

# EVALUATION OF AGRI-ENVIRONMENTAL MEASURES

<b>EXECUTIVE SUMMARY</b>
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This evaluation, financed by the European Commission, was realised by Oréade-Brèche who is responsible for the content of the study which does not reflect the opinion of the European Commission.

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## **1 ORIGIN OF AGRI-ENVIRONMENTAL MEASURES (AEM) IN EUROPE**

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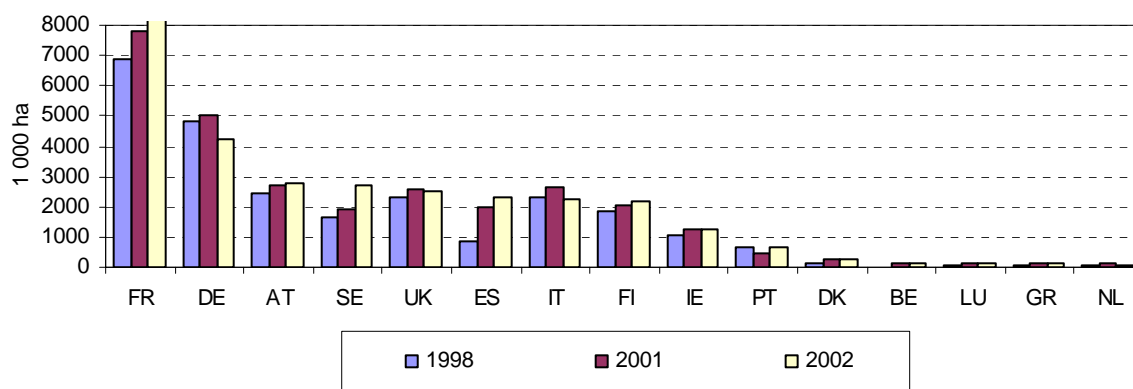
AEM are the result of more than 20 years of experience in Europe. Initiated in 1985 with the Council Regulation (EEC) No 797/85 and completed in 1991 by the Council Regulation (EEC) No 2328/91, the implementation was quite limited. AEM really started with the regulation No 2078/92 which enlarged and detailed the content. The implementation of AEM became compulsory for the Member States but remained optional for farmers.

In 1999 Council Regulation (CEE) No 1257/1999 confirmed "the essential role played by farmers as paid providers of environmental services that go beyond good farming practices and compliance with environmental legislation". Taking into account national specificities, the implementation of AEM was part of the Member States' responsibility and had to be included in the corresponding Rural Development Programmes (RDR). In accordance with national priorities, a great variety of measures were therefore implemented. In the last Council regulation on rural development (1698/2005), AEM remained compulsory for the Member States, which underlines their ongoing importance.

## 2 IMPLEMENTATION OF AEM

AEM have been implemented by two successive programmes resulting from the regulations 2078/92 and 1257/99. The breakdown of surface area in which AEM were implemented in the old MS is shown in the following graph:

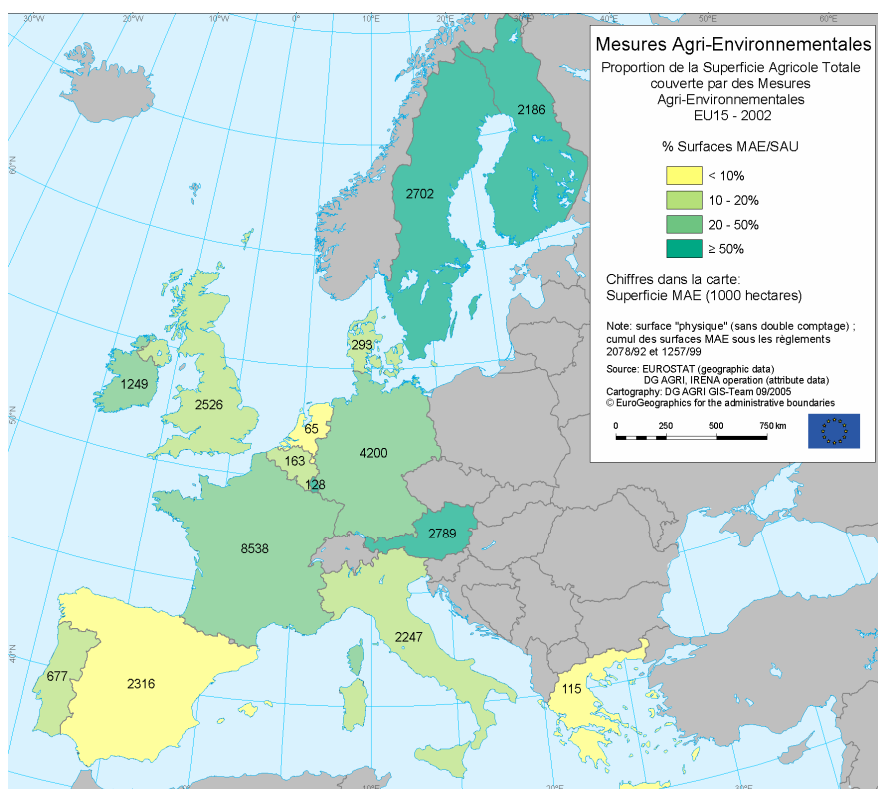
**Graph 1 : Breakdown of AEM uptake in surface area in the old MS from 1998 to 2002**



Source DG Agri

The AEM part of the UAA is shown in the following map:

**Map 1: Estimate of the part of the UAA in the EU 15 covered by AEM in 2002 (Regulations 2078/92 and 1257/99).**



Source DG Agri

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### 3 EVALUATION FRAME

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In 2004 DG Agriculture launched an evaluation of AEM implemented under Regulation 2078/92 and 1257/99, covering a period of more than ten years. The request included a representation of the AEM, inventory and typology, an analysis of the implementation and finally the evaluation including a definition of the intervention logic of the AEM and answers to 16 evaluation questions.

This evaluation has been carried out during a very short period of ten months. It was based on a series of interviews and on the collection of data at EC-level, the implementation of 15 national studies in the old MS (using an identical template), ten national studies at a more restricted level for the 10 new MS with a more prospective character, six case studies in six old MS in order to analyse in the field the effects of the AEM in six main environmental fields covered by the AEM, a scientific bibliography of more than 280 publications with regards to AEM or related practices, and finally the opinion of an AEM expert panel.

#### Environmental impacts of AEM-related practices

The effects resulting from AEM have been analysed using scientific publications. In order to correlate agricultural practices implemented by the farmers (e.g. grass strips, input reduction, fallow, direct seeding, etc.) and their effect on the environment (e.g. biodiversity, soil, water, landscape, etc.), we proposed a typology of practices simplifying the analysis of the link between AEM and their environmental effects. By examining several overlapping studies, we were able to obtain, if not formal proof, at least strong presumptions that a specific link exists between a certain practice and a certain environmental impact

**Table 1 : Synthesis of environmental impacts of AEM-related agricultural measures by type**

<b>AEM by type of practice</b>	<b>Most frequent environmental effects in scientific studies identified during the evaluation</b>
Reduction of agricultural inputs	Plant and animal diversity increased or maintained Reduction of phosphates and nitrates in the soil Improvement of water quality, but not always Reduction of nitrogen oxide and of greenhouse gas emissions into the atmosphere by reducing nitrate input
Reduction of the transfers of fertilizers and pesticides into the water	Clear effectiveness of grass strips on the transfers of nitrates and pesticides Clear effectiveness of catch crops on reducing nitrate leaching Clear effectiveness of grass and green fallow lands on reducing nitrate and pesticide leaching
Reduction of irrigated surfaces and irrigation amounts	Reduction of utilisation of water (but low implementation) Sometimes restoration of humid zones
Limitation of drainage, reconversion of drained regions or other cultural practices linked to quantitative water management	Effect on the balance of water quantity in the fields (but low implementation)
Control of soil erosion	Reduction of run-off and erosion with grass strips, cover crops, set-aside, reduced tillage without herbicide and arable reversion to grassland Limitation of sediment transfers to rivers and flood peaks due to small pond networks. Limitation of erosion by rehabilitation of terraces Reduction of erosion and increase of carbon in the soil by hedges
Maintenance of soil quality (preservation of soil organic matter content, control of acidification, salinisation, compaction, etc.)	Improvement of the soil structure and the organic matter content by grass fallow and plant cover. Improvement of the soil water reserves and fauna and flora activity by non ploughing of the land and the implantation of plant cover Improvement of soil compaction by non ploughing or reduced tillage
Creation or maintenance of ecological infrastructures with a habitat role (hedge, copse, small fields, grass strip/headland, etc.) or fallow field – set aside	Biologic diversity increased or maintained by creation or preservation of ecological infrastructures Creation of habitats for fauna and flora Reduction of run-off, erosion and input transfer Effect on diversification and landscape structuring

<b>AEM by type of practice</b>	<b>Most frequent environmental effects in scientific studies identified during the evaluation</b>
Conservation of rare high nature value farmland habitats and endangered species	Diversity of plant and rare animals increased or maintained Habitats mostly maintained
Preservation of endangered domesticated animals and cultivated plant varieties	Alert concerning problems of species conservation Stabilisation of endangered animal species, but not always Encouraging the preservation of endangered permanent crop species
Diversification of rotations, maintenance of grasslands, arable reversion to grassland and extensification	Plant and animal diversity increased or maintained particularly in prairies Creation and preservation of habitats Effectiveness of prairies on catching nitrates and against erosion Reduction of greenhouse gas emissions by reducing the animal load by ha Increase of diversity and quality of landscape
Continued farming in zones of agricultural decline (marginal zones, mountainous zones etc.)	Plant diversity sometimes improved Mostly preservation of habitats Restoration of landscape quality, diversity and opening
Other AEMs related to air quality, energy saving, control of fires in forests adjoining farmland, archaeology and historic environment and other issues	Effectiveness of AEM against fire not proven Increase of carbon stocking in the soil and limitation of GHG-emissions by reduced ploughing of the soil, fallowing and catch crops
Maintenance and preservation of agricultural landscapes	Effect on landscape diversification and structuring Preservation of cultural identity of rural landscapes Strong link of these measures with the preservation of the biodiversity and habitats
Cross-cutting programme including organic farming or Horizontal measures including organic farming	Plant and animal diversity mostly increased or maintained Increase of the diversity of habitats Reduction of the utilisation of input and therefore corresponding pollution Reduction of the utilisation of energy (by reducing the utilisation of fertilizers) and GHG-emissions

Source Oréade – Brèche

## **4 ENVIRONMENTAL EFFECTS OF THE IMPLEMENTATION OF AGRO-ENVIRONMENTAL PROGRAMMES**

As the monitoring system of AEM of the RDP, at a European level doesn't actually provide (at least for certain types of measures) elements that are sufficiently precise to evaluate the measures by type and corresponding environmental impact, we have therefore analysed AEM by creating a series of indicators for the evaluation.

In order to answer the evaluation questions relating to environmental effects, we have broken down each question into a series of criteria reviewing systematically:

- if the environmental stakes have been defined beforehand by the MS in their RDP and if national catalogues made AEM relating to this stake, available,
- if the measures have been implemented significantly at the UAA as a whole or at the zones with the corresponding environmental stake (e.g. biodiversity, water, soil, etc.)
- if the contract has led to a change of practices or to maintaining environmentally friendly practices that would have been abandoned without the AEM,
- if it was possible to verify if the implementation corresponded to the commitments.

### **Effects of Agro-environmental programmes on biodiversity and habitats**

Biodiversity is one of the areas for which all MS have fixed implicit or explicit objectives, some of them quantified. The catalogue of measures defined by the MS clearly reflects the attention that is paid to this issue.

Scientific studies point out the generally positive effects of the AEM on the preservation of the quality and the creation of habitats. Certain measures have a very positive effect, especially:

- *Reduction of inputs*: an inversely proportional effect between the input level and the diversity of the perennial species has been identified and, in a minor degree, effects on the abundance of populations and rare species.
- *Creation or preservation of ecologic infrastructures or fallow*: in particular grass strips, even more if they are located along fixed elements of the landscape (forests, waterways, etc.), have a positive effect, also hedges and field margins cultivated in an extensive way or sowed to promote biodiversity. Fallow is another biodiversity friendly practice.
- *Diversification of rotations, maintenance of grasslands, arable reversion to grassland and extensification*: grasslands constitute one of the most biodiversity friendly practices. The incorporation of grassland into rotations is also very favourable. Grazing, appropriate mowing dates (late mowing), centrifugal mowing, are fundamental management elements for the improvement of the functionality and diversity of the habitats of the grassland. Maintaining stubbles and growing winter crops on bare soil are positive for certain bird populations. Finally, non-ploughing has positive impacts on certain invertebrate populations, amongst others.
- *Organic agriculture* is favourable for biodiversity by increasing richness and abundance of species.

### **Effects of Agro-environmental programmes on endangered domestic breeds and cultivated species**

Except for Denmark and the UK, all MS have a preservation programme for local breeds. Concerning endangered plant species, only Denmark, the UK and Sweden have no programme. However the available measures have hardly been implemented. Scientific publications show a worrying situation in many countries, where measures have been insufficient in preventing the decline of the number of endangered breeds. Nevertheless, more encouraging studies in certain MS (e.g. Austria, Germany, Greece, etc.) show a significant effect of the AEP, stabilising or increasing the number of animal breeds.

### **Effects of Agro-environmental programmes on water quality**

Water quality is a priority in Finland, Sweden, Greece, Ireland, France and Denmark while all countries have defined zones for water quality. The AEM portfolio in this area varies a lot.

Scientific studies state an effective input reduction due to AE measures. If water quality measurements are carried out directly on the plots where AEM are implemented, they often show quicker and more concluding results than those done at water basin level, that include other plots, out of AEM. Studies confirm the favourable effects of the following measures:

- *Reduction of agricultural inputs measures*: measures have favourable effects, but not always, and rarely rapidly.
- *Transfer reduction of agricultural pollutants*: in particular, "grass strips" are really effective in catching fertilisers and pesticides, but also in their degradation. Fallow-lands can also act on nitrate (or other element) reduction when they are sown.
- *Diversification of rotations, maintenance of grasslands, arable reversion to grassland and extensification*: in particular the conversion of arable land into grassland has significant effects on nitrate reduction. Soil coverage in winter can also be a very effective nitrate catch crop.
- *Organic farming*: has an effect on water quality by reducing inputs.

### **Effects of Agro-environmental programmes on water resources (quantity)**

Only Spain, France and Portugal have defined quantitative water management as one of their main agri-environmental issues. This is nevertheless an area where much could be done, notably about overexploitation of water resources, in particular in Southern Europe. It should be noticed however, that AEP have in some cases obtained results in the reduction of water consumption and in recovering water tables, e.g. in Castilla la Mancha.

### **Effects of Agro-environmental programmes on soil preservation**

Soil quality and fight against erosion is a central element in most MS. In the southern countries it is rather directed towards protection against erosion while in the northern countries soil quality is predominant.

Main measures on soil protection are the reduction of inputs, followed by anti-erosion measures. Soil quality improvement measures (correction of organic matter rate, work against salinisation and compaction) remain very limited but do exist.

According to scientific studies, practices such as the conversion to grassland, set-aside (excepted bare fallow), grass strips, covering of soil during critical periods by vegetation or stubbles, terraces in the areas concerned by very steep slopes, are demonstrated to be highly effective against erosion. Reduced tillage is also effective against erosion, compared to conventional works. With regards to the preservation of soil quality, sown fallow, soil cover and ecological infrastructures (hedges and small plots), are considered to be practices which improve certain soil qualities.

### **Effects of Agro-environmental programmes on other resources**

About half of the countries have identified other environmental issues than biodiversity, water, soil and landscape within their AEP. These topics often concern air quality (Finland, France, Greece), protection against forest fires (France, Portugal, Spain), energy and waste (Finland), risks of flood and avalanches (France), historical heritage and rural archaeology (Ireland and the United Kingdom). There are only few measures linked to these topics and their implementation is very limited. According to scientific studies, AEM may also be of interest for the reduction of GHG emissions and for the energy sector in agriculture.

### **Effects of Agri-environmental programmes on landscape**

Landscape is being taken into account by a majority of the MS and is a major objective in: Finland, Ireland, Portugal and the UK. Many measures, not specifically dedicated to landscape, have an impact on it, as the landscape finally integrates most of the measures. Landscape related measures have significantly been implemented in most countries covering wide surfaces. Scientific publications confirm in particular the favourable effect of the following measures:

- *Creation or preservation of ecological infrastructures and set aside land*: in particular the maintenance or creation of hedges and copses which structure the landscape.
- *Diversification of rotations, maintenance of grasslands, arable reversion to grassland and extensification*: in particular conversion of arable land in grassland. Extensification has effects in certain zones by maintaining fixed landscape elements (e.g. isolated trees). Diversification of rotations has by its nature an effect on landscape.
- *Continued farming in zones of agricultural decline* (marginal zones, mountainous zones etc.): in particular, clearing and cleaning of encroached grasslands and wild lands are very beneficial practices for the landscape



- *Specific landscape measures*: such as the protection of walls, terraces, hedge networks, old vineyards and orchards, small buildings or by making the surroundings to farm building more attractive are significant measures to improve or maintain the landscape quality.

### **Other effects of Agri-environmental programmes**

Beyond the environmental effects, other effects have been obtained by AEP, in particular on the income and image of contracting farmers.

Studies and inquiries undertaken in the MS demonstrate clearly that AEM can be a source of income for farmers in return for environmental services. The studies demonstrate furthermore that the contracting farms are smaller, more extensive and more fragile than the average. In these situations, AEM can represent a significant part of the farm's receipts. The majority of these studies also show that it has been difficult everywhere to get the interest of the intensive farms for the AE.

The image of the farmers participating in AEM is little known or not known at all by the public and depends a lot on the image of agriculture itself in the country. Where investigations exist, they show however a strong support with regards to these subsidies for farmers, when they have clear environmental objectives. The public's lack of information about the programme and the participating farms should probably be corrected.

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## **5 QUALITY OF EXISTING AE PROGRAMMES AND POSSIBLE IMPROVEMENTS**

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### **Drafting AE diagnostics of the territories (regions or states), definition of priorities and conception of AEM catalogues**

For AEM, experience is an important factor for the success. A wider participation would make it possible to integrate more people in the definition of priorities, the programme or even the measures. As for example the calculation of premia has often been difficult, methodological recommendations could help the MS in this respect. A better adaptation of the programmes to the territories seems to be a necessary improvement, either at regional level or at farm level. This should not necessarily be done by a multiplication of the number of measures, but rather by offering more possibilities of adaptation.

### **Information, training and support for contracting farmers**

Information and training of farmers have been implemented everywhere, but with varying means. The information on programme and measure specifications discussed directly with the beneficiaries, are not only essential, but moreover certainly the best way to allow good implementation and development of AEM. This contact with the beneficiaries should not be limited to the moment of choosing the corresponding measures, but continue during the implementation (technical consulting, justification of measures, monitoring of the contracted plots, etc.).

### **Mechanisms for monitoring, evaluation and control of the implementation**

Some countries have developed complex monitoring systems (e.g. Finland, Sweden, UK) which include technical monitoring but also the evaluation of environmental effects and

specific research programmes. In the other countries, the monitoring systems are mainly focused on administrative monitoring and do not provide information about environmental effects.

The control reports could be a precious source of information to improve the programmes, even if this is not their original purpose, because the control is the only moment for the authorities to observe the reality in the field. The output from monitoring, evaluation and supervision has already been used by the MS for the review and implementation of their programmes.

### **Means allocated to AE programmes**

The funds allocated to AEM are mostly considered insufficient by the MS. With a better funding, AEP could be more ambitious, of better quality and wider implemented. The situation is, however, not uniform all over Europe. It seems that in some countries (Belgium, Ireland, Sweden), the lack of funds did not disadvantage the quality of the programmes while in other countries (Germany, France, Italy, United Kingdom, etc.) it seems to have been the case. However, even if real financing problems may have occurred, the slowness of their availability due to slow national procedures (France, Finland, Greece) has also lead to problems.

### **Payment level of every AEM and the link to the corresponding environmental objective**

Article 24 of the RDP (Regulation 1257/99) stipulates that the payments for the AE commitments are allocated annually and calculated on income foregone and additional costs resulting from the commitments. Though foreseen in the regulation, the calculation of payments linked to AEM actually rarely include the investments for certain AEM and do not cover financial risks encountered.

The payments do not necessarily correspond to the real costs and losses, mainly because the calculations are based on average farms. So, certain measures could be considered financially interesting for one farmer (costs being inferior to the average: generally extensive farms) when the same AEM is not for another farmer (costs being higher: generally intensive farms). Nevertheless, results from studies carried out in France and Greece show that an increase of the AEM payment by 20 % is not a deciding factor to increase contracting. In fact, factors such as the simplicity of the measures are more decisive for the farmers than the level of the subvention.

Amongst the possible improvements for the calculation model and payments, we propose:

- methodological assistance for the MS in calculating the income losses and additional costs. A certain standardization of the approaches would avoid significant differences between similar measures.
- the possibility to adapt payments to the specific case of each farm, which allows payments by environmental result as it is already the case in the Netherlands. However, this adaptation is not easy to carry out because it is not obvious how to establish the link between payment and environmental result. Therefore it should not try to replace the general system, already considered as complex, by another one too heavy to handle.

### **Synthesis concerning the quality of AE programmes**

The success of environmental programmes depends on a series of components. We consider the following major points as possible improvements of the current mechanism:

- elaboration of programmes and measures starting from a more participative process, defining quantitative implementation objectives and environmental results by topic,
- possibility of a certain flexibility in implementing AE measures by adapting to different national or regional contexts,
- significant development of: information, training, support for farmers, making available all information necessary for the understanding of the issue and decision making (including information about the results after the implementation of the AEM). This should also include public information about the mechanism which is today unappreciated and which does not valorise the participants.
- development of monitoring and evaluation procedures and tools that are less oriented towards implementation and more oriented towards impact, and adapted to the variety of issues concerned,
- elaboration of instructions for the authorities in order to assure that the controls remain rigorous, but become more flexible and didactical bearing in mind that the farmers are volunteers, the issues complex and that the environmental legislation which is the basis for the AEM, in permanent evolution.

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## **6 ELEMENTS OF THE CONTEXT THAT HAD EFFECTS ON THE EFFECTIVENESS OF THE AE PROGRAMME**

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Obviously, AEM have been elaborated within a context that has not been neutral with respect to their content and impacts. Some elements of this context have been identified as relevant.

- the attitude towards AE, which can be reserved or favourable. In recent years, more and more farmers have a positive attitude towards AEM.
- the knowledge of AE, which influenced the development of the programmes. The lessons learnt from the programme 2078/92 were very beneficial to the following AEP and the knowledge of AE tends to spread at all levels in the MS.
- Good Farming Practices (GFP) exists in all MS, but in many MS the farmers' knowledge about GFP and the link between GFP and AEM remains imperfect. More information should be provided to allow the rapid adaptation to environmental legislation.
- synergies between AEM and other instruments of the EU such as the Habitat-Directive of the Natura 2000 network, or certain subventions of the CAP.

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## **7 PERSPECTIVES**

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The implementation of AEM for more than ten years has resulted in positive effects on the environment. Nevertheless, there are some objectives which seem worth to be considered for the future in order to give AEM the importance they should have:

- the attractiveness of the measures for intensive farms must be improved, as they remain, at the present time, mostly outside the schemes, even though they are often the most problematical ones from an environmental point of view. As the contexts vary in the different MS, the solutions to this problem must be found at the individual level of each country.
- a significant increase of the territory covered by the AEM would be essential if the effects shall become visible at a higher level than at limited areas. A massive increase in the number of contracts should be aimed at obtaining the desired improvement effects on rural environment.
- even if many countries have already defined zones of priority by environmental field, for the implementation of the AEM, progress must still be made to focus the efforts on

environmentally sensitive areas, whereas this should not reduce the implementation of AEM in the whole agricultural area.