Background Paper

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Final Version

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1 Introduction

1.1 Background work of the SSG on WFD & Agriculture

As a result of a process of more than five years of discussions and negotiations, the EU Water Framework Directive (2000/60/EC) entered into force in 2000. The Directive sets a framework for the protection of all waters with the aim of reaching a "good ecological status" of all Community waters by 2015. The successful implementation of the Water Framework Directive (WFD) depends strongly on agricultural land use, which is mainly influenced by the Common Agricultural Policy (CAP) (Herbke et al., 2006).

Acknowledging this, the Water Directors agreed in June 2004 to take action in the field of agriculture and water management by establishing the EU Strategic Steering Group (SSG) on WFD and Agriculture, 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. During 2005-2006, the SSG mainly focused its activity on identifying the gaps between WFD requirements and what the existing CAP can deliver. Options were explored to bridge these gaps with detailed assessment of rural development programmes opportunities, the question of cross-compliance standards and the importance of water pricing. In detail SSG initiated numerous activities, including the preparation of five issue reports on:

1) Pressures and impacts from agriculture on water bodies (Herbke at al., 2006),[1]
2) Rural Development and the WFD (Dworak et al., 2005),
3) Incentive water pricing and cost recovery in the WFD (Interwies, et al., 2006),
4) Cross-compliance and the WFD (Müssner et al., 2006), and
5) Co-operation and participation at the interface of EU Agricultural and Water Policies (Dworak et al., 2006a).

Additionally, two major conferences were held in London on 20-21 September 2005[2] and Vienna on 3-4 March 2006[3] to discuss the above mentioned reports. Finally, a further

[1] The results of this analysis can be summarised as follows:
- increased pollution of groundwater and rivers due to nitrate and pesticide leaching;
- reduction of groundwater and river flow levels as a direct result of water abstractions;
- increased negative impacts on natural resources resulting from the construction of dams and the diversion of watercourses for irrigation purposes;
- secondary effects such as risks of erosion, the disappearance of wetlands and oxygen deficits in rivers, leading to the possible extinction of species of flora or fauna or the gradual salinisation of groundwater in coastal areas;
- risks of adverse effects on human health and problems related to water treatment due to water pollution; and
- increased risks of flooding due to deforestation and the installation of polders for agricultural purposes.

[2] For more detailed information on the London conference and the individual presentations, please refer to http://www.defra.gov.uk/environment/water/wfd/0509-conference/index.htm. (last accessed on 7th Sept. 2007).

[3] The Vienna conference summary as well as all presentations can be downloaded from http://www.ecologic-events.de/cap-wfd/index.htm. (last accessed on 7th Sept. 2007).

report was prepared providing an outlook towards 2007 and identifying further steps with regard to research in the field of agriculture and water (Herbke et al., 2006).

However, the level of analysis possible on potential measures under the 2005/06 mandate of the SSG was limited, since the analysis took place before the publication of the river basin management plans and their associated programmes of measures (which must be drafted by 2008 and adopted by 2009). Few practical case studies were therefore available and part of this work remained theoretical (Dworak et al, 2006b). Now, several Member States have started detailed work on setting up first programmes of measures.

In order to address the gaps of previous work on the basis of current developments, the SSG, under the co-lead of UK, France and the EC, has decided to focus specifically on the compilation of alternative ideas, measures and solutions and their impacts in a catalogue of measures. This catalogue should also bring together the experiences and knowledge available in the Member States.

A second objective of the current mandate of the SSG is the continuation of the exchange of information in order to identify best practice or "success stories" that should stimulate the further policy development in water and agriculture.

1.2 Aim of conference

The conference “WFD meets CAP – Looking for a consistent approach” (20-21 September 2007, Paris) will provide a forum to discuss the different approaches (e.g. voluntary versus mandatory measures) as well as different types of measures (economic, technical) related to the current development of the catalogue of measures to tackle pressures from agriculture in order to achieve the WFD objectives. The event will also be used to exchange different experiences gained and lessons learned from the different approaches. Furthermore, since prospective questions such as the impacts of new technologies, the effects of the EU Biomass Action Plan have been poorly addressed so far, the conference will discuss these issues in more details. In addition, regarding the recent developments of the issue of water scarcity and droughts, a specific focus will be given on the way to address these water quantity issues.

1.3 Aim and structure of this background paper

The purpose of this paper is to provide a brief summary of key past developments and key current issues and challenges related to the main topics of the conference. At the end of each section the paper also proposes **main questions** to be addressed in the moderated working groups of the conference, which cover the following topics:

WG 1 *Cost and benefits of measures foreseen in the WFD programmes of measures – Agricultural pressures on water quality*

WG 2 *Voluntary measures versus compulsory measures: looking for an effective approach*

WG 3 *Contribution of rural development programmes to WFD objectives*

WG 4 *The EU Biomass Action plan and WFD objectives*

WG 5 *Cost and benefits of measures foreseen in the WFD programmes of measures – Agricultural pressures on water quantity*

WG 6 *New farming systems (e.g. integrated farm management), research and innovations in the agricultural sector: implications for water issues*

WG 7 *Article 38: towards an appropriate use for WFD issues*

WG 8 *Climate change and agriculture - what consequences and measures of adaptation included in rural development programmes and likely WFD programmes of measures*

The structure of the paper does not address each WG with a single section; rather, issues that are strongly related to each other are handled commonly. This allows for a broader and more holistic approach.

Section 2 of this paper deals with the programme of measures, including the issues of voluntary/compulsory measures, costs and benefits of measures as well as links of the WFD to the rural development programmes. On the issues of voluntary/mandatory measures as well as on rural development programmes, the filled-out questionnaires sent by the EC to the Water Directors in February 2007[4] to elicit information on the WFD programmes of measures with focus on agricultural pressures and the rural development programmes have partly been used as a source.

Section 3 addresses new farming systems and possible opportunities for the WFD environmental objectives. Section 4 is concerned with important future developments which should be considered in the interface of agriculture and water management, including climate change consequences and adaptation needs as well as issues related to biomass production in the EU.

Please note the questions at the end of each section are proposals and might be adopted in the working groups. However, they should be used as a guide to address the most important issues to be discussed in the working groups

[4] There were 13 Member State replies to these questionnaires (Belgium, Estonia, Finland, France, Germany, Lithuania, Luxembourg, Latvia, The Netherlands, Portugal, Spain, Sweden, UK).

2 Programmes of measures

2.1 Voluntary versus mandatory measures

Several Member States are currently in the process of selecting measures in the context of their draft WFD programmes of measures in order to tackle agricultural pressures on water bodies. These measures can be voluntary or mandatory and both types of measures often co-exist. Experiences from several Member States show that mandatory measures are considered as the most appropriate to address agricultural pressures, while the success of voluntary measures is highly dependant on farmers' acceptance of a problem. For instance, participation in voluntary agri-environmental measures has not always been fully effective until now. On the other hand, several farming advisory projects in water protection areas have shown good results when they are realised in combination with demonstration projects.

The replies of 13 Member States to the questionnaire on WFD programmes of measures with focus on agriculture (distributed by the EC in February 2007) can be summarised as follow:

- Most Member States are now developing the WFD programmes of measures and could only present a preliminary list of measures for the agricultural sector.

- Measures reported in the questionnaires are mainly of technical and legislative nature as well as a few "soft" measures like advisory systems and services. Economic instruments were reported by very few Member States. In general, water pricing policies for the agricultural sector seem to be far from widely applied until now.

- Certain measures (e.g. buffer strips) are reported as mandatory by some Member States and as voluntary by others.

- The **mandatory measures** reported include mainly legal actions (related to the implementation of EU laws and regulations, including several water directives and CAP requirements) and technical measures. A few economic instruments to reduce agricultural pollution (e.g. taxes on diffuse pollution collected on pesticide distributors and taxes on breeding activities collected on cattle farms) are also reported.

    - The focus of most Members Sates is on agricultural pollution. Most mandatory measures relate to existing legislation such as Action Programmes for the Nitrates Directive (e.g. balance of nitrogen fertilisation, the limitation of quantities of organic nitrogen distributed), Directive on Plant Protection Products (pesticides), the Groundwater Directive as well as the Sewage Sludge Directive. Technical measures address point (e.g. non-leaking manure storage, wastewater treatment) and diffuse sources (e.g. manure transportation and spreading equipment).

In general, most Member States reported the adoption of several mandatory measures for reducing agricultural pollution in combination with a series of voluntary measures (see below).

- Specific mandatory measures to reduce water abstractions and hydromorphological modifications to prevent and reduce soil erosion are only reported by single Member States. For example, delimitation of zones to control water abstractions in territories with water imbalance as well as the use of taxes on water abstractions are reported in France. Interdiction of new drainage against hydromorphological modifications is reported by Luxembourg. Belgium (Flemish Region) also reported the adoption of mandatory measures on parcels most sensitive to erosion.

- **Voluntary measures** reported in the questionnaires were often related to the Rural Development Programmes (previous programmes and/or new programmes of 2007-2013).

  - For tackling agricultural pollution, measures reported include agri-environmental measures to limit fertilisation and pesticides and to support organic farming, catch crops, buffer strip management, limits on animal manure use and low cattle loads in pastures. Additional voluntary measures aimed at addressing pollution coming from agricultural activities include farm advisory systems, e.g. to strengthen groundwater protection (support in calculation of N balances), as well as improved training for farmers on fertiliser management. Cooperative agreements between farmers, water authorities and water supply companies in water protection areas were also reported as possible voluntary measures.

  - Voluntary measures to reduce water abstractions, to combat soil erosion and to improve hydro-morphological modifications are measures taken in the context of Rural Development Programmes (e.g. implementation of eco-efficient technologies, landscape management, soil covering, buffer strips).

2.2 Costs and benefits of measures

The WFD gives an important place to economic methods, tools and approaches. Economic elements of the WFD include in brief the polluter-pays principle, cost recovery, including environmental and resource costs, the selection of cost-effective combinations of measures and cost disproportionality.

At the conference, the analysis of costs and benefits of measures (technical measures, policy instruments, “non-material” measures such as training systems and demonstration) related to the WFD and the agricultural sector will be discussed in a practical way. The WFD implementation process can lead to the assessment of benefits. Only such an assessment gives a full picture of the measures from all angles. Measures under the WFD often have indirect benefits to other environmental problems (e.g. soil protection) or can have economic benefits to a region (e.g. flood protection). Such arguments can increase

the acceptance of the implementation of the WFD to the general public. An assessment of benefits can also deliver valuable arguments in judging disproportionality.

A recent study on the current state of play on methodological issues and data availability on costs and benefits (VITO et al., 2007) also examined specific WFD measures related to agriculture. All in all, the assessment of costs and benefits of measures remains a challenging task due to large uncertainties, data gaps and methodological weaknesses. As a conclusion of the study, more exchanges between MS are needed in order to share new information on the basis of concrete case studies. The chapter on costs and benefits therefore needs to highlight and reflect the issues and challenges identified in the CBA study. Box 1 summarises some key conclusions of this study.

Factors determining costs and benefits

There are a number of factors identified that are important for both costs and benefits. The size of the gap between the reference situation (basic measures) and the required supplementary measures required by the WFD to reach good ecological status (GES) or potential (GEP) is an important factor. The gap size depends both on current status and physical characteristics of the water bodies, measures in the pipeline and the ambition level for WFD implementation. As both reference situation and ambition level are uncertain or may vary, most studies analyse different scenarios. Costs and benefits will both depend on the measures selected. In addition, costs will largely depend on the degree of cost-effectiveness and efficiency of implementation. Benefits will depend on the type of water body and the functions it delivers (drinking water, recreation, etc.), the number of users of that water body and people affected, the extent to which there are alternatives available and the preferences of users and their income levels. Finally, some factors relate to parameters such as the time horizon, discount rates, etc. that do not depend on the water body or ambition level but may be study specific.

Box 1: Main results of the costs and benefits of the WFD implementation in the agricultural sector

2.3 Rural Development Programmes & WFD issues

The Rural Development Regulation (RDR) for the period 2007-2013 is designed to place agriculture in a broader context by covering three major policy objectives. These objectives aim to improve: i) competitiveness of farming and forestry (Axis 1); ii) environment and land management (Axis 2); and iii) quality of life and diversification (Axis 3). The three thematic axes are complemented by a fourth implementation axis (LEADER) that streamlines the local development strategies which could also include WFD implementation.

Measures under all axes could contribute to reaching the WFD objectives as they offer various possibilities to protect and enhance natural water resources (see Annex). While the measures under axis 1 and 3 are mainly indirectly linked to water, the measures provided under axis 2 offer high potential to support the implementation of the WFD directly. Under this second axis, also a specific measure allowing farmers to be compensated for income foregone due to WFD implementation (**Art. 38**) is provided.

Many Member States have already developed their Rural Development Programmes (RDPs) for the period 2007-2013[5] and submitted them to the Commission. The questionnaire distributed by the EC in February 2007 aimed to compile information to which extent water issues have been addressed in these programs.

From the replies of 13 Member States the following picture can be drawn:

- Measures contributing to water protection are contained mainly under Axis 2 of the RDPs. Especially the voluntary agri-environmental measures are used to address diffuse and point sources of agricultural water pollution (nitrates, phosphates, pesticides) as well as soil erosion.

- The targeting of water quality issues by the agri-environmental measures is not a new issue, since the previous RDPs already contributed to the aims of other water directives prior to WFD (e.g. the Nitrates Directive). In the new RDPs, most of these previous measures have been maintained and, in some cases, were amended and extended to include new elements reflecting the WFD aims.

- Furthermore, some new measures have been explicitly added in the RDPs to support the WFD objectives. For example, in the Belgium-Flemish Region a new voluntary measure aims at retaining precipitation and allowing infiltration without negative consequences. Also, in the Irish Rural Development Programme 2007 – 2013,[6] it is stated that new voluntary measures shall be introduced and designed to improve water quality in a number of areas in the sense of the WFD, specifically certain salmon rivers and pearl mussel habitats as well as the catchments of certain (western) lakes.

- Southern Member States, like Spain and Portugal, also use their RDPs 2007-13 to promote water saving. In Spain, measures to improve water savings in existing agriculture are included under axis 1 of the RDP (affecting 1 million ha and expecting 1800 hm³ of water savings). Portugal also supports the installation of systems and equipment that increase the efficiency of water use in its RDP.[7]

- In the Netherlands, an iterative process is followed whereby a midterm evaluation of its RDP 2007-13 is compulsory to focus on further possibilities for contributing to the WFD implementation (current relevant RDP activities involve, among others, knowledge distribution on environmental sensitive use of pesticides, nutrient policy and organic farming; business modernisation contributing to emissions reduction; emissions reduction of water polluting substances as part of

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5 For further details on see http://ec.europa.eu/agriculture/rurdev/countries/index_en.htm; (last accessed on 7th Sept. 2007).

6 See http://www.agriculture.gov.ie/index.jsp?file=cap/CAPruraldevelopment06.xml; (last accessed on 7th Sept. 2007);

7 Questionnaires filled in by Spain and by Portugal on WFD programmes of measures with focus on agriculture (distributed by the EC in February 2007).

several agri-environmental measures). This evaluation will take place in 2010, by which time the measures to achieve the WFD goals will be clear.[8]

- In most countries national strategies and RDPs have been developed (or are in the process of being developed) in a cooperative manner between the agricultural and water authorities. In this process, water authorities have mainly provided proposals on the technical content of the measures in the RDPs, especially with respect to voluntary agri-environmental measures and activities. France and Luxembourg reported that the contributions of the water authorities in this process remained somewhat marginal; in Luxembourg this was especially the case for some newly proposed measures. Thus, the final version of the rural development programme in this country may lead to the interpretation that the main goal seems to be the continuation of the actual agri-environmental programme instead of adding additional elements directly linked to the WFD implementation.

- First ideas for measures under **Art.38 RDR,** which specifically may compensate farmers for WFD implementation, have not been reported so far[9].

2.4 Questions for further discussion at the conference

Cost and benefits of WFD programmes of measures– Agricultural pressures on water quality/quantity (WG1/WG5)

- What are the key technical measures selected by your MS? What is the importance given to supportive or "non-material" measures (advisory and training systems, demonstration, education etc)? What are the policy instruments used to support the “technical” and/or supportive measures (regulations, voluntary approaches etc)?

- What are the tools for calculating cost effectiveness /cost benefits? How are uncertainty and data gaps dealt with?

- Are WFD exemptions for the agriculture sector being used or considered? With what justification?

Voluntary measures versus compulsory measures (WG2)

- Do “soft” regulations such as voluntary measures work? Which voluntary measures exist in the different Member States and are they effective?

- How can voluntary measures such as co-operative agreements complement compulsory measures?

- What are the limitations of voluntary measures and how can we overcome them?

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[8] Questionnaire filled-in by the Netherlands on WFD programmes of measures with focus on agriculture (distributed by the EC in February 2007).

[9] The Commission (DG Agriculture with support from DG Environment) has to set up implementation rules for applying Art. 38 in 2008.

- What are the limitations of compulsory measures and how can we overcome them?

- Can we accommodate the views of farmers and land managers in this debate?

Contribution of rural development programmes to WFD objectives (WG3)

- How far do rural development programmes contribute to the achievement of WFD objectives in your MS (budget devoted to WFD issues and comparison with the needs to address all WFD issues linked with agricultural issues)? What are the challenges and issues involved and how do you overcome them?

- How have the measures been selected and which territorial priorities have been set?

- What indicators have been selected in order to estimate the effectiveness of the measures in achieving WFD objectives, and how are they implemented?

Article 38: towards an appropriate use for WFD issues (WG7)

- In the light of the agricultural issues identified in your country or district, have you considered the possibility of using Rural Development Regulation Article 38 in the future?

- What issues should be addressed first under Article 38 (priorities, line to take on how article 38 should be used, national modalities etc)?

3 New farming systems – research, innovation, opportunities for water issues

The CAP promotes the modernisation and intensification of agriculture in Europe. This has increased food production and reduced the cost of food, but has also led to damaging effects on the environment. In order to reduce these negative impacts, a shift from conventional to more environmentally-friendly agriculture is seen as one solution. Such a shift requires new farming techniques and practices or the wider application of experienced sustainable agricultural practices (e.g. rotation of crops) (Dworak et al, 2006b). This is challenging as managing nutrients and pesticides within a farming system to minimise losses to water (and air) is extremely difficult.

There has been a large research effort over the last 20 years to understand leaching processes and to develop 'Best Management Practices' (BMPs) that can be adopted in farming systems to reduce losses to the wider environment. However, it is one thing to develop BMPs to decrease nutrient and pesticide losses and another to implement them successfully on the farm.

The conference should be used as a forum for an exchange of best practice examples and to discuss which framework has to be established in order to implement a more environmental friendly farming system aimed at environmental improvements and economically sustainable farming.

3.1 Questions for further discussion at the conference

- What are the effects of water from environmentally-friendly (e.g. organic farming, integrated farming system) agriculture? Are there clear differences between this type of farming and more conventional farming?

- What do we want farmers to do and what are the key challenges for them? Are there limits to what they can do if they are to continue farming?

- What are the most urgent research needs?

4 Future developments to be considered in the interface of agriculture and water management

4.1 Climate change – consequences and adaptation needs

The impacts of climate change on the agricultural sector will vary across Europe and the adaptation efforts required will be different. Water shortages, which are amongst the main problems expected in a changing climate, would have a significant impact on the agricultural sector. In central Europe, the projected shifts in precipitation patterns would reduce water availability during the vegetation period in summer and possibly increase the demand for irrigation water. Rising temperatures and evaporation rates would aggravate the situation in southern Europe further, where the dependency on water for irrigation is considerably higher. The consequences for farmers could be critical, starting with higher costs for irrigation and potentially leading to production losses or the complete loss of land due to desertification. One of the main priorities in order to address this threat is a more efficient use of existing water resources[10]. In order to address these challenges adequately, the Commission adopted on 18 July 2007 a Communication on water scarcity and droughts (Commission of the European Communities, 2007a).

Communication on water scarcity and droughts[11]

The starting point of the Communication on water scarcity and droughts is that it is better – and less costly – to prevent droughts and water scarcity as much as possible rather than to try to solve the problem once it has affected us. In order to reach this result, two main concepts were included in the Communication. The first one is the establishment of a water hierarchy where water savings[12], water efficiency any cost-effective action on water management must be given full consideration before other alternatives. Any new water supply measure should be considered as the last option when others have been exhausted. The second concept is the "user pays" principle where an adequate financial contribution of the different water users is required for the recovery of the costs of water services.

The Communication also identifies land-use planning as one of the main drivers of water use. This leads to the conclusion that all production, including irrigated and biomass production, and all economic activities should be adapted to the amount of water available locally. This is a key condition for sustainable land-use planning across Europe.

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10 Discussion Paper on Agriculture and Conclusions of the Conference Time to Adapt – Climate Change and the European Water Dimension. Available online: http://www.climate-water-adaptation-berlin2007.org/; (last accessed on 7th Sept. 2007);

11 See for more detail: http://ec.europa.eu/environment/water/quantity/scarcity_en.htm

12 A recent study (Ecologic et al, 2007) shows that there is a potential of water savings of an average of 40% in the European Union. The potential water saving in public water supplies is estimated at 33% and at 43% in the industrial sector and in agriculture. This potential is based on the implementation of water efficiency measures, the introduction of water saving technologies and the opportunity to further improve the technologies and management of irrigation. Full report and executive summary available on: http://ec.europa.eu/environment/water/quantity/scarcity_en.htm

Other regions at higher latitudes might benefit from rising temperatures and higher precipitation (in terms of prolonged vegetation periods, increase of crop yields, cultivation of new crop species or new land available for farming). Northern regions, however, will also face an increase in nutrient losses and erosion due to increased precipitation, with negative impacts such as eutrophication of aquatic ecosystems. These impacts can be tackled by regional planning, landscape design and farming techniques (Commission of the European Communities, 2007a).

Both situations – increasing water scarcity and new farming areas – will require adaptation funding schemes under the CAP; however, the right choice of measures remains a challenge. According to the Green Paper on "Adaptation to climate change in Europe - options for EU action" (Commission of the European Communities, 2007b), there is a need to integrate adaptation when implementing existing and upcoming legislation and policies. As far as agriculture and forestry are concerned, they have a major role to play regarding, among others, efficient water use in dry regions, protection of water courses against excessive nutrient inflow and improvement of flood management. Future adjustments of the CAP and the 'Health check' of 2008 could provide opportunities to examine how to better integrate adaptation to climate change in agriculture support programmes.

4.2 Biomass production

The demand for more sustainable and secure energy sources in Europe[13] puts increasing pressures on Europe's water resources. In particular hydropower and energy from biomass are likely to increase water demand and change water resource allocation. While hydropower is largely a non-consumptive water user[14], the production of biomass highly consumes water (Ecologic et al, 2007) and may compete directly with food crop production for water and land resources (Commission of the European Communities, 2005). With the increasing demand of biomass production for energy purposes, more and more concerns are being raised that agricultural production in many regions will again become more intensive.

Bioenergy has been identified as an important renewable as it can be derived from a wide range of sources including products and by-products from agriculture and forestry as well as municipal and industrial waste streams. Furthermore, bioenergies are the "all-rounders" among the renewables, since only biomass is equally suitable for the generation of electricity and heat and the production of transport fuels. Even if bioenergy from agriculture represents a relatively small share within the total energy sector and also within the renewable sector, its production is increasing constantly.

With the increasing demand for bioenergy, European efforts towards more environmentally friendly agricultural production can easily be foiled. Concerns continue to rise that the large-scale growth of biomass to achieve set political targets will interfere with other policies aiming to reduce agricultural pressures on the environment and will

[13] The Energy Policy for Europe adopted on 10 January 2007 sets up a binding target of 20% for the share of renewable energy in overall EU energy consumption by 2020 and 10% minimum biofuels.

[14] There are some consumptive losses through evaporation from reservoirs.

result in new increments on these pressures (EU press release, 2007). In this context it is necessary to evaluate the potential consequences of the ambitious energy policy targets that have recently been established at EU level against the objectives of the WFD.

A first attempt to draw out the key interlinkages between the objectives of the EU WFD, EU bioenergy policy and agricultural land use in particular is carried out in a specific paper for this conference produced by the European Environment Agency (EEA, 2007).

This will be discussed further in **The EU Biomass Action plan and WFD objectives (WG4) and Climate change and agriculture (WG8)**

- What are the potential threats coming from biomass production (e.g. land use change) and what are potential benefits? To what extent are these synergies and conflicts currently considered when drafting national biomass action programmes and river basin management plans?

- How can the achievement of the biomass targets and WFD objectives be achieved at the same time all over Europe?

- What sustainable criteria for protecting water when growing biomass are needed? Are they covered under existing legislation? Is there a need to distinguish between first and second generation production?

Climate change and agriculture (WG8)

- Impacts and vulnerability: Which climate driven changes in agriculture will pose the greatest challenges to water management? What benefits can be expected? Which regions will be most concerned?

- What options for adaptation are available, and which of them should be implemented in a long term perspective? What could be gained from coordinating and implementing adaptation at EU level?

- Integrated approach: What role should the agricultural sector play in an integrated adaptation effort at river basin level? What are potential adaptation measures in the WFD framework? What are most suitable approaches to mitigate conflicts between agriculture and other water users when water becomes scarce?

5 Concluding remarks

As discussed, the implementation of the WFD in the agricultural sector remains a challenging issue. Several interlinkages have to be considered which requires a co-ordination between the different authorities in the water and agricultural sectors. However, with the latest CAP reform and the flexibility available when implementing the WFD, these challenges can be met.

The Paris conference has to be considered as a further opportunity to better link water and agricultural policies, allowing Members States and different stakeholders to share views and create a better understanding.

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Annex: Overview of RDR generic measures 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)	+/	+/	+/	+/

Source: Dworak et al., 2005.

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