# Procedure for defining target settings/target areas









#### Overview of the WAgriCo key messages:

- Procedure for defining target settings/ target areas\*
- Planning and implementation of measures
- Synergies
- Results assessment/impact monitoring
- Environmental objective and reduction requirements
- Ecological and economic evaluation
- Implementation in assistance programmes (e.g. agro-environmental measures)
- Transferability to other (EU) countries
- Consultancy service
- Statements of the farmers

See also WAgriCo Final Report Chapter 7.3 at www.wagrico.de

#### **Importance**

- Targeted use of resources for water conservation measures
- The target settings form the spatial frame of reference for defining environmental objectives and action targets

#### **Procedure**

- Initial data: Nutrient concentration at groundwater measuring points, groundwater body areas or hydro-geologically delimited sub-areas, river catchment areas, management, nitrate degradation capacity on the basis of the soil overview map 1:50.000, direct discharge (target area: surface waters) and groundwater recharge (target area: groundwater) as share of total discharge
- Designation of areas eligible for assistance (for example see figure 1 overleaf):
  - 1. All field blocks located within the target setting
  - 2. Possibly set a limit (farms with relevant proportion of assigned field blocks)
  - 3. Possibly implement measures outside the target setting, but provide assistance corresponding only to the extent of farm areas within the target setting.
- State-wide designation of target settings for groundwater conservation or for reducing nutrient loads in surface waters on the basis of groundwater bodies (or sub-areas) or catchment areas. In the event of limited financial resources: further restriction of target setting on basis of farm management, pedological and hydrogeological information (combination of different sensitivity maps, overlay method, see figure 2 overleaf).
- Creation of maps of target areas for voluntary water protection measures
- The delineation of target areas is principally based on the actually measured nutrient impact in the groundwater. This is important for the implementation of voluntary measures, but especially when administrative measures are considered to be implemented.

#### **WAgriCo recommends**

- Easily identifiable and clearly designated target settings
- Clear definition of farms entitled to take part in the measures
- Determination of target settings in accordance with defined assessment procedures having regard to the farm as a whole



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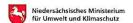




























Figure 1: Designation of areas eligible for assistance (WAgriCo recommendation)

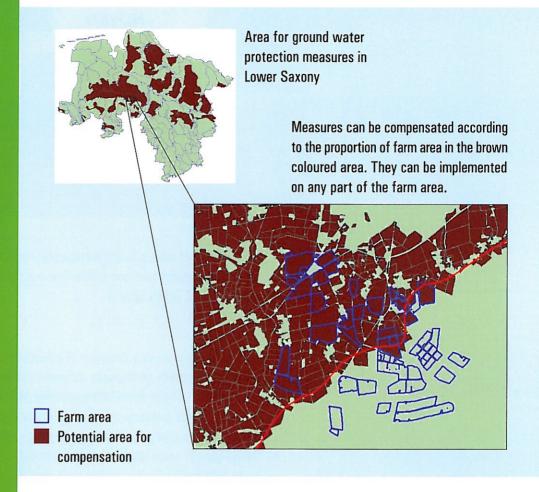
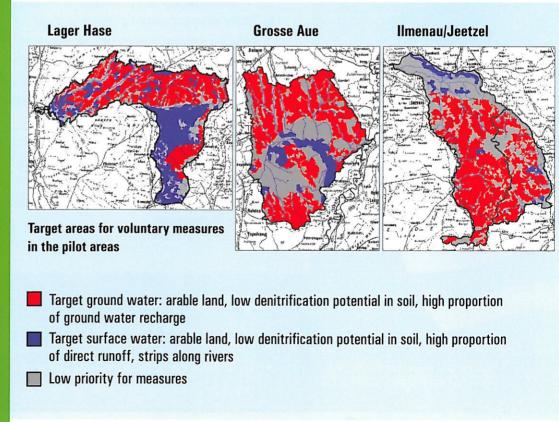


Figure 2: Target areas in the WAgriCo project as a result of the combination of different sensitivity maps



# Planning and implementation of measures









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- See also WAgriCo Final Report Chapter 7.4 and 7.5 at www.wagrico.de

#### **Importance**

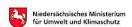
- Optimised planning and implementation of measures is the basis for cost-effective achievement of the WFD objectives
- Provision of a list of (environmentally, economically) efficient water conservation measures that are suitable for programs and meet with the maximum possible acceptance

#### **Procedure**

- Making use of existing experience (research findings, existing programmes of
  measures, findings from participation processes involving affected parties) in all
  planning steps; in this case: experience gained from water conservation scheme
  in Lower Saxony and the Voluntary Initiative on Pesticides (programme for reducing
  pesticide inputs) in the United Kingdom, intensive participation process within
  WAgriCo
- Defining indicators for estimating the efficiency of measures; in this case: net farm nitrogen balances and mineralised nitrogen content in soil (autumn SMN)
- Determination of ecological efficacy of individual measures, taking account of the feasibility of checking this measures and its expected acceptance
- Create programme of measures from prioritised list of measures and further important building blocks e.g. accompanying consultancy service, data requirements for control and monitoring purposes
- Determination of necessary resources (personnel, financial)
- Formulation of further opportunities for optimisation; in this case: further development
  of result-oriented rewards to improve nitrogen efficiency, and accompanying
  consultancy service in different intensities
- Taking account of changes in framework conditions: e.g. dynamic rewards system
- Use of initial and further training as basic measure

#### **WAgriCo** recommends

- Offering simple and flexible measures under voluntary schemes (no compulsary measures)
- Programme of measures with efficient groundwater conservation measures
- Use consultancy service, impact monitoring as well as efficient planning and implementation of measures to facilitate reduction in nutrient inputs

















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## **Synergies**









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See also WAgriCo Final Report Chapter 7.6 at www.wagrico.de

#### **Importance**

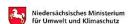
- As active support for achieving the objectives of the EC WFD it makes sense for different planning bodies and land users to work closely together to permit targeted exploitation of potential synergies in the interests of water conservation.
- How is it possible to achieve simultaneous positive environmental impacts for different protection goals if the resources are limited?
- Different actors in the field pursue their own different aims. Given appropriate coordination these could have distinct additional benefits, including with regard to water conservation.
- In a dialogue with actors involved at regional level it is possible to identify target areas for efficient measures from agro-environmental programmes and for use of synergies with other conservation programmes in target settings in accordance with the EC WFD.

#### **Procedure**

- Research into conservation and planning projects in existing conservation and assistance programmes (e.g. nature and landscape conservation, river protection programme) or land consolidation procedures
- Identifying similarities of different objectives with regard to common benefits
- Graphic representation of target areas of the actors involved. Combining individual target areas by means of geographical information systems to produce an overview map showing "synergy areas" where measures are particularly efficient (overlay method).
- Evaluation of results and coordination with planning bodies and authorities.
- Bringing together activities of other regional planning bodies to establish and maintain multilateral cooperation arrangements.

#### **WAgriCo recommends**

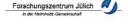
- Using synergies with other conservation and planning programmes for exploiting positive ecological and economical impacts
- Production of target settings maps for all planning bodies and discussion in local or regional panels
- Establishing multilateral cooperations with planners, stakeholders and local authorities





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# Results assessment/ impact monitoring









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See also WAgriCo Final Report Chapter 7.8 at www.wagrico.de

#### **Importance**

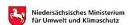
Crucial component for assessing potential state-wide emission reductions: What improvements are achieved with regard to diffuse nitrate inputs into groundwater and surface waters, and what is paid for by national authorities and the EU (cost effectiveness)?

#### **Procedure**

- The so called zone model is basis for a state-wide monitoring concept (see figure 1 overleaf)
- Spatial breakdown: Local (farm), regional (water conservation area, parts of groundwater body area, groundwater body), and entire state (see figure 2 overleaf)
- Local: Monitoring is performed on the basis of farm-specific nitrogen balances, based
  on a two-stage farm measuring network in which on the one hand ways of improving
  nitrogen efficiency are to be developed with individual model farms. On the other hand
  changes in nitrogen excesses over time will be registered on the basis of all participating
  farms
- Regional: Substance-based analytical methods in water conservation areas (autumn SMN, nitrate depth profiles). Effects of measures at groundwater body and sub-area level are assessed by scaling up effects at field and farm level by means of data on crop areas and livestock numbers, area covered by measures, and model-based calculation of reduction in nitrogen emissions from the soil.
- State level: Current situation regarding nitrogen emissions (as reference without measures and as change over time) is quantified by state-wide nitrogen balances and calculation of nitrogen emissions.
- Impact monitoring is performed as a combination of local, regional and state-wide levels.
- Ongoing coordination of impact monitoring with current planning and implementation of measures.

#### **WAgriCo recommends**

- Impact monitoring based on analytical methods and modelling at various levels as a precondition for measuring the emission reduction
- Show impacts of measures by means of accompanying monitoring concepts at different spatial levels





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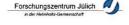






















Figure 1: Zone model (NLÖ 2001: Anwenderhandbuch für die **Zusatzberatung Wasserschutz**)

Zone model	Monitoring method	Time scale	Category of method	Result	Unit
Farm/soil surface	Nutrient balancing	1-year	calculation	N-surplus	kg N/ha
Root zone	Autumn soil mineral N (SMN) value	1-year	Chemical analysis (indirect)	Autumn-SMN- value x soil depth = load	kg N/ha
Percolation zone	Vertical nitrate profile (leachate quality)	1-year multi year	Chemical analysis (direct)	Leachate concentration x percolation rate = emission load leachate conc. = immission cons.	kg N/ha mg/l
Upper ground water zone	GW-Sampling (ground water quality)	multi year	Chemical analysis (direct)	Immission concentration	mg/l

Figure 2: Spatial breakdown of monitoring concept

Level	Method	Starting point	Effect
Local contributing farms	N-balancing on farm level	N-surplus (3-year mean) at the start of advisory/measure implentation	N-surplus (3-year mean) during of advisory/measure implementation
Regional A: water protection areas	Autumn soil mineral N (SMN) samples Vertical nitrate profiles	Fields without measures	Fields with measures
Regional B: sub-areas of ground water bodies (GWB)	Combination of measure effect (farms, water, protection area) with emission model	Nitrate leaching on sub- area level (according to emission model)	Nitrate leaching on sub- area level after implementation (emission model + effect x transfer function)
Regional C: GWB	Proportion of polluted areas	Status of GWB without measures in polluted sub-areas	Status of GWB with measures in polluted sub-areas
State wide (surveillance- monitoring)	Emission model (N-balance - GROWA-DENUZ), sampling on soil moni- toring sites (validation)	Basic N-surplus monitoring (actual agricultural statistics)	Repetition of basic N- surplus monitoring (recurring agricultural statistics)

GW groundwater N nitrogen GWB groundwater body

GROWA water balance model DENUZ model for estimating the denitrification

# Environmental objective and reduction requirements









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See also WAgriCo Final Report Chapter 7.3 and 7.8 at www.wagrico.de

#### **Importance**

- The Groundwater Daughter Directive of the EC WFD specifies a threshold of 50 mg nitrate per litre for groundwater.
- Probably 50 60% of the groundwater bodies in Lower Saxony do not satisfy the Groundwater Daughter Directive's requirements for good chemical status.
- The problem of nitrate inputs into groundwater is one of the major management issues in Lower Saxony.
- Targeted application of resources for measures and optimised selection of measures call for identification of area-specific reduction requirements for nitrate inputs.
- Groundwater pollution can only be reduced on a long-term basis. Short-term evidence of improvements or trend reversal will have to be provided by other indicators.

#### **Procedure**

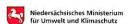
- Target setting: Polluted areas within groundwater bodies with poor chemical status.
- Definition of a regional environmental objective: The mean nitrate concentration in seepage water for the individual setting (polluted area) is defined as the indicator of achievement of the environmental objective. This takes account of dilution areas with low pollution potential, e.g. forest.
- Definition of the limit value for the indicator "mean seepage water concentration":
   50 mg nitrate per litre.
- Calculation of maximum permissible nitrate excesses that still allow the environmental objective to be achieved.
- Determination of reduction requirement for agricultural nitrogen excesses by comparison with the current situation, as a mean value for each measures area.
- Distinction between reduction requirement and attainable objective for the programmes of measures.

#### WAgriCo recommends

- Translate the environmental objective into a specific reduction requirement for the individual measures areas
- Indication of the nitrate reduction requirement and the effort necessary to achieve the environmental objective of 50 mg nitrate per litre in the groundwater



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## **Ecological and economic evaluation**









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See also WAgriCo Final Report Chapter 7.7 and 7.9 at www.wagrico.de

#### **Importance**

- Determination of costs and environmental impacts of measures to reduce inputs of agricultural nitrate into groundwater
- Potential for nitrogen reduction through individual measures and combinations of measures
- Preparation of a catalogue of (environmentally, economically) efficient and programmable water conservation measures

#### **Procedure**

- For voluntary measures, determine the ecological impact and the compensation necessary for implementation by farms.
- On the basis of experience gained during the former implementation of measures to reduce nutrient inputs (programme for water protection areas in Lower Saxony) surveys of transaction costs (administration, consultancy service, monitoring) and acceptance are made.
- Calculate various scenarios to estimate nitrogen reduction potential: present
  pollution situation and possible future changes resulting from European agricultural
  policy, development of the agricultural market, implementation of fundamental
  measures such as the Nitrate Directive and implementation of supplementary
  voluntary water conservation measures.
- The total costs are optimised on a regional basis: What combination of voluntary measures offers the best prospects for specific regions having regard to costeffectiveness and the possible area covered by the measures?
- With the participation of practising farmers, administrative authorities and scientific
  institutes, develop a proposal for a national programme of measures that is to be
  continuously adapted to changing framework conditions (e.g. dynamic compensation
  to take account of changes in product and input prices).

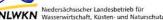
#### **WAgriCo recommends**

- Use of ecological and economic evaluation to select cost-effective water conservation measures
- Simulation of different scenarios to show the expected absolute effects
- Synergies, e.g. with climate change mitigation and biodiversity conservation, should to be taken into account in decision processes.





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# Implementation in assistance programmes (e.g. agri-environmental measures)









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See also WAgriCo Final Report Chapter 7.9 at www.wagrico.de

#### **Importance**

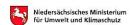
- Achieving the EC WFD objectives with regard to nutrient inputs from the agricultural sector requires effective cooperation between environmental and agricultural policy ranging up to joint assistance programmes.
- When linking assistance instruments, it is necessary to take account of the technical, administrative, financial and organisational situation and possibilities.

#### **Procedure**

- Ongoing process-related consultation with the ministries (environment and agriculture)
   on EU-compliant design of assistance programmes
- Feedback from grass-roots farmer level on existing assistance programmes and on acceptance-boosting design of future programmes
- Preparation of a catalogue of measures in cooperation with technical bodies and grass-roots farmers
- Involvement of EC WFD relevant bodies (e.g. land users) in preparation of catalogue of measures
- Acceptance-boosting design of assistance programmes (voluntary character, flexibility, administrative simplification)
- Development of a programme of measures having regard to accompanying advice and impact monitoring at various spatial levels
- Estimate of environmental impact and resources required for agri-environmental programmes

#### **WAgriCo recommends**

- Cooperation between ministries for environment and agriculture to encourage the implementation of agri-environmental measures for water conservation purposes
- Involvement of EC WFD-relevant bodies and representatives of the landusers to develop catalogues of measures
- Integration of water conservation measures with high acceptance and cost-efficiency, which are easy to implement, into agri-environmental programmes





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# Transferability to other (EU) countries









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See also WAgriCo Final Report Chapter 7.10, 8, and 10 at www.wagrico.de

#### **Importance**

Provision of transferable recommendations for the implementation of the EC WFD

- early involvement of all parties concerned as an important building block for achieving the WFD objectives
- active information of the public and political decision makers at state, national and EU level
- consideration of existing framework conditions

#### **Procedure**

- Public involvement to create transparency and maximum possible acceptance
- Provision of a guideline to establish the participation process
- Establishment of regional participation structures on different levels, e. g. river basins, groundwater bodies or hydrogeological subunits
- Use of the entire spectrum of media to inform the relevant authorities, the stakeholders and the public
- Exchange with other EU member states at international workshops
- Presentation of project results and methodologies developed at international conferences and events

#### WAgriCo recommends

- · Early involvement of stakeholders and decision makers
- Establish participation structures with all parties concerned (e.g. farmers, other stakeholder groups) at local level accompanied by a strong cooperation between agriculture and water management
- Transferability of methods, guidelines and strategies to other (EU) countries through information and exchange with decision makers, relevant authorities, stakeholders and local actors





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## **Consultancy service**









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See also WAgriCo Final Report Chapter 7.5 and 7.9 at www.wagrico.de

#### Introduction and background

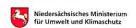
2010 will see the start of work on implementing water conservation measures in those target areas which according to the assessment do not currently meet the quality objectives of the European Water Framework Directive (EC WFD). This statewide implementation of measures seeks to achieve a reduction in diffuse inputs into groundwater and surface waters from the agricultural sector. In the interests of targeted action, consultancy service for farmers and land managers have a crucial role to play here.

#### **Importance**

- Consultancy service raises awareness of water conservation issues among farmers and land users and lays the foundations for the acceptance necessary for the implementation of water conservation measures.
- Years of experience, e.g. from the Lower Saxony cooperation programme on drinking water protection, show that consultancy service is indispensable as a measure in its own right in the interests of targeted and efficient water conservation.
- Targeted consultancy service promotes optimisation of farm-level nutrient and fertiliser management in the interests of water conservation.
- Technical backup for implementation of measures in future target areas of the EC
   WFD ensures optimal placement of measures on farmland areas.
- By means of targeted impact monitoring at farm level in accordance with agreed standards, e.g. preparation of nitrogen balances or determination of residual soil nitrogen, consultancy service identifies the results of implementing the measures, and also opportunities for improvement.

#### **WAgriCo recommends**

- Consultancy service as a important component for targeted and efficient planning and implementation of measures to reduce diffuse inputs in the EC WFD target areas
- Ongoing impact monitoring by consultancy service at farm level to identify the results of implementing the measures and also scope for improvement in the field of nutrient management





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### Statements of the farmers









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#### **Importance**

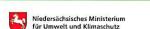
One important precondition for successful implementation of agricultural measures aimed at water conservation is involvement of local farmers.

#### The main statements

- International EU partnerships provide farmers, scientists and representatives of public authorities an important opportunity for sharing experience gained during implementation of the EC WFD in other countries.
- Cooperation on an equal footing between farmers, authorities and research institutions must be intensified in future, as currently practised in WAgriCo.
- Local working groups of these participants provide opportunities for good cooperation.
   They enable typical regional demands to be incorporated in the planning of measures.
- Easily understood measures, unbureaucratic procedures and, in particular, consultancy services accompanying the measures guarantee practice-oriented implementation.
- Payments for the implementation of measures are not profit for the farmer, but compensation for the additional expenditure involved.
- Dynamic payments: Compensation payments should keep pace with the economic situation.
- Remove obstacles: Binding 5-year contracts are only acceptable given flexible handling of the individual measures.
- Only longer-running projects can yield meaningful results for changes in operating methods.

#### **WAgriCo recommends**

- Development of programmes of measures geared to practical needs.
- Intensified ongoing exchange of information between farmers, researchers and politicians
- Development of simple application forms and a simple processing procedure
- Binding 5-year contract for consultancy service, but not for individual measures





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