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LIFE Project Name
WAgriCo

Project Data

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Data on Beneficiary

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2 List of abbreviations

ADAS	ADAS UK Ltd
AG	Arbeitsgruppe (working party)
AK	Arbeitskreis (working group)
ATKIS	Amtliches Topographisches-Kartographisches Informationssystem (official cartographic information system)
Autumn N_{\min}	Mineral nitrogen concentration available in soil in autumn
CIWEM	Chartered Institution of Water and Environmental Management
CSF	Catchment Sensitive Farming
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EG-WRRL	Europäische Wasserrahmenrichtlinie (EC Water Framework Directive)
EPLR	Entwicklungsplan für den ländlichen Raum (rural development plan)
EU	European Union
FAL	Bundesforschungsanstalt für Landwirtschaft (Federal Agricultural Research Authority)
FZJ	Forschungszentrum Jülich (research centre)
GROWA	Name of a water resources management model
LBEG	Landesamt für Bergbau, Energie und Geologie (State Agency for Mining, Energy and Geology)
LS	Lower Saxony
LWK	Landwirtschaftskammer Niedersachsen (Lower Saxony Chamber of Agriculture)
ML	Niedersächsisches Landwirtschaftsministerium (Lower Saxony Ministry of Agriculture)
MU	Niedersächsisches Umweltministerium (Lower Saxony Ministry for Environment)
N	Nitrogen
NAU	Niedersächsisches Agrarumweltprogramm (Lower Saxony Agro-environmental Scheme)
NDR	Norddeutscher Rundfunk (Northern German broadcasting corporation)
NFU	National Farmers' Union
NLWKN	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (Lower Saxony Water Management, Coastal Defence and Nature Conservation Agency)
N_{\min}	Available soil concentration of mineral nitrogen
NSA	Nitrate Sensitive Area
NVZ	Nitrate Vulnerable Zone
UK	United Kingdom
UKWIR	UK Water Industry Research Ltd
WAgriCo	Water Resources Management in Co-Operation with Agriculture
WSG	Wasserschutzgebiet (water protection area)
WW	Wessex Water Services Ltd

3 Executive Summary



The LIFE project WAgriCo with financial assistance from the EU started on 01.10.05 and is due to run for three years. Its purpose is to draw up and implement integrated measures and programmes of measures in accordance with the EC Water Framework Directive to reduce diffuse inputs in the agricultural sector. Various German and British authorities and research establishments are involved in this project as partners.

An important key area dealt with during the first year of the project concerned the creation of project structures (e.g. kick-off events with all project participants, development of communication and dissemination strategies, designation of pilot areas, establishment of a model farm measuring network etc.). A further step was to define target areas for the implementation of water-conserving measures within the pilot areas on the basis of technical criteria.

In parallel with this, a list of measures for action-orientated and result-orientated water conservation measures was drawn up in a broadly based discussion process.

In Lower Saxony a successful start was made in autumn 2006 on implementing these measures contractually agreed between NLWKN and farmers.

The UK partners have been working closely with individual farmers on a one-to-one basis in the sub-areas within the three UK geographical pilot catchments in order to promote a strong working relationship. Current and historic nutrient data has been obtained to provide base for the project. A risk assessment has been carried out and the pilot catchment sub-areas have been categorised as high, medium and low risk and mitigation measures have been identified. These are to be agreed with the farmers.

The expansion of the website, the further development of the list of measures, and the use of synergies with other protection objectives are steps scheduled for the next six months. Another task, in the context of an agro-economic analysis, is to assess the measures undertaken.

The present report has been drawn up on a cooperative basis by all the partners.

4 Project management

Project structure

A three-tier project structure was established for implementing the project: international, national and regional bodies ensure integration of the actors at all levels and active exchange of information within and between the levels.

Working groups were set up at the regional level in the 3 project areas in Lower Saxony and in the UK these working groups are still being developed (cf. Chapter 5.2). In the UK the Steering Group is developing a slightly different arrangement for working groups. The UK structure recognises the variance in land management and agronomic advise organisation (Annex 1-UK).

These working groups foster ongoing cooperation with local interest groups and acceptance of individual regional responsibility with regard to the problems associated with diffuse pollution and their solution (cf. Chapter 5.3). These working groups coordinate all working steps and their results. The working groups are managed by the local branches of NLWKN and of UKWIR.

National coordination of the work in the project areas is handled by a national steering group in each country, consisting of representatives of the project partners and of the working groups. This steering group draws up national guidelines and feeds the project results into the political and administrative decision processes at national level (cf. Chapter 5.10).

Close links between the project work in the UK and Lower Saxony are maintained at the level of the international steering group and through international expert teams and additional workshops, which not only ensure up-to-date sharing of interim results, but also promote contacts between farmers.

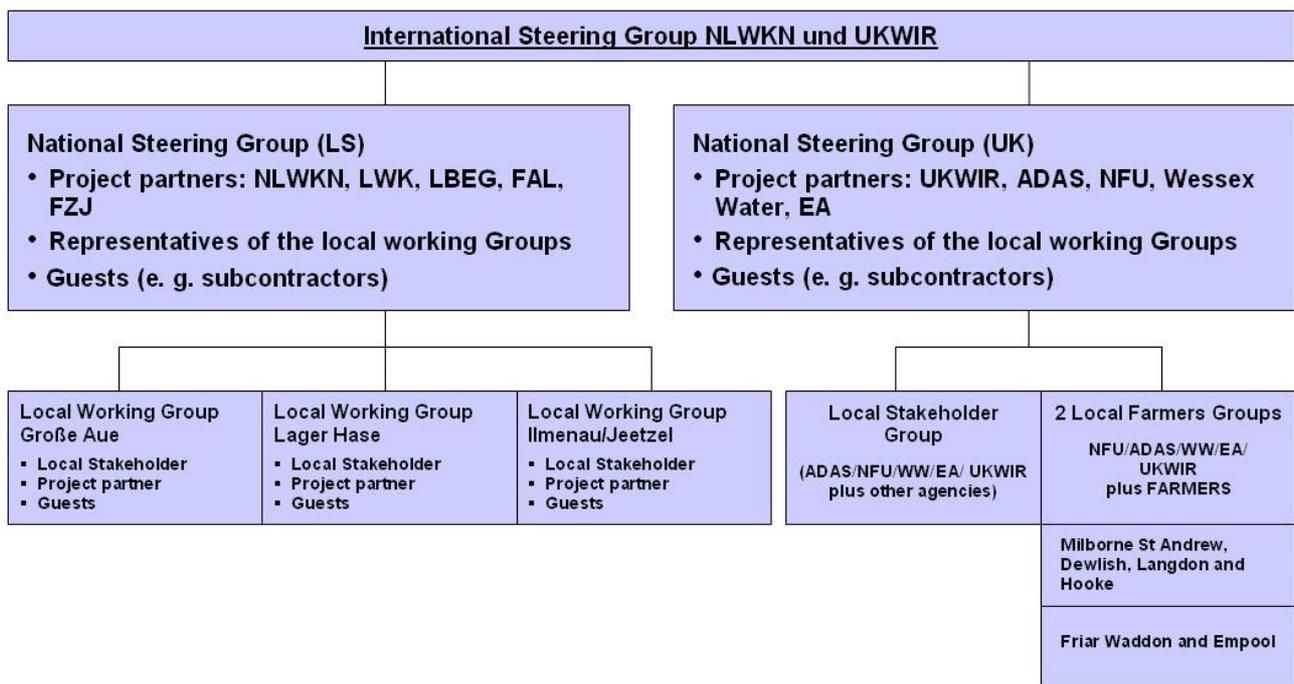


Fig. 1: Project structure

Further meetings of the groups have been held at all levels since the kick-off events. A list of the meetings can be found in Annexes 2-LS und -UK.

Partner agreements

NLWKN signed agreements setting out the tasks, rights and responsibilities of the participants with UKWIR and with the German partners (Annex 3-LS). Similar agreements have been agreed between UKWIR and the other British partners; these are yet to be signed. Thus UKWIR acts as the principal UK partner in relation to NLWKN.

Structure of and timetable for financial management

To increase the transparency of financial management, all partners send their accounts to NLWKN on a quarterly basis. To this end the evidence of inputs and costs is submitted and checked in accordance with the Commission's General Provisions, and the reimbursable amount is paid to the relevant partner. The financial status of the project is set out in Chapter 9.

5 Technical development

5.1 General

Each sub-section gives a brief description of the individual tasks that were either started or completed by October 2006. In each case a basic description of how the task was implemented and what deliverables were produced is followed by a description of the procedure in Lower Saxony and in the UK.

5.2 Project management and reporting, establishment of project structures

The establishment of the project structure has been completed. The basic structure is described in Chapter 4. The management of the project is the responsibility of the beneficiary, NLWKN. All essential decision processes are followed at the three levels of the project. Accordingly the present progress report has been drawn up by NLWKN in cooperation with the partners, having regard to the process of coordination with the national steering groups and the international steering group. The other reports planned are set out in Chapter 10.

As an important step in the establishment of the project structure it was necessary to designate six pilot areas, the principal features of which are described below. The participation process used in the pilot areas is outlined in Chapter 5.3. The Lower Saxony memoranda in which the members of the regional working groups officially agreed the project targets as a basis for their significant participation in the project are attached as Annex 4-LS. As indicated in Chapter 4 the UK are still establishing its working groups.

The three pilot areas in unconsolidated rock (Grosse Aue, Lager Hase, Ilmenau/Jeetzel) selected in Lower Saxony differ considerably as regards existing land uses and the relevant problems. This ensures the development of a methodology that is applicable throughout the region.

Agricultural use in the Grosse Aue area is characterised by pig and dairy cattle farming with the associated improvement and fodder growing operations, plus a considerable proportion of cash crop farms. Compared with the relatively heterogeneous nature of the Grosse Aue area, production in each of the other two pilot areas displays a clear individual focus: the Lager Hase area is dominated by livestock farming including fodder growing, while the emphasis in the Ilmenau/Jeetzel area is on cash crop farms.

In the UK the three pilot areas are the Frome, Piddle and Wey river catchments in Dorset and are geographically adjacent unlike the Lower Saxony pilot areas. In terms of geology the upper parts of the Frome and Piddle catchments are both chalk. These then flow out onto the Tertiary sediments composed of sands, gravels and clays which overlays the chalk before entering Poole Harbour. In contrast, the River Wey flows across Jurassic limestone and Sandstones (Purbeck and Portland Units) and Kimmeridge Clay before it enters Weymouth Bay.

In terms of land use the three UK pilot areas are similar with farm enterprises consisting of arable, intensive dairy, intensive beef, sheep and a small number with pigs. The majority of the farms are within the Nitrate Vulnerable Zone so the amounts of organic nitrogen fertiliser (manures/slurries) that can be applied are regulated.

Further details of the physical classification, land use and pollution situation of all pilot areas are set out in Annexes 5-LS and -UK.

5.3 Communication and participation process

Communication and dissemination strategy

The basic principles of the communication and dissemination strategy were developed by NLWKN and UKWIR during the workshop at the beginning of February 2006 and at the meeting of the international steering group in March. On the basis of these ideas, each country drew up a dissemination plan that was agreed in the national steering groups (Lower Saxony and United Kingdom).

At the core of the Lower Saxony dissemination strategy (Annex 6-LS) is the definition of which target groups are to be reached with which contents. In addition to general information on the project and the financial assistance from the EU, the main aim is to describe the practical added value that the various target groups gain as a result of the project: the general public as the first target group is basically to be informed about the project in the context of the EU LIFE assistance programme. As a second target group, farmers are to be informed about the connections between agriculture and water quality and about the ways in which water-conserving farming can make an important contribution to conserving and improving bodies of water. As members of the working groups and in the national steering group, farmers play a direct part in designing possible means of supporting the EC Water Framework Directive in the project. The experts, as the third target group, are not only to receive this information, but also to be informed about the basic principles drawn up within the project for the key topics of setting priorities and planning and implementing measures. In addition, the experience gained with regard to necessary structural and administrative limiting conditions is to help the experts in their task of advising politicians.

The UK approach is similar to that of Lower Saxony and UK strategy is set out in Annex 6-UK.

Both the Lower Saxony and UK strategies will be continuously reviewed to monitor its success and modified if necessary.

The following is a list of the communication instruments already used in Lower Saxony and the UK (Annexes 7-LS and -UK):

- **Press work:** 26 press releases were placed in local and regional newspapers in Lower Saxony. In the UK 2 press releases were made one by WW the other by the NFU.
- **Radio and television:** Radio report (NDR) on the kick-off event in the Ilmenau/Jeetzel pilot area.
- **Internet:** The German website (www.wagrigo.de) on the project is regularly updated. This offers information on the project for all three target groups: farmers and consultants, technical experts, and the general public. In addition, a number of partners have inserted information about WAgriCo in their websites and provided links to www.wagrigo.de. UKWIR has established a contract for its web site. The UK Partners have developed the architecture of the website and are formulating the information required for the site. The UK website address is www.wagrigo.org. Details of the project have also been posted on the UK-ADAPT website www.uk-adapt.org.uk. UK-ADAPT is a resource for researchers and funders to make everyone aware of projects that contribute to our understanding of managing catchments to decrease diffuse pollution from agriculture
- **Media design:** Three newsletters in German have been published (December 05, March 06, June 06, September 06). These are offered as downloads on our website; they are also distributed at the working group meetings and sent by e-mail to a constantly updated circle of

interested parties, which is considerably larger than the group directly involved in the project (e.g. towns and cities, rural districts...). “Wasser und Abfall”, the technical journal on water management, waste management, soil conservation, contaminated sites and environmental legislation, published an article (in its July/August 2006 issue) on various topics including WAgriCo. At each of the four locations for the “slurry side dressing” demonstration measures in the Lager Hase pilot area we have put up two notice boards with information on the project and the measure in question.

The UK partners prepared a newsletter/flyer for both the International and National/Local Launches to provide background information on the project and the issues of concern. This has been used for raising awareness of the project with others. The partners have also agreed a programme to issue both technical newsletters and general newsletters over the coming year. These will be focused and relevant to agricultural issue at the time of release.

- **Communication activities within the project structure:** Annex 2-LS to Chapters 4 and 5.11 contains a list of all meetings within the project structure. Chapter 5.6 shows the progress of the initial and further training measures to date.
- **Workshops, seminars and conferences:** WAgriCo is the focus topic of this year’s 11th Groundwater Workshop in Hildesheim/Lower Saxony on 11 October 2006. About 140 participants from water management, research establishments, agriculture, engineering offices and environmental and nature conservation associations participated in this workshop. There have also been two speakers from the UK partners.

Both at the European Geosciences Union Conference (EGU, April 2006, Vienna) and at the 10th International Conference on Diffuse Pollution and Sustainable Watershed Management (DipCon, September 2006, Istanbul) the proceeding and the results of geographical prioritization were presented.

In the UK the partners have made presentations at various seminars/conference since the project commenced either specifically on WAgriCo or where it was referred to. In addition to those undertaken, at the CIWEM Land-use and Water Series conference in November 2006, entitled Farming and Water, WAgriCo will feature with presentations from the NFU on farm scale measures as well as from WW on the project.

- **Internal communication by partners:** All participating institutions in Lower Saxony have presented the WAgriCo project at internal meetings and to some extent in staff circulars. Two staff circulars from NLWKN are included. In the UK internal notification of the project have been made in internal communications as referred to earlier. UKWIR in its Newsletter December 2005 identified the commencement of the project. This newsletter is widely circulated to all in the water industry and to many other stakeholders. WW have also carried out meetings with its staff and others to keep them aware of this catchment management project.

Participation process

In accordance with Article 14 of the EC Water Framework Directive it is necessary to ensure active participation by the public, including the users, at an early stage. In the interests of broad acceptance of the management plans that have to be drawn up, there is therefore a need for cooperative involvement and integration of the parties concerned (including land users, authorities, associations) with a view to establishing efficient structures.

Important cornerstones of cooperation within the meaning of the EC Framework Water Directive, which is intended to ensure a broadly based participation process, include:

- an initiator as “driving force” and overall coordinator (e.g. NLWKN, ...);

- defining the areas concerned (e.g. river basin area, sub-basin area);
- addressing and integrating the relevant social groups (see above);
- defining an internal circle of participants for cooperation meetings and regulating the inclusion of external multipliers;
- regulating responsibilities and tasks (e.g. drawing up rules, producing minutes of meetings, terms of reference); and
- drawing up a communication and dissemination strategy.

The basic principles of this process and the experience gained are described in the “Participation Process Guide” (Annex 8-LS).

In Lower Saxony the structures of the cooperation model for drinking water protection and the many years’ experience gained are used as a basis. These bilateral cooperations between the water sector and the agricultural sector are potentially suitable forums for expansion to take in the interests of the EC Water Framework Directive. These structures were used for WAgriCo. At the initiative of NLWKN, working groups were set up in the 3 pilot areas on the basis of the cornerstones described above. A list of the participants in the working groups is attached in Annex 9-LS. The working groups meet at regular intervals. Against the background of the requirements of the Water Framework Directive and the results of the inventory, the working groups support all main steps in the project, e.g. the preparation of action plans which are then implemented in previously prioritized target areas as part of a coordinated procedure.

These working groups, the orientation of which is largely agricultural, will have to be integrated in the structure of the cooperation alliances that have now been set up state-wide at working area level.

In the UK the cooperative alliance between Agriculture and Water Resource Managers is a relatively new concept. This is therefore being developed within the WAgriCo project and the approach is detailed in Annex 1-UK. In the first instance both WW and ADAS made ‘preliminary’ approaches to the local farmers. WW made direct approaches to local farmers within the ‘sub area’ pilot catchments they were managing. However, ADAS’s approach was different in that they wrote to all the farmers in their sub-area pilot catchments and then followed up with one-to-one contact. This enable both to develop the ‘routine’ and ‘detailed’ levels engagement and participation (Annex 8-UK). This approach will now enable the establishment of Local Farmer Group(s) which is being planned for November 2006. This is timed to coincide with the time farmers are most likely to be engaged as it follows on from the very busy harvest period.

5.4 Geographical prioritization for planning of measures and environmental objectives

Geographical prioritization

In order to prioritise within the pilot areas Lower Saxony and UK use information about impact and utilisation of resources to identify areas with high priority for measures.

In Lower Saxony numerous measurements show that by comparison with other uses, nitrate levels in seepage water are highest under arable fields (often in excess of 100 mg/l). This is also reflected by the results of the inventory, which were presented and discussed in the pilot area working groups.

On the basis of the land use map of the official cartographic information system (AKTIS-DLM 1) and the soil overview map 1:50.000 (BÜK 50), all arable land with a low nitrate degradation potential in the soil was therefore designated as potential target areas. The water balance model

GROWA was then used to undertake a differentiation of total runoff into direct runoff and groundwater recharge. In a further step, this was used to arrive at target areas for groundwater conservation (high level of groundwater recharge) and areas for conservation of surface waters (high direct runoff). These target areas form the planning basis for the selection of farms for the implementation of measures.

These working steps give rise to the following land categories in the pilot areas:

- target areas for groundwater conservation measures: arable land with low nitrogen degradation potential and large share of total runoff going to form new groundwater;
- target areas for surface water conservation measures: arable land with low nitrogen degradation potential and large share of total runoff accounted for direct runoff, plus 50 m-wide riparian strips alongside surface waters; and
- areas with low priority for measures (all other areas)

The target areas designated for groundwater conservation essentially comprise the intensively farmed Geest areas (i.e. quarternary soils, e.g. Sögeler, Cloppenburger, Syker and Lüneburger Geest). The target areas for surface water conservation comprise the flood plains of the surface waters and the intensively farmed parts of the large lowland districts – especially in the region of the Quakenbrück basin in the Lager Hase pilot area. The target areas for both categories are shown in the map in Annex 10-LS.

In the UK, the Piddle, Frome and Wey river catchments were selected because of the existing nitrate problems in these catchments and the amount of work that already being carried out by WW and other agencies on catchment management issues. The specific target sub areas within these three catchments are based on six public water supply sources, Empool, Hooke and Langdon in the Frome, Dewlish and Milborne St Andrews in the Piddle and Friar Waddon in the Wey. These sources, which are considered to be the ‘endangered water bodies’ on the basis of their rising nitrate trends. They represent a mixture of borehole and spring abstractions. The nitrate peaks on which WW performance is measured, are running close to EU Drinking Water Directive defined permissible levels. The areas around these sources are further defined by the Environment Agency’s Source Protection Zones. These zones were defined on the basis of the assesement of experienced Hydrogeologists and groundwater modelling.

Environmental Objectives

Definition of environmental objectives is an indispensable precondition for assessing the efficiency of water conservation measures. If, when deciding on these environmental objectives, one regards the groundwater/surface water as an asset to be protected, then the anthropogenic substance inputs should be low enough to achieve “good status” of the body of water and ensure it on a long-term basis. In view of the limited project period of 3 years, we see a need to make a distinction between objectives for the reduction of these inputs (emission) that can be achieved in the “short term” and set out on an annual basis, and possible “long-term” objectives for the quality of groundwater in particular (immission).

In the WAgriCo project it is therefore considered necessary to use the assessment criterion “nitrate concentration in seepage water” (calculated or measured) as a basis for the definition of environmental objectives. In particular, this parameter permits a rapid estimate of the attainable immission objectives that makes it possible to show compliance with the ban on quality deterioration or, ideally, a trend reversal even in the short term, i.e. within the project period.

Currently, however, no concrete specification of quantitative values on the scale of groundwater bodies has yet been defined for the 6 pilot areas in WAgriCo (3 in Lower Saxony and 3 in the UK). The target values currently under discussion will be modified in the course of the project in line with the project findings and the figures specified by the expert bodies at EU and national level. In the UK catchments of the Frome, Piddle and Wey one of the main environmental drivers is the reduction of nitrate concentrations in the public water supply sources. At these sites WW is faced with having to install expensive, unsustainable treatment works unless catchment management can succeed.

5.5 Measure planning and compilation of programmes of measures

On the basis of the experience gained in Lower Saxony (e. g. voluntary agreements in water protection areas, cooperative approaches, agro-environmental scheme NAU) and in UK (e. g. pesticide initiative, NVZ, NSA) new approaches to improve groundwater quality even outside water conservation areas are being developed and tested in practice.

As a first step, an overview was compiled of water conservation measures that have been offered in recent years in Lower Saxony and other federal *Länder*. These were assessed by experts from LWK, NLWKN, FAL and members of the working groups from the three pilot areas with regard to their ecological effectiveness, economic efficiency, acceptance and controllability. The several measures are presented in a “toolbox” (Annex 11-LS/UK). On the basis of the overview of measures, a catalogue of 42 possible measures for practical testing was drawn up (Annex 12-LS).

The second step was to select from this catalogue the measures which permit a progress review after only one year and which display the best possible ratio of costs to results while offering good acceptance and good controllability (prior measures for arable land use). From this list a catalogue of 6 action-orientated measures was selected and is being offered in all three project areas in autumn 2006 (Annex 13-LS). Starting in spring 2007, further measures will be offered and put into practice.

In addition to purely action-orientated measures, there will also be an innovative result-orientated approach to reducing the nitrogen excess. Farms have a free hand in their adjustments to fertilizer usage, fodder and crop growing, but can also take part in selected measures to reduce nitrogen levels. The cost of implementing the measures is only partly met by a small basic contribution. In addition, the ecological results are rewarded if an improvement in fertilizer efficiency will be achieved (cf. Chapter 5.8).

Previous studies undertaken in the UK for Defra (NT2511 Cost curve of nitrate mitigation options; PE0203 Cost curve assessment of phosphorus mitigation options relevant to UK agriculture and ES0121 COST-DP: cost effective diffuse pollution management) have identified a range of measures that could be adopted to reduce diffuse water pollution from agriculture. Along with the ‘Inventory of Measures to Control Diffuse Water Pollution from Agriculture (DWPA)’ handbook, these projects described a list of 44 potential measures (Annex 11-LS/UK) that farms could adopt. It has been accepted that this list be used within the WAgriCo project and form the ‘tool-box’ of measures. This list will be kept under review and modified as appropriate.

In order to obtain a unified understanding across the 6 UK sub-areas, a Field Work Plan has been developed and all partners have signed up to it, thereby ensuring a unified approach by all (Annex 14-UK).

Following the detailed analysis of many of the farms within 4 catchment areas (Annex 15-UK), results from nutrient budgets and farm audits illustrate that there are very few radical mitigation methods that need to be imposed on the farms at this stage within the project. It is more about less demanding changes in practice. An appropriate and meaningful initial range of mitigation methods (catalogue of measures) that would be suitable to undertake on the farms within the study areas have been identified as the central approach (Annex 16-UK). These methods will be kept under review to ensure they are appropriate to both action and result-orientated tasks as the project moves forward. The analysis also suggested that there were few examples of poor practice that could be immediately identified as being the cause of diffuse pollution problems within the catchment and that not all the implications of management practices on nitrate in the catchment (e.g. unsecured slurry lagoons) are understood.

In summary, the audit concludes the mitigation methods that could be implemented can be categorised thus:

- Good Agricultural Practice (GAP);
- Enhanced GAP; and
- Infrastructure Changes.

5.6 Implementation of primary measures

Model farm measuring network

In Lower Saxony the concept for selecting the model farms was drawn up starting in October 2005 and underwent further development in 2006. In the interests of selecting farms that were as representative as possible and building up a model farm measuring network, an analysis of the agricultural statistics was made to identify the socio-economic farm types and their operational orientation. In the pilot areas, notice-board announcements and articles in regional newspapers provided information about the WAgriCo project and encouraged farms to take part. The farms sought for practical trials are not only farms with great adaptation needs that are willing to take part, but also “best-practice examples”. In parallel, a preliminary selection of potential candidates was made in all three pilot areas. The following criteria were taken as a basis:

- location in project area
- location in target areas (see Chapter 5.4)
- representative farm type
- no land in drinking water extraction areas

In Annex 17-LS there is a map of the target areas where the measures are implemented.

Multi-year contracts with interested (model) farms were signed in August (basic agreement and measures agreement; cf. Chapter 5.9; Annexes 18 and 19–LS), so the implementation of measures can start in autumn 2006 with a focus mainly on action-orientated measures, but partly also on result-orientated measures. Further development of the catalogue of measures, especially with regard to result-orientated, will take place in autumn 2006 for the spring 2007 measures.

For the livestock-strong Lager Hase pilot area, “slurry side dressing for maize” combined with non-use of mineral fertilizer has been implemented since spring 2006 as an area-specific demonstration project at 4 sites in the pilot area.

The UK has yet to finalise and develop its model farms although those used for the 2nd International Steering Group farm visits were selected for their range of practices that are currently being

undertaken by the farmers. By working with these farmers it is hoped to extend the relationships that have already been developed.

A range of measurements (Annex 20-UK) are being taken during the project and are controlled by the Field Work Plan. The measurements are:

- Soil nutrient status;
- Soil mineral N;
- Borehole/well sampling; and
- Nitrate leaching using porous cups.

These measurements will be used for several purposes: supporting farmers and their co-operation in the project, assessment of effectiveness, identifying problems and demonstration of effects to farmers.

Initial and further training

The Lower Saxony Chamber of Agriculture conducted an analysis of initial and further training in Lower Saxony. An analysis of the teaching of topics relevant to water-conservation in initial and further agricultural training and the existing teaching material was undertaken in an intensive exchange of information with vocational school teachers. Discussion was also given to the possibility of closer integration of this complex of topics in teaching. In the course of field inspections and specialist events (e.g. crop protection days, see summary below), agricultural apprentices as budding farmers were informed about the objectives and significance of WAgriCo. Discussions were held with the apprentices about ways and means of groundwater-conserving farming, and they were given extensive information material.

Date	Topic	Participants
02.03.06	Teaching material	Vocational school teachers, LWK
21.04.06	Crop protection day & WAgriCo, Gross Lessen	Apprentices, LWK
27.04.06	Water conservation day, pilot area Grosse Aue	Apprentices, LWK
03.05.06	Crop protection day & WAgriCo, Wietzen	Apprentices, LWK
29.06.06	Nitrate input risks and fertilizer strategies	Tech. coll. students, LWK, LBEG

This has yet to be undertaken by the UK Steering Group but a discussion with the Local Farmers Group and the Local Stakeholders Group will take place in November as it is considered the farmers are key to identifying training needs. The training could be shared with the other agencies who are working in the catchments especially the Frome. This would ensure that there is participation by both farmers and other agricultural advisors thereby engagement in the participation process.

5.7 Implementation of secondary measures

In Lower Saxony a procedural concept for making use of relevant third-party planning projects for the water conservation field was developed, and overview lists were produced of potentially useful plans and protection objectives. An initial analysis of areas with other protection objectives that were also capable of being turned to account for water conservation under the Water Framework Directive (nature conservation areas, landscape reserves, water conservation areas etc.) was made for the three pilot areas in Lower Saxony and is shown in first planning maps (Annex 21-LS). The

analyses were made in close cooperation between the Chambers of Agriculture (LWK) and the Water Resources and Nature Conservation divisions of NLWKN and the Lower Saxony Agency for Mining, Energy and Geology (LBEG).

For all three pilot areas a start was made on compiling a list of measures that are designed or being implemented to fulfil a specific protective purpose within the conservation areas. An extensive exchange of data and experiences took place to this end, especially between the Chambers of Agriculture and the Nature Conservation division of NLWKN. The planning maps provide an important basis for discussion, e.g. for the planned integration of the planning institutions (rural districts).

In the interests of timely and continuous exchange and, where appropriate, coordination with state-wide specialist bodies, a presentation is planned of the results to date with regard to the project focus “Synergies with the relevant bodies for the implementation of the Water Framework Directive”. After this, the rural districts will be involved.

In the Frome and Piddle catchments, in the UK, there are other agencies looking at other aspects of diffuse pollution and these are primarily related to surface water in particular sedimentation of the river beds. The UK Steering Group has been in discussion with the Defra CSF Officer who has agreed to share the knowledge gained from this Defra initiative. The Farming and Wildlife Advisory Group (FWAG) are currently commissioned by the riparian owners to engage with farmer to help address the sedimentation issues. The Steering Group has a working relationship with FWAG. These relationships will be extended through the local working groups. There is also an interest group in the Wey catchment concerned with the sedimentation of a Site of Special Scientific Interest this site being managed by the Royal Society for the Protection of Birds (RSPB).

Continued work within ADAS on other related projects will allow further investigation and improvement on work carried out within the Wagrico project. For example, the development of nutrient trading schemes to reduce diffuse pollution is being investigated by as a policy option. This information will feed directly into the WAgriCo project.

5.8 Agro-economic analysis

In Lower Saxony uniform bonuses for all three pilot areas have been laid down for the five action-orientated measures offered from autumn 2006 onwards (H1-H5, cf. Annex 13-LS). A consensus was reached although similar measures offered in the individual water conservation areas within the pilot areas display a variety of bonus levels and management conditions, and although there are in some respects considerable differences in the production structure of the three pilot areas. One reason why this was possible was that expenditure-related compensation is paid for the selected measures. In the case of catch cropping, for example, such expenditure includes seed costs, soil cultivation and sowing costs, which – unlike measures with a direct impact on yield – show only minor variations from farm to farm. The sixth measure, “limited period for the application of organic manure” (H6, cf. Annex 13-LS) is offered either as an action-orientated measure or in combination with result-orientated rewards, since the costs of this measure are considerably influenced by production alignment and intensity.

For this reason consideration was given to putting it out to tender in combination with the result-orientated approach. The farms were to be able to offer a nitrogen input reduction of a freely chosen size in return for a payment they specified themselves. However, it was not possible to put this

approach into practice at the present stage in the project. Farmers who take part in the result-orientated reward scheme are now to receive a fixed amount per kg of nitrogen reduction. Improvements in fertilization efficiency will be rewarded, but no reward will be given for structure-induced changes (increase/decrease in livestock numbers, increase/decrease in land areas). Similarly, no investment assistance in connection with environmentally friendly technologies will be given under the project.

Annex 22-LS gives an overview of payment calculation methods for agro-environmental measures and also the potentials, the flaccidities and options of advancement.

In the UK the farmers will be required to enter into an Agreement with UKWIR for any funding awarded for implementing a mitigation method (Annex 18-UK). The works to be agreed with the farmer will form part of Programme of Measures funding application (Annex 23-UK) to ensure consideration has been given to the methods available. As part of the Agreement the farmer must in return provide real time costs of the impact of the measure to ensure a true agro-economic assessment to be made. This approach shall be undertaken for both action and result-orientated mitigation methods. It is important that the economic effects on individual farm businesses in the WAgriCo catchments are taken into account, this is vital for good farmer relations.

At the moment no agro-economic analysis has been undertaken. However, it can be demonstrated that through the use of the DWPA Handbook farmer costs are being considered at this time. Further more, under the CSF initiative the costings of various combinations of mitigation methods are being considered. This work will eventually inform further agro-economic analysis undertaken in this project at farm, catchment and national levels.

5.9 Examination of the results of the programme of measures

The results of the measures to reduce the use-related pollution pressure are to be shown in terms of emission reductions that are – as far as possible – quantifiable. In the selection of measures to date a distinction has been made between two impact categories (cf. Fig. 2), namely: a) measures that have a largely “ N_{\min} reducing impact in the autumn” (known as action-orientated measures), and b) measures with a more “N-excess reducing impact” (on the basis of result-orientated rewards). The development of “action-orientated measures” (especially ground cover during the winter) has been completed, and a start has been made on communicating them on the model farms. The potential of these measures for reducing substance levels can be monitored to a considerable degree by means of the N_{\min} being analysed in autumn. Special attention has been paid to adequate reliability of the impact of the measures by defining farm management conditions. Moreover, the model farms are also offered measures to reduce N excesses in conjunction with the result-orientated approach.

The basic agreement signed with the model farms (Annex 18-LS) includes not only special advisory services by the Chambers of Agriculture (analysis of weaknesses, calculation of multi-year farm-gate balances, fertilizer planning) to improve farm-specific nutrient management, but also inputs by the farmer (e.g. provision of data for calculating such balances).

On the basis of the data supplied, a suitable measuring concept is being created that combines the requirements regarding transparency, information value, controllability and proximity to the environmental objective with good practicability. Target-orientated monitoring on the basis of farm-gate balances, supplemented by selected elements of field-stall balances, will therefore be a firm component of the practical test.

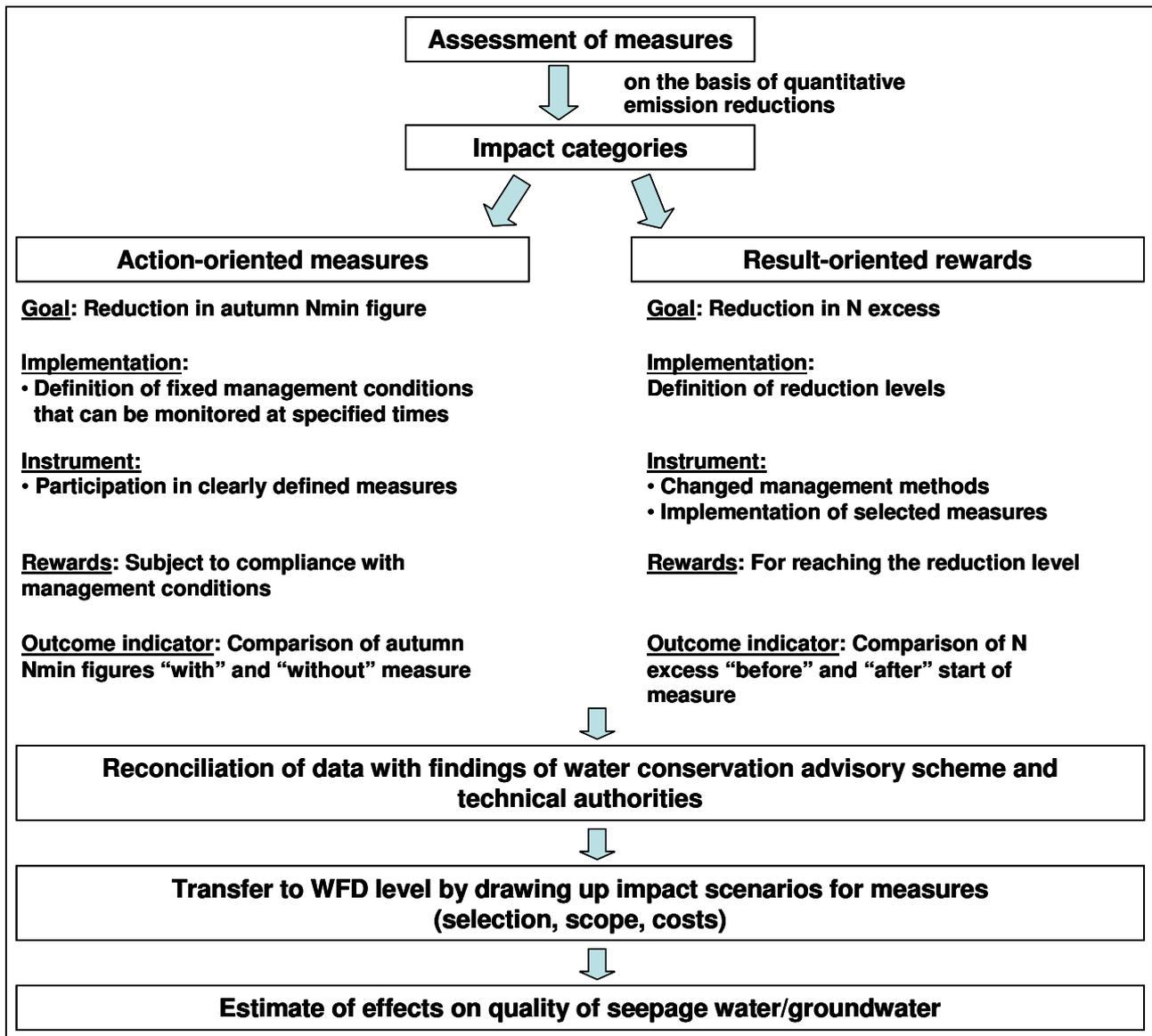


Fig. 2: Assessment scheme for action-orientated and result-orientated approaches

In the pilot area working groups and in the national steering group there is a large measure of agreement about the reduction potentials (nitrogen pollution causes) to be achieved by means of the existing measures and the forthcoming counselling. In the course of the further work on the project, it will be possible to apply the overall effect of the measures very well to the geographical level of the Water Framework Directive as a result of the coverage achieved. On this basis an estimate will be made of the scope of measures and the associated costs necessary to achieve cumulative effects for wide-area improvements in seepage water quality (as a precursor to groundwater).

The UK Steering Group considers it is unlikely that the monitoring network of soil and water measurements will be able to demonstrate changes in water quality during the life of the project. Therefore this data will be supplemented by the data collected on farm practices at the start of the project (‘baseline data’) and then again at the end of the project. Along with modelling and N

budget calculations this will allow the evaluation of the likely impacts of changes in farm practices on predicted changes in diffuse pollution.

In order to fully evaluate the success of the Programme of Measures a PhD student has been employed and will start in October. The aim of the PhD project is *'to compare and contrast selected monitoring methods (water quality measurement, farmer activity and modelling) in assessing the effectiveness of catchment management to control diffuse water pollution at several spatial scales (field, farm and catchment)'*.

5.10 Integration of programmes of measures under the EC Water Framework Directive in state agro-environmental programmes

One important objective of the project is to reach agreement with the agricultural and environmental authorities on measures for integration in state agro-environmental programmes, and to support implementation in EU assistance programmes (e.g. EPLR).

As a first step towards this objective, the relevant authorities/ministries are being involved in the process of developing measures and assessing them on the basis of the environmental impact and cost of the measures, in order to achieve close consultation with the potential decision makers at this early stage in the project.

In Lower Saxony the Lower Saxony Ministry for Environment (MU) and the Lower Saxony Ministry of Agriculture (ML) are guests in the national steering group in which agreement is reached on all relevant steps for the progress of the project, including for example the selection of those measures which are to be offered in the pilot areas in autumn 2006. At various specialist events, staff members from the MU and ML have moreover indicated opportunities for and ways and means of integrating Water Framework Directive measures in agro-environmental programmes. Current individual results of the project have already been taken into account in draft planning of the rural development programme for the assistance period 2007-2013.

In the UK this will be undertaken in cooperation with Defra building upon the knowledge gained on the identified mitigation methods and the agro-economic assessment. It will also build upon the knowledge obtained from the Defra CSF initiative.

5.11 Demonstration of the added value created by WAgriCo

Local and regional: In each Lower Saxonian pilot area a member of the staff of NLWKN is responsible for local dissemination plans. In terms of their composition, the pilot area working groups (AK) already have the status of a cooperation at the geographical level of the working area/groundwater body; they meet as necessary. There are also working parties (AG) that draw up a regional basis for individual topics. Notice-board announcements and newspaper articles were placed in an effort to recruit participating farms. As a result, the majority of farmers in the pilot areas have been informed about the project.

In the UK the 2 different approaches made by ADAS and WW have both ensured engagement by the farmers in the 6 sub-areas. This is recognised by the base data information being collected. Therefore the farmers are engaging with the project. Further a small group of farmers attended the Local/National launch which helped to stimulate interest. It is proposed to build on the current level of engagement through the local working groups. Preliminary discussions have taken place on whether there should be a local/regional seminar to disseminate knowledge gained and to share experience but no conclusion has yet been reached and will be referred to the working groups.

Supra-regional: At its Wehnen experimental farm the Lower Saxony Chamber of Agriculture organized a field inspection tour (07/2006) especially for farmers from the pilot areas and for agricultural advisors. A report on this is attached as Annex 24-LS.

National: The groundwater workshop in Hildesheim (10/2006) has ensured dissemination of the WAgriCo results to approx. 140 participants, almost all advisory institutions of the drinking water protection scheme in Lower Saxony and farmers from the three pilot areas, thereby achieving a multiplication of the information in these areas.

In the UK, the project is continuing to receive publicity. It has been widely disseminated through a number of platforms and consequently the government and other relative agencies are fully aware of the benefit of such a project. In particular a presentation was made in July 2006 at the CIWEM meeting entitled 'Progress with Catchment Management Integration and Delivery' at which ADAS presented a paper called 'Lessons Learnt from Catchment Projects'. The WAgriCo project was also referred to by the UKWIR's project Client Manager in his presentation. Other opportunities for national dissemination will continue to be used as they arise.

International: As part of the 2nd International Steering Group meeting held in Dorchester UK on the 20-22 September 2006 there were three farms in the pilot catchments. These were representative of the main types found in the catchment. These were attended by the Lower Saxony and UK partners and farmers from Lower Saxony and UK to promote intensive sharing of experiences between these farmers (Annex 24-LS). The UK partners will planning further walks and visits as the project progress and at suitable opportunities.

A list of all project events to date can be found in Annexes 2-LS and -UK.

6 Problems encountered

Two of the deliverables with end dates within the time period of this report are not yet finished. There is no risk to default on the whole project. The concerning concepts / deliverables will be available as defined below. The missing deliverables details are as follows:

- Deliverable 1.1: Report on partnership agreement
Date according to project application: 04/06
A report only exists for the Lower Saxony pilot areas (see Annex 4-LS). In the UK alliance between Agriculture and Water Resource Managers is a relatively new concept. In the first instance both WW and ADAS made preliminary approaches to the local farmers. This approach will now enable the establishment of Local Farmer Group(s) which being planned for November 2006. This is timed to coincide with the time farmers are most likely to be engaged as it follows on from the very harvest period. Following the first meetings there will be the report prepared.
- Deliverable 7.1: Procedures for cost predictions at the level of the individual farm, region, river basin area and state
Date according to project application: 09/06
The reason for the time displacement is a temporary elevated attention to the matter of measure planning and implementation. In Lower Saxony this was in order to use the cultivation time as from autumn 2006 both for measure implementation and for analyzing. The deliverable will be available by the end of this year.

In the UK this was impacted upon by the need to understand the current farm status to identify the measures which are now to be finalised with the farmers. However, the DWPA Handbook on farmer costs will be used as the base, cf. Chapter 5.8. Deliverable will be available by the end of March 2007.

7 Dissemination

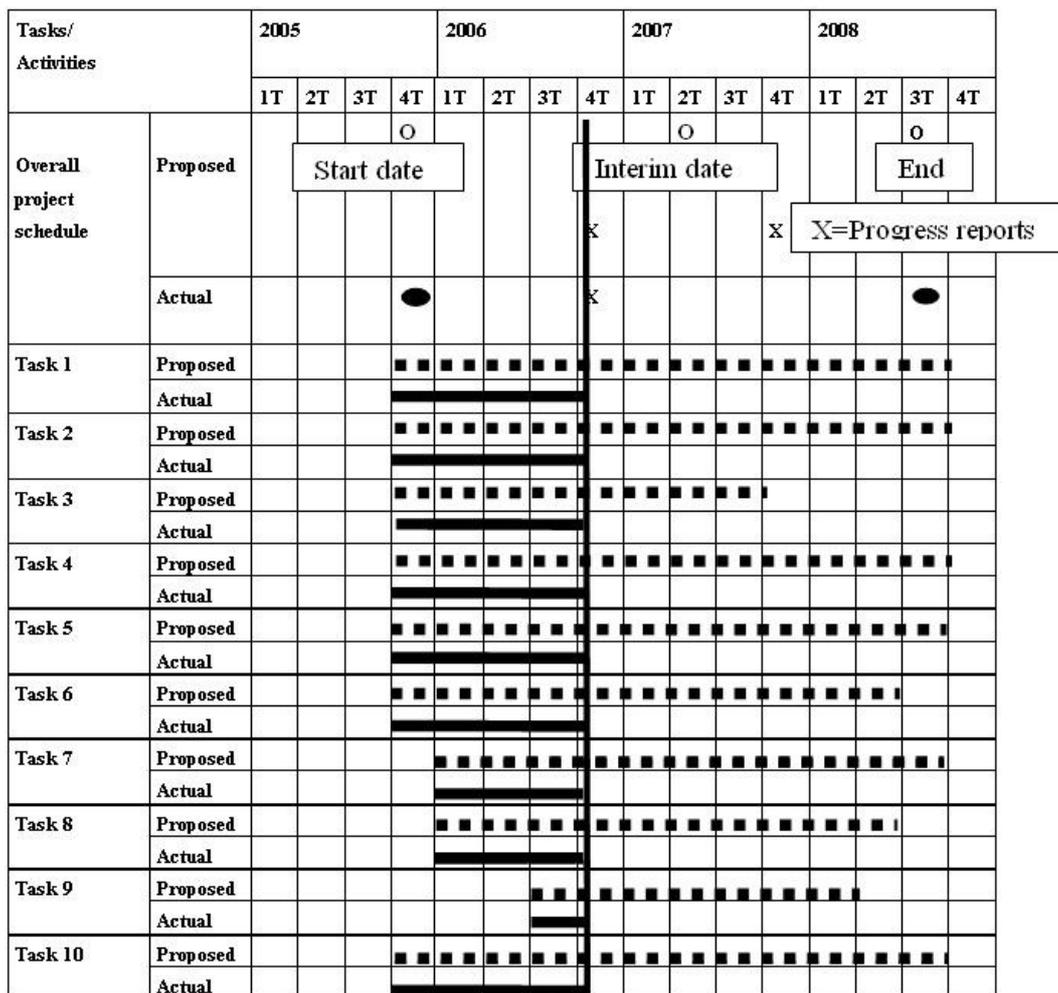
The public relations activities are set out in Chapter 5.3.

8 Envisioned progress up to 31.03.2007

The following is a brief summary of the forthcoming individual tasks:

- **Communication and dissemination strategy**
 - Further development of website
 - Planned publications: flyer, newsletter, various press articles
 - Establish Working Groups in the UK
- **Decide geographical priorities**
 - Guide to geographical prioritization
- **Implement measures at river basin, farm and field level**
 - Guide to environmental management in agriculture
 - Further development of list of measures (focus on result-orientation)
- **Perform assessment of measures**
 - Validate the agricultural data obtained
- **Water conservation topics in initial and further training**
 - Preparation of teaching and demonstration material
- **Use synergies with other protection objectives**
 - Update planning maps with common target areas
 - Involve relevant planning institutions (e.g. rural districts)
- **Macro-economic analysis**
 - Report on impact scenarios

9 Progress and planned activities (Gantt-chart)



10 Annexes

List of Annexes

Annex 1-UK	UK project Management Structure
Annex 2-LS	Overview of events
Annex 2-UK	List of Meetings
Annex 3-LS	Partner agreements
Annex 4-LS	Partnership arrangements [Deliverable 1.1]*
Annex 5-LS	Technical reports by pilot areas
Annex 5-UK	Diffuse Pollution Control in England
Annex 6-LS	Dissemination strategy [Deliverable 2.1]*
Annex 6-UK	Communication and Dissemination Strategy [Deliverable 2.1]*
Annex 7-LS	Public Relations activities [Deliverable 2.3 and 2.4]*
Annex 7-UK	Public Relations activities [Deliverable 2.3 and 2.4]*
Annex 8-LS	Guide to participation process [Deliverable 2.2]*
Annex 8-UK	Participation Process [Deliverable 2.2]*
Annex 9-LS	List of working group (AK) participants
Annex 10-LS	Target areas for water conservation (primary measures) [Deliverable 3.1]*
Annex 11-LS/UK	Water conservation measures toolbox [Deliverable 4.1]*
Annex 12-LS	Catalogue of preselected measures
Annex 13-LS	List of measures Autumn 2006
Annex 14-UK	Farm Work Plan for the on-farm component of WagriCo
Annex 15-UK	Assessment of Farm Pollution Risk and Opportunities for Mitigation Methods
Annex 16-UK	Programme of Measures – Mitigation Methods – Suggested Approach
Annex 17-LS	Map of the target areas where the measures are implemented
Annex 18-LS	Basic Agreement
Annex 18-UK	Draft UKWIR / Farmers Agreement
Annex 19-LS	Measures Agreement
Annex 20-UK	Monitoring Measurement Network
Annex 21-LS	Planning maps for secondary measures
Annex 22-LS	Payment calculation methods for agro-environmental measures
Annex 23-UK	Programme of Measures Funding Form
Annex 24-LS	Report on reciprocal visits by farmers [Deliverable 10.5]*

* in accordance with project application, form T1