SSPE-CT-2005-006618-CAP-WFD

CAP & WFD

Water Framework Directive meets Common Agricultural Policy - Opportunities for the Future

Instrument: SSA

Thematic Priority 8.1. Policy Orientated Research

Deliverable 3
WFD and Agriculture – Linkages at the EU Level
Final Report about Rural Development Programmes

Due date of deliverable: 01.02.2006
Actual submission date: 29.11.2005

Start date of project: 01.04.2005 Duration: 15 Months

Lead: Ecologic – Institute for International and European Environmental Policy

Final Version – 29/11/2005

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Warsaw Agricultural University

WFD and Agriculture linkages at the EU level

Final report about Rural Development Programmes

29/11/2005

Final Version

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The Water Directors endorsed the report during their meeting in London on 28-29 November 2005.

Foreword

As a result of a process of more than five years of discussions and negotiations between a wide range of experts, stakeholders and policy makers, the Water Framework Directive (or the Directive 2000/60/EC) of the European Parliament and of the Council established a framework for European Community action in the field of water policy. The Directive, which entered into force on the 22nd of December 2000, sets a framework for the protection of all waters with the aim of reaching a "good status" of all community waters by 2015.

The latest reform of the EU Common Agricultural Policy (CAP) in 2003 increased the opportunities for the implementation of the Water Framework Directive (WFD). A working document prepared by the Environment Directorate General of the European Commission highlighted a number of opportunities where the CAP can help achieve the WFD objectives (European Commission, DG Environment, 2003). However, achieving these objectives remains a challenge. Acknowledging this, the Water Directors, who are the representatives of the EU Member States administrations with overall responsibility on water policy, agreed in June 2004 to take action in the context of a Common Implementation Strategy (CIS)[1]. To this aim they established an EU Strategic Steering Group (SSG) to address the issues of interrelations between CAP and WFD. The timeframe for the SSG work is short, given the tight WFD timetable (developing draft River Basin Management Plans by 2008, achieving the ecological status objectives by 2015) and the timing of CAP developments, notably the new European Rural Development Regulation which is to cover the period from 2007 to 2013.

The Strategic Steering Group (SSG) on WFD and Agriculture is led by the UK and the Environment Directorate-General of the European Commission with technical support from the Directorate-General for Agriculture and Rural Development. The aim of the group's work, which met for the first time in April 2005, is to identify the issues relating to agriculture which affect a Member State's ability to meet WFD objectives. The group will also put forward suggestions on how to best manage the risk of not meeting these objectives, taking into account the opportunities of the reformed CAP. There is also a role for the group to consider the potential impacts of achieving the WFD objectives upon agriculture, and the effects this would have on policy development and decisions.

As one of its first steps, the focus of the SSG is on preparing a report to support the aims of the WFD which deal with the opportunities available in Rural Development Programmes (RDP). Ecologic and Warsaw Agricultural University (WAU) have been commissioned to prepare this report in the context of the 6th Framework Programme of Research project "WFD meets CAP – Opportunities for the future"[2]. This report about Rural Development Programmes uses information from:

- the output of the SSG on WFD and Agriculture activities and discussions that have taken place since April 2005;
- the replies to the Commission questionnaire on WFD and Rural Development Programmes that was sent to relevant actors in the EU Member States; and

[1] The main aim of this strategy is to allow a coherent and harmonious implementation of the WFD. The focus is on methodological questions related to a common understanding of the technical and scientific implications of the WFD.

[2] EC Contract no.: SSP-CT-2005-006618 CAP&WFD.

- the Defra activities on the preparation and arrangement of the UK conference on Water Framework Directive and Agriculture, held on September 20-21, 2005 in London, and the conference outcome.

Furthermore, the report builds on the input and feedback from a wide range of experts and stakeholders that have been involved through meetings or electronic communication media.

The Water Directors endorsed the report during their meeting in London on 28-29 November 2005.

Ecologic and Warsaw Agricultural University would like to thank all experts of DG Environment, DG Agriculture and Rural Development, Defra and all national experts for supporting us and providing background for this document.

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2. Agriculture differs from other sectors in having available CAP mechanisms for the provision of funding to encourage, and measure to require, the changes in agricultural practice which will contribute to the delivery of WFD requirements.

3. Amongst those mechanisms, the current programming period (2000-2006) has shown that Rural Development measures can have positive impacts on water resources. The experiences gathered should be transferred to the design of the upcoming RD-programmes (2007-2013).

4. Thus, the report explores the potential synergies for the future between rural development and water policies. Relevant users of the paper could be the different authorities and stakeholders involved in Rural Development planning, river basin management planning and nature protection.

The forthcoming rural development regulation (2007-2013) can help with WFD implementation..

5. Of the three categories identified in the RD programme, Environment and land management (Axis 2) offers the most obvious opportunities for a direct contribution to the delivery of WFD objectives most specifically in relation to payments linked to the WFD (Art. 38). However RD programmes should not just involve directly targeted measures but should also consider how other measures might be tailored so as to give added value by contributing to the WFD delivery. Improving competitiveness of farming and forestry (Axis 1) and improving quality of life and diversification (Axis 3) offer opportunities to contribute indirectly to WFD delivery. Care needs to be taken to ensure that the best use is made of the opportunities available and that there are no unintended negative influences.

6. The timetables for the development of the 2007 – 2013 RD programmes and for WFD implementation allow an opportunity to make the best use of the funds available. The proposed Strategic Guidelines make a clear statement that measures available under Axis 2 should be used to integrate environmental objectives including implementation of WFD objectives.

7. Upcoming RD programmes will also make a contribution to understanding the costs involved in delivering River Basin Management Plans, so that the most cost effective measures can be adopted and informed judgements made on the use of the 'disproportionate costs' provisions of WFD.

   Examination of the small scale case studies supported by the current RD programmes (2000-2006) which have been carried out in Member States gives an indication of the success factors which are likely to gain the best value from the resources available:

   - In the first place, all stakeholders should have a clear understanding of the need for and likely benefits of a proposed course of action. A well-tailored approach

including well defined territorial scope, objectives and activities is thus a pre-requisite.

- This is likely to involve participation of all stakeholders at the development stage but also provision of advice and education so that farmers are aware of the likely environmental consequences (positive or negative) of a particular course of action.
- To the extent that participation is voluntary, it is important to ensure a 'critical mass' of farmers are prepared to participate in any particular scheme. The extent to which compensation is available for measures which increase costs will also be important.

….but the impacts are likely to be limited in scale

9. It has not proved possible to scale up the cost information from data collected but a rough assessment suggests that, even if the maximum possible use is made of available funding, the current total national RD budgets would be insufficient to provide the necessary funds in order to meet the WFD objectives.

10. Water protection is also one amongst other competing priorities for Rural Development Programmes. Therefore, it is necessary to look for prioritisation and synergies when designing the programmes.

11. As it is unlikely that future RD budgets would be large enough to fund all of the actions that the agricultural community might need to take in order to deliver its contribution to meeting WFD requirements. As well as ensuring full implementation of existing environmental legislation (e.g. Nitrates Directive), the question of additional funding for RD-type measures, and possibly of additional instruments and/or measures might have to be considered. Specific attention should also be given to adoption of alternative objectives for the WFD where the most cost-effective measures involve a 'disproportionate cost' for the rural communities or are technically unfeasible.

Positive co-operation between those involved in Rural Development and WFD implementation will be needed

12. The RD programmes have potential to make a valuable contribution to delivery of WFD objectives. On the other hand, the River Basin Management Plans can also have huge impacts on rural development, as the measures will deliver economic, social and environmental costs and benefits amongst different actors and territories. Thus, co-operation and co-ordination between those involved in delivery of the WFD and RD programmes will be important especially where the WFD RBMP crosses national boundaries.

13. Initial suggestions for enhancing positive co-operations between RD and WFD are:

- When drafting RD national strategies and programmes, the results of the WFD Art. 5 reports should be used to help target territories (e.g. areas of high nutrient pollution, flood-plain areas) objectives and measures concerning water resources management. At a later stage, WFD Art. 5 reports could provide a baseline and WFD monitoring procedures could help with the assessment of the effectiveness of certain RD measures.

- A common approach weighing up the different risks, costs and benefits could also be used to select the measures and determine the appropriate use of the exemptions when designing RBMPs.
- In that context, public participation in the development of programmes will deliver a clear added-value to mitigate potential conflicts and help to foster a common approach between farmers, other stakeholders, and water and rural development authorities.

Conclusion

14. In conclusion the RD programme has potential to make a valuable contribution to delivery of WFD objectives. Co-operation between the various stakeholders will be important if the maximum benefit is to be obtained. Even where this is the case, Member States will need to plan to use other measures or to justify exemptions in order to achieve full delivery against the requirements that fall to the agriculture industry.

1 Introduction

Despite political, organisational and investment efforts, the quality and quantity of water resources in many European countries is not satisfactory when compared to the standards required by the Water Framework Directive (WFD).[3] There are several reasons for this situation, such as the fast urbanisation and industrialisation processes and intensive land use. In order to tackle these pressures, the EU has put several legislative documents into force aiming at achieving a high water quality. However, due in large measure to the gaps between WFD requirements and existing legislation, and its inconsistent implementation by the Member States, several pressures remain[4].

Agriculture and forestry - covering more than three quarters of the European Union's land - play a key role in determining the development of the rural economy as well as the rural landscape. As European agriculture is extremely diverse, ranging from large and specialised commercial production using intensive farming practices to subsistence and semi-subsistence farming using mainly traditional practices, the impacts on the environment vary in scale and intensity. On one hand modern farming methods bring major benefits to society, but also exert to pressures on the environment, not least on water resources. On the other hand, agriculture plays an important role in maintaining the countryside and its related biodiversity in many of Europe's semi-natural habitat regions, resulting in benefits for the environment. In these areas the environmental risk associated with agricultural change is that of abandonment.

The European Common Agricultural Policy (CAP) has been progressively reformed in ways which reduce pressures from agriculture on the environment, and increase benefits. For example, the most recent reform of the CAP (in 2003) reduced incentives to produce intensively - by decoupling payments from production and linking them to the respect of environmental standards (cross-compliance) - and increased opportunities to support farmers in addressing environmental issues through Rural Development (RD) payments (see Chapter 3 and 4). However, the possibilities to improve the environmental situation by using only the existing CAP measures are rather limited by competing demands on RD and a limited overall budget.

Despite the existing measures supporting the environment available under rural development, not all Member States have made the most of opportunities to use RD to reduce the negative impact of agriculture on the environment. In some cases administrations are willing, but farmers' attitudes can take time to evolve. Therefore further effort is needed in the promotion of projects aimed at protecting water resources, and in the education of farmers about the importance of protecting the environment.

In order to reach the WFD objectives and to tackle the pressures resulting from certain agricultural practices, it is necessary to develop synergies between both policy sectors and instruments, supporting both the agricultural activities and the water protection efforts[5].

This paper is the first of a series of papers dealing with the linkages between the EU CAP and the water policy focusing on RD and the WFD. Relevant users of the paper could be the authorities in charge of RD planning, river basin management planning and nature protection.

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[3] For more information, see Herbke et al (2005).

[4] For example, in the 2000 report on the implementation of the Nitrates Directive, the Commission expressed its concern about the lack of progress in the implementation process (European Commission, 2002).

[5] It is obvious that all sectors, i.a. chemical industry, transport, health sector and wastewater sector, will have to contribute to the implementation of the WFD.

2 Rural Development and WFD implementation – Background information

The agricultural sector is, besides residential and industrial needs, one of the major reasons for water degradation and often impedes the achievement of the primary goal of the WFD, which is to achieve "good status" of all waters. On the other hand, agricultural production depends strongly on the availability of sufficient qualitative water.

With the aim of establishing a common approach and developing a common language between both policy sectors, a short overview of the key elements of both policies will be given in this section.

2.1 Water Framework Directive

The Water Framework Directive entered into force in December 2000. As opposed to earlier water protection measures, which were based on a sectoral and on a mean approaches, the area covered by the new Directive extends to all aquatic systems, surface waters (rivers and lakes), groundwater and coastal waters. Land eco-systems depending on groundwater are also included in the protection of the quantity and quality of groundwater.

The WFD has the following main objectives:

- Expanding the scope of water protection to all waters;
- To achieve the "good status" of all waters in the Community by 2015 and ensure that there is no deterioration in the status (Art. 4);
- Water management based on river basins across national boundaries, choosing an integrated approach within river catchment areas;
- "Combined approach" of emission limit values and quality standards, plus the phasing out of priority hazardous substances;
- Introduction of incentive water pricing policies to help achieve objectives and the polluter pays principle;
- Getting the public more closely involved in water issues, which means interested parties must have opportunities to participate;
- Streamlining water legislation;
- Establishing a coherent managerial framework for all water-related legislation (e.g. energy, transport, agriculture, fisheries, regional policy, tourism), thus allowing for consistency in planning and measures at the same time.

Following these objectives, river basin management plans including summaries of programmes of measures should be drawn up to reach the main goal of the "good status" of all waters. The programmes of measures can be considered as the principal mechanism for the implementation of the environmental objectives of the WFD, and have to be developed for each river basin district (Hansen et al., 2004). These programmes have to be established by 2009 and made operational by 2012 (Art. 11 WFD) and should be based on a risk assessment (Art. 5 WFD). The first risk assessment analyses under the programmes of measures had to be

completed by the end of 2004 and had to assess the risks of failing to achieve WFD objectives[6] by carrying out pressure and impacts analyses.

The WFD distinguishes between **basic measures** (minimum requirements), including the so-called combined approach[7] for point and diffuse sources (Art. 10 WFD), and **supplementary measures**. Basic measures include, according to Annex VI (Part A), the implementation of a number of environmental directives (e.g. Nitrates Directive (91/676/EEC)) that directly or indirectly assist in the protection of water.

If the basic measures are not sufficient for achieving the environmental objectives, supplementary measures shall be taken (Annex VI Part B WFD). The Directive provides a non-exclusive list of such measures, which are aimed at either reinforcing the provisions or setting up new ones. This includes measures such as economic and fiscal instruments, negotiated environmental agreements, codes of good practice, voluntary agreements, demand management measures, efficiency and re-use measures, rehabilitation projects and research, and development and demonstration projects.

Programmes of measures can also include activities which do not have to be exclusively water-based, including measures regarding land use activities, which require changes in land use and management (e.g. development of low-input farming systems, changing from arable to grassland, afforestation, and, in extreme cases, taking land out of agricultural activity). This could put pressure on the agricultural sector with regards to income development, and may lead to further discussions on the necessity to compensate farmers.

The WFD requires that the most cost-effective combination of measures has to be identified based on the information provided by the status report and the monitoring. Annex III of the WFD specifies that the economic analysis should contain sufficient information in order to allow judgements about the most cost-effective combination of measures to be included in the programme of measures[8] (see also chapter 5.2).

2.2 Rural Development under the Common Agricultural Policy

In the last forty years, intensification, concentration, greater specialisation and abandonment of agricultural production have all occurred in the EU. These were caused by a variety of driving forces, including technical change, international market developments and the CAP instruments themselves, such as production-related subsidies. As a result, the pressures on the environment increased significantly over this period, bringing about pollution of surface waters and groundwater, loss of biodiversity, soil degradation and erosion. However, agriculture also plays an important role in the maintenance of cultural landscapes and semi-natural habitats, including “high nature value” farming systems.

The CAP, established in 1962, is one of the European Union's central policy areas, representing one of the most developed forms of EU supranational decision-making, and involving a larger share of the EC budget than any other policy.

The latest CAP reforms took place in the light of various internal developments and external pressures, such as the WTO negotiations, the EU enlargement process, increased awareness

[6] For initial results from the Art. 5 reports, see Herbke et al., 2005.

[7] This means that water policy should be based on using pollution control at source through the setting of emission limit values and of environmental quality standards.

[8] This would also imply that measures under the RDP have to be proven in terms of cost-effectiveness, rather the cross sectoral effectiveness of the measures needs to be established if they are to be part of the measures which can be used to develop the Programs of measures.

about environmental protection and nature conservation, the need for farming that is more market-focussed and, last but not least, increased expectations regarding food quality and safety. The key elements of this reform are:

- The introduction of **decoupled payments** – the **single farm payment scheme**. From 2005 onwards, the vast majority of direct payments are paid to farmers independently of their production volume, thereby effectively decoupling the link between subsidies and production. These payments have, in addition, been made conditional on farmers respecting "**cross compliance**" (which consists of an array of existing legislation concerning the environment, public, animal and plant health, and animal welfare standards, as well as on the requirement of keeping all farmland in good agricultural and environmental condition).
- A reduction in direct payments for bigger farms. The funds raised are used to fund rural development measures ("**modulation**"). Under CAP Reform, modulation became compulsory at the same rates across the EU. These rates are of 3% in 2005, 4% in 2006 and 5% for the period 2007 to 2012. These modulated funds are added to the rural development budget, and redistributed for rural development purposes across the Community in a way that is designed to help particularly those Member States having greater rural development needs[9].
- A mechanism for **financial discipline** to ensure that the farm budget fixed until 2013 is not overshot.
- Revisions of the **market policy** of the CAP. This included asymmetric price cuts in the milk sector, a reduction of the monthly increments in the cereals sector by half and reforms in the rice, durum wheat, nuts, starch potatoes and dried fodder sectors.

The EU's rural development policy has evolved as part of the historical development of the CAP. It is a response to the various characteristics of Europe's rural areas, which differ both in geographical and landscape features, as well as in the challenges they face. These challenges range from the restructuring of the agricultural sector, remoteness, poor service provision and depopulation to population influx and pressure on the natural environment, particularly in the rural areas near urban centres (Bendz, 2004).

Over recent years, rural development has increased in importance within EU agricultural policy. As part of the "Agenda 2000" CAP reform, the introduction in 1999 of the RD Regulation 1257/1999[10] (RDR) marked an important step in the strengthening of this policy. The RDR brought together a number of policy measures under a single instrument, forming a 'second pillar' of the CAP concerned with rural development.

The EU RD policy is designed to place agriculture in a broader context that also takes into account the protection of the rural environment, the quality of produced food, and the attractiveness of rural areas to young farmers and new residents. With the aim of protecting the environment, all media are targeted and water protection is seen as only one issue out of several (e.g. NATURA 2000). It is clear that, although it is not the "one for all" solution, the

[9] For further details see Commission Regulation (EC) No 796/2004 of 21 April 2004 laying down detailed rules for the implementation of cross-compliance, modulation and the integrated administration and control system provided for in of Council Regulation (EC) No 1782/2003 establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers.

[10] Council Regulation (EC) No 1257/1999 of 17 May 1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain Regulations.

RD Policy can be a strong instrument in support of the implementation of the WFD objectives.

The current RDR offers Member States and regions a series of 26 measures targeting three main domains of intervention (European Commission, DG Agriculture, 2004):

- agricultural restructuring;
- environment/land management; and
- wider rural development (including development beyond farming).

In addition, LEADER continued its 3rd generation, as LEADER+.

The national Rural Development Programmes and measures had to be submitted by the Member States to the commission for approval for the current period (2000-2006, in the "New" Member States for the period of 2004-2006). The programmes are subject to monitoring and reporting requirements, and Member States are required to evaluate their programmes and modify them if necessary.

The RDP 2000-2006 are co-financed by the European Agricultural Guidance and Guarantee Fund (EAGGF) and the Member States. The overall EU funding for RD for this period comprises over EUR 50 billion for 'mainstream' rural development programmes, and another approximately EUR 2 billion allocated to LEADER+ (European Commission, 2003).

The European Commission was required by the 2001 Gothenburg Summit to produce a synthesis report based on the mid-term evaluations carried out by Member States. General key messages from the rural development evaluations were (European Commission, 2004):

- Better co-ordination is needed between rural development programmes and other European or national support schemes, as well as between measures within individual programmes;
- The large number of available measures may include some with partly contradictory objectives, but it allows Member States/regions to select a package of measures tailored to their specific needs;
- The viability of rural areas can best be maintained and enhanced through regional approaches (e.g. LEADER) which target multiple sectors in the rural economy. They should be based on strengthened local/regional co-ordination and management structures, and should be open to bottom-up participation of local actors[11], starting from the programming phase;
- Funding provisions and delivery mechanisms should be simplified;
- Networking and exchange of good practice, both nationally and across borders, clearly increase the effectiveness of programmes;
- The Commission must give clear guidance already at the programming stage on monitoring and evaluation requirements for Member States.

Based on these and other findings and recommendations, a the new Council Regulation on Support for Rural Development by the European Agricultural Fund for Rural Development (EAFRD)[12] was adopted on 20 September 2005 (see Chapter 4)[13].

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[11] See also the UN-ECE Aarhus Convention.

[12] Council of the European Union (2005): Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)

2.3 Timetable of CAP modifications and WFD implementation

The CAP and the WFD policies follow specific time tables that are currently not linked to each other. Table 1 shows a comparison of the timetables of the CAP modifications and the WFD implementation.

Table 1: Timetables of the CAP and the WFD

Year	Common Agricultural Policy	Water Framework Directive
2000	Approval of Rural Development Programmes under Agenda 2000	Adoption and coming into force of the WFD
2003	CAP-Reform (incl. decoupling, cross-compliance, modulation, strengthened rural development policy)	
2004		Analysis of the characteristics, pressures and impacts in river basins (according to Art. 5)
2005	Cross-compliance becomes compulsory	
2006	End of 2000 – 2006 Rural Development programming period Final approval of EU strategic guidelines Drawing up and submission to Commission of national strategies and RD measures	Monitoring network must be established (according to Art. 8) Public consultation of timetable and working programme for the production of a river basin management plans (according to Art. 14)
2007	Start of new Rural Development Programmes	Interim report of significant water management issues (according to Art. 14)
2008	Review of 2003 CAP Reforms	Public consultation on the river basin management plans (according to Art. 14)
2009		River basin management plans (according to Art. 13)
2013	End of 2007 – 2013 Rural Development programming period	
2015		Achievement of good status (according to Art. 4)

The analysis of the timetables clearly shows that there is an opportunity to establish a link between both policies. The Rural Development planning period is from 2007 – 2013, and the design and allocation of the funds for each RD measures will be finalised by the end of 2006[14]. By that time a monitoring network must also be established (according to Art. 8 WFD), gathering more detailed information on the status of water bodies. Furthermore, there are still a lot of open questions regarding methodology of the selection of cost efficient measures.

Bearing this in mind, the following two points become clear:

1. The currently existing window of opportunity has to be used. Even if there are several uncertainties on the status of water bodies and on methodological issues, the WFD Art. 5 reports will give a clear picture of the main pressures resulting from agriculture at the river basin scale, and this information needs to be available in discussions about the design of national Rural Development strategy plans, and RD Programmes, including budgetary issues (allocation of funding for each measure).

[13] After coming into force, the Regulation will replace the current Council Regulation 1257/1999, which expires at the end of 2006.

[14] For payments linked to the WFD (Art 38 RDR, as of 5.07.2005) detailed rules, including the maximum amount of support, can be introduced at a later stage.

2. In the future, there is a need to establish common and efficient co-operation processes between the different stakeholders.

2.4 Key messages

- Water protection is an important objective of European policy. To reach this goal, the European Union introduced the WFD in the year 2000. Its aim is to achieve the "good status" of all waters in the Community by 2015. It is an ambitious task. Due to various uses of land and water, several different pressures influence overall water quality and quantity as well the hydromorphological structure of surface waters. It is clear that all sectors like the chemical industry, transport, health and urban wastewater treatment, will have to contribute to the implementation of the WFD.
- Agriculture differs from other sectors in having public funding mechanisms – through rural development – to help achieve WFD objectives.
- To achieve the implementation of WFD objectives a number of approaches are required. The first is the full implementation by Member States of existing environmental obligations to do with water quality and resources. These include Directives already in force (e.g. the Nitrates Directive, the Drinking Water Directive); to some extent, Rural Development can help with the implementation, e.g. measure for meeting standards. Existing environmental obligations also include cross-compliance rules introduced with the 2003 CAP reform, and in place since the start of 2005: these are designed to ensure effective implementation at the farm level of certain environmental directives. Cross-compliance also requires farmers to keep their land in "good agricultural and environmental condition", and Member States are required to define this on the basis of general EU requirements and local conditions. Some of these requirements will bring benefits for water.
- In addition to all these existing legal instruments which require farmers to protect water, a series of measures are available under the current Rural Development Programme. The Rural Development Program in general aims to (a) improve the competitiveness of agriculture and forestry by supporting restructuring, development and innovation, (b) improve the environment and the countryside by supporting land management and (c) improve the quality of life in rural areas and encouraging the diversification of economic activity. Some of the measures under these objectives help farmers to implement obligations (e.g. the meeting-standards measure, farm investments, etc.); others pay farmers for going beyond obligations, and these measures (e.g. agri-environment) can be beneficial to WFD objectives in many different ways.
- Rural development is a compromise between economic development, protection of the environment and development of vital rural areas. Proposed measures should take into account these three dimensions. Further, even a proper implementation of the RDR and making the best use of the measures set out in the regulation throughout Europe will not alone be sufficient to solve all water problems: RDR funding has many calls on it, and it will not suffice to cover all water measures requiring funding. Therefore, other sources to finance water protections need to be considered.

3 How current RD Programmes (2000-2006) support WFD implementation

3.1 Impacts of the current Rural Development Programmes on water

Evaluating the environmental effectiveness and economic efficiency of measures resulting in benefits for the environment is a complex exercise. Compared to the analysis of more conventional agricultural policies (which is undertaken mainly in terms of the effects of price support and input subsidies on production, prices and trade), analysis of agri-environmental policies is difficult, notably in terms of understanding the links between agriculture and the environment, and in quantifying the influence of policies (OECD, 2004). Furthermore, no study analysing the impact of the full set of EU-RD-measures on the environment was found. Most of the studies found deal with agri-enviromental measures only and their impact on the environment, but an analysis of the current regulation reveals several other measures (e.g. training, investments, meeting standards, water resource management, less favoured areas and areas with environmental restrictions, forestry, promoting the adaptation and development of rural areas) that support the improvement of environmental conditions directly and indirectly. Further, with regards to this, it should be clearly stated that when several measures are applied simultaneously the effects cannot easily be associated with an individual measure.

However, in 2004 DG Agriculture carried out an impact assessment of rural development programmes in view of the post 2006 rural development policy (European Commission, DG Agriculture, 2004). This study refers to the fact that most evaluations of the RD programmes indicated a positive effect on environmental protection through the implementation of various measures[15]. The most cited positive outcome was improved water resource management and water protection. More specifically, the following statements regarding water were made within this study:

- If implemented, the existing agri-environmental schemes clearly increase the positive influence on the quality of ground and surface water. In 12 cases water quality was improved, or was likely to have been improved, by the agri-environment schemes[16]. However, the extent and intensity of these improvements differed in several cases. In many of these examples, impacts on water were not measured, but water resources were considered to have been affected by changes in practice due to the reduction of

[15] The following measures are mentioned: measures relating to *reallocation* agricultural water resource management; development and improvement of infrastructure related to agriculture; environmental protection in connection with agriculture, forestry and landscape management and improving animal welfare; basic services for the rural population; renovation and development of villages; protection and conservation of rural heritage; diversification of agricultural activities and activities close to agriculture to provide multiple activities or alternative sources of income.

[16] Some examples from the Member States: The RDP had environmentally beneficial effects on farming practices in about 25% of the land area of England. The Netherlands RDP evaluation indicated that, thanks to this programme, several watercourses had been restored, groundwater quality improved and water depletion reduced. In Ireland, 41% of all RDP spending was dedicated to the Rural Environmental Protection Scheme (REPS). It helped reduce the use of fertiliser and the quantity of effluents entering water supplies. In the Spanish Extremadura Obj 1, the improvement of water management was seen as one the most important positive effects of RDP implementation. (The Austrian RDP evaluation reported that in 64% of all cases RDP result in water quality improvements thanks to the expenditure of more than 60% of the budget on the improvement). The German Thuringen RDP evaluation cited effective reduction in water pollution as one of the most positive effects.

fertiliser and pesticide inputs, promotion of organic farming and integrated crop management.

- Only a very few reports provided relevant information concerning the influence of agri-environmental measures on the quantity of water resources. Only the Spanish RDP evaluation considered that the sub-measure on saving irrigation water and extensification of production has had little impact on water quantity, and that benefits do not go beyond those generated by the rational use of water proposed by agricultural best practice.
- There is no information regarding the direct influence of less favoured areas and areas with environmental restrictions on water protection. Nevertheless, there is some indirect evidence, as most of the national evaluators assessed that this measure had a positive effect on the protection of the environment by maintaining or promoting sustainable farming and/or by extensification of agriculture practices. (Reported in 9 cases.)
- Supported investments facilitate environmentally-friendly farming. Environmental improvements were considered to be largely a positive side effect of structural investment, resulting from the purchase of machinery and equipment that use fewer pollutants and/or the creation of irrigation systems that made more rational use of available water.
- Afforestation has the potential to contribute to a variety of environmental objectives, such as flood protection, control of erosion, and protection of water resources. However, the provision of these services depends on a variety of factors, such as the location of new forests, selection of species (native or alien) and forestry methods employed. Even if the afforestation is expected to have positive influence on water resources, the evaluators did not consider this issue in their reports as this measure focuses primarily on forest activities.
- Regarding the promotion of the adaptation and development of rural areas, most evaluations indicated positive effects on environmental protection through the implementation of the measures relating to e.g. agricultural water resource management; development and improvement of infrastructure related to water protection etc. The Austrian RDP and the Bavarian RDP in Germany registered similar effects, both commenting on the positive effects on water quality.

In summary, it can be stated that the Rural Development measures have been assessed rather positively. All evaluations stated that some of these measures were conducive to the protection and improvement of the environment. The positive effects of forestry, LFA and agri-environment measures were generally the most cited.

Nevertheless, the evaluation of the Commission and some national evaluations discussed the shortcomings of the existing programmes. The overall impacts were limited by the size of the budget or by the bad design of the programme. Furthermore, some RDP evaluation (Denmark, Flanders) considered that there had been some impact on the environment, but that many impacts were hard to assess due to poor monitoring and documentation. The impact was smaller than expected for agri-environment measures (European Commission, DG Agriculture, 2004).

However, a more detailed assessment of the RD-Programmes and its inputs on the environment is necessary if we are to get a more comprehensive picture of the issue. In the future, such an assessment for the issue of water will be much easier, as the Art. 5 reports

could serve as a basis for such an assessment, though it will no doubt continue to be difficult to fully apportion the sources of improvements in water quality. In order to monitor the environmental progress (e.g. reduction of pesticides), a strong linkage to the WFD monitoring requirements should be established (see chapter 4.1.4).

3.2 Lessons learned from existing RD measures - Success stories from the Member States

The best sources of information on agricultural practices to protect water resources are the success stories – case studies (see Annex 1: "Good examples") of the projects which helped reduce water contamination from agricultural activity. A major source of information when collecting these case studies was the questionnaires sent by Member States to the European Commission in 2005[17].

Additionally, information on water protection projects was obtained from a study carried out by the European Crop Protection Association (2003), which describes 17 water protection projects all over Europe, as well as five information and awareness-raising campaigns. The situation in "new" member countries has been investigated based on the results of the "Central and Eastern Sustainable Agriculture" project[18]. Another source of information was the EU research project "Co-operative Agreements in Agriculture as an Instrument to Improve the Economic Efficiency and Environmental Effectiveness of the European Union Water Policy"[19]. This project also presents the results of more than 40 case studies.

There are many reasons why these projects were implemented: to reach national and EU ecological policy goals, to protect sources of drinking water, to ensure long term, sustainable use of water resources, etc. Also, the policies and measures used were different. Nevertheless, there are a few common features among these projects – in all cases, there was a clear policy objective and will to improve water quality and to reduce the negative influence of certain agricultural practices. All the projects were implemented on a limited area, none covered the whole country. This suggests that in order to protect water resources in agriculture, specifically targeted programmes may have to be implemented. This point has to be confirmed. The authors of the case studies presented the successful projects and indicated several keys for their success. They are as follows:

- **Well defined territorial scopes, objectives and activities facilitating implementation**: Farmers as well as authorities should understand why planned activities are needed, and what kind of benefits they obtain by the implementation of these activities. Regarding the French case study, this factor was a key element for their willingness to co-operate. Therefore RD measures should have clearly expressed objectives and consist of clear requirements at a farm level. Further measures need to be adapted to the type of farming practice (arable, dairy), agriculture intensity, climate influence and type of soil, as well as to the organisational circumstances, and have to suit local conditions.
- **Education**: While farmers are often concerned about possible negative impacts of their activities on the environment, they do not always know how to put these concerns into practice. Advisory programmes can have the same significance as

[17] France, UK, Italy, Belgium, Germany, Ireland, Denmark, Sweden and Norway reported case studies based on the questionnaires sent by the EU to all Member States.

[18] EC Contract no.: QLK5 – 1999 – 01611.

[19] EC Contract no.: ENV4-CT98-0782.

financial incentives in producing changes in farming practices. There are some cases where compensation payments to farmers were not necessary, thanks to effective advisory programmes. Therefore, a wide educational component should be a part of the planned projects to show what can be done in practice.

- **Co-operation and willingness to participate**: A very important key for success is the broad co-operation of farmers in the implementation of water protection projects. It can be expected that if projects to reduce pressures on the environment were implemented only by small numbers of farmers, a sufficient improvement in environmental quality would not be obtained. Therefore, future projects should ensure that a sufficient number of farmers are willing to participate in such projects. In order to reach such a high level of participation, intensive education efforts, training activities as well as the promotion of the benefits arising from the proposed projects are key elements for success.
- **Compensation for activities which go beyond good agricultural practice**: The most important factor influencing farmers to use more environmentally friendly practices which go beyond good agricultural practice is financial compensation. In most cases, farmers decided to co-operate if the compensation level was assessed as being satisfactory. As the authors of the UK case study stated, even farmers who were aware of the fact that their farming practices contributed to nitrate leaching would not be ready to voluntarily pursue the environmentally friendly practices without compensation. It should be ensured as well that the compensation for water protection activities will be competitive with regards to other payments the farmer could receive.
- **Use of modern technologies**: The Italian case shows that the use of technologies such as GIS, Internet and mobile phone (SMS) can rationalise water use by facilitating information on when and how much to irrigate. Further, this was demonstrated by using precision-farming techniques which can improve the economic and environmental performance of farms[20]. Use of modern technologies should also incorporate the use of more effective machines and agricultural techniques.
- **Monitoring**: This is an important element in programmes aiming for water protection. The results obtained through the monitoring network should help determine if implemented measures are effective. Also, existing examples show that the implemented projects do not always result in fast improvement of water quality (e.g. groundwater). It is clearly stated in the cases studies that the expected results could be obtained in the long term rather than in the short term. As already mentioned, many of the cases investigated in the study on co-operative agreements include financial incentives for the use of environmentally-friendly technologies (e.g. drag hoses).

All of the projects described in the questionnaires from the Member States have a small scale – all of them were implemented in an area from a few thousand to several hundred thousand hectares, none of them had a nation-wide perspective. This is not to say that it will not be possible to obtain similar results in other regions, but this clearly depends on the other regions getting sufficient effort/funding, as case studies often focused on areas where considerable resources have been deployed. Further, due to the rather small scale, a mere extrapolation of cost from the local level to EU level is not possible.

[20] See the Agriculture Directorate-General website on the Common Agricultural Policy and the Lisbon Strategy [http://europa.eu.int/comm/agriculture/lisbon/index_en.htm] and the JRC MARS project [http://mars.jrc.it/].

3.3 The issue of financing

The Water Framework Directive is the most significant and far-reaching piece of water legislation to come out of Brussels to date. Implementing the Directive is a demanding process for all EU Member States and the costs for implementation are estimated as high. As budgets (private and administrative) are limited, there is a clear need to develop financing strategies as part of the implementation plans in order to ensure full implementation. These plans should take into account all available resources and the need for mechanisms to monitor effective implementation, so as to ensure cost effectiveness and avoid disproportionate costs.

As the RDR provides for various public supports (e.g. supports to farmers who go beyond obligatory requirements or supports for meeting new environmental standards) on an annual or single payment basis, these supports can contribute to the cost of implementation of the WFD.

In order to estimate the budgets that are needed to tackle agricultural pressures on water, the case studies provided in the questionnaires received from several MS have been assessed. Due to their small scale – all of them were implemented in an area from a few thousand to several hundred thousand hectares – and lack of data on costs, scaling-up has not proved possible.

In a second step, an attempt to calculate costs for certain pressures was made (e.g. nitrate) by using data from the Art. 5 WFD risk assessment and cost estimations on measures to tackle agricultural pressures. As there is only limited information on these costs[21] and preliminary results of the risk assessment available, it is difficult to provide a reliable estimate.

In a third step, a literature survey was carried out, compiling varied information of some regions regarding the costs that are incurred as a result of pollution of water by agriculture and the available RD budgets.

Based on this information, a first qualitative assessment and interpretation was made in order to get a first rough estimate of the relation between these costs of water pollution[22] and RD budgets (see Annex 2 of the document).

Even if the information collected is very limited in terms of comparability within the regions, and the methodology used to collect the costs and the liability of data still has to be tested, a basic trend can be drawn:

- RD funding has limited capacity to cover the costs of water protection measures. These comparisons support the view that it will be necessary to consider additional measures (which might include increased RD funding, or possibly additional mandatory standards or incentive pricing) to tackle the current pressures from agriculture[23].
- In order to address the specific support requirements, more detailed information from the River Basin Management plans are needed[24]. Preliminary indication on the potential

[21] The most comprehensive data was found in the study of Jacobsen (2004) on programmes for the protection of water resources in Denmark and in the study of the German Federal Environmental Agency (2002) on the cost-effectiveness of sustainable measures for water protection.

[22] The final estimation of the costs of water pollution will depend on the criteria for the environmental objectives ("distance to target").

[23] As the application and enforcement of other water protection legislation are inadequate in a number of Member States and, thus, costs related to implementing those are easily, but wrongly, added to the costs of implementing the WFD. There is need to distinguish between the water management costs incurred due to the implementation of the WFD the costs which would have been incurred in the absence of the WFD.

[24] Speech of Mr. Ahner (Deputy Director General, EU Commission, DG Agriculture) at the Conference on WFD and Agriculture, 20-21 September 2005, London, UK.

contents of the programmes of measures are now necessary, as more effort has to be put into the specification of the final needs to reach the good status of waters, in order to have positive discussions with RD authorities on the future design of the RD programmes.

3.4 Key messages

- It is possible to reduce water deterioration from agriculture sources by using RD measures.
- Well defined territorial scopes, objectives and activities, the willingness to participate, education of farmers and well established compensation levels are the key factors for success if implemented jointly.
- Most of the measures currently provided under the RDR are applied on a rather small area (from a few thousand to several hundred thousand hectares), and none of them have a nation-wide perspective. Therefore, it is difficult to extrapolate the cost of such measures to the Member State or to EU-level. First attempts of a qualitative assessment and interpretation of these costs for some regions, by estimating the relation between RD budgets and costs that are incurred as a result of pressures on water by agriculture, show that, even if available, the current total national RD budgets are insufficient to provide the necessary funds in order to meet all the WFD objectives. More effort in the coming months has to be put into the assessment of these costs.
- Different measures should be used for different regions, and they should depend on the type of farming practice (arable, dairy), agriculture intensity, climate influence and type of soil, as well as on the organisational circumstances.
- Even if the above mentioned examples show that RD measures could help protect water and improve its quality, it should be remembered that water protection is not the only aim of these RDR. Improvement of the state of the environment is an important objective of RD-Programmes, but the primary aim is to support the development of rural areas. Besides, as far as the improvement of the state of environment is concerned, water protection is only one issue among several others (biodiversity, landscape, …). Therefore, RD measures obviously have a limited capacity for water protection.

4 How can the upcoming Rural Development Regulation (2007-2013) support or hamper the WFD implementation?

Analysis of the evolution of the CAP, of the current Rural Development Regulation (RDR)[25] and of the current situation of rural areas as well as the results from stakeholder consultations confirm that the focus of the EU's future rural development policy should be on three main areas as shown in Figure 1:

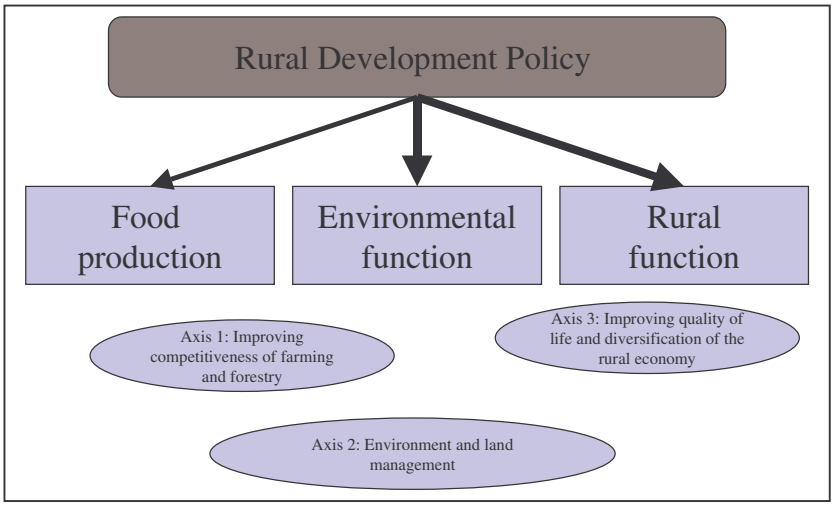

Figure 1: The main objectives of the upcoming RD Policy

By bringing the new RD policy under a single funding and programming instrument (European Agricultural Fund for Rural Development - EAFRD), the new draft Regulation seeks to increase its coherence, transparency and visibility, and aims to facilitate its implementation. The proposed reform is based on three major policy objectives:

- **Axis 1: Improving competitiveness of farming and forestry**: Increasing the competitiveness of the agricultural sector through support for restructuring. A minimum of 10% of the national envelope has to be spent on this axis. The EU co-financing rate is maximum 50% (75% in convergence regions).
- **Axis 2: Environment and land management**: Enhancing the environment and the countryside through support for land management. Payments are subject to cross-compliance including good agricultural and ecological farming practice (and in the case of agro-environmental payments (Art. 39), national mandatory requirements as regards pesticides and plant protection products , and other relevant national legislation (sanction approach)). A minimum of 25% of the national envelope has to be spent on Axis 2. The EU co-financing rate is maximum 55% (80% in convergence regions).
- **Axis 3: Improving quality of life and diversification**: Strengthening the quality of life in rural areas and promoting diversification of economic activities through measures targeting the farming sector and other rural actors. A minimum of 10% of the national envelope has to be spent on the third axis. The EU co-financing rate is maximum 50% (75% in convergence regions).

[25] Council of the European Union (2005): Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD).

The three thematic axes are complemented by a **fourth implementation axis (LEADER)** that streamlines the local development strategies. These strategies should be developed through a bottom-up approach. A minimum of 5% of national programme funding is reserved for LEADER.

The three Axis consist of many different measures, with a variety of objectives. Some have specific environmental objectives (e.g. meeting environmental standards), some have several objectives of which one may be environmental (e.g. natural handicap payment), and some do not have explicit environmental objectives (e.g. support of business creation and development).

In order to guarantee consistency within the Member State and the overall EU, the individual measures have to be submitted to and assessed by the Commission and require a positive decision by the Commission, based on a positive opinion of the Monitoring Committee, to be put into effect. Thereby the Commission tries to ensure as far as possible that measures do not have negative environmental impacts.

4.1 Managing Rural Development Programmes – Options for the WFD

Current implementation processes in both policy fields - the Common Agricultural Policy reform and the Water Framework Directive - offer potential to combine the efforts of the two policies. Therefore, the RDR offers several possibilities to support the implementation of the WFD, but it could also hamper the implementation of the Directive by supporting more intensive practices. The following chapter takes a closer look at each single measure under the RDR and tries to explore their capacity to support the implementation of the WFD objectives. As the situation for the water and the agricultural sector varies widely within Europe, no clear recommendations on specific measures can be made. The aim is to show different options of how to use these measures and thereby to support the upcoming process of designing the national RD-programmes and the WFD programmes of measures.

4.1.1 EU Strategic Guidelines for rural development

Art. 9 establishes Strategic Guidelines for rural development for the programming period (1.1.2007 to 31.1.2013). These guidelines shall set the strategic priorities for rural development for the programming period, with a view of implementing each of the axes laid down in the Regulation and serve as a basis for the national strategy plan (Art. 11 and 12).

Within the guidelines a clear statement with reference to water and the WFD is made. The measures available under axis 2 should be used to integrate environmental objectives and contribute beside other policy targets to the implementation of WFD objectives. Thereby, Member States should focus on key actions such as promotion of environmental services, adherence of mandatory standards, preservation of the farmed landscape, consolidation of the contribution of organic farming, or the encouragement of environmental/economic win-win initiatives.

The European Commission proposed Strategic Guidelines on the 5th of July 2005 (European Commission, 2005). A formal Council adoption of these proposed guidelines is expected by early 2006.

4.1.2 National Strategy Plan and Rural Development Programmes

Each Member State is required to submit a national strategy plan indicating the priorities of the action, taking into account the Community's Strategic Guidelines, the contribution from

the EAFRD and the other financial resources. It shall be implemented through the RD-programmes.

The National Strategy Plan shall ensure that Community aid for rural development is consistent with the Community's Strategic Guidelines and that Community, national and regional priorities are all co-ordinated. Each National Strategy Plan shall include, among other elements, an evaluation of the economic, social and environmental situation and the potential for development, as well as a list of the Rural Development Programmes implementing the National Strategy Plan and an indicative fund allocation for each programme, including the amounts that are provided for. Both the National Strategy Plan and the individual programmes have to be submitted to and assessed by the Commission in order to guarantee consistency within the Member State and between Member States, and the overall EU RDR, although only the programmes require a positive decision from the Commission and a positive opinion on part of the Monitoring Committee.

Art. 15 RDR requires the establishment of RD programmes within a Member State in close co-operation with relevant stakeholders as set out in Art. 6 RDR, such as competent local and regional authorities, other public bodies, economic and social partners or any body representing civil society. This could also include relevant water stakeholders.

When developing these RD programmes, as already mentioned in chapter 2.3, the Art. 5 WFD reports could be used to inform the requested task under this article. This could include:

- support of the evaluation of the economic, social and environmental situation;
- allocation of funding for each axis;
- allocation of funding within each axis;
- location of measures (see chapter 4.2).

4.1.3 Networks for rural development

Under Art. 67, a European Network for RD shall be established. This would bring about the networking of national networks, organisations and administrations active in the field of rural development at Community level. The aims of the European Network shall be to:

- collect, analyse and disseminate information on Community RD measures;
- collect, disseminate and consolidate good rural development practice at the Community level;
- provide information on developments in the Community's rural areas and in non-member countries;
- organise meetings and seminars at the EU level for those actively involved in RD;
- set up and run expert networks with the aim of facilitating an exchange of expertise and of supporting the implementation and evaluation of the rural development policy;
- support the national networks and transnational co-operation initiatives.

Such a network at the European level could serve as a basis for the exchange among Member States of outcomes and best practice examples including water related RD measures.

Art. 68 establishes national networks for rural development, which gather together the organisations and administrations involved in RD (as set out in Art. 6). Furthermore, the involvement of any other appropriate body representing civil society (e.g. NGOs) is foreseen.

It provides an option to get authorities responsible for water management and persons responsible for RD together at one table.

4.1.4 Strategic monitoring

Art. 13 (2a) and Art. 82 of the RDR require that each Member State submit a summary report to the Commission, setting out the progress made in implementing its strategy and objectives and their contribution to the achievement of the Community Strategic Guidelines for rural development. A first annual report has to be submitted by 2008 and should describe, among other issues, the progress of the programme in relation to the set objectives, on the basis of output and result indicators. As Art. 4b sets the objective of improving the environment and the countryside, indicators for such an improvement are needed. The Commission will be setting out EU level indicators for monitoring purposes, and Member States will be able to identify additional national indicators for national purposes.

As a continuous monitoring of water bodies is required by the WFD, the data collected for the purpose of assessing water quality could also be used to build indicators for the impact of RD-measures on water resources.

This should lead to a close co-operation (e.g. data share) between stakeholders involved in water and agriculture management in Member States. It would allow for a better understanding of problems identified through the monitoring programmes of the WFD, allowing a better design of RD measures with the aim of improving water quality.

4.1.5 Rural Development Axis IV: LEADER

LEADER (Art. 61 and 62) is a method to implement local development strategies that is designed to help rural actors consider the long-term potential of their local region. Encouraging the implementation of integrated, high-quality and original strategies for sustainable development, it has a strong focus on partnerships and networks of experience exchange.

Under LEADER, regional networks of local groups can be set up and act as knowledge brokers, promotional platforms and instruments of political negotiation at the interface between local actors, administrations and other segments of society, e.g. professional organisations or training institutions (ÖIR-Managementdienste, 2004). This offers a unique chance to create a bottom-up approach in WFD “problem areas”.

The LEADER approach could also be used to introduce the transboundary aspect that is required by the WFD into RD programming. Considering the existing differences in political and institutional structures among the Member States and within the agriculture and water management sector, it becomes quite obvious that there is a strong need for clarifying and setting up rules for co-operation in a transboundary region/catchment. Solidarity, co-operation and a common approach are essential for mitigating water degradation and for simultaneously overcoming the distortion of the competition between farmers in the same region. Sharing experiences between international river basins and all European countries is therefore necessary.

4.2 Measures under the upcoming RDR which could reduce water pressures

The upcoming RDR sets out rural development measures which can be included in national programmes. The full set of available measures relevant to water resource management is

listed and described briefly below. Table 2 gives an overview of the relevant measures and potential effects (positive and negative) in accordance to the main pressures on water. As outlined in the RDR and the accompanying proposed Strategic Guidelines, negative impacts on the environment should be limited.

By showing possible linkages, the following chapters will demonstrate the various options given by the upcoming RDR to support the implementation of the WFD. Some of these linkages can be made directly to the water management (e.g. farm investments for irrigation), while some of the measures support water protection indirectly (e.g. measures to reduce soil erosion). It is obvious that the options shown are preliminary and stay on a very general level.

Table 2: Overview of generic measures under the upcoming RDR relevant for water

	Pollution	**Alterations of hydrologic regimes**	**Hydro-morphological modification**	**Soil erosion**
Rural Development Axis I				
Natural disaster & prevention actions (Art. 20 b ((vi))	0	0	+++	+++
Vocational training and information actions (Art. 21)	+++	+++	+	+++
Setting up of young farmers (Art. 22)	+	+	0	+
Early retirement (Art. 23)	+	+	0	+
Use of advisory services (Art. 24)	+++	+++	+	+++
Setting up management, relief and advisory services (Art. 25)	++	++	+	++
Modernisation of agricultural holdings (Art. 26)	+++/---	+++/---	0	+++/---
Improvement of the economic value of forests (Art. 27)	+	+	+	+
Infrastructure related to the development and adaptation of agriculture and forestry (Art. 30)	++/--	++/--	--	++/--
Meeting standards based on community legislation (Art.31)	+++	+++	++	+++
Semi-subsistence farming (Art. 34)	+/-	+/-	0	+/-
Rural Development Axis II				
Natural handicap payments in mountain areas and payments in other areas with handicaps (Art. 37)	++	++	++	++
NATURA 2000 payments and payments linked to the WFD (Art. 38)	+++	+++	+++	+++
Agri-environmental payments (Art. 39)	+++	+++	+++	+++
Non-productive investments (Art. 41)	++	++	++	++
First afforestation of agricultural land (Art. 43)	+++	++/--	+++	+++
First establishment of agroforestry systems on agricultural land (Art. 44)	+++	++	+++	+++
First afforestation of non- agricultural land (Art. 45)	++	++/--	+++	+++
Natura 2000 payments (Art. 46)	+	+	+	+
Forest-environment payments (Art. 47)	+++	+++	+++	+++
Restoring forestry potential and introducing prevention actions (Art. 48)	0	0	+	0
Non-productive investments (Art. 49)	++	++	++	++
Rural Development Axis III				
Conservation and upgrading of the rural heritage (Art. 57)	++	++	+	++
Skills acquisition and animation (Art. 59)	+/	+/	+/	+/

Note: The table is based on the following sources: table prepared by DG Environment; WWF, 2005; own additional research.

+++	very relevant (positive)	---	very relevant (negative)	0	not relevant
++	relevant (positive)	--	relevant (negative)		
+	indirect linkage (positive)	-	indirect linkage (negative)		

As the RDR budgets are limited, it is necessary to look for prioritisation within the national RD programs and for synergies with other policies (e.g. biodiversity, soil, etc.), and to avoid negative "side-effects" of other RD measures (e.g. investments in farm holdings).

4.2.1 Rural Development Axis I: Improving competitiveness of farming and forestry

4.2.1.1 Natural disaster & prevention actions (Art. 20 b (vi))

These measures can contribute to mitigating floods by giving aid for restoring agricultural and forestry production damaged by natural disasters (including floods) and introducing appropriate prevention instruments.

4.2.1.2 Vocational training and information actions (Art. 21)

Support for vocational training is intended to improve the occupational skill and competence of farmers and other persons involved in agricultural and forestry activities. Also, it is designed to help them re-deploy production in qualitative terms, apply production practices that are compatible with the upkeep and improvement of the landscape, protect the environment, meet the applicable standards, and better manage their holdings. Vocational training, as already mentioned in chapter 3.2, is one of the most important keys for improving the quality of the environment and implementing RD measures.

The term training summarises a multitude of proposals for advanced training, ranging from written information materials, via papers and demonstration projects, to group consultations and problem-related consultations of individual farms.

To consider water pollution control aspects in the framework of agricultural practices, the promotion of interdisciplinary agricultural consulting and training and advanced training is highly relevant. The farmers should collectively know why and how to implement projects aiming at water protection. It is very important to ensure that they have access to well educated extension services. This is especially important for farmers from "new" Member States, where overall level of ecological awareness is much lower than in the majority of "old" Member States.

4.2.1.3 Setting up of young farmers (Art. 22)

Young farmers receiving such aid have to set up a business plan for the development of their farming activities. Such a business plan does not directly refer to environmental standards, but its design will be based on such standards (cross-compliance). Compliance with environmental standards will have a strong impact on the business plan, as it will require specific investments (e.g manure storage capacity) or set limits on the use of fertiliser and pesticides, and must be financially sustained.

4.2.1.4 Early retirement (Art. 23)

New farmers who take up previously abandoned farmland will need to take into account the main water management issues identified at their level (for instance, wetlands to be preserved) and will be able, depending on the type of issues, to implement agro-environmental measures responding to them.

4.2.1.5 Use of advisory services (Art. 24)

The minimum advisory services shall cover statutory management requirements and advise on good agricultural and environmental conditions in accordance with regulation 1782/2003. Based on these requirements, such advisory service could further include water resources management, irrigation and appropriate water control technologies, best practices for sustainable water use and conservation, and the avoidance and mitigation of adverse environmental effects on water (e.g. recommendations on usability, hazards and management strategies of nutrients and pesticides). Depending on the pressure, the content of such a service should be adopted specifically for each region or (local) river basin catchment. Advisory services also play a central role to implement other RD measures most effectively on the ground.

4.2.1.6 Setting up management, relief and advisory services (Art. 25)

This measure covers grants in order to cover costs arising from the setting up of services under Art. 24.

4.2.1.7 Modernisation of agricultural holdings (Art. 26)

Modernisation of farms is a powerful tool (see chapter 3.1) which can be used to improve the environment. The purchase of machinery and equipment that use fewer pollutants and/or the creation of more efficient irrigation systems allowing a more rational use of available water are only two of several options. Cost savings due to the use of advanced equipment may compensate for the additional costs incurred by changing farming practices in a more water-protective manner (e.g. water saving due to more efficient irrigation).

It has to kept in mind, though, that modernisation of farms can produce negative environmental effects by applying more intensive farming practices (e.g. heavy farming equipment can lead to higher soil compaction resulting in less soil capacity to store water). Such negative impacts should be limited as the Commission tries to ensure that investments do not have negative environmental impacts.

4.2.1.8 Improvement of the economic value of forests (Art. 27)

This sub-measure is aimed at the improvement of the overall quality of the forest estate, enrichment and enlargement of the native and semi-native woodland, establishment of amenity and urban woodland and sustainable new forest management system. Measures under this article can also be used to reduce erosion.

4.2.1.9 Infrastructure related to the development and adaptation of agriculture and forestry (Art. 28)

Support provided may cover operations related to access to farm and forest land, land consolidation and improvement, energy supply and water management (i.e. water saving irrigation). Payments under these measures could be used for appropriate forms of irrigation technology that are more efficient (replacement of leaky systems) or to reduce the incidence and the severity of soil erosion in some regions (e.g. replacement of sprinkler systems by drip systems) and thereby support the implementation of the WFD. Such investments might also hamper the WFD implementation, for example in areas where agricultural water use has exceeded the sustainable capacity of local water sources.

4.2.1.10 Meeting standards based on community legislation (Art.31)

Aid may be granted to help farmers adapt to binding Community standards in the field of the environment, public health, food safety and occupational safety. These standards must be newly introduced in national legislation and based on Community legislation. The flat-rate aid has to be granted on a degressive basis for a maximum period of five years from the date on which the standards enter into force. It allows to provide compensatory payments to farmers when implementing the WFD and the upcoming new groundwater directive.

4.2.1.11 Semi-subsistence farming (Art. 34)

This measure applies only to the new Member States, and offers them the possibility to support semi-subsistence farms (farms which produce primarily for their own consumption and market only a small portion of their output) with a flat-rate aid, provided these farms have developed a business plan. The use of this aid can either support WFD objectives (e.g. better fertiliser), or hamper them (e.g. use of more fertiliser)[26].

4.2.2 Rural Development Axis II: Environment and land management

4.2.2.1 Natural handicap payments in mountain areas and payments in other areas with handicaps (Art. 37)

Natural handicap payments in mountain areas and payments in other areas with handicaps should contribute, through continued use of agricultural land, to maintain the countryside (e.g. the preservation of farming activities in mountain and hill zones can ensure the maintenance of a positive land management in these areas, which could eventually contribute to prevent floods and landslides by decreasing the water velocity of peak run-off events).

4.2.2.2 NATURA 2000 payments and payments linked to the WFD (Art. 38)

This article can be used to compensate for costs incurred and income foregone resulting from disadvantages in the areas related to the implementation the WFD. For payments linked to WFD, detailed rules, including the maximum amount of support, will be fixed in accordance with the procedure referred to in Art. 90 (2). Accordingly, it is not possible to make a clear statement on these payments at the moment. In order to make this statement more detailed information from the River Basins Management plans are needed[27].

4.2.2.3 Agri-environmental payments (Art. 39)

Agri-environmental measures (such as environmentally favourable extensification of farming, management of low-intensity pasture systems, integrated farm management and organic agriculture, inter-crop management, operation of hedges and buffer strips in sensitive areas linked to water courses or to risks of erosion, measures for protecting wetlands) have demonstrated their capacity to reduce pressures from agriculture over recent years and have been widely recognised to do so.

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[26] Experiences from the current support of semi-subsistence farms in new Member States under EC regulation No 141/2004 of 28 January 2004 do not aim at environment protection, but rather to support agriculture production in these farms. A change of this practice will strongly depend on the content of the Strategic Guidelines to be established under Art. 9 of the upcoming RDR.

[27] Speech of Mr. Ahner (Deputy Director General, EU Commission, DG Agriculture) at the Conference on WFD and Agriculture, 20-21 September 2005, London, UK.

Such agri-environmental measures are a site-specific policy that is optional for farmers, who may choose to sign a contract to carry out one or more measures designed to provide an environmental service that goes beyond the relevant mandatory standards established pursuant to Articles 4 and 5 and Annexes III and IV of Council Regulation (EC) No 1782/2003 as well as minimum requirements for fertiliser and plant protection product use and other relevant mandatory requirements established by national legislation and identified in the programme. This optional nature tends to promote constructive co-operation and a positive attitude to the environment on the part of farmers. In this respect, it has an advantage over statutory environmental obligations. This site-specificity enables the establishment of measures that are tailored to different agronomic and environmental circumstances. The environmental effectiveness of the measures is affected by contextual and institutional factors such as the quality of the scientific basis chosen for the measures, the extent to which the measures are suited to the area in which they are applied, the professional advice farmers receive on how to apply the measures, and the care with which farmers follow this advice (European Commission, DG Agriculture, 2005).

4.2.2.4 Non-productive investments (Art.41)

The article supports the funding of non-productive farm investments which are (i) linked to the achievement of commitments undertaken pursuant to the agri-environmental measures of Art. 39 or other agri-environmental objectives and (ii) enhance the public amenity value of a Natura 2000 area or other high nature value area (e.g. wetlands). Such non-productive farm investments are e.g. planting buffer stripes or set up of Natura 2000 areas.

4.2.2.5 First afforestation of agricultural land (Art. 43)

The first objective is to develop forest activities in territories affected by land abandonment, in order to fight unemployment. Besides, it could be used in areas with perennial or seasonal watercourses, in order (i) to set up riverine vegetation, which plays a major role in the regulation of water flow (wetlands), the maintenance of water quality and the reduction in the intensity of floods and the frequency of droughts, and (ii) to prevent soil erosion by protecting steep banks and the immediate slopes from direct heavy rain and rain damage, and root weirs also maintain the streambed. Areas with perennial or seasonal watercourse, which is subject to site erosion, should especially be considered for afforestation measures.

4.2.2.6 First establishment of agroforestry systems on agricultural land (Art. 44)

Agroforestry integrates crops and/or livestock with trees. The resulting biological interactions provide multiple benefits, including diversified income sources, increased biological production, better water quality, and improved habitat for both humans and wildlife. In terms of water management, such agroforestry systems can be used as riparian buffer stripes which catch soil, excess nutrients, and chemical pesticides moving over the land's surface before they enter waterways. Plantings also physically stabilise streambanks and have the ability to store water (wetlands), which is relevant for flooding. Furthermore, such stripes help to prevent streambank erosion, which in turn decreases sedimentation downstream.

4.2.2.7 First afforestation of non-agricultural land (Art. 45)

In addition to flood mitigation benefits, afforestation can result in benefits such as increased amenity and recreation facilities, biodiversity enhancement and a marketable product. Afforestation has the potential to reduce the catchment runoff and reduce flood peak flows.

4.2.2.8 Natura 2000 payments (Art. 46)

Support can be provided in order to compensate for costs incurred and income foregone as a result of the restrictions on the use of forests and other related wooded land, through the implementation of the Habitats Directive (92/43/EEC) and the Birds Directive (79/409/EEC) in the area concerned. Both Directives are also mentioned in the Register of Protected Areas under Annex IV of the WFD and in the List of Measures under Annex VI of the WFD, to be included within the programmes of measures. Payments can be used to maintain such areas.

4.2.2.9 Forest-environment payments (Art. 47)

Forest-environment payments are similar to the agri-environmental payments of Art. 39 and could be used for the maintenance of wetlands.

4.2.2.10 Restoring forestry potential and introducing prevention actions (Art. 48)

Support can granted for restoring forestry production potential in forests damaged by natural disasters and fire and introducing appropriate prevention actions. These measures can support the mitigation of floods.

4.2.2.11 Non-productive investments (Art. 49)

This article could be used to support measures set under Art. 47.

4.2.3 Rural Development Axis III: Improving quality of life and diversification

4.2.3.1 Conservation and upgrading of the rural heritage (Art 57)

The support shall cover the drawing-up of protection and management plans relating to Natura 2000 sites and other places of high natural value, environmental awareness actions (e.g. environmental advisory and promotion schemes) and investments associated with maintenance, restoration and upgrading of the natural heritage and with the development of high natural value sites (e.g. wetlands or coastal zones).

4.2.3.2 Skills acquisition and implementation (Art. 59)

This article could support skill acquisition and animation measures with the view to preparing and implementing the local development strategy. Such a strategy should also consist of environmental targets and water related issues.

Depending on the content of the local development strategy, the provisions of this article could be used to fund the preparation of (or parts of) the river basin management plans and the implementation of capacity building and awareness actions.

When looking at the long list of articles listed above, it becomes clear that the RDR provides a broad set of opportunities to organise a linkage between WFD and rural development. More specifically, the following key messages can be drawn.

4.3 Key messages

- To protect and enhance the EU's water resources, measures under the upcoming RDR devoted to all four axes (three thematic and one management) could contribute to reaching the WFD objectives. The measures under axis 2 offer an especially high potential to support the implementation of the WFD. Measures under the other two axis support water resource protection indirectly. This is also set out in the Strategic Guidelines.
- The RDR provides a broad set of opportunities to organise a linkage between WFD and rural development. The national RD network under Art. 68 provides a framework for the co-ordination of measures at the national level. LEADER offers a bottom-up approach for regions to co-ordinate their activities and to set up tailor-made programs that fit the objectives of both directives, thereby creating a win-win situation for both environmental services and the strengthening of rural development.
- When setting up measures, there is a need to recognise that water is only one of a wide range of competing objectives for RDR payments. The impact of the measures related to the WFD objectives is strongly dependent on the priority each relevant measures is given within a Member State. Therefore, it is necessary to look for prioritisation and synergies with other policies and to avoid negative "side-effects" of other RD measures.

5 Suggestions for enhancing positive co-operations between RD and WFD

In addition to the recommendations made previously, there is a clear need to establish positive co-operation between the water and the agricultural sector to achieve WFD objectives. First examples of such co-operations can be found in Annex 3 of this document.

5.1 RD national strategies

The European Model of Agriculture reflects the multifunctional role farming plays in the richness and diversity of landscapes, food products and cultural and natural heritage[28]. The new generation of rural development strategies and programmes will be built around a competitiveness axis for agriculture, food and forestry, a land management-environment axis and a quality of life/diversification axis in rural areas.

The implementation of the Water Framework Directive objectives was clearly identified within the Community Strategic Guidelines as an important aim. Especially measures available under Axis 2 of the upcoming RDR should support and contribute to this aim.

When drafting RD national strategies and programmes, the results of the WFD Art. 5 reports on impacts and pressures should be used to help define the scope, objectives and measures concerning the preservation or restoration of water resources. At a later stage the results of water monitoring networks could be used to help evaluate the effectiveness of certain measures under the RDR.

5.2 River Basin Management Plans

River Basin Management Plans (RBMP) are one the major instruments for setting out WFD objectives and how they will be delivered. When drafting and implementing the RBMP the responsible authorities should consider the development of rural areas in order to enhance a positive co-operation between WFD implementation and rural development. The WFD comprises two strong tools that can be used to mitigate conflicts: (i) public participation and (ii) economic analyses and derogations. The following section describes these tools in more detail.

5.2.1 Public participation

The core public participation provision of the WFD is Art. 14, referred to as "Public Information and Consultation". In this article three levels of participation are mentioned – information, consultation and active involvement – which are modelled after the first two pillars of the Aarhus Convention.

It is very unlikely that any RBMP can be implemented successfully if it does not have public acceptance, and success is extremely unlikely without the acceptance of relevant water users. Thus, public participation will be a key factor to develop a common approach between farmers and authorities responsible for water management at all levels. The involvement of relevant stakeholders, such as farmers, water suppliers and nature conservation groups, can give the possibility to identify measures that result in benefits for each of the parties (for example, farmers can reduce the costs of mineral fertilisers and pesticides thanks to a better

[28] Presidency Conclusions European Councils of Luxembourg 1997, Berlin 1999 and Brussels 2002, Agricultural Council, 14 March 2005.

application of these substances; water suppliers can abandon responses to increasing water pollution, such as the closure of wells). Potential conflicts between RDR and WFD policies can be minimised. Therefore, major efforts should be put into backing these tools.

5.2.2 Economic assessment and exemptions

The implementation of the WFD requires the use of economic data to support and guide a range of decisions, including characterisation of the River Basin district to the selection of mitigation measures to meet good status and determining appropriate use of the exemptions. The Directive (Art. 4 WFD) allows the application of less stringent objectives or extended deadlines under specific circumstances (e.g. in the case that the most cost-effective combinations of measures for reaching the good status prove to be disproportionately costly[29]). Exemptions have to be justified in each river basin management plan, and need to be scrutinised every six years (Pielen and Holländer, 2005). A methodology for a process for the considerations of exemptions from good status can be found in the CIS Guidance Document "Environmental Objectives under the WFD" (2005).

These economic assessments will look at the economic and social costs and benefits of measures, as well as the environmental ones. When considering agricultural activities, this will mean weighing up the risks, costs, benefits and other impacts of changing current practices of food production including environmental benefits and impacts on rural development.

5.3 Co-ordination

One of the major difficulties besides the different timetables (see chapter 2.3) is the issue of co-ordination. The WFD follows a river basin approach, while the RDR follows a national/regional approach. In order to create cost-efficient win-win situations for both policy areas, it is essential to rationalise and to ensure harmonisation of the implementation. This task becomes even more difficult in cases where different regions/Member States are sharing the same river basin (transboundary river basins) and different stakeholders - not only between riparian states, also between agriculture and water management within a Member State- are involved. This requires a very ambitious collaboration of the authorities planning rural development and authorities responsible for river basin management plans.

This means that representatives from the authorities in charge of Rural Development planning need to be represented in the river basin authorities and vice versa. Equally, measures of the Rural Development Programmes may become part of the programme of measures under the WFD or vice versa. As the window of opportunity is rather limited at this stage (RD programmes will be finalised by end of 2006, drafts of Programmes of Measures have to be available by the end of 2008) options coming from the RD mid-term revision (2008) should be kept in mind.

As river basin catchments will be larger than the geographic regions for Rural Development in many cases, it is possible that river basin authorities will need to seek input into several regional Rural Development Programmes, and it is also possible that individual rural regional authorities may have to be involved in more than one river basin plan.

[29] There is no clear definition on the term "disproportionately costly".

5.4 Key messages

- The establishment of a linkage between both policies is not easy, due to several existing differences (transboundary approach of the WFD vs. national approach RDR, different implementation schedules, different objectives), but there are many options for the development of positive co-operation.
- Co-ordination between the stakeholders involved will play a central role in order to achieve win-win situations between both policy areas. This is even more important in transboundary areas. Furthermore, public participation will be a key factor for developing a common approach between all stakeholders.
- The cost-effectiveness is an important assessment criterion, as it has a determining influence on the feasibility of objectives in water protection by CAP and WFD policies.
- As the upcoming RD-programmes should be finalised by end of 2006 and the draft WFD Programmes of Measures have to be published by the end of 2008, the window of opportunity for establishing a common set of measures is rather limited. Nevertheless options coming from the RD mid-term revision in 2008 should be taken into considerations. Furthermore it will be necessary to consider the economic and social costs and benefits of measures involving changes in agricultural production as well as the environmental ones.

6 Conclusions

The Common Agricultural Policy (CAP) and the Water Framework Directive (WFD) are two of the major policies in Europe with a strong influence on environmental issues. The WFD establishes a framework for the protection of all waters, including inland and coastal waters, with the aim of reaching "good status" in all waters by 2015. The WFD implementation is based on a River Basin District (RBD) approach. For each RBD, the competent authorities have to set ecological targets which have to be reached by the implementation of programmes of measures. In some areas, these measures are likely to have a significant impact on agricultural production patterns and land-management methods.

As some agricultural practices are hampering the successful implementation of the WFD objectives in certain areas, there is a strong need to identify the opportunities and constraints where the CAP can help achieve WFD objectives. The 2003 CAP reform puts more emphasis on the integration of environmental issues by offering various possibilities to achieve positive environmental effects. Decoupling direct payments from production values might reduce incentives for intensive production. In addition, direct payments have been made conditional on a farmer respecting “cross-compliance”, which consists of a list of existing legislation and of the requirement to keep all farmland in good agricultural and environmental condition. Furthermore, modulation becomes compulsory, with the latter increasing the budget available to finance rural development measures.

As many positive experiences show, if properly designed and implemented, the existing RD measures can bring substantial contributions for achieving WFD objectives. The selection of measures chosen depends on various factors such as the type of farming practice and the intensity of production within the targeted area, the organisational and geographical circumstances, the willingness of different stakeholders to co-operate, as well as the level of ecological awareness of farmers. Nevertheless, improving water quality is only one of a wide range of competing objectives established under EU RD policy. Therefore, it is necessary to look for prioritisation and synergies with other policies (e.g. biodiversity, soil, nitrate) in order to create as much environmental benefit as possible.

The new upcoming Rural Development Regulation (RDR) for the period 2007-2013 directly supports the WFD objectives (Art. 38 RDR). In addition, the four axes of the upcoming RDR contain a set of measures that offers the ability to protect and enhance natural water resources (e.g. agri-environment and agro-forest payments, natural handicap payments, use of advisory services), as well as to preserve high-nature value farming and forestry systems and the cultural landscapes of Europe’s rural areas. Advisory services should play a central role to implement these measures most effectively on the ground. However, the set of measures could also hamper the WFD implementation by negatively affecting waters (e.g. payments for certain investments leading to intensification).

A common understanding of both policies is crucial for an effective implementation of the WFD and sustainable rural development in each river basin. Therefore, it is important to link the selection and implementation of the RD measures to the WFD River Basin Management Plans. The co-ordination and the work within a common organisational framework could be an important feature for a harmonised implementation of both policies.

The national RD network under Art. 69 RDR provides *inter alia* a framework for the co-ordination of measures at the national level. The fourth axis of the RDR (LEADER) offers a bottom-up approach for locals to co-ordinate their activities and to set up tailor-made programmes that fit the objectives of both the WFD and the RDR. This gives the opportunity

to establish win-win situations for both the water protection and the rural development sectors.

The WFD also provides possibilities to support the RD implementation. The Art. 5 WFD reports could be a valuable source of information for targeting the territories (e.g. areas of high nutrient pollution, flood prone areas) and setting the objectives of the measures for the RD measures under the upcoming RDR. In addition, the Art. 5 reports could be used to evaluate the performance of some RD measures (e.g. agri-environmental measures). As Art. 4 of the WFD provides the option for exemptions, disproportional costs for farmers could be averted through the use of this option. Furthermore, public participation under the WFD as well as partnership under the RDR will play an important role in promoting public acceptance of the WFD environmental objectives and RD objectives.

The design of the approach used for the implementation of both policies should take into account the level of scale (local, regional, national or international), and ensure that the selected measures are acceptable and beneficial to all stakeholders affected. Such approaches should also consider the linkages between environmental, social and economic processes and conditions. The share of best practice examples across EU Member States could be beneficial to the development of such approaches.

Finally, the new upcoming RDR plays an important role for achieving the WFD objectives. However, the RD measures provided and the RD budgets available will not be sufficient to tackle all pressures from agriculture. It is most likely that a package of additional measures and the full implementation of the existing EU environmental legislation (e.g. Nitrates Directive) will be needed by Member States. Furthermore, it is obvious that not only the agricultural sector but rather all sectors (e.g. chemical industry, transport, health sector and sanitation sector) will have to contribute to the implementation of the WFD.

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Annex 1: "Good examples"

Innovative Project 1: Nitrate Sensitive Areas (NSA) Scheme (England)[30]

The aim of the project was to reduce the nitrate pollution of drinking water supplies. The project was implemented in 32 different areas in England, and participation was voluntary. The NSA framework covered approximately 35 thousand hectares of eligible agricultural land. These activities were separate from the mandatory Action Programme measures which implemented the Nitrate Directive (91/676/EC). The NSA offered farmers three different schemes of measures:

- **Premium Arable Scheme (PAS)**. Under this scheme, farmers were required to convert arable land to extensive grass under one of six' agriculture management systems;
- **Premium Grass Scheme (PGS)**. Under this scheme, the extensification of existing intensively managed grasslands was supported;
- **Basic Scheme (BS)** under which two different options of low nitrogen cropping were supported.

Compensation was paid to participants in these schemes for a 5 year period. Payment rates were based upon level of income foregone, and they varied according to farming systems in the different areas. Typical payable rates (pounds/ha) were as follows:

- PAS 440 – 590 (depending on options),
- PGS 250,
- BS 65 – 105.

Total expenditure varied from 1,5 million pounds to 6,2 million pounds per year (between 41 - 185 pounds/ha of total project area).

Results have shown that NSA schemes have resulted in a reduction of nitrate concentration in water as well as in a reduction of nitrate leaching from the soil root zone. The nitrate concentration in water resources decreased from 125 mg/l in 1995/96 to 72 mg/l in 2000/01.

Innovative Project 2: The Baltic Agriculture run-off Action Programme (Poland)[31]

Between 1945 and1990, economic development in Poland, as was the case with many other CEE countries, took little account of environmental protection. As a result, the natural capacity of ecosystems was exceeded, and regional ecological disasters occurred. Since the end of the socialist regime in 1989, greater efforts have been taken to improve the state of the environment. Some of the projects intend to improve the state of water resources polluted from agricultural sources. One of these projects was the Baltic Agriculture run-off Action Programme (BAAP), implemented between 1994 and 1997 in two regions of Poland. It was a Swedish-led initiative that aimed to improve the quality of the Baltic Sea and covered Polish water resources. The overall goal of the project was to create a social, economic and political

[30] Based on the UK Questionnaire on WFD and RDP, prepared by Poul Petersen, DEFRA.

[31] Based on Karaczun, Z. M.: Preparing for EU environmental policy in Poland: the case of the Nitrates Directive. *Land Use Policy* (in press).

climate that would encourage both the recognition of agriculture-related water quality problems and the development of the specific solutions. In both areas, 8 farms were selected where liquid manure tanks or organic manure slabs were built. The cost of the construction have been estimated on the level of 5 000 – 10 000 Euro/farm. Fifty percent of the investment costs were provided by BAAP project funds, approximately 15 – 30% of the cost have been covered by farmers. The successful implementation of the demonstration component of the project and a high level of interest by farmers in both regions resulted in the extension of the project, thanks to financial support from the regional environmental funds. As a result, several additional manure tanks or slabs have been built. Due to the success of the project, several new initiatives have been undertaken across Poland. This has helped to ensure that nitrate levels in surface and underground water in these regions do not exceed 50 mg/l.

Innovative Project 3: Protection of mineral water resources in Vittel Catchments (France)[32]

The aim of the programme was to ensure that concentration of nitrate in water stayed at a level below 10 mg/l and that the pesticide level did not exceed 0 mg/l in the catchment for Vittel mineral water extraction. The area is occupied mostly by dairy farms based on corn feeding. In the 70's. and 80's,. because of the intensification of milk production, the nitrates content in the small watercourses and in surface sources increased. Fortunately, the contamination did not reach the deep water-bearing levels. In order to protect mineral water resources, Vittel Corporation negotiated a contract with the farmers in order to ensure that their practice will not negatively influence the water quality. The main requirements were as follows:

- Total suppression of the corn crop
- Composting of all animal waste
- Limited load to 1 LAU/ha of areas designated for animal grazing
- Ban on the use of phytosanitary products
- Priority for natural fertilisers, rationalisation of nitrogen fertilisation
- Introduction of new crop rotation system with alfalfa
- Standardisation of breeding holdings.

Since 1987, the Vittel Corporation has offered to buy the agricultural lands and land working rights at a price of 3 000 Euro/ha. In the 1990s, the company attained ownership of over 50% of the cultivated land of the catchment (1800 ha). The monitoring showed that in a large number of control points the limit of 10 mg of nitrates/l was reached. Only the return of the temporary grassland, especially of alfalfa, resulted in an increase of nitrate concentration above 10 mg/l. Nevertheless, further analysis shows that there are many options and possibilities to improve the grassland management for better water protection.

[32] Based on the Case Study on the Vittel Experiment, Annex to the French Questionnaire on WFD and Rural Development Programmes.

Innovative Project 4: Upland restoration and management: Protecting Drinking Water Supplies (England)[33]

Location and Background:

Whitendale Farm is one of a number of upland farms in the North West of England owned by United Utilities Water Company. These landholdings encompass the catchments of United Utility water supply reservoirs. Typically the farms are tenanted and grazed, although Whitendale has been unoccupied since 1999 and a new tenant will be appointed in early 2006 to implement the management plan. United Utilities are proposing to re-negotiate tenancy agreements and make around 9 million pounds of capital investment in order to secure statutory biodiversity objectives and protect/improve raw drinking water quality. Annual farm incomes could be supported by agri-environment payments and investment in farm infrastructure and operations.

Measures:

- United Utilities will pay for a range of measures, including the blocking of drains (also known as "grips") in blanket bog, establishment of hillside woodland along water courses and re-vegetation of bare, eroding peat..
- Stocking density is controlled and restricted to sheep.
- Whitendale Farm management plan relies on a range of agri-environment payments (Environmental Stewardship) and English Woodland Grant Scheme, which have yet to be secured (see Table 3).

Table 3: Cost of Measures (Whitendale Farm)

Scheme	Option	Ha	Payment rate (£)	Total (£)
EWGS	Creation of broad leaved woodland	64	60	3,840
ES	Creation of species-rich, semi-natural grassland	2.6	280	728
ES	Supplement for hay making	2.6	75	195
ES	Management of permanent grassland with very low inputs	20.7	60	1,242
ES	Two-metre buffer strips on intensive grassland	2,200 m	6 per 100 m	132
ES	Supplement for small fields	20.7	35	724
ES	Restoration of rough grazing for birds	54.9	80	4,392
ES	Raised water level supplement	26.9	80	2,152
ES	Creation of successional areas and scrub	25.8	100	2,580
ES	Restoration of moorland	873	40	34,920
ES	Moorland re-wetting supplement	280	10	2,800
ES	Maintenance of heather moorland	128	40	5,120
ES	Shepherding supplement	1,001	5	5,005
TOTAL				**63,830**

Note: the measures listed in this table are those applied for under the ES and EWGS schemes, but the final figures are subject to negotiation with the government agencies responsible for allocation of grant aid payments.

Synergies:

- Blocking grips has the potential to restore the blanket bog ecosystem (a Natura 2000 habitat) and to reduce oxidisation of peat and thus slow, or reverse, the deterioration in

[33] Based on the on information provided by RSPB – England. For further information contact Ruth.Davis@rspb.org.uk

water colour, a problem that requires expensive and complex treatment contrary to Art. 7 WFD.

- Agri environment scheme measures to limit grassland inputs and create buffer strips will reduce nutrient load to watercourses and potentially reduce drinking water treatment costs associated with eutrophication.
- Tighter controls of livestock, grazing pressures and absence of cattle reduce risk of cryptosporidium pollution, an issue for drinking water treatment.
- Reduction of stocking density, blocking of drains and re-wetting of moorland has potential to reduce run-off and mitigate the effects of drought.
- Upland catchment restoration will reduce erosion and thus the sediment load entering rivers, an issue which has knock on effects for river morphology, fish spawning, macro-invertebrates and macrophytes.
- The fencing out of 5km of water course from livestock helps reduce the risk of pathogens such as cryptosporidium as well as suspended solids and diffuse pollution.

Annex 2: First estimation of the relation between RD budgets and costs that are incurred as a result of pollution of water by agriculture

Estimating environmental costs is problematic because the extent of environmental damage is often uncertain, and because environmental goods are not usually traded in the market place and thus do not have market prices.

Table 4 shows a qualitative assessment and interpretation in some regions in order to get a first rough estimate of the relation between RD budgets and costs that are incurred as a result of pollution of water by agriculture. In addition, it has to be kept in mind that the cost figures for each example given in the table have been estimated with different methodological approaches and are based on different assumptions. Accordingly, a comparison between the data from the different Member States is not possible.

With regard to the total RD-budget for the period 2000-2006 displayed in the table, it should be taken into consideration that the total budget provided for RD is not always taken up completely by farmers. Furthermore, the RD budgets have to be used for all measures under the current RDR and not only for measures supporting the creation of environmental benefits. Therefore, the budget available for water protection measures is limited.

Table 4: Estimation of the relation between RD budgets and costs that are incurred as a result of pollution of water by agriculture

Region	Pressure	Costs of pressure	Average annual RD-budget of the MS [a]	Total RD-budget 2000-2006 of the MS
Germany	Nitrate	1 250 to 5 000 million Euro/year [b]	2 144.90 million Euro	15 014.3 million Euro [c]
Germany (West) (contamination of drinking water)	Pesticides	64 to 93 million Euro/year [d]		
England and Wales	Diffuse pollution	£385 million/year (554 million Euro/year) [e]	658.88 million Euro	4 612.20 million Euro [f]
France (700 000 hectares of drinking water catchments, representing 2% of the overall national agricultural area)	Diffuse pollution	150 million Euro/year [g]	3 934.48 million Euro	27 541.35 million Euro [h]

(a) The figure given in the table for the annual RD budget is calculated by dividing the total RD budget for 2000-2006 by the amount of years covered (7 years).

(b) The annual external costs are calculated for emissions to ground and surface waters and atmosphere in 1995 (Schweigert and van der Ploeg, 2002).

(c) The figures for Germany are taken from the EU RD country profile pages (European Commission, DG Agriculture, 2003a).

(d) This figure includes the contamination with pesticides in the former Federal Republic of Germany before unification (without the former East Germany). Source: Waibel and Fleischer, 1998.

(e) The costs are given on 2004 price basis. Source: EA, 2005. Please note that the end figure is a conservative estimate. The costs and benefits in this report are derived from the following sources: EA, 2002; Eftec, 2004; EA, 2004; DEFRA and Welsh Assembly Government.

(f) Source for England: DEFRA, 2005; and for Wales: The National Assembly for Wales, 2000.

(g) Costs are only addressing drinking water catchment issues. Source: Personal communication from the French Water Direction, 2005.

(h) The figures for France are taken from the EU RD country profile pages (European Commission, DG Agriculture, 2003b).

Even if the figures do not cover all costs that are incurred as a result of water pollution by agriculture, a basic trend can be drawn from the three Member States examples:

- In ***Germany***, the calculated annual external costs for nitrate emissions to ground and surface waters and to the atmosphere are estimated between 1250 to 5000 million

Euros for the year 1995. As the nitrogen emissions in Germany have not changed significantly in the last 10 years[34], the current cost will approximately account for the same amount. This means that undertaking measures for the reduction of nitrates emission into waters would account for half to twice of the total annual RD budget.

- The figure of £385 million (554 million Euro) per year for ***England and Wales*** is a conservative estimate and work continues to refine it. The estimated cost for measures to reduce diffuse pollution into waters would cover more than two thirds of the annual RD budget.
- No cost estimation was available for the total agricultural area of metropolitan ***France***, which is around 33 million hectares (i.e. 60% of the country). According to the figures provided, 3.75% of the annual RD budget would be necessary to tackle diffuse pollution from agriculture in the combined area of drinking water catchments serving more than 10,000 inhabitants, which amounts to 700,000 hectares.

In conclusion: it is not possible to scale up from these examples to give a EU comparison of the estimated costs of dealing with the agricultural pressures against RD budgets. However, they do give an indication of the likely relationship between both figures.

[34] See information on water protection indicators on the German Federal Environmental Agency website:[http://www.umweltbundesamt.de/dux/wa-inf.htm].

Annex 3: Integrated river basin management plans (IRBMP) and programmes of measures – First examples from Member States

In the following some good examples of how agriculture could be involved within the IRBMP and how cost effective measures to reduce agricultural pressures can be implemented.

Example 1: Odense Fjord

In the Odense Fjord River Basin, land use is dominated by agricultural exploitation. Farmland thus accounts for 68% of the basin. In 2000, there were approximately 1.870 registered farms in the Odense River Basin, of which approx. 960 were livestock farms. The dominant crop type in Odense River Basin is cereals (2/3 winter cereals), while only 10% is accounted for by grass/green fodder.[35]

Within the CIS process of the WFD, the Odense River Basin was designated to be the Danish test area in relation to the WFD in line with 15 other catchments in Europe (so called Pilot River Basins - PRB). Within the Odense PRB project, a preliminary River Basin Management Plan for the whole Odense River Basin will be completed by the end of 2006. Based on applicable quality goals for water bodies, lakes, wetlands, Odense Fjord and groundwater, the plan must include specific measures for agriculture, households and industry in order to comply with the goal of good status of the water bodies.

Due to the intensive agricultural activities in the Odense River Basin, the environmental authority proposed the following set of measures in order to reduce agricultural losses of nutrients:

- **Technological types:**
  - Improvement of manure and slurry: biogas, separation techniques;
  - Limitation of ammonia evaporation: application of acid to slurry, improvement of stables.
- **Fertiliser related types:**
  - Standards for utilisation and maximum use of manure and slurry;
  - Reduced fertiliser quota.
- **Land use related types:**
  - Demand of utilisation of catch crops
  - Set a side areas: reduced application of fertiliser, catch crops, selection of agricultural areas for wetlands, forests and riparian areas free of cultivation
  - Cultivation without ploughing
- **Measures effecting both the water environment as well as the terrestrial environment:**
  - Stop rotation cultivation along river valleys;
  - Stop cultivation along riparian areas;
  - Reduction of ammonia emission;
  - Organic farming.
- **Economical measures:**
  - Fees on fertilisers, quotas
  - Subsidies to environmental improvements – CAP (voluntarily): reduced application of fertiliser, catch crops, selection of agricultural areas for wetlands, forests and riparian areas free of cultivation.

[35] Cf. Odense Pilot River Basin Website, http://www.odenseprbuk.fyns-amt.dk/.

The Danish Ministry of the Environment and the Danish Ministry of Food, Agriculture and Fisheries developed the Action Plan for the Aquatic Environment II (Vandmiljøplan II – VMP II), which covers the period from 1998 until 2004. Within the implementation process of the plan, one working group carried out a project which aims at defining a set of measures for protecting the aquatic environment against nitrogen and phosphorus pollution. For the Odense Fjord catchment, this project defines three different scenarios on agricultural measures to meet environmental objectives:

- Scenario 1: Mixed type of measures,
- Scenario 2: "Set-aside" based measures,
- Scenario 3: Most cost effective measures.

The following tables gives an overview of the specific measures for each scenario and the related reduction of nitrogen loading in the Odense Fjord. In addition, the tables give information on the cost effectiveness of each measure (in DKK per kg N).

Table 5: Odense Fjord - Scenario 1: Mixed types of agricultural measures [36]

Measure	**Area involved** **Hectare (percent of agricultural area)**	**Cost** **1.000.000 DKK *(EURO)***	**Reduced Nitrogen leaching**		**Reduced Nitrogen loading Odense Fjord (50% retention)**	
			ton N	**Cost effectiveness DKK/kg N**	**ton N**	**Cost effectiveness DKK/kg N**
Better utilisation of animal fodder	70.000 (100%)	0	45	0	23	0
10% higher utilisation of animal manure	70.000 (100%)	2,4	142	17	71	34
Catch-crops: Optimised utilisation of catch-crops on areas with manure	3.200(4,6 %)	0	38	0	19	0
Catch-crops: Increased use	5.000(7,1%)	1,3	185	7	93	14
Set aside for wetlands. – Wetlands in river valleys.	4.000(5,7%)	11,6	400	29	400	29
Set aside for new forest. - New forests on cultivated areas.	5.000 (7,1%)	14,1	214	66	112	125
Reduced N-fertiliser quota (20%)	70.000 (100%)	9,0	508	17	254	34
Reduced livestock production (10.000 AU)	70.000 (100%)	16,2	108	150	54	300
Agri-environmental schemes * Voluntary measures – EU subsidies (CAP)	2.000 (2,8%)	2,2	18	122	9	244
Organic farming – increased area	2.500 (3,6%)	7,2	50	144	25	287
Total cost DKK *(EURO)*		63,9 *(8,44)*				
Total reduction - leaching, loading			**1 684**		**1 048**	
Cost effectiveness - average (DKK/kg N removed) *(EURO/kg N)*				**38**		**61** ***(8,1)***

* This calculation on effects of implementing extra 2000 hectare measures within agri-environmental schemes (voluntary measures subsidised by EU) presumes the same distribution of types of voluntary measures as used today. The average effect is 9 kg N/hectare, which is relatively low because the use today of the measures "set aside"," Establishment of wetlands" and "40 pct reduction of Nitrogen fertiliser" are low. These types of voluntary measures are the most efficient to reduce nitrogen losses.

As Table 5 shows, the agricultural measures of scenario 1 lead to a reduction of ca. 1048 tons nitrogen in the Odense Fjord catchment, while the total cost of all scenario 1 measures

[36] MEM, 2003: Rapport for arbejdsgruppen til gennemgang af virkemidler i en regionalt baseret beskyt-telse af vandmiljøet mod kvælstof og fosfor. Del III, Miljøministeriet og Ministeriet for Fødevarer, Landbrug og Fiskeri, December 2003 (In Danish).

amounts to 63.9 million DKK corresponding to approx. 8.44 million Euro. Thus, the cost effectiveness rests with 8.1 Euro per kg nitrogen removed.

Table 6: Odense Fjord - Scenario 2: Set aside" based agricultural measures [37]

Measure	**Area involved** **Hectare (percent of agricultural area)**	**Cost** **1.000.000 DKK.** ***(EURO)***	**Reduced Nitrogen leaching**		**Reduced Nitrogen loading Odense Fjord (50% retention)**	
			ton N	**Cost effectiveness DKK/kg N**	**ton N**	**Cost effectiveness DKK/kg N**
Wetlands in river valleys – Set aside for wetlands	5.400(7,7%)	15,7	540	29	540	29
New forests on cultivated areas located in areas vulnerable for groundwater contamination (nitrate). Set aside for new forest	25.000 (35,7%)	64,5	974	66	487	132
Erosion protection – buffer zones. Set aside for erosion protection	250 (0,4%)	0,7	13	54	13	54
Erosion protection – remaining risk areas. Set aside for erosion protection	1000 (1,4%)	2,8	38	74	19	148
Total cost DKK ***(EURO)***		83,7 *(11,0)*				
Total reduction - leaching, loading			**1 565**		**1 059**	
Cost effectiveness - average (DKK./kg N removed) ***(EURO/kg N)***				**53**		**79** ***(10,4)***

With regard to scenario 2 (Table 6), the set of defined agricultural measures lead to nearly the same amount of nitrogen reduction as in scenario 1. However, the cost of the measures (11 million Euro) is higher than in the first case, which results in an average cost effectiveness of around 10.4 Euro per kg nitrogen removed.

[37] MEM, 2003: Rapport for arbejdsgruppen til gennemgang af virkemidler i en regionalt baseret beskyt-telse af vandmiljøet mod kvælstof og fosfor. Del III, Miljøministeriet og Ministeriet for Fødevarer, Landbrug og Fiskeri, December 2003 (In Danish).

Table 7: Odense Fjord - Scenario 3: Most cost effective agricultural measures [38]

Measure	Area involved Hectare (percent of agricultural area)	Cost 1.000.000 DKK *(EURO)*	Reduced Nitrogen leaching		Reduced Nitrogen loading Odense Fjord (50% retention)	
				Cost effectiveness		Cost effectiveness
			ton N	DKK/kg N	ton N	DKK/kg N
Better utilisation of animal fodder	70.000 (100%)	0	45	0	23	0
10% higher utilisation of animal manure	70.000 (100%)	2,4	142	17	71	34
Catch-crops: Optimised utilisation of existing catch-crops on areas with manure	3.200(4,6 %)	0	38	0	19	0
Catch-crops: Increased use	5.000(7,1%)	1,3	185	7	93	14
Reduced N-fertiliser quota (20%) *	70.000 (100%)	9,0	603	15	301	30
Total cost DKK *(EURO)*		28,4 *(3,82)*				
Total reduction - leaching, loading			**1 553**		**1 099**	
Cost effectiveness - average (DKK/kg N removed) *(EURO/kgN)*				**18**		**26** ***(3,4)***
Wetlands in river valleys –Set aside for wetlands	5.400(7,7%)	15,7	540	29	540	29
New forests on cultivated areas. Set aside for new forest	5.000 (7,1%)	14,1	214	66	112	125
Reduced N-fertiliser quota (20%) *	70.000 (100%)	9,0	603	15	301	30
Total cost DKK *(EURO)*		28,9 *(3,82)*				
Total reduction - leaching, loading			**1 553**		**1 099**	
Cost effectiveness - average (DKK/kg N removed) *(EURO/kgN)*				**18**		**26** ***(3,4)***

*1) The effect of reduced N fertiliser quota are higher in this scenario 3 compared to the scenario 1 because voluntary measures based on EU-subsidies are not included in this scenario

Scenario 3 combines the different agricultural measures from the cost effective perspective (see Table 7). Through these agricultural measures, which cost a total of 3.82 million Euro, the nitrogen loading of Odense Fjord can be reduced by 1 099 tons. The cost per kg nitrogen amounts to 3.4 Euro, which is only half the average cost effectiveness of scenario 1. This cost is low compared to the present cost of total sewage treatment in the catchment. The cost of the latter treatment is around 40 million Euro/year. Hereby around 1200 tonnes of N is removed from the sewage produced in the catcment, (equals around 33 Euro/kg N removed).

Finally, it can be concluded that it will be necessary to reduce the nitrogen loading by about 50% (1000 tons N/year or 9.5 kg N/ha) in order to achieve the WFD's objective (good ecological status) in the Odense Fjord. The yearly expenses related to agriculture amount to 4-8 million Euro.[39]

The most cost effective measures (1.9-5.4 Euro per kg N) include extended use of catch crops, establishment of wetlands, higher utilisation of nitrogen in manure and reduction of total

[38] MEM, 2003: Rapport for arbejdsgruppen til gennemgang af virkemidler i en regionalt baseret beskyt-telse af vandmiljøet mod kvælstof og fosfor. Del III, Miljøministeriet og Ministeriet for Fødevarer, Landbrug og Fiskeri, December 2003 (In Danish).

[39] Harley Bundgaard Madsen (2005): Odense Pilot River Basin – Links between WFD and Agriculture Presentation at the 1st meeting of EU Strategic Steering Group WFD/Agriculture, 25 April 2005, Brussels.

nitrogen use. Measures such as the establishment of wetlands and buffer zones along rivers and lakes, and afforestation give added bonus in the form of more nature in the basin.[40]

Example 2: The Morsa catchment in Norway[41]

The Morsa catchment, located in the South-East part of Norway between the Oslofjord and the Glomma river, provides an appropriate example for identifying the potential contents of the programmes of measures and agricultural activities. For the Morsa catchment, a river basin management plan (RBMP) was prepared. The catchment area is dominated by agriculture (16%) and forest (80%) land use. The RBMP includes (i) an assessment of reference conditions and required reductions in nutrient inputs to meet the quality targets defined on the basis of specific user standards, (ii) an analysis of possible measures and quantification of potential reductions in nutrient inputs, including the cost of these measures, as well as (iii) the implementation of these measures.

The RBMP comprises a number of measures primarily linked to diffuse agricultural sources and scattered dwellings. The following table shows the measures and the related impacts of these measures on the reduction of phosphorus discharge and losses in the periods of 2002-2005 and 2006-2008.

Table 8: Quantified effects for reduction of P discharges/losses in the Morsa catchment

Measures	Reduction of P discharges/losses in tons	
	Period I (2002-2005)	Period II (2006-2008)
Agriculture		
Conservation tillage	3.6	0.4
Constructed wetlands	0.8	0.7
Grassed waterways	0.2	–
Vegetation zones	0.2	–
Other measures	0.4	0.85
Wastewater treatment		
Private	1.0	0.8
Public	0.3	0.25
Total reduction of P in tons	**6.5**	**3.0**

With regards to the measures on ***wastewater treatment***, each individual household within the Morsa catchment that was not connected to the public sewers systems was registered, including the type of wastewater treatment and its efficiency. Since most of the treatment plants were considered insufficient, a programme of substantial upgrading was proposed and then implemented.

The results of the measures implemented on farms in the Morsa catchment in 1999 and 2003 can be taken from Table 9.

[40] Harley Bundgaard Madsen (2005): Odense Pilot River Basin – Links between WFD and Agriculture Presentation at the 1st meeting of EU Strategic Steering Group WFD/Agriculture, 25 April 2005, Brussels.

[41] Based on the Questionnaire on WFD and Rural Development Programmes, completed by the Ministry of Agriculture and Food in Norway, March 15, 2005.

Table 9: Measures implemented on farms in the Morsa catchment

Measures	1999	2003/2004
Reduced tillage systems	20-30% (in stubble over winter)	ca. 60% (in stubble over winter)
Constructed wetlands	4	32 built > 10 planned
Vegetation zones/buffer strips	0	100 km (7.5m) / 0.8 hectares
Planting on riverside	0	15 000 m
Grassed waterways	< 1 000 m	5 000 m
Farms with environmental plan	0	nearly 100%
Calculated discharge of P from agriculture	11 tons	7 tons

The cost of the implemented measures in agriculture in the period 1999-2003 amounts to 35m Norwegian Crowns (NOK). The cost for the remaining measures is about 40m NOK. An additional compensation of 5m NOK per year is needed. For the period of 2002-2008, the investment cost for the wastewater treatment plants amounts to 270m NOK.