measures implemented on a voluntary basis by farmers should be achieved.

- The focus of the controls should not be on administrative issues but on the practices that could harm the environment. When doing so, it is important to acknowledge that the control of different objectives requires different approaches.
- Farmers should participate to the controls, as this allows feedback to them to better understand environmental issues.
- Controls should be developed on a robust scientific basis and should be concentrated on priority issues and should be as closely aligned to farming routines as possible in order to reduce or avoid bureaucratic burden.
- Other forms of (non-governmental) controls should be recognised as providing an efficient means of controlling adverse environmental impacts – these include environmental standards being included in food labelling and consumers therefore acting as enforcers of environmental standards.

Best Practice Example: The EWP Water Stewardship scheme

The European Water Partnership (EWP) has been developing a Water Stewardship Scheme (EWS) which defines efficient and implementable sustainable water management response strategies for water users, including farmers, in Europe and on a river basin scale. The EWS include a guideline/standard and checklists for farmers to help them in changing practices towards sustainable water use, management and governance. It aims also at rewarding for sustainable practices, takes into account the context of EU policies and promotes a take-up of the Water Framework Directive.

The farmers in the pilot countries and farms have participated actively to the development and testing of the EWS. Evaluation of the Water Stewardship pilot farms will provide further information also on its potential to help in the implementation of WFD agricultural measures.¹⁸

¹⁸ <http://www.ewp.eu/activities/water-stewardship/faq/>

4. Farm-level perspective: clear measures required to protect water bodies

WFD agriculture measures are now known

As mentioned in the Chapter 1, agricultural measures are, in general, already very well known and have been described in the Catalogue of Measures that was commissioned by the DG ENV to help member states in the implementation of the WFD. A first version of the CAOM was released in 2008 and an update was done in 2010 based on the findings of the two assessments on Rural Development Programmes and draft RBMPs. The River Basins Network has also participated in its refinement. The catalogue comprises of 85 measures with descriptions (definition, primary effects, time, implementation and effectiveness, etc.), related examples and references. The River Basins Network has started an in-depth assessment of the selected key measures which will provide more detailed information, for example, on the implementation, acceptance and social/financial/legal aspects of each measure.

As a general rule, WFD provisions relate to the way water is abstracted and discharged or to activities that are part of the farming practice that have a direct impact on the quality, quantity or physical condition of the aquatic environment. Following list illustrates these provisions by giving examples of potential failures to follow mandatory measures at farm level:

- Abstraction of water for irrigation without a permit (WFD Article 11.3.e)
- Discharging waste water directly to water courses or indirectly using percolation through soil without a permit (WFD Article 11.3.g and j)
- Application of pesticides not in accordance with the rules (time of application, type of pesticide, application close to water courses, etc) (WFD Article 11.3.h)
- Modifying a riparian area of a water body without authorisation (WFD Article 11.3.i)

Farmers need clear information on what we expect from them in order to achieve the WFD objectives

Farmers require clear, consistent messages about measures to be implemented, taking into account that, in addition to contributing to water protection, farmers are also asked to manage soil resources in a sustainable manner, to protect biodiversity and to mitigate GHG emissions. The role of the River Basin Competent Authority is to make the information on farm level water protection measures as clear and transparent as possible.

In this regard, informing farmers of the WFD objectives and the mandatory and voluntary measures is utmost important. If farmers are not well informed, the objectives may seem unachievable leading to non-action. In addition to the early involvement of stakeholders in the elaboration of measures, ongoing intensive communication with farmers and their representatives is needed.

Farmers need information on how to change practices towards more sustainable farming and how to avoid legal infringements, but more and more also on how to get compensated for providing environmental services. All the information, for example a list of WFD measures that they must or are encouraged to implement, should be easily accessible by farmers.

A proper implementation of the WFD requires a clear list of measures at farm level

A proper implementation of the WFD requires that the competent authority must be in a position to clearly specify for any farm of the river basin which WFD mandatory measures must be implemented and which WFD voluntary measures could be implemented to contribute to the achievement of the environmental objectives set for water in the river basin. Moreover, the list of mandatory measures is needed to check if the farmers in the area are compliant with the WFD.

Good examples of how such a list of mandatory and voluntary measures can be communicated have been undertaken in the UK. There, for example, the document “Water for life and livelihoods – River Basin Management Plan Anglian River Basin District” a list of mandatory and voluntary measures as well as a strategy on how to implement them has been published.¹⁹ This has been done for all 11 English river basin districts.

Farmers need to understand why measures are needed

It is crucial to explain the rationale behind the WFD measures. This includes that information about the impacts that farming is having on the water environment should be disseminated as well as information on the costs being paid by water customers to clean up the water. A set of questions to be clarified could, for example, contain:

Why have these mandatory measures been selected? Why do we need their involvement with these voluntary measures? What is the societal benefit of changing farming practices? What improvement can be achieved and in what time frame?

Many measures that support water protection have important implications for resource efficiency and thus short and longer term economic benefits for farmers. By reducing inputs and thus protecting natural resources farmers can also save financial resources. It is crucial to incorporate these aspects of resource efficiency in conveying the messages to farmers. For example, in relation to nutrient leaching, the more efficient use of inputs implies that “what is not lost to water courses is won for plant production/farm economics”.

Another important element to share with farmers is to give them information on the cost-effectiveness of suggested/required measures. Cost-effectiveness analysis should include the economic impact of measures on different farm types and local situations. It should also take into account for both the investment costs and operational/management costs of measures, the latter by integrating measures into the daily operations of a farm. However, in some cases, it may be difficult to derive cost-effectiveness for all measures and for all situations. This could be due to the fact that the net-effect of an individual measure may be complex to estimate even though the direct costs would be easy to quantify.

WAgriCO -project in Lower-Saxony in Germany has put emphasis on how to communicate the cost-effectiveness aspects:

¹⁹ Environment Agency, (2009) Water for life and livelihoods – River Basin Management Plan, River Basin Management Plan Anglian River Basin District
<http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/anglian/Intro.aspx>

Best practice example: the WAgriCo project

The Water Resources Management in Cooperation with Agriculture (WAgriCo) is an EU-Life demonstration project which aims to test the cooperation possibilities between water resources management and agriculture to reduce diffuse pollution. The objective of the project results is the sustainable achievement of the environmental objectives for groundwater set out in Article 4 and 7 of the Water Framework Directive.

The project activities take place in Germany (Lower Saxony) and the United Kingdom (pilot areas' within the catchments of the Frome, Piddle and Wey in Dorset). It builds on successful previous work on water protection, such as the 'Water Protection Areas' in Lower Saxony and the Voluntary Initiative on pesticides in the UK. The target groups are local farming communities. The project has produced reports and studies that develop a programme of measures and solutions. The main objectives are:

- The production of a tool-box of measures for farmers, land and water managers to reduce diffuse pollution cost effectively
- The development of a new approach for the improvement of nutrient management at farm level that is oriented at producing innovative results
- The identification of options on how to integrate water protection into agri-environmental schemes to support sustainable water resources management in the pilot areas
- The assessment of costs associated with large scale programmes of measures to protect the water environment

A project report specifically relevant for the success of the implementation of measures at farm-level, is Annex 39 of the Final Report on the "micro- and macro economic analysis"²⁰, which estimates the cost based on public transfer payments to farmer for the selected voluntary measures. These costs as well as assumption on environmental effects are used for the calculation of cost-effectiveness. The economic analysis identified the likely real costs of implementing mitigation methods, and potential methods of meeting these costs through agri-environment schemes, farm assurance, etc for farms typical of the agriculture within the pilot areas.

The results of the economic analysis showed that whilst it is not possible to assess the cost-effectiveness of different measures without information on the extent to which they reduce pollution, it is clear that farmers should be strongly encouraged to adopt mitigation methods which can be introduced at no net cost, the facilitation approach is a relatively low-cost way of informing farmers about methods that could reduce diffuse pollution and that measures

²⁰ Crabtree, J.R., Wightman, B., Morgan J. (2008) Water Resources Management in Cooperation with Agriculture (WAgriCo) - Micro-Macro Economic Analysis Final Report Annex 39-UK, accessed at: http://www.wagrico.org/publishor/system/component_view.asp?LogDocId=140&PhyDocId=167

based on reducing fertiliser usage below recommendations or converting arable land to extensive grass are expensive to implement when grain prices are high.

Farmers need to understand how to implement the measures

Farmers understanding on how to implement the measures can be increased significantly, simply, by developing the implementation together with them (or their representatives). This guarantees, among other things, that the measures are designed in a way that is practical. Some of the measures included in the PoMs can be challenging, for example, because they are new or technically demanding requiring advanced specific knowledge or technologies (e.g. creation of wetlands). The more technically demanding the measures are, the more advice and support is needed in order to ensure a proper and effective implementation.

Making information available for farmers

Many routes are available to inform farmers. Information can be provided to farmers directly from government, environment and agricultural agencies, local water boards or commissions, farmer unions, NGOs, and importantly advisory services, or demonstration farms.

Having many different routes and sources of information, however, can be a problem as it makes necessary to align the messages well to avoid inconsistency in the information provided. Therefore, where possible, some form of hierarchy providing a degree of management and quality control of information dissemination is beneficial. To the extent possible, the information flow directly to farmers should be managed by one source (even one person in a given location) that is well known and trusted in the farming community. The Scottish model of using the Diffuse Pollution Management Advisory Group, consisting of stakeholders, to implement the diffuse pollution plan has succeeded well in managing information exchange in practice²¹.

There are various types of possible facilitators for increasing farmers' knowledge of measures (see Table 2). For example, much can be achieved by involving intermediary groups in providing guidance. The involvement of farmers (peer pressure) that have practical experiences with good practices to share these experiences with other farmers can be a very effective method to encourage the adoption of good practices. The establishment of farm advisory services, going beyond the current Farm Advisory System that is addressed to cross compliance, is crucial for the knowledge exchange. In order to enhance the establishment and use of such services, financial support can be drawn from the Rural Development Programmes. Specialist advisors funded by government are another option. In addition, it is recommended to take full advantage of existing advisory services that are often also acknowledged by farmers. Interaction with educational establishments is also seen as an opportunity to ensure that both the educational institutes and farmers are up to date with the information available. Young farmers associations also offer the opportunity to educate the next generation of farmers.

In any case, it must be ensured that sound advisory services or well trained advisory specialist are available and accessible to farmers.

²¹ See http://www.sepa.org.uk/water/river_basin_planning/diffuse_pollution_mag.aspx

Table 2: Types of facilitators in the farming sector

Type of facilitator	Examples
Intermediary groups	<ul style="list-style-type: none"> • Stakeholder led management groups (e.g. Scottish DPMAG) • Local bodies – river or fishery groups • Local administration / municipal council • Advisors (see column below) • Farmers unions / organisations • Agricultural chambers • NGOs • Collective structures of management of the irrigation networks • Agricultural co-operatives
The Use of Peer Pressure	<ul style="list-style-type: none"> • Farmer “champions” • Farm based visits/examples of good practice • Case studies
Advisors	<ul style="list-style-type: none"> • Payment for advisory services/ extension services through RDP • Specialist advisors, e.g. agri-environmental advisors • Public or private
Education	<ul style="list-style-type: none"> • Agricultural courses • Environmental courses • Young farmers associations • Refresher training / vocational training
Government	<ul style="list-style-type: none"> • Raise awareness of regulatory controls
Water Industry	<ul style="list-style-type: none"> • Raise awareness about the cost of diffuse pollution on water bills.

In the cases where sound advisory services are already in place, they should be fully utilised for communicating various aspects, such as identifying the best ways to reduce environmental impact and the costs and benefits of implementing measures or changing practices. A useful example of an agri-environmental advisory programme is the Swedish programme “*Focus on nutrients*” which started in 2001 and has currently 7,500 farmers as members. More than 200 specialised agri-environmental advisors support the farmers, in particular in reducing nutrient leakage²².

Around the Baltic Sea, the Baltic Deal project, which is a flagship project of the EU Strategy for the Baltic Sea Region, is currently undertaking a major effort in increasing the participating countries’ capacity in agri-environmental advisory services²³.

²² See <http://www.greppa.nu>

²³ See <http://www.balticdeal.eu/>

Best Practice Example: Baltic Deal

The “Baltic Deal – Putting best agricultural practices into work” aims to reduce nutrient inputs to acceptable levels and thus responds to the EU Strategy for the Baltic Sea Region, the HELCOM Baltic Sea Action Program and several EU Directives. The project focuses on improving the environmental status of the Baltic Sea through reductions in nutrient losses from the agricultural sector, without impairing competitiveness or production and reaching this objective in a cost-effective way. This is suggested to be achieved through advancing and strengthening agricultural advisory services and demonstration activities, by highlighting and demonstrating best farm practices.

While the approach is common to several countries in the Baltic Sea region, the adaptation is national. The support on the national level will mainly consist of support to further strengthen the agricultural advisory services and to enhance effective transfer of knowledge on practices and measures that reduce the nutrient input the Baltic Sea to acceptable levels.

In 2013, Baltic Deal will deliver new tools for advisors, develop the network of farms and best practices, prepare reports and studies, engage farmers in the pilot area, organize study tours for all stakeholders and cooperate with other agri-environmental projects.

Best Practice Example: Lower Saxony (giving priority to voluntary measures and communicating with farmers)

The implementation of the programme of measures in Lower Saxony aims at reducing diffuse pollution from agricultural sources. The basic measures to achieve this objective is fertiliser ordinance (such as ban periods, annual surplus limits per ha, restricted input) and supplementary measures. The supplementary measures are tailored to local conditions and aim to accelerate good chemical status. Also a priority approach is given to voluntary measures.

The procedure adopted consists of the determination of required N-load reductions in a first phase, then tackles the assessment of cost-efficiency. Efficiency is evaluated through literature research and interviews, while cost is assessed through definition of measures and looking at compensation payments and effects, backed up by statistical analyses (soil samples and book-keeping records).

Stakeholder participation is ensured through discussions in pilot areas within the WAgriCo project, concerning Environmental targets and the appropriateness of measures. The stakeholder involvement process in particular adds to acceptance, cost-effectiveness and the area for implementation.

The proposed technical measures include agri-environmental measures and advisory services. Non-technical measures include voluntary (technical) measures, which are given priority, regulatory measures, only of voluntary measures prove to be insufficient, financial instruments (such as an N-tax). However, a tax would distort the market and could thus only be considered if implemented at EU-wide-level. Therefore, incentives to encourage N-efficiency improvements are preferred, which however present the problem of lacking reliable indicators).

Best Practice Example: Development of an environmental handbook for farmers (Southwest Finland)

In order to improve water protection and to meet WFD objectives the Finnish Government has, among other things, decided to start several sectoral flagship projects to help in managing the most significant pressures identified in the RBMPs. In the agricultural sector, a project called "TEHO" has been carried out since 2008. The project has taken a long term cooperative approach between the environmental authorities and the farmers' union and it has particularly been aiming to:

- improve the effectiveness of the current agri-environmental scheme,
- test new water protection measures,
- assess the impact of bio-energy production on water protection,
- introduce approaches and suggestions for a new agri-environmental scheme starting in 2014

One of the main results so far has been the development of a comprehensive environmental handbook for farmers. The handbook was tested in 122 farms participating in the project. It includes many aspects related to the current status of the farm's water protection and to the identification of development needs to maintain waters in good condition such as

- farm characteristics (type of agriculture, nutrients balances at parcel level and gate balances, maps of risk/sensitive areas, slopes, etc.)
- soil physical and biological quality test
- existing and already planned agri-environmental plans and measures
- status of water protection and detailed development needs at farm level
- comprehensive information package on relevant measures to be taken

The process of developing a farm specific environmental handbook consisted of two farm visits, written feedback and contacting by phone between these visits and possible further actions on a case-by-case basis.

Dissemination tools

Many different tools for disseminating information to farmers can be chosen (see Table 3)

Table 3: Dissemination tools aimed at providing information to farmers

Types of dissemination tool	Explanation	Advantage
Web Pages	With an increasing number of farmers having access to the internet, websites can be effective for dissemination	<ul style="list-style-type: none"> • Dynamic and easily updated • Interactive • Videos on Youtube demonstrating good practices
Newsletters	Available in printed and electronic form and distributed regularly	<ul style="list-style-type: none"> • Ability to keep information up to date • Targeted information

Types of dissemination tool	Explanation	Advantage
Leaflets	Information in leaflets should be of generic nature, so that it will remain relevant in the long-term	<ul style="list-style-type: none"> • Ability to focus on specific problems or activities • Can focus on local scale
Media	Farming press TV/ radio NGO publications	<ul style="list-style-type: none"> • Proved very effective • Satellite channels now also concentrate on rural issues
Courses	Training courses, workshops , seminars and information meetings	<ul style="list-style-type: none"> • Specific courses and meetings allow farmers to be informed, and provide them with possibilities to discuss technical aspects and the environmental benefits of measures as well as practical implementation.
On farm Demonstrations	Demonstrations of practices are given on local farms.	<ul style="list-style-type: none"> • Experience has proven this tool to be very effective.
Software - and computer-based approaches	Computer programmes to check the compliance with the standards and good practices	<ul style="list-style-type: none"> • Software and computer-based models facilitate analysis and advice on environmental issues.
One-to-one farm visits	An advisor visits the farm to provide specific advice targeted to the particular needs of the farmer.	<ul style="list-style-type: none"> • Direct interaction and personalized approach are effective. The farmers can ask questions and follow-up. • Through the relationship between the farmer and the advisor, monitoring of the set objectives is facilitated.
Small Group Events	Training of small groups of farmers with a similar business or production methods	<ul style="list-style-type: none"> • Allow farmers to address specific problems with advisors or fellow farmers. • An advantage is the low cost for such events, but a possible drawback is that some farmers might be reluctant to explain individual farm problems or ask questions in group sessions.
Telephone helpline	Farmers are invited to call the helpline to ask specific questions	<ul style="list-style-type: none"> • A telephone helpline is a low cost option. • The individual providing the helpline service needs to be competent and trained.
Check lists	Check lists contain a set of questions or statements targeting compliance with a specific regulation.	<ul style="list-style-type: none"> • This tool is used by farmers for self-checks (e.g. Germany) • By advisors during one-to-one visits on the farm (e.g. The Czech Republic, Germany).

Best Practice Examples: concrete examples of existing dissemination systems:

- In Germany many internet portals, such as the Information System on Integrated Production (ISIP), which is a web-based information system on crop production, have been developed. This system provides information and possibility to simulate crop protection of cereals, potatoes and sugar-beet, for which comprehensive warning systems are also available.
- The working group KTBL in Germany and RISE in Switzerland have developed farm evaluation systems including assessment methods that help to evaluate the sustainability of farm business offering information to the farmer on economic, ecological and social sustainability of his farm.²⁴
- In Italy in Emilia Romagna Region there is a decision support tool called IRRINET, which is a web service based on a water balance model aiming at crop irrigation management at field scale. The system is developed by the Consortium for the Canale Emiliano Romagnolo and it is available for free to all farms in area. It gives e.g. advice on timing and distribution of the irrigation needed in order to guarantee high quality crops and water savings²⁵.

Best Practice Example: A web-based guide for agri-environmental measures in efforts to implement the EU Water Framework Directive (WFD) (Norway)

Norway is not an EU member state but is connected to the European Union as an EFTA country, through the Agreement on the European Economic Area (EEA). Norway has taken full part in the Common Implementation Strategy (CIS) for the WFD since 2001. Norway performed a voluntary implementation of the WFD in selected sub-districts across the country from 2007 until 2009. River Basin Management Plans for the sub-districts were adopted by the County Councils in 2009, and the RBMPs covering the entire country will be prepared from 2010 until 2015. The Norwegian agri-environmental policy consists of a 4-level system. Objectives, measures and tools are made at each level, with stakeholders involved. The purpose of this approach is to have some requirements that are mandatory for all farmers, and at the same time being able to target the measures to suit the local and regional environmental challenges, with good involvement from stakeholders in the process. An important purpose is to do the right action at the right place.

Bioforsk (the Norwegian Institute for Agricultural and Environmental Research) has developed a website with a catalogue of measures within agriculture, targeting the agricultural administration at regional and local level, as a help in working out PoMs, but it has also become a website for farmers and other interest groups (stakeholders).

²⁴Zapf, R., Schultheiss, U., Doluschitz, R., et al. (2009) Assessment of sustainability - common requirements and comparative evaluation of the systems RISE, KSNL and the "DLG certification system for sustainable agriculture" "Reports on Agriculture", Exercise number 3, December 2009, Accessed at: <http://www.bmelv.de/SharedDocs/Standardartikel/EN/Service/ReportsonAgriculture/Volume87/Number3.html#doc861140bodyText3>

²⁵ http://irrigation.altavia.eu/Docs/CER/Irrinet_testo_documentazione_english_version.pdf

The web-site is developed as a toolbox and contains overviews of different types of agri-environmental measures (e.g, bufferstrips, constructed wetlands, reduced autumn-tillage), as well as descriptions of how to choose the right measures in areas with different agricultural practices. Furthermore, the site contains up-dated fact-sheets on relevant issues, information on legal and economic instruments, and web-links to other pages with useful tools.

www.bioforsk.no/tiltak The web-site is currently only available in Norwegian, but work is going on to make a short English version.

The dissemination tools should fulfill some general requirements in order to be efficient and effective (see Table 4).

Table 4: Requirements for the preparation of information targeted at farmers

The information must be...	That means in practice...
User friendly	<ul style="list-style-type: none"> • Well presented to encourage action • Include many illustrative items (such as graphics, best practice examples) • Easy to read + short • Pictorial appeal • Provide clear guidance on issues like funding + implementation • Adaptation of the messages at local level
Consistent	<ul style="list-style-type: none"> • All routes providing same message, yet recognizing that the farmers and society also strive towards other objectives • Clear strategy
Up to date	<ul style="list-style-type: none"> • Accessible • Method used should be able to be kept up to date easily
Focused and practical	<ul style="list-style-type: none"> • Farming type • Addressing key pressures • Local relevance • Advice on what, who and why and where more detailed information can be found • Highlight economic benefit to the farm, when appropriate • Highlight public ecosystem services provided by farmers

When applying different tools, it is important to develop a strategy for monitoring the results and evaluating the success of dissemination. Two main obstacles seem to be that the farmers' baseline knowledge is unknown and can vary strongly as well as that it is difficult to quantify the success of dissemination. The latter can be done through direct and regular conversations with farmers, which, however, is often rather resource intensive.

Nevertheless, personal approaches (farm visits, interviews, meetings) are often more effective than other not so cost-intensive ways, including approaching farmers through print media or the internet. When organizing seminars or workshops, it is worthwhile examining whether information should be disseminated through single-focus events (i.e. focus only on WFD) or integrated into more broadly focused meetings.

More ideas and examples can be found from the CIS handbook of ideas for administrations on how to better integrate water issues in farm advisory services which is available in all EU languages²⁶.

Finally, no one single dissemination tool will guarantee success but a combination of the tools / mix of measures will most likely be required with some form of review to assess performance.

²⁶ See http://ec.europa.eu/environment/water/quantity/good_practices.htm.