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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

Indicators for the Integration of Environmental Concerns into the Common Agricultural Policy

PREFACE

The European Council at Cardiff in June 1998 invited all relevant formations of the Council to establish their own strategies for giving effect to environmental integration and sustainable development within their respective policy areas. It invited among others the Agriculture Council to start this process.

The European Council in Vienna in December 1998 reaffirmed the commitment to integrate the environment and sustainable development into all Community policies. It requested the Commission to provide a co-ordinated report on indicators. The Agriculture Council was invited to continue its work with a view to submitting a comprehensive strategy, including a timetable for further measures and a set of indicators, to the Helsinki European Council. The Agricultural Council requested in July 1999 a report on agri-environmental indicators from the Commission.

As presented in COM(1999) 22 "Directions towards Sustainable Agriculture", the reforms undertaken as part of Agenda 2000 provide a powerful impetus for the integration of environmental concerns into agriculture policy. The Commission, Member States, local authorities and agricultural and rural communities now have a considerable range of instruments at their disposal to achieve sustainable agriculture.

Appropriately developed agri-environmental indicators will be particularly important in improving transparency, accountability and ensuring the success of monitoring, control and evaluation. This will contribute significantly to the effectiveness of policy implementation and will feed into Global Assessment processes.

However, if these indicators are to be meaningful, they must give a sufficiently accurate picture of the underlying processes and relationships that link human activities with the environment. This is particularly the case for agriculture where the relationship is highly complex and where farming itself involves a range of biophysical and site specific processes. An indicator framework for agricultural policy therefore needs to reflect the sector's specific characteristics.

At present, a partial set of indicators can be established to monitor the integration of environmental concerns into the CAP. This set will evolve as the indicators are improved and completed. They are mainly based on the indicator work developed within the OECD supported by work undertaken by Eurostat, the European Environment Agency, the Joint Research Centre and the ELISA research project. In principle, many of these indicators could be operational in the short to medium term, dependent on the adequate collection of data at a sub-national level. There are, however, areas such as farm management, habitat, landscapes and biodiversity for which the definition of operational indicators remains a major challenge.

A number of key actions need to be undertaken to ensure that the potential of indicators is fully exploited. These involve improving existing indicators as well as extending the set to fully cover sustainable development, improving information collection capacities, developing approaches to environmental efficiency and the classification of agri-ecosystems, developing methods to estimate the wider international impacts of the CAP as well as reinforcing communication on agri-environmental issues.

A priority over the coming years will be the further development, implementation and monitoring of the sectoral integration strategy developed by the Agricultural Council. A framework for further development is proposed.

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1. THE POLICY CONTEXT FOR AGRI-ENVIRONMENTAL INDICATORS

1.1. Environmental Integration

1.1.1. Treaty of Amsterdam

The Amsterdam Treaty reinforces sustainable development as an objective of the EU, while retaining the existing Treaty bases for environmental and agricultural policy. It highlights the need to integrate environmental protection requirements into the definition and implementation of all Community policies. Agriculture remains a Community policy where the instruments of the CAP are decided by the Council of Ministers. This enables environmental considerations to be developed, enacted and applied throughout the EU.

1.1.2. The mandate from Cardiff and Vienna

The European Council at Cardiff in June 1998 endorsed the principle that major policy proposals by the Commission should be accompanied by an appraisal of their environmental impact. It noted the Commission's efforts to integrate environmental concerns in all Community policies and the need to evaluate the level of integration in individual decisions, including AGENDA 2000. It invited all relevant formations of the Council to establish their own strategies for giving effect to environmental integration and sustainable development within their respective policy areas. It invited among others the Agriculture Council to start this process.

The European Council in Vienna in December 1998 reaffirmed the commitment to integrate the environment and sustainable development into all Community policies. It requested the Commission to provide a co-ordinated report on indicators. The Agriculture Council was invited to continue its work with a view to submitting a comprehensive strategy, including a timetable for further measures and a set of indicators, to the Helsinki European Council. The Agricultural Council requested in July 1999 a report on agri-environmental indicators from the Commission to support the preparations of the European Council.

1.1.3. Agricultural Council Integration Strategy

The Strategy adopted in November 1999 responds to the request of the Vienna Council to address the integration of environmental requirements into the Common Agricultural Policy (CAP) through the reforms under Agenda 2000. The measures set out encompass environmental requirements and incentives integrated into the market policy as well as targeted environmental measures forming part of the Rural Development Programmes. The Strategy sets objectives for water, agro-chemicals, land use and soil, climate change and air quality, as well as landscape and biodiversity. It is stressed that achieving sustainable agriculture will depend on the implementation of the available measures by Member States. The need for rigorous monitoring and evaluation of integration, based on meaningful environmental indicators is underlined.

1.2. Practical implementation of policies: Sound and Efficient Management

Over the past few years the Commission in partnership with Member States has sought to improve the implementation and control of EU programmes and expenditure. This has been undertaken in the context of the SEM 2000 initiative and has been an integral part of the reform proposals presented in the context of Agenda 2000. Reinforced control, monitoring and evaluation will accompany greater subsidiarity and decentralisation of responsibilities. Such improvements also reflect a need to improve the accountability of EU policies to the budgetary authority and to EU citizens and their representatives.

Agenda 2000 clarifies the respective roles of the Commission, Member States and other bodies in the implementation of Agricultural and Rural Development policies. A greater role is given to Member States to tailor policies to the needs of their agriculture and rural areas principally through Regulation (EC) No 1259/99 on the establishment of common rules for direct support schemes under the Common Agricultural Policy - and Regulation (EC) No 1257/99 on support for rural development. These two regulations, in particular, provide for reinforced monitoring and reporting requirements.

As regards evaluation, new conditions apply to CAP expenditure. Common rules applying to all direct payments have been laid down, including the evaluation of Common Market Organisations. The quantification of rural development programmes has been reinforced in order to ensure effective evaluation on an exante, mid-term and ex-post basis. An assessment of the environmental impact of these policies will form an important element of evaluation. The Commission will provide a Community level synthesis of both the mid-term and ex-post evaluations.

Appropriately developed agri-environmental indicators will be particularly important in improving transparency, accountability and ensuring the success of monitoring, control and evaluation. This will contribute significantly to the effectiveness of policy implementation and feed Global Assessment processes.

1.3. CAP Reform: Towards Sustainable Agriculture¹

1.3.1. The integration of environmental concerns and requirements into the CAP

1.3.1.1. The interaction between agriculture and the environment

Historically, agriculture has shaped many European landscapes over centuries. This has given rise to unique semi-natural environments with a rich variety of habitats and species dependent on the continuation of farming. However, as commercial activities, agriculture and forestry are aimed primarily at production and rely on the availability of natural resources. Increasingly, the development of commercial activities has brought new environmental pressures to bear on the natural capital stock. Technological progress and the desire to maximise returns and minimise costs have produced a marked intensification in agriculture over the last 40 years.

Intensification can lead to degradation of soil, water and air. During recent decades awareness has grown that differentiated landscapes and related biodiversity are also

[&]quot;Directions toward Sustainable Agriculture" COM(1999) 22.

threatened by the intensification of agriculture. On the other hand, they are also increasingly threatened by marginalisation and abandonment of agricultural land use due to economic forces. These differing challenges posed by intensification and abandonment of farming highlight the complexity of the relationship between agriculture and the environment.

1.3.1.2. Sustainable agriculture

The desired relationship between agriculture and environment can be captured by the term "sustainable agriculture". Sustainability is the key concept of the 5th Environmental Action Programme, which refers to sustainable development as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs". This entails preserving the overall balance and value of the natural capital stock and taking a long-term view of the real socio-economic costs and benefits of consumption and conservation.

At a first level, "sustainable agriculture" involves managing natural resources in a way which ensures that they are available in the future. This narrow definition of sustainability in many cases reflects the *economic* self-interest of farmers.

A broader understanding of sustainability extends, however, to a larger set of features linked to land and land use such as the protection of landscapes, habitats, and biodiversity, and to objectives such as the quality of drinking water and air. In this broader perspective, the use of land and natural resources for agricultural production must take account of the protection of the *environment* and cultural heritage.

Finally, sustainability needs also to reflect society's concerns as regards the *social* function of agriculture, the maintenance of the viability of rural communities and a balanced pattern of development.

Sustainable agriculture therefore needs to reflect productive, environmental and social functions. This document restricts itself, in line with the mandate from the Council, to the indicators necessary to assess the role of this environmental function within agriculture. Further work will need to be undertaken to provide a full set of indicators. This should be completed with the development of appropriate indicators to measure environmental efficiency.

1.3.1.3. Principles governing agri-environmental policies

It is the complexity of the relationship between agriculture and the environment – harmful and beneficial processes, diversity of local conditions and production systems – that has conditioned the approach to environmental integration in the context of the CAP. Central to understanding this relationship is the principle of "good farming practice", corresponding to the type of farming which a reasonable farmer would follow in the region concerned. On this basis:

 As a minimum, farmers should respect general requirements as regards environmental care without specific payment. This means that all farmers should follow compulsory laws in relation to pesticide use, to fertiliser application, water use and where appropriate, national or regional guidelines on good farming practice. However, wherever society asks farmers to pursue environmental objectives beyond good farming practice, and the farmer incurs a cost or foregoes income as a result, then society must expect to pay for that environmental service.

This approach is based on the Polluter-Pays-Principle. Accordingly, farmers bear compliance costs up to a reference level of "good farming practice" reflected in property rights. However, in rural areas environmental objectives are often more ambitious than "good farming practice". In such cases, environmental objectives will be achieved only if appropriately remunerated. It is therefore appropriate to pay farmers to preserve the environment through privately owned resources or factors of production, provided that this goes beyond good farming practice.

1.3.1.4. CAP Reform

The reforms undertaken as part of the Agenda 2000 package represent a significant step forward in putting this approach into practice. In the Common Rules Regulation, Member States are required to take measures necessary for the protection of the environment. Three courses of action are included in this Regulation. First, to apply compulsory restrictions. Such measures are already required in Member States in relation, for example, to pollution by nitrates in water. Secondly, Member States may apply cross-compliance, by attaching specific environmental conditions to the granting of direct CAP payments. Thirdly, Member States may use agri-environment programmes to protect or enhance the environment beyond good farming practice. Furthermore, while the CAP is a common European policy, Agenda 2000 recognises that the diverse nature of the farmed environment across Europe means that the policy has to be applied in a decentralised way.

The application of these measures by Member States should therefore enable them to improve the balance between agriculture and the environment. This would eliminate damaging features of agriculture and improve its performance as a sector in harmony with the environment. Society in general, although prepared to take into account legitimate social and economic interests, will not accept that CAP funding leads to environmental degradation whose costs it, in turn, would have to bear. It will be, nevertheless, necessary to carefully monitor and analyse developments in all agricultural sectors irrespective of the level of CAP intervention.

With regard to the sectors covered by Agenda 2000 the Berlin Summit foresees certain reports or mid-term reviews within the next five years: arable crops, the milk quota system, oilseeds, the budget situation. Any legislative proposals arising from these reviews will require an appropriate environmental appraisal. Sectors not covered by Agenda 2000 and scheduled to be revised will be subject to environmental appraisal.

Agenda 2000 has made a strong effort to correct the most apparent negative environmental effects of the old CAP by providing member states with a range of instruments. A main task for the future will be to monitor and evaluate the implementation of these instruments and their effectiveness.

1.3.2. Issues for the future: environment and trade, consumer concerns, enlargement

The fundamental basis of the European model lies in the multifunctional nature of Europe's agriculture and the part it plays in the economy and the environment, in

society and in preserving the landscape. This creates a specific need to maintain farming throughout Europe and to safeguard farmers' incomes.

The Agenda 2000 agricultural reforms are considered to constitute essential elements in defining the Commission's negotiation mandate for the next World Trade Organisation round. The EU will need to work in these negotiations in order to both safeguard the European model and benefit from opportunities on international markets. In particular, it will be important to safeguard the ability of those employed in agriculture to supply public goods, in particular as regards the environment and the sustained vitality of rural areas. At the same time, it will necessary to fully meet international commitments under Multilateral Environmental Agreements and to take into account the legitimate concerns of developing countries. Indicators could a play a potentially important role in developing appropriate strategies in areas such as climate change.

A robust and consistent system of agri-environmental indicators will contribute to the detection of environmental problems and will help the European Union explain to its citizens what it is doing and what remains to be done to promote sustainable agriculture in Europe and at an international level. They will also help the EU's trade partners understand the importance Europe attaches to the environmental function of its agriculture.

Increased consumer concerns about safety, origin and quality of agricultural products can be partly addressed by improved information and transparency about farming practices. Once again, this will also be particularly important in an international context over the coming years.

Finally, enlargement will bring particular challenges for agri-environmental policy. A clearer picture of sustainable (and unsustainable) practices in the Union as well as a corresponding set of indicators will help acceding countries adapt to the Acquis. It should not be forgotten that Central and Eastern Europe contains many areas of remarkable high nature value that could be threatened by land abandonment or the unregulated intensification of agriculture. Similar indirect environmental effects of the CAP in countries where the EU has economic or development co-operation agreements should also be taken into account.

1.4. Assessing the integration of environmental concerns into the CAP

The reforms undertaken as part of Agenda 2000 provide a powerful impetus for the integration of environmental concerns into agriculture policy. The Commission, Member States, local authorities and agricultural and rural communities now have a considerable range of instruments at their disposal to achieve sustainable agriculture. Appropriate agri-environmental indicators can help to provide information to those involved in the development and implementation of these policies. Indicators need to meet at least five criteria. They should enable those who implement and make policy as well as the broader public:

- to identify the key agri-environmental issues that are of concern in Europe today,
- to understand, monitor and evaluate the relationship between agricultural practices and their beneficial and harmful environmental effects.

- to assess the extent to which agricultural policies respond to the need to promote environmentally friendly agriculture and to communicate this to policymakers and the wider public,
- to monitor and evaluate the site specific environmental contribution of Community programmes to sustainable agriculture,
- to map the diversity of agri-ecosystems in the European Union and Candidate Countries. This has particular relevance in explaining to the EU's trading partners the specificity of the farmed environment in Europe.

2. DEVELOPING INDICATORS FOR AGRICULTURAL AND RURAL POLICIES

2.1. The specificities of agriculture

The Councils in Cardiff and Vienna underlined the importance of developing environmental integration indicators to support the sectoral Council strategies The purpose of environmental integration indicators is to help assess the extent to which environmental concerns have been integrated into sectoral policies. To do this they must operate at a range of levels - policy, human activity and the environment – and reflect the complex chain of cause and effect. Information about actual environmental damage and its economic valuation need to be supplemented with analysis of causality and the sector's contribution to the problem. This will ensure a balanced evaluation of the effectiveness of current policy instruments both within and outside the sector. Only in this way can data about human activities in given sectors and the state of the environment be transformed into policy decision supporting information.

Such indicators should therefore help achieve a better understanding of the complex issues in the domain of agriculture and environment, to show developments over time, and to provide quantitative information. All of these are needed for targeting and monitoring. However, if these indicators are to be meaningful, they must give a sufficiently accurate picture of the underlying processes and relationships that link human activities with the environment. This is particularly the case for agriculture where the relationship is highly complex and where farming itself involves a range of biophysical and site specific processes.

2.2. The context of agricultural activity

Unlike many other sectors, agriculture is one in which direct public intervention remains the norm rather than the exception. This makes farming activity particular sensitive to changes in public policy. Farmers' decisions are heavily influenced by market support, direct payments, agri-environmental policy and environmental legislation. These decisions may be further shaped by water, energy or planning policies.

However, recent reforms of the CAP have encouraged greater market orientation among farmers, particularly through reductions in price support and development of niche markets and higher value added products. Production and farm management decisions are increasingly sensitive to changes in input and product price signals.

Furthermore, the sector has experienced rapid, if geographically uneven, changes in technology and skills level since the late 1950s. Since these changes have also characterised agriculture in those developed countries outside Europe which have traditionally supported their agriculture less, a great deal of agricultural intensification would have occurred even in the absence of the CAP.

Consumer and producer attitudes are increasingly shaping agricultural practices. These attitudinal changes have an important influence on the ways in which responses to environmental concerns are developed, for example in the development of environmental services and markets for organic produce.

Better farming practices play an important role in improving food safety and food quality for consumers. Together they can contribute to better health for farmers, workers and consumers.

The broad range of contextual factors reveal the role and limits of policy in shaping agricultural activities and related environmental effects resulting from CAP measures. Understanding the importance of market developments, technological progress or attitudinal change will enable policy to be targeted there where it is most effective.

A further feature of agriculture in the European Union is that it is covered by a common policy in which environmental requirements are specifically integrated. An environmental policy response is now internal to the CAP; the key issue is now to assess its scope and effectiveness.

2.3. Agricultural activity as a biophysical activity

A second specificity of agriculture is that by its biophysical nature it is part of, rather than external to, local ecosystems. Of course, in seeking to turn nature to agricultural production a range of external elements are introduced to the system, natural resources are used or consumed and new physical or biological elements produced. Relatively detailed information is needed to characterise input use (chemicals, energy and water), land use/cover (topology, cropping and livestock practices) and farm management. In many cases, sustainable agriculture is the product of the right mix of input, land use and farm management practices appropriate to local conditions.

While detailed specification of farming practices helps to understand the processes driving the sustainability of agriculture, the sheer diversity of farming practices and local conditions are difficult to capture at an aggregate level. For this reason, it is particularly important to develop indicators that capture the key trends in farming activity: expansion-withdrawal, intensification-extensification, specialisation-diversification, marginalisation-concentration. These need to be available at a range of geographical levels in order to identify both broad national trends as well as localised concentrations of practices. This type of indicators would help policymakers and the public better understand the shape and characteristics of the agricultural sector from an environmental point of view.

2.4. Beneficial and harmful environmental processes

The relationship between environment and agriculture is a particular one and the nature of effects is distinct from other economic sectors. Agriculture is by far the

biggest user of land. On the one hand, some farming systems exert harmful pressures on the environment and food safety, for example the build up of nutrients and pesticides in soil and water, soil compaction and erosion or the excessive abstraction of water for irrigation. However, in Europe, much of the valued rural environment is the product of agriculture and is dependent on it: appropriate farming systems help to preserve landscapes and habitats as well as a range of conditions favourable to beneficial environmental processes. Some of these processes can be summarised below:

Relationship	Processes		
Pollution of environment	Buildup of nitrate and other mineral residues, pesticide residues, salination, ammonia and methane emissions		
Depletion of environmental resources	Inappropriate use of water and soil, destruction of seminatural and natural land cover.		
Preservation and Enhancement of the environment	Creation/preservation of landscapes, habitats, landcover, preservation of genetic diversity in agriculture, production of renewable energy sources		

The potential for certain types of agricultural activity to make a significant contribution to environmental objectives should not be underestimated, particularly within a favourable policy context. The production of biofuels can, for example, make an important contribution to combating climate change.

Developing indicators that reflect both the beneficial and harmful effects of agriculture is a key element in defining an operational framework for sustainable agriculture.

2.5. Site specificity

For the monitoring of rural policies and agri-environmental programmes, indicators have to reflect site-specific features and programme criteria in order to be meaningful. Less site-specific indicators, which are more readily available, tell little about effects in local areas. Indeed, they may fail to disclose significant developments at a local or regional level.

Developing environmental indicators relating to agriculture requires a differentiated approach, reflecting regional differences in economic structures and differences in natural conditions. The available data, often highly aggregated may provide some valuable insights, but can also be misleading for some areas such as biodiversity or water quality due to a lack of regional differentiation.

A site-specific approach is necessary. First, it offers an accurate picture of the state of the environment in a given area and the effects of local farming activities. Secondly, it is, in principle, the level at which agri-environmental policies define good farming practice and therefore offers natural synergies between programmes and other environmental policies. Effective evaluation will depend on an appropriate focus at this level. Thirdly, the impact of many polluting, depleting or beneficial processes will depend on site specific characteristics such as geology, topography or climate. Finally, a site-specific approach enables us to look at ecosystems in a holistic way and address systemic characteristics such as quality and vulnerability.

A meaningful systemic context of agri-environmental indicators can be provided by the concept of "landscape" as the cultivated, partly semi-natural space within which agricultural production takes place and which is characterised by the totality of its biophysical, geophysical and cultural features. This type of landscape characterisation has the potential to bring together a broad range of site specific features in a coherent manner.

2.6. Aggregation and diversity in addressing global impacts

While a certain amount of information concerning the impact of agriculture on natural resources exists at a national and EU level, much of this is based on estimates and macro-modelling rather than the aggregation of local information. A much clearer link needs to be built between local and global levels. This is particularly important, if agriculture is to be correctly placed within the overall pollution context and its interaction with the economy as a whole.

There are particular difficulties as regards biodiversity, habitats and landscapes where, in addition to the global stock of species or natural habitats, we are particularly interested in differentiation and diversity. Europeans are attached to rural areas not only because they have aesthetically pleasing landscapes and rich flora and fauna, but also because they are highly differentiated with great species diversity. Farming plays an important role in maintaining this differentiation.

Global impacts need to therefore reflect both the cumulative and differentiated effects of aggregating the environmental state of specific sites. In this respect, landscape (as defined above) can play an important role in classifying differentiated European ecosystems. By taking into account issues of vulnerability and quality it also permits a spatial understanding of areas at environmental risk across the EU.

2.7. An indicator framework for agriculture

The OECD's DSR² framework and the European Environment Agency's DPSIR³ framework, both of which contain some degree of flexibility to allow adaptation to specific sectors, provide the basis for an agri-environmental indicator framework.

At the centre of the framework is the current **state** of the agricultural environment and how this has changed over time. State indicators bring to the fore any undesirable changes which need to be combated, (for example, nitrate or pesticide concentrations in water) as well as particularly desirable states which should be preserved (for example, many agricultural landscapes or valuable habitats).

The second step is to identify the **pressures** which have brought about undesirable change and environmental **benefits** resulting from farming which have helped to preserve or enhance the environment. These have, respectively, a negative and positive **impact** on the environment.

The third step is to link these pressures and processes to the **driving forces** in the economy (farmers' activities, which are themselves driven by market forces), as it is

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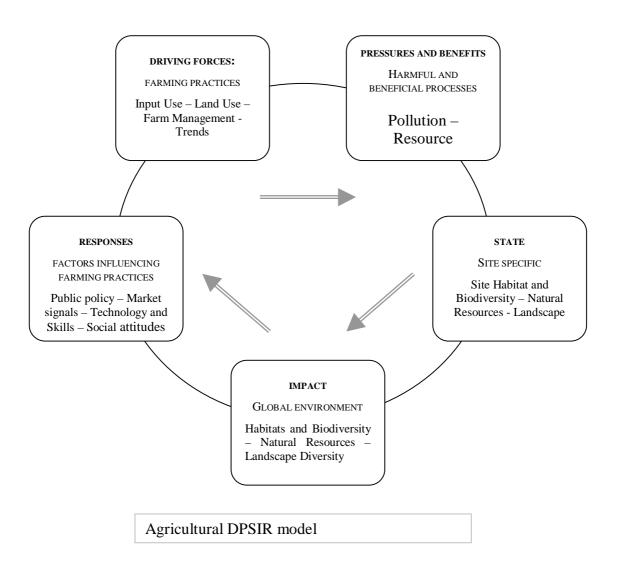
² Driving force-State-Response

Driving force-Pressure-State-Impact-Response

these driving forces that are directly influenced by agricultural policy, and it is here where the integration process is applied.

Finally, it is necessary to monitor how society's **response** to these issues is working. Are agri-environmental measures having the desired effect, are they responding quickly enough, or are they producing unforeseen problems?

This framework allows the relevant questions to be posed, and the information needed to answer these questions, i.e. the indicators, to be identified.



3. CURRENT WORK ON AGRI-ENVIRONMENTAL INDICATORS

A considerable amount of work on indicators has already been undertaken at a European, national, regional and local level. Much of the most innovative and promising developments exist at a national or sub-national level. However, for reasons of consistency and data collection, this report focuses on indicators developed in co-operation between Member States as well as those available at an EU level.

3.1. The implementation of agricultural and rural policies

3.1.1. Monitoring

Article 43(1) of the *Rural Development Regulation* states that rural development plans shall include « provisions to ensure the effective and correct implementation of the plans, including monitoring and evaluation »; Article 48(2) of the same Regulation foresees that « monitoring shall be carried out by reference to specific physical and financial indicators ».

The Commission has presented a set of common indicators to Member States, as well as a common structure to present such indicators. This will provide a basic level of harmonised information on the implementation of rural development measures in Member States/regions – information that can be aggregated to a community level. The final aim is to obtain a clear indication of the progress of the measures applied in Member States/regions, which will serve as a basis for the annual progress reports.

The Common Rules Regulation for Direct Support Schemes requires member states to inform the Commission in detail on the measures taken to implement the regulation, including cases of non-compliance with environmental requirements. Some work is needed to harmonise this work in order to produce indicators that are meaningful at an EU level.

3.1.2. Evaluation

Rural development programmes and payments under the support schemes are subject to evaluation (ex-ante, mid-term and ex-post) designed to appraise their impact. The latter will take account of the need to better integrate the environment into the common market organisations.

The Commission will provide guidance and establish with Member States appropriate indicators to assess the effectiveness of these programmes and policies focusing on results and impact.

3.2. Agri-environmental indicators in development

3.2.1. *OECD*

Considerable work has been undertaken in the OECD. This has been possible due largely to input from Member States and the Commission Services. Thirteen indicator subject areas have been identified: nutrients, pesticides, water use, land use and conservation, soil quality, water quality, greenhouse gases, biodiversity, wildlife habitats, agricultural landscapes, farm management, farm financial resources, sociocultural issues. In addition, a further set of contextual indicators covering land cover and land use has been developed.

Under these subject areas, about thirty actual indicators have been selected for short-term development while more than twenty indicators will need further refinement in a medium/longer term. The OECD has developed its own database but most of the indicators developed will rely on existing figures at national level or new uncollected data. For three indicator areas (nutrients, pesticides, green house gases), it is considered that data collection and indicator measurement are already well advanced

and being refined. The other areas, which were extensively discussed in a workshop in York in September 1998, still require further development.

The OECD Secretariat intends to request OECD countries on an ad hoc basis to provide the appropriate missing data. This will be facilitated through a regularly circulated and updated questionnaire.

3.2.2. EUROSTAT

As the official statistical office of the EU, the main focus of Eurostat's work is to provide the basic statistical information required by the Commission. Therefore, for many years now Eurostat has collected basic statistics on agriculture, and manages 3 main agricultural themes: the Farm Structure Survey, livestock and crop production data (including agricultural land use data) and the Economic Accounts for Agriculture, including prices. Additional data on agriculture is available from the FADN⁴ managed by DG Agriculture.

The current work programme for environment statistics and indicators, based on the 5th Environment Action Programme, includes development of the environmental aspects of agriculture. A first step has been to use as far as possible existing agriculture statistics and surveys, and other readily available data. Priority areas have been nutrient balances and pesticide use, where methodologies are being developed and data sources explored.

A first attempt to bring together all the available data has resulted in the publication "Agriculture, Environment, Rural Development: Facts and Figures." Issues covered include economic and employment dynamics, crop trends, specialisation, intensification, concentration, non-food crops, organic farming, agri-environmental measures, Natura 2000, forestry, water, nitrogen, pesticides, climate change, acidification, landscape, soil and rural development.

Moreover, following the Communication from the Commission to the Council on Environmental Indicators and Green Accounting⁶, Eurostat has identified the main pressures on the environment from human activities and the indicators needed to describe these pressures. The first results, 60 pressure indicators (some of which are directly relevant to agriculture) covering ten policy fields, were published in 1999. The second edition of this publication (due in 2000) will look more closely at the contribution of the various sectors, among which agriculture, to the pressures.

Eurostat has organised several seminars and workshops to advance agrienvironmental work. The most recent, held in Copenhagen in July 1999, in collaboration with Danmark Statistics, aimed at improving knowledge of ongoing work in national statistical offices, agricultural ministries, EEA, and the Commission Services.

On the basis of the CORINE land cover database different Commission Services have undertaken work to develop a land cover diversity indicator. This has included

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Farm Accountancy Data Network

⁵ European Commission, 1999

⁶ COM(94)670 final

data collection and processing methodologies in order to operationalise the indicator and analysis of its evolution over time⁷.

3.2.3. The European Environment Agency

Priority issues for the EEA are: emissions, waste, nature protection, air quality, water, marine and coastal zones, soils, land cover, chemicals, noise, impact on health. The EEA has not worked specifically on agri-environmental indicators, even though much of its work on indicators can be applied to this area.

The Agency regularly produces an analytical state of the environment report, and in 1999 will produce its first annual indicator report. Within the yearly indicator report, agriculture is dealt with within a sectoral chapter in which seven different indicators are developed and assessed. These rely mostly on available data and are related to macro-questions.

The European Topic Centres (ETCs) of the EEA on soil, nature, biodiversity, water, waste and landcover provide a good starting point for the further development of a number of agri-environmental indicators. The ETC for Nature Conservation of the EEA is currently developing an EU nature information system (EUNIS). A habitat classification is being developed under this framework, as a successor to the CORINE habitat classification.

3.2.4. Indicator work in the context of EU Research Programmes

A considerable amount of research has been undertaken in the framework of the EU's AIR and FAIR programmes into the relationship between agriculture and the environment. The ELISA⁸ concerted action, led by the European Centre for Nature Conservation, seeks to improve the territorial coherence of work emerging out of the OECD. ELISA identified 22 state indicators related to soil, water, air as well as biodiversity and landscape. Agricultural practices (such as pesticides application, nutrient discharge, land use intensity) with their potential effects were described by 12 pressure indicators. Emphasis was also placed on the linkages between state and pressure indicators.

A targeted area of the ELISA work is landscape. Preliminary findings stress the need for a clear distinction between indicators for assessing driving forces (agricultural land uses practices and rural processes) and policy-relevant landscape functions. The complexity of driving forces as well as landscape functions is likely to require the need for developing « composite » indicators that combine a set of assessment criteria. Four main indicators to assess the environmental state were retained (biophysical adequateness of land use, openess versus closedness, adequateness of key cultural features and land recognised for its scenic or scientific value).

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Publication of the results of the work (DG Agriculture/Eurostat/JRC/EEA) is envisaged for early 2000.

Environmental Indicators for Sustainable Agriculture in the EU (FAIR-CT97-3446)

3.3. Gaps and challenges

3.3.1. Coverage of agri-environmental issues in current work on indicators

While considerable work has been undertaken in the development of indicators, many gaps still remain. These gaps exist at a number of levels in data, the construction of indicators, but above all in the existence of appropriate indicators that reflect key policy issues. It is therefore necessary to compare the "policy" coverage of existing indicator work with the key issues and questions highlighted above.

The table below summarises the coverage of agri-environmental indicators in various fora for which data is available at least at national level⁹. The indicators are structured in relation to the agricultural DPSIR framework presented above. Considerable information relevant to the development of indicators is expected to be generated through rural development programmes. However, this information will be territorially differentiated both by programme area and coverage of agrienvironmental measures. It will, nevertheless, provide a rich source of information about the beneficial effects of agricultural practices.

		OECD stocktaking report	EEA (1999 indicator report)	Eurostat Pressure Indicators	(Eurostat) Joint Publication	RDP – monitoring and evaluation	All sectors
Factors and	Public policy					possible	
responses influencing	Market signals						
farming practices.	Technology and skills					possible	
	Attitudes						
Characteristics	Input Use					possible	
of farming practices	Land use					possible	-
	Manage- ment					possible	
	Trends					possible	
Harmful and	Pollution					possible	
beneficial processes	Resource depletion					possible	
	Benefits					possible	
Site specific	Habitats/ biodiversity					possible	
state	Natural resources					possible	
	Landscape					possible	
Global impact	Habitats/ biodiversity						
	Natural resources						
	Landscape diversity						
	Good polic	v	We	ak policy		No cove	erage
	coverage			erage			ruge

This table is based on the survey of current indicator work presented in the Working Paper of the Commission Services "Current Agri-environmental Indicators at EU level". This table should only be taken as a broad picture of the current state of play since it only takes into account published work.

It is clear that weaknesses remain at a considerable number of levels. These are particularly prominent at the level of harmful and beneficial processes and site specific states. Further work is required on the diversity of European agriecosystems.

3.3.2. Indicators for assessing environmental integration

At present, a partial set of indicators can be established to monitor the integration of environmental concerns into agricultural policy. This set will evolve as the indicators are improved and completed. This table below presents indicators that reflect particularly well the main concerns arising from the relationship between agriculture and the environment. They are mainly based on the indicator work developed within the OECD supported by work undertaken by EUROSTAT, the EEA, and the JRC. In principle, all these indicators chould be operational in the short to medium term, dependent on the adequate collection of data at a sub-national level. Data requirements are presented in the fourth column of the table:

		Indicators	Data requirements	Key tasks
Factors and responses influencing farming practices.	Public policy	Area covered by AEP Regional levels of good farming practice Regional levels for environmental targets Area under nature conservation	Available in programmes and member state reporting on cross compliance.	Aggregation of local data
1	Market signals	Organic producer price premium	Sub-national data required.	
	Technology and skills	Holder's training levels		
	Attitudes	Area of organic farming	Sub-national data required.	
Characteris tics of farming practices	Input Use	Average consumption of N and P fertilisers Consumption of pesticides Water use intensity Energy use	Sub-national data required	Collection of data on active ingredients per crop Completion of pesticide risk classification
	Land use	Topological change Cropping/livestock patterns		Need to develop indicators Need to integrate EUROFARM and CORINE
	Management	*		
	Trends	Intensification/extensification/specialisation/diversication/marginalisation		Need to develop clearly defined indicators and appropriate indices
Harmful and beneficial processes of	Pollution	Soil surface nitrogen balance CH4 emissions Pesticide soil contamination Water contamination (directives/monitoring)	Sub-national data required	Pesticide soil contamination indicator needs further development
agriculture ?	Resource depletion	Groundwater abstraction and Water stress Soil erosion Land cover destruction Introduction of low genetic diversity species	Sub-national data required For water, data is needed for river basins.	Co-ordination with Water Framework Directive Composite land cover indicator required.
	Benefits	*Area of high nature value grassland etc. Production of renewable energy sources		Further work required
Site specific	Local habitats/ biodiversity	Species richness (birdlife richness)	Sub-national data required	Birdlife is a good proxy indicator; more work is needed on indexes.
state	Natural resources	Soil quality Nitrates/pesticides in ground /surface water Ground water levels	Sub-national data required	
	Landscape	*		Further work required
Global impact	Habitats and biodiversity	*		Aggregate indicator required
	Natural resources	Share of agriculture in emissions, nitrate contamination, water use		
	Landscape diversity	*		Further development work required

There are, however, areas in which the definition of operational indicators remains a major challenge. (marked "*"). This is particularly the case for farm management, beneficial processes, landscapes, global habitat stock and biodiversity and landscape diversity. For these, appropriate indicators need to be defined on the basis of the considerable information that is currently available. Although a large amount of contextual information on factors and responses influencing farming practices is available, this needs to be further developed into a more complete set of coherent indicators. To date, little work has been done concerning the presence of genetically modified organisms, both as regards voluntary release and long-distance dispersion.

In general, scientific models will be necessary to encompass and validate the information base of indicators, in order to foster a comprehensive and shared approach to sustainable agriculture.

3.4. Monitoring the integration strategy for the Agricultural Sector

A central task over the coming years will be the further development, implementation and monitoring of the sectoral integration strategy developed by the Agricultural Council. The strategy sets a number of objectives. In assessing progress to meeting these objectives, it will be important to provide quantified information that responds to key questions:

- What policy measures are being undertaken to improve the environmental situation in the agricultural sector?
- What improvements in farming practices are taking place?
- To what extent have beneficial environmental processes such as habitat preservation increased and harmful processes such as pollution decreased?
- What is the effect on the state of the environment?
- To what extent have specific objectives been met?

As regards policy measures and farming practices, the key source of information will come from the monitoring of rural development, market and environmental policies. However, this will remain dependent on the coverage of these policies and the willingness of member states to collect the appropriate information. The indicator set outlined above could be adapted to reflect the broader concerns of the strategy and its specific objectives. A monitoring framework for further development is proposed below.

Indicator framework for Agricultural Council Integration Strategy:

Theme	Specific objectives of the strategy	What policy measures are being undertaken to improve the situation?	What improvements in farming practices are taking place?	To what extent have beneficial processes increased and harmful processes decreased?	What is the effect on the state of the environment?	To what extent have global objectives been achieved?
Water	 Pollution into ground and surface water should be reduced Inappropriate use of water for irrigation should be reduced Leaching of nitrates and phosphates should be reduced 				 Reduction in nitrates and pesticides in water Improved groundwater levels 	 Increase in environmental efficiency of agricultural water use. Improvement in agricultural contribution to water quality.
Agro- chemicals	The environmental risks of pesticide use should be reduced			Reduction in pesticide soil contamination	 Reduction of pesticides in water Increased species richness 	 Increase/preservation of species diversity Improvement in agricultural contribution to water quality. Increase environmental efficiency of pesticide use
Land use and soil	 Degrading physical, chemical and biological pressures on the soil should be reduced Erosion should be reduced, adequate farming systems should be promoted 	Development l Market Organ	Monitoring of Rural Development Programmes; Market Organisations and Environmental policies		Improved soil quality	Increase/preservation of habitats and species diversity Increased environmental efficiency of land use
Climate change	 Reduction of CH4, N2O and other Green House Gases Non-food production should be increased Use of renewable energy from biomass and biofuels should be promoted 				Increase in energy produced from renewable resources	Reduction in contribution of agriculture to Greenhouse Gases Increase in biofuels as part of total energy consumption Increase environmental efficiency
Landscape and biodiversity	Landscapes, habitats and biodiversity should be maintained Preservation of genetic material of crops and domestic animals			 Landcover destruction Increase in agricultural genetic diversity Preservation of seminatural habitats 	 Preservation of high nature and culture value landscapes Species richness (birdlife indicator) 	 Preservation of landscape richness and diversity Preservation/increase in biodiversity

4. NEXT STEPS

A number of key actions need to be undertaken to ensure that the potential of agri-environmental indicators is fully exploited. These will be particularly important in ensuring that Council Strategy can be fully monitored and evaluated. These can be summarised under the headings of improving and operationalising existing indicators, improving information collection capacities, extending indicator approaches (environmental efficiency and classifying agriecosystems) and finally improving communication on agri-environmental issues.

4.1. Further development of the indicator set

The first task to be undertaken is the completion of a set of integration indicators for agriculture, particularly where indicators are poorly defined or where full data sets are missing. This should be based on the continuing work of the OECD and consolidated with work in other European Union bodies. This should be accompanied by the development of social and economic indicators to provide a complete picture of sustainable agriculture and, where appropriate, development of methods and indicators to assess the wider international impacts of the CAP, in particular on accession and developing countries.

4.2. A long-term strategy on data information needs

The quality of indicators will depend on the quality of statistics available. However, the collection of statistical information remains a financially and administratively onerous process with long lead-in times, particularly in the agricultural sector. While the development of indicators can be based partly on existing statistics, it should not be driven by current data availability. The economy of data collection is certainly important, but it should neither hinder defining an appropriate geographical level for agri-environmental indicators nor the identification of relevant environmental themes. In providing an adequate statistical basis for agri-environmental indicators an appropriate balance will need to be struck between existing data and the collection of new data.

As far as data management is concerned, the first step should be to make better use of existing data, when they have not yet been fully exploited. For example, there is still room to make better use of the results of Eurostat's Farm Structure survey, agricultural production statistics and balances and the regional database. A first step in this direction is the joint publication: "Agriculture, Environment, Rural development. Facts and Figures" but this kind of initiative needs to be continued and deepened in close collaboration with producers and users of statistics.

In order to advance this indicator work, Eurostat will gather as much information as possible must be gathered on local studies (sub-regional level) or national or regional surveys - where they exist- of agricultural practices,

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Prepared in collaboration between EUROSTAT, DG Agriculture and DG Environment

landscape and its changes and rural development. A synthesis will be produced of the data available, methods used, results obtained and possibilities for more widespread use and for monitoring over time.

On the basis of this synthesis of existing data and indicators, new indicators will be proposed to deal with environmental aspects of agriculture. Particular attention will be given to good farming practices, to landscape and its changes, and rural development at regional or sub-regional level.

An important conclusion to be expected is the proposal of additional variables to be collected under the European agricultural statistics system. This will include specific proposals on how they should be collected (methodology, use of existing surveys and/or introduction of new tools for data collection).

Other sources of information, such as the geographical databases managed by the Joint Research Centre and the European Environment Agency, the CORINE landcover data base, and the Farm Accountancy Data Network (FADN) should be better exploited in the development of agri-environmental indicators. The information provided by member states through rural development programmes and other reporting requirements will be particularly important in increasing our knowledge about site specific characteristics. If provided in an appropriate format a database could be established covering both environmental characteristics as well as definitions of good farming practice. Information on use of the Common Rules Regulation will also provide insights.

The Commission therefore proposes to consolidate the use of existing sources of information as well as identifying future needs. This would take the form of a Communication to the Council "Information needs for sustainable agricultural and rural development: Statistical needs for assessing the integration of environmental and agricultural policies" and would cover the following themes:

- facilitating the process of existing data collection and treatment,
- identifying common priorities on agri-environmental indicator,
- improving synergies between the Commission and the EEA. A joint seminar on agri-environmental indicators was held between the EEA and the Commission Services in early 1999 and will form the basis for further co-operation,
- improving the use of data and indicators currently developed by Member States. Contributions by Member States in the OCED have highlighted the richness and diversity of indicators and statistics at national level. A key challenge is to bring them together at a European level and facilitate exchange of best practice,
- identifying new needs.

A broad understanding of current data availability and future needs would enable the EU to take a long-term view of the development of statistical information in the field of agri-environment.

4.3. Developing Environmental Efficiency Indicators

Environmental efficiency indicators can provide useful information about long-term trends and the relationship between production and associated environmental costs and benefits. They can help indicate those practices that are most likely to contribute to broad environmental targets and, of course, those which are most damaging. In the medium to long-term, the capacity of Europe to maintain a high level of environmental quality and a significant food production capacity will depend on reducing the environmental costs of agricultural production. Environmental efficiency indicators therefore help highlight the important role both technology and traditional methods of production have to play in sustainable agriculture. Such work remains currently underdeveloped and requires greater attention and possibly further resources.

4.4. Using landscape to classify European Agri-ecosystems

Landscape enables us to better understand the specific characteristics of sites and the nature of the interaction between agricultural practices and the environment of the interaction between agricultural practices and the environment. Together with territorially differentiated information on driving forces and the state of the environment, landscape can form the basis for describing in a relatively simple way the balance between agricultural activity and the ecosystem of which it is part. Such a system would enable policymakers to identify vulnerable or threatened areas and take appropriate action and to better understand the nature of the threat or vulnerability. Work of this type has already been undertaken by some member states and could be extended to a Community level. Such a system would seek to build on existing member state classifications in order to present information in a concise and synthetic manner. From a policy point of view at least five groups of landscape types are present across the Union in varying degrees:

- high nature value and cultural landscapes threatened by the intensification of agriculture and where environmental quality is very dependent on strict constraints being placed on farming activity,
- farming dependent high nature value and cultural landscapes threatened by the marginalisation of agriculture and where agriculture has a particular role in creating environmental quality,
- landscapes characterised by low-input farming, low pollution and resource depletion as well as the enhancement of habitats and biodiverity,
- landscapes characterised by intensive or extensive good farming practice in a balanced relationship with the land leading to the maintenance of natural resources, biodiversity and semi-natural ecosystems,
- landscapes characterised by overexploitation, pollution, and resource depletion leading to the deterioration of natural resources, biodiversity and semi-natural ecosystems.

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OECD, COM/AGR/CA/ENV/EPOC(98) 136.

In the medium to long term, the development of such a system would provide a good tool for both providing information to policymakers and making the integration of environmental concerns into agricultural policy transparent to the wider public.

4.5. Bringing agri-environmental concerns closer to the citizen

The development of agri-environmental indicators presents a particular opportunity to engage citizens in both rural and urban areas. Alongside improved competitiveness, the multifunctional role of agriculture and the growth of publicly remunerated environmental services will play a large part in ensuring the viability of many rural areas. It is therefore important for society in general to understand the issues at stake and, indeed, the quality and diversity of Europe's rural environment.

The role of agriculture in maintaining the landscape and semi-natural rural environment is increasingly reflected in a range of initiatives such as the European Landscape Convention (ELC) and the Pan European Biological and Landscape diversity strategy (PEBLDS). The site specificity of agricultural activities fits closely with growing concerns about sustainable development and landscape quality at a very local level expressed in Local Agenda 21.

A key challenge for the coming years will be to ensure that the development of agri-environmental indicators complements European initiatives such as the ELC and PEBLDS. It is equally important that the development of indicators can be used to improve communication and the transparency of EU policies. There is scope here for greater involvement of NGOs and farmers groups. There is also a need to ensure that the European citizen is well informed, in an understandable manner of the changing relationship between agriculture and the environment. In this respect, indicators should be developed on a sound scientific basis that incorporates the social concerns of interested groups and society at large. In return, those groups and citizens must be reassured that sound scientific knowledge is duly incorporated into the indicators.

4.6. Developing Specific Headline Indicators for Agriculture

One way of communicating broad trends to a wider public and policymakers is to develop a separate, restricted sub-set of "headline" indicators for the sector. Although such a restricted list cannot reflect the complexity of the relationship between agriculture and the environment, it can provide some information on important key issues provided indicators are selected in a balanced manner. A possible set of headline indicators for a number of key agri-environmental concerns are presented below:

	Key issue	Possible Headline indicator
Factors and responses influencing farming practices	Enhancement beyond good farming practice	Expenditure/area on agri- environmental programmes
Farming practices	Rational input use	Pesticide use risk (factoring in integrated pest management)
Harmful and beneficial processes	Benefits outweigh harmful effects	Nitrogen balance
Site specific state	Ecosystem health	Bird species on agricultural land
Global Environmental Impact	Ecosystem Richness	Landscape diversity

In comparison with the comprehensive indicator systems presented above, a short list of headline indicators of this kind has to be used carefully. It should be used only for the purpose for which it is designed - namely to give some indication to the public of certain broad trends in the agri-environment relationship, particularly at sub-national levels. In presenting such a restricted set, great care must therefore be taken to point out that it does not give a complete picture of this relationship.

For these reasons, it is proposed to test the feasibility of a first set of possible headline indicators, before a decision on their potential for further long-term development. As regards food safety, other possible indicators might include agricultural and other contaminants in food, water quality at the stage of extraction. Other indicators for biodiversity reflecting biodiversity in the soil provide good indicators of rapid change.

4.7. Timetable

The rhythm of environmental integration into the CAP will be largely set by the implementation of Agenda 2000. However, a timetable for the development of indicators can be summarised as follows:

	Action	Timetable	Milestones
Task 1	Further development of set of agrienvironmental indicators	Ongoing	 Completion of OECD stocktaking Synthesis of mid-term review 2004
Task 2	Communication on Statistical Information Needs	End 2000, dependent on data availability in Member States	Development of sustainable development indicators 2003
Task 3	Environmental Efficiency Indicators	Ongoing	First review end of 2000First set of indicators 2003
Task 4	Classification of Agri- environmental systems	Full system developed by 2006	 Land cover/land use variables identified mid 2000 Classification system developed by 2003
Task 5	Improved communication and complementarity with other initiatives	Ongoing	Presentation of Communication to Parliament
Task 6	Agricultural Headline Indicators	Ongoing	