



## TERMS OF REFERENCE

### DK-Copenhagen: Outlooks on selected agriculture variables for the 2005 State of the Environment and Outlook Report

#### Open call for Tender

EEA/RNC/03/016

#### 1. Background information

##### *The 2005 State of the Environment and Outlook report*

According to article 2 (vi) of European Environment Agency Regulation (Council Regulation EEC/1210/90 amended by EC/993/1999), a key task of the European Environment Agency (EEA) is:

*(vi) “to publish a report on the state of, trends in and prospects for the environment every five years, supplemented by indicator reports focusing upon specific issues”*

The most recent ‘State of the Environment and Outlook Report’, entitled ‘Europe’s Environment at the Turn of the Century’ was published in 1999. The next State of the Environment and Outlook report is due to be published in 2005 (SoEOR2005), in order to comply with the EEA Council Regulation and to support the mid-term review of the 6th Environment Action Programme (EAP). The report will provide an assessment of both the past trends and outlooks for Europe’s environment.

The current thinking of the EEA is that SoEOR2005 will be a brief and concise report supplemented by a number of sub-reports, including sub-report 7 with the working title “European Environment Outlook”.

##### *The development of outlooks*

The overall objectives of the outlook activities undertaken at the EEA are the following:

1. To provide outlooks across sectors and themes according to the SoEOR2005 report requirements and which are relevant to decision-makers and give insights (and early warnings if necessary) on what might be expected from the future.

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2. To enhance the development of a long-term systematic approach to outlooks in the EIONET network (European Environment Information and Observation Network) so as to make sure they are incorporated in EEA regular reporting.

In the context of the SoEOR2005 report, outlooks are developed for the following sectors and themes: air and climate change (energy, transport, agriculture, etc.), waste and material flows, water, terrestrial environment and land use development, and nature protection and biodiversity. Both quantitative and qualitative outlooks are developed. This is in line with EEA Council Regulation EC/993/1999 article 2 (vii) stating that a key task of the Agency shall be:

*(vii) “to stimulate the development and application of environmental forecasting techniques so that adequate preventive measures can be taken in good time”*

## **2. Overall objectives of EEA outlooks on selected agriculture variables<sup>1</sup>**

The overall objectives of EEA outlooks on selected agriculture variables are to a) provide quantitative outlooks on agriculture variables, which constitutes an input to the air and climate change scenarios developed by the EEA for the next State of the Environment and Outlook report; b) provide agriculture outlooks which supplement the existing projections used in the RAINS model within the framework of the CAFE (Clean Air For Europe, DG Environment) programme<sup>2</sup> as well as the existing European Commission projections developed up to 2009/2012 (DG Agriculture); c) identify and analyse the main driving forces and uncertainties affecting the future developments of the agriculture sector and provide insights on their possible effects; and d) to gain experience in quantitative modelling and outlooks on agriculture issues and contribute to enhancing the development of a long-term systematic approach to outlooks in the EIONET network.

## **3. Specific objective of the study**

The specific objective of the study is to provide quantitative assessments of future changes in the agriculture sector in EEA member countries up to 2020 and 2030. This includes providing insights on the possible effects of key driving forces and uncertainties on future developments of the agriculture sector as well as developing scenarios and projections, which are relevant to decision-makers and give early warnings if necessary. Due attention will be paid to the specificity of the EEA member countries in terms of regulation and policies (e.g. EU laws, Directives, CAP (Common Agriculture Policy) reform, etc.) and these will explicitly be taken into account. The study is to represent a value added to recent outlooks of the agriculture sector.

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<sup>1</sup> The list of (selected) agriculture variables for which outlooks have to be undertaken is given in Appendix A at the end of this document.

<sup>2</sup> Detailed information on the RAINS model, which is maintained by IIASA, can be found at the following web page: <http://www.iiasa.ac.at/rains/>. Further information on the CAFE programme is available at <http://europa.eu.int/comm/environment/air/cafe/index.htm> while scenario activities are described at <http://europa.eu.int/comm/environment/air/cafe/activities/basescenario.htm>.

## 4. Results

The results of the study shall be provided to the EEA in a final edited report in English no later than nine months after the signing of the contract<sup>3</sup>. An interim report summarising the results of tasks 5.2 and 5.3 and providing proposals for task 5.4 and 5.5 shall be provided to the EEA (no later than four months after signing the contract) as well as a final draft report (no later than eight months after the signing of the contract).

The results of the study can be published under the name of the contractor in scientific journals if the contractor wishes to do so. In that case, the contractor has to acknowledge the EEA funding.

## 5. Activities

### 5.1 Introduction

The study on outlooks for selected agriculture variables shall focus in particular on the effects of key driving forces and the development of a baseline projection and two alternative scenarios. This study is meant to constitute an input to the air and climate change scenarios developed by the EEA for the next State of the Environment and Outlook report. To avoid duplication of work, the contractor will be provided with the relevant statistical data on agriculture by the EEA, including data collected in the framework of IRENA (Indicator Reporting on the Integration of Environmental Concerns into Agriculture Policy) and in cooperation with EUROSTAT. EEA indicator fact sheets related to agriculture can be found at the following address:

<http://ims.eionet.eu.int/Topics/AGRI/indicators>

The contractor will have to rely on modelling experience in the agriculture area and a very good knowledge of agriculture issues at national and European levels. The contractor will demonstrate that they have directly contributed to agriculture outlooks and projections for EEA's member countries, and provide a proven track record accordingly.

The EEA and the contractor will share responsibility for the coordination effort. The contractor shall closely liaise and cooperate with the various groups involved in EEA's outlook activities (i.e. the EEA, the European Topic Centres (ETCs) and in particular the ETC/Air and Climate Change<sup>4</sup>, the Institute for Prospective Technological Studies (Joint Research Centre-European Commission) and other consultants) as well as with the contractors involved in the CAFE (Clean Air For Europe, DG Environment) scenario work.

### *Activity*

Undertake quantitative outlooks for selected agriculture variables, including a baseline projection, sensitivity runs on key driving forces and two alternative scenarios. The outlook activities will have to supplement the existing projections used

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<sup>3</sup> The EEA shall provide the contractor with guidelines on writing styles and formatting of the report.

<sup>4</sup> Key partners include the National Institute of Public Health and the Environment (RIVM, The Netherlands), the International Institute for Applied Systems Analysis (IIASA, Austria) and AEA Technology (AEAT, United Kingdom).

in the RAINS model within the framework of the CAFE (Clean Air For Europe, DG Environment) programme and, to do so, make use as much as possible of the existing European Commission projections developed up to 2009/2012 (DG Agriculture). The projections developed by the contractor will be used in the RAINS model, both within the CAFE framework and EEA's air and climate change scenarios developed by the European Topic Centre on Air and Climate Change, in order to make projections of emissions of pollutants (e.g. nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), ammonia (NH<sub>3</sub>)). In this context, the results of the study in terms of data will have to be reported in a format, which is compatible with the RAINS model. Links with EEA's PRELUDE (PRospective Environmental analysis of Land Use Development in Europe) project are also to be expected.

### ***Scope of the study***

As many as possible of the following countries (i.e. EEA 31 member countries + Switzerland): Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom. Results should be reported at national level. When relevant and possible, results should be given at sub-national levels, e.g. on a case study basis. If results are reported in form of maps, these have to be documented by background data.

### ***Timeframe***

Projections up to 2020 for all the parameters and variables given in Appendix A, and as many as possible of these up to 2030. In the final report, the results should be reported by steps of 5 years as a maximum. However, the database of the results, which should be delivered to the EEA in Microsoft Access or Excel formats, will have to include the entire outlook data used for the final report.

### ***Detailed tasks and sequence of activities***

#### **5.2 Provide an overview of the most recent and important outlooks at European and national levels for the selected agriculture variables**

Provide an overview of the most recent and important outlooks at European and national levels for the selected agriculture variables. This implies providing a summary or synthesis, a comparison and an analysis of the main results. Due attention will have to be paid to the modelling tools used to undertake the projections. This review should be limited to 5 pages maximum in the final report.

#### **5.3 Detailed description and discussion of the driving forces for the selected agriculture variables**

Provide a detailed description and discussion of the (economic, sectoral, political and social) driving forces for the selected agriculture variables and how the key driving forces affect (presently and in the future) farmers' and consumers' behaviours (e.g. risk attitude, technology adoption, etc.). Provide a detailed description and discussion of how the key driving forces and their impact on farmers' and consumers' behaviours are reflected/modelled within the quantitative tool to be used for the projections. Both demand and supply side (sectoral and technical) driving forces will have to be analysed. The key driving forces include the following, which is a non-exhaustive list:

1. Demand side:

- Population trends (net growth rates, etc.)
  - Economic growth
  - Food consumption, split up into beef, pork, poultry, eggs, milk, cereals and vegetables, and possibly by sectors (e.g. households/domestic sector, agriculture, services).
  - Meat and crop prices
  - Social and lifestyles changes (vegetarianism, preference for organic products, buying locally, etc.)
2. Supply side
- Farming population trends (net growth rates, ageing, geographical distribution, etc.)
  - Farm size
  - Crop production yields
  - Housing of livestock
  - Technological change/shift
  - Manure system
  - Efficiency of farming appliances
  - Irrigation system and water availability
  - EU Common Agricultural Policy (i.e. market policies, income support payments, rural development policies, etc.)
  - Development of competing activities (tourism, etc.)

A sub-set of key driving forces should be defined in light of their importance for the selected agriculture variables in the future and the policy options. The selection criteria of the driving forces should be made explicit.

Undertake a discussion of the key assumptions, modelling approach and tools to be used to undertake the projections (capabilities, drawbacks and limitations of the approach). The discussion will also focus on the capabilities and drawbacks of the modelling tool to simulate the effects of the key driving forces.

#### **5.4 Analysis of the future development of the key driving forces and running the baseline scenario for the selected agriculture variables**

The baseline scenario for the selected agriculture variables will be based on an analysis of the future development of the key driving forces. The main uncertainties will be identified and discussed. The baseline scenario should include as much as possible all the agreed EU policies up to the end of 2003 (i.e. including 2003 CAP reform negotiations). For the development of the projections, due attention will also be paid to global issues (e.g. World Trade Organisation (WTO) arrangements, etc.). In order to ensure consistency and coherence between EEA's outlooks activities across sectors and themes, the assumptions on the future development of the driving forces will have to build on existing driving forces used by the EEA for the SoEOR2005 report, in particular for population trends, economic growth or water availability.

Report on the baseline scenario: results should cover the list of selected agriculture variables given in Appendix A. Main implications for environment policies of EEA member countries are to be discussed. The key findings, as well as the possible early warnings, will have to be highlighted. A comparative assessment of the baseline scenario with the most recent and important outlooks for the selected agriculture

variables will also be done. The sensitivity runs on key driving forces will be reported and the baseline projection will be re-interpreted in light of these.

### **5.5 Development of two alternative scenarios to the baseline projection for the selected agriculture variables**

The contractor will develop two alternative scenarios to the baseline projection based on an alternative analysis of the future development of the key driving forces. Storylines will be developed, including possible policies and measures, and options affecting the future development of the agriculture sector, e.g. contrasting a liberalised versus a protected EU agriculture market. Alternative assumptions for technological change/shift or social trends could also be the focus for such scenarios. The alternative scenarios will be discussed and agreed between the contractor and the EEA, taking into account the advices/comments from an Advisory Group (see below). The EEA intends to set-up an Advisory Group, consisting of representatives from the Commission (DG ENV, DG AGRI, DG TREN, DG RTD) and additional experts, for the air and climate change scenarios in the SoEOR2005 report. A sub-group could focus on the agriculture outlooks.

The two alternative scenarios will be reported on the same level of detail as the baseline projection. Attention will be paid to the comparison of the results with those of the baseline projection and their analysis. Policy options included in the scenarios and their effects on the selected agriculture variables will also have to be discussed. The key findings, as well as the possible early warnings, will have to be highlighted. A comparative assessment of the alternative scenarios with the most recent and important outlooks for the selected agriculture variables will also be done.

The main role of the Advisory Group is to provide comments and advice for the development of the baseline and alternative scenarios. The Advisory Group will meet with EEA staff and the contractor in Copenhagen as appropriate.

### **5.6 Final report to the EEA**

The results of the study shall be reported to the EEA in an interim report summarising the results of tasks 5.2 and 5.3 and providing proposals for task 5.4 and 5.5 (no later than four months after signing the contract), a final draft report (no later than eight months after the signing of the contract) and a final report (no later than nine months after the signing of the contract). These reports should contain the following indicative chapters, which will be further discussed and defined with the EEA during the course of the study:

- Executive summary
- Chapter 1. Introduction (key questions to be answered, relevance and consistency issues, links with other EEA's outlook activities, etc.)
- Chapter 2. Methodology for undertaking the study (modelling tools, assessment approach, etc.)
- Chapter 3 Detailed description and discussion of the (economic, sectoral, political and social) demand and supply side driving forces for the selected agriculture variables. Discussion of the sub-set of key driving forces in light of their importance to the selected agriculture variables in the future and the policy options. The capabilities and drawbacks of the

	modelling tool to simulate the effects of the key driving forces are discussed.
Chapters 4	Analysis of the future development of the key driving forces and the baseline scenario; the selected agriculture variables are reported. The main uncertainties affecting the selected agriculture variables are discussed and the sensitivity runs on key driving forces are reported. Rationales for the development of alternative scenarios to the baseline projection. Discussion of the policy options to be included.
Chapter 5	Assessment of the future development of the key driving forces in the alternative scenarios to the baseline projection. Comparison of the results of the alternative scenarios with those of the baseline projection.
Chapter 6	A comparative assessment of the results of the study (i.e. baseline projection, sensitivity runs and alternative scenarios) with the most recent and important outlooks at European and national levels for the selected agriculture variables. This implies providing a summary or synthesis, a comparison and an analysis of the main results.
Chapter 7	Conclusions: main findings, key signals and possible early warnings. References Annexes (with data results tables of all the scenarios)

## 6. Deliverables and timetable

The contractor must deliver according to the following timetable:

Within a month after signing of the contract	Kick-off meeting (in Copenhagen) or tele/videoconference with EEA project managers to discuss the detailed activities and implementation plan. The contractor will be provided with relevant statistical data on agriculture by the EEA.
No later than three months after signing of the contract	Progress meeting (in Copenhagen) or tele/videoconference with EEA project managers.
No later than four months after signing of the contract	Delivery of an interim report summarising the results of tasks 5.2 and 5.3 and providing proposals for task 5.4 and 5.5. Discussion and agreement between the contractor and the EEA experts on the development of the two alternative scenarios to the baseline projection.
Within seven months of signing of the contract	Delivery of draft report to the EEA containing drafts of all chapters: the report should be format edited. Delivery of draft database of results (in Microsoft Access or Excel formats).
No later than seven months and a half after the signing of the contract	Comments from the EEA to draft report.
No later than nine months after the	Delivery of final report to EEA: the

signing of the contract	report should include EEA's comments on the draft version and be language and format edited. Delivery of final database of results (in Microsoft Access or Excel formats).
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### **Appendix A - List of (selected) agriculture variables**

Below are given the variables and sub-variables (1) for which the results shall be reported as a minimum and (2) those which are considered important but not essential and therefore should be delivered if feasible only.

#### **1. Variables for which the results shall be reported as a minimum**

##### **Livestock**

- Livestock patterns (i.e. number of living animal):
  - \* Dairy cows
  - \* Other cattle
  - \* Sows
  - \* Fattening pigs
  - \* Laying hens
  - \* Other poultry (if possible distinguishing between "chickens (broilers)" and "other poultry" like geese, turkeys, ducks)
  - \* Sheep and goats

##### **Fertilizers**

- Fertilizers consumption: use of nitrogen (N, split into consumption of "UREA" and "OTHER N mineral fertilizers"), phosphate (P) and potassium (K) mineral fertilisers.
- Cropping patterns (i.e. areas and volumes): cereals (wheat, barley, oat, rye, etc.), maize, rice, oilseed rape, permanent crops (e.g. vineyard, fruits and olive trees), etc.

##### **Supplementary information**

- Macroeconomic assumptions used in the projections (e.g. exchange rates).
- Assumptions about the agricultural policies taken into account, i.e. anticipated no change of WTO agreements or not, EU policies, etc.
- The assumed changes (in time) in productivity for animals, i.e. change in off-take (slaughter) weights, milk production, egg production.
- Assumptions about the improvement in efficiency of application (if they are taken into account or not and how), i.e. better timing, etc.

#### **2. Variables considered important but not essential; deliver if feasible.**

##### **Livestock**

- Livestock patterns (i.e. number of living animal):
  - \* Fur animals
  - \* Horses (if possible distinguishing between "agricultural horses" and "recreational horses")



**Other activities**

- Area enrolled in agri-environment schemes
- Organic farming (area)
- Oilseed crops intended for the production of biodiesel.
- Area of other bio-energy crops, e.g. plants for bio-ethanol production and short-rotation coppice

**Supplementary information**

- Nitrogen and carbon excretion for animals listed above (this will be used to assess emission factors).
- Percent of animals kept on solid manure and liquid manure systems and a discussion of potential future developments, e.g. potential impact of animal welfare-related policies, etc.
- Application of sewage sludge on agricultural land as fertilizer.

**Emissions**

- Nitrous oxide (N<sub>2</sub>O).
- Methane (CH<sub>4</sub>).
- Ammonia (NH<sub>3</sub>).
- Emission factors (for the same pollutants).