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Characterisation of data collection - processing - reporting for agri-environmental policies in Member States of the European Union

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Characterisation of data collection - processing - reporting for agri-environmental policies in Member States of the European Union

This document is the result of the DireDate project's task 6. DireDate stands for 'Direct and indirect data needs linked to the farms for agri-environmental indicators'. The DireDate project is a study financed by Eurostat, European Commission, and undertaken by a consortium led by ALTERRA (NL) (Service Contract 40701.2009.001-2009.354).

The general objective of DireDate is “to create a framework for setting up a sustainable system for collecting a set of data from farmers and other sources that will serve primarily European and national statisticians for creating the agreed 28 agri-environmental indicators (AEIs) and thus serve policy makers, but as well agricultural and environmental researchers, observers of climate change and other environmental issues linked to agriculture”.

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Executive summary

Introduction

Member States have to collect agri-environmental data and information to be able to report on the impact of agriculture on the environment, the progress of the implementation of the EU agri-environmental policies, as well as to estimate the agreed 28 AEIs.

There is as yet little insight in the actual data collection – processing – reporting chains in the Member States. There is no information about 'who is doing what'. The methods and procedures are also not well known.

This draft report deals with task 6 of DireDate. The objective of task 6 is "*to characterize data collecting and reporting systems for AEIs in Member States of the European Union (EU-27) with the ultimate aim to give best practices recommendations for a common data collection procedure*". The results of the study reported here are based on:

- Assessment of the four questionnaires.
- Case studies on data collection, processing and reporting
- Interviews with experts, including telephone interviews
- Assessment of the UNFCC and CLRTAP inventory reports on data collection and data reporting systems.

Results obtained from questionnaires

The response rates of the four questionnaires to Statistical Offices, Governmental Departments and Research Institutes ranged from low to high. Quite a few returned questionnaires were incomplete. The following observations were made:

- Many organizations are involved in data collection – processing – reporting chains of agri-environmental data and information in Member States, especially in Member States with decentralized, federal governments.
- Nobody in Member States has a complete overview of the agri-environmental data collection – processing – reporting chains.
- The Rural Development Programme (RDP) requires the collection of a lot of agri-environmental data, which Member States often do not have.
- Insufficient data are available for the accurate estimation of many of the AEIs.
- Most Member States use random quality checks, but there is no easy accessible information about the quality of the reported data and information
- The strategy of 'report once, use many times' is highly welcomed by Member States, but they note that prior to streamlining of the data flows, there should be a phase of harmonization of data reporting requirements.

- Member States noted that there are several barely reconcilable differences in reporting requirements between EU Directives (timeframe of reporting, different formats, different units, differences in the level of details, etc.)
- Member States use various methods for data aggregation, depending in part on the institute that is doing the data processing. Within guidance documents there is often scope for variable interpretation, which ends up in different results if done by different people.
- In general, Member States are not willing to providing the raw data to the EU-27 to be aggregated centrally, because of loss of background information.

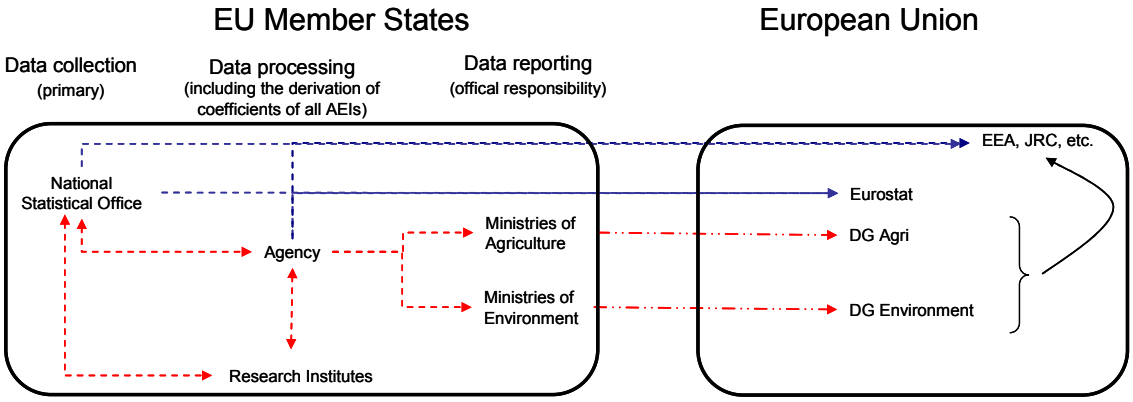
Results obtained from case-studies and interviews

The results of case studies in Poland and The Netherlands indicate that the data collection – processing – reporting chains for ammonia and greenhouse gas emissions and N balances are highly complex. The complexity is scale-dependent. The procedures and practices of collecting, processing and reporting data and information have evolved over time and are at different stages of development in the EU-27.

The interviews revealed that there are different perceptions of best practices for data collection and processing. Many experts emphasized the need for simplification of reporting requirements, and suggested a leading role for DG Eurostat. The need for detailed agri-environmental data was not always understood, and some questioned the effectiveness and relevance of some AEIs.

Member States foresee a key role for National Statistical Offices in further coordinating and streamlining the data collection – processing – reporting chain, in liaison with DG Eurostat and European Environmental Agency. Research Institutes have a role in establishing calculation procedures and guidelines for estimating coefficients, and in data collection. Independent agencies should have key roles in reporting (see Figure 1).

Figure 1: Suggested framework for the data collection – processing – reporting chain in Member States, and the flow of information from Member States towards the European Commission.



Conclusions and recommendation

The data collection – processing – reporting chains for agri-environmental data and information in EU Member States are diverse and complex. They are diverse because of differences between Member States in historical and cultural backgrounds. They are complex because agri-environmental interactions are complex. Characterizing these interactions adequately requires a large amount of good-quality data and information. It should also be noted that the current collection – processing – reporting chains in EU Member States have not been designed specially for reporting agri-environmental data and information, including the 28 AEIs, to the European Commission. Rather, the current data collecting and reporting systems in EU Member States reflect the status quo in which the emphasis was on agro-economic and much less on agri-environmental characterisations.

Evidently, the data collection – processing – reporting chains in EU Member States are in development. We observed that there is sometimes a lack of appropriate data and then 'guesstimates' are being made. On the other hand, we also observed that duplicates are being made. Guesstimates are defined as 'data that has a verifiable origin somewhere, but that has become vague and untraceable through multiple manipulations'. Duplicates may occur when policy reports demand similar data and these data are then collected, processed and reported by different departments without much tuning or harmonisation. We were not able to quantify the extent and occurrences of duplicates and guesstimates.

We recommend that Member States appoint a coordinating institution and develop an integral overview of the data collection – processing – reporting chains. National Statistical Offices are the most obvious organizations for coordination. Currently, they rely on the support (and goodwill) of many other institutions. We recommend that the European Commission and the Member States strengthen (by political decisions) the responsibility and domains of the National Statistical Offices for the coordination of the data collection – processing – reporting chains for all agri-environmental data and information.

We recommend the European Commission to further streamline the reporting requirements for agri-environmental policies, especially as regards the requirements for agri-environmental data. We also recommend that the data collection – processing – reporting chains for agri-environmental policies are fully harmonized/standardized, i.e., the AEIs should form the basis for reporting about the progress of the agri-environmental policies (see task 2).

We recommend the set-up of Task Forces for the development and approval of protocols and guidelines for uniform data collecting – processing - reporting of agri-environmental data and information. Experts from all Member States should be involved in these Task Forces, while DG Eurostat should have a coordinating and stimulating role. The protocols and guidelines should be updated on a regular basis (once in ~five years) to be able to incorporate new insights from science, policy and practice. The institutional structure with quality control and assurance, and uniform protocols and formats for reporting of GHG and ammonia emissions may serve as a model for the creation of uniform and harmonious data collecting and reporting systems.

There is a certain 'questionnaire fatigue' among Statistical Offices, Governmental Departments and Research Institutes. This can be concluded from the low response rates to some of the questionnaires and from the responses. This 'fatigue' is also a signal to the policy arena and political arena; it is time for action and more support for the agri-environmental data collection – processing - reporting chains.

1. Introduction

Agriculture exerts various effects on the environment. These effects depend on both the agricultural activities and the environmental conditions. Agriculture in the European Union (EU) is highly diverse and also dynamic, as agriculture responds to changes in markets, technological developments and governmental policy. As a consequence, effects of agriculture on the environment are spatially diverse and change over time.

The Common Agricultural Policy (CAP) and Rural Development and Environmental Regulations and Directives of the EU-27 have a strong influence on agriculture and its effects on the environment. The general objectives of these policies are to making EU agriculture more productive, competitive and environmental sound, whilst safeguarding the livelihoods and natural values of rural areas. Member States of the EU-27 are required to report regularly to the European Commission on the effectiveness of the aforementioned policies. Agri-environmental indicators (AEIs) increasingly play a role in assessing the effectiveness of agri-environmental policy measures.

Member States have to collect agri-environmental data and information to be able to report on the impact of agriculture on the environment, the progress of the implementation of the EU agri-environmental policies, as well as to estimate the agreed 28 AEIs. There is as yet little insight in the actual data collection – processing – reporting chains in the Member States. There is no information about 'who is doing what'. The methods and procedures are also not well known.

The general objective of the service contract 'DireDate' is "*to create a framework for setting up a sustainable system for collecting a set of data from farmers and other sources that will serve primarily European and national statisticians for creating the agreed 28 agri-environmental indicators and thus serve policy makers, but as well agricultural and environmental researchers, observers of climate change and other environmental issues linked to agriculture*". DireDate is carried out by a consortium of 5 research institutions from 5 Member States and has 9 different tasks.

This draft report deals with task 6 of DireDate. The objective of task 6 is "*to characterize data collecting and reporting systems for AEIs in Member States of the European Union (EU-27) with the ultimate aim to give best practices recommendations for a common data collection procedure*". There is a growing awareness that through differences in data collection and reporting systems between different EU Member States, the interpretation of the agri-environmental data and information at EU level is obscured. Main areas of concern are the occurrence of so-called guesstimates and duplicates. Guesstimates are defined as data that has some identifiable source, but that through multiple transformations and processing by different organizations, has lost its relation with the data source. Also, filling in missing data using 'expert consultation' may contribute to turbidity of underlying data. Ultimately, comparison of agri-environmental data and information between Member States will loose its validity and, by that, scientific and eventually public support. Duplicates occur when (almost) similar data are collected more than one time for different regulations. This leads to inefficiency and harbours the risk of creating differences in reporting.

The data collecting and reporting systems for agri-environmental data and information in EU Member States are diverse and complex. They are diverse because of differences between Member States in historical and cultural backgrounds. They are complex because agri-environmental interactions are complex and characterizing these interactions adequately requires a huge amount of data and information. It should be noted also that the current data collecting and reporting systems for agri-environmental data

and information in EU Member States have not been designed specially for creating accurate estimates of the 28 agreed AEIs. Rather, the current data collecting and reporting systems in EU Member States reflect the status quo in which the emphasis was on agro-economic and not on agri-environmental characterisations.

This draft report provides a first attempt to characterize the collection and reporting systems for agri-environmental data and information in Member States. The authors of the report do not pretend to provide a complete overview for all agri-environmental data and information, also because of the huge diversity and complexity involved, and also because the data collection and reporting systems are continuously changing. Rather, this report provides an overview of the diversity and complexity of data collection and reporting systems in the EU member states for some agri-environmental data. Based on this overview and the analyses, recommendations are provided for best practices.

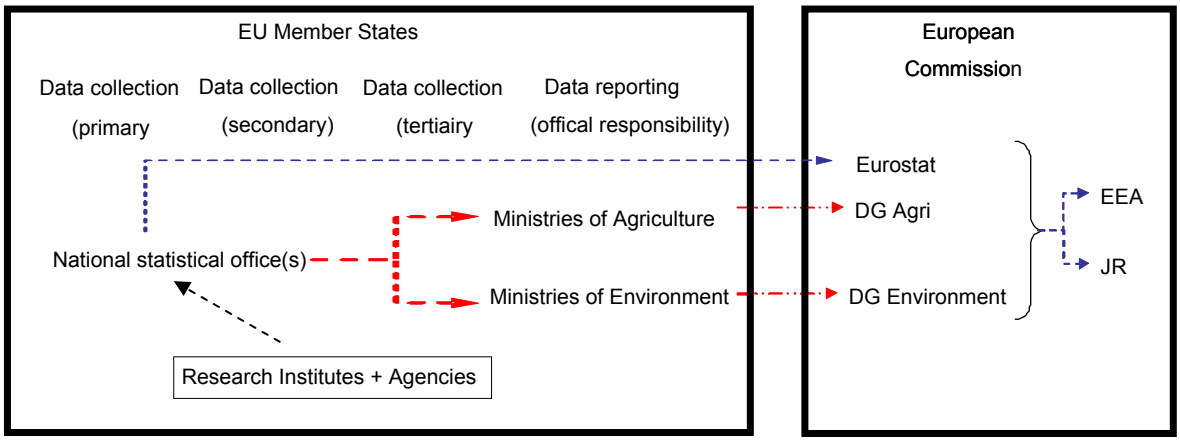
2. Organisational Layout

To facilitate the understanding of data collection and reporting systems an organisational layout was developed which schematically visualizes the flows of information within member states (MS) and towards the EC (Figure 1).

In this figure several stages of data collection are distinguished.

- Primary data collection: this is the organization that collects data on the ground.
- Data processing: this is an organization which summarizes aggregates or scales collected data and which formats the data towards the required reporting system.
- Primary data collection: these are the organizations that collect the data on the ground, at farm or field level.
- Secondary data collection: these are the organizations that process and aggregate the collected data so as to making them representative for a certain region/area.
- Tertiary data collection: these are the organizations that format and interpret the data and make the formal report, following the reporting guidelines of the EU Agri-Environmental policy.
- Data reporting: this is the organization (most often a Ministry) that is formally responsible for reporting.

Figure 2: Conceptual flow of data (blue dash) and reports (intermittent long and short dashes) between EU member states and the EC. In red the routes of policy reports are indicated.



3. Materials and methods

To achieve the objectives set out in the introduction several sources of information were explored:

1. Assessment of the questionnaires. These questionnaires are divided into the so-called EUROSTAT questionnaires, Development, distribution and analysis of the DireDate questionnaires, the assessment of a previous questionnaire distributed by the DireDate coordinator: the RAMSOIL questionnaire and the assessment of a previous questionnaire distributed by DG Environment: the streamlining questionnaire
2. Case studies on data collection, processing and reporting
3. Interviews with experts, including telephone interviews
4. Assessment of the UNFCC and CLRTAP inventory reports on data collection and data reporting systems.

In this chapter the methodology to explore each source of information is described.

3.1. Questionnaires

Questionnaires can be very helpful to obtain a cross-cut view of perceptions on a certain subject from a population. The advantage of using questionnaires is that information can be requested in a pre-defined format, which subsequently allows structured assessments. However, there are also disadvantages, which are related to possibilities of biased, non-representative results. In other words, responses tend to come from well-informed and motivated persons and less from less interested persons, whereas for a representative analysis respondents should come from all levels of interest.

Previous studies suggest that achieving a good response rate is a particular problem for postal questionnaire surveys and that the response rate may be reduced by up to 20% compared to an interviewer- based survey. A response rate of 75% for a postal questionnaire survey is considered to be extremely good (Williams, 2003).

Notwithstanding the possible shortcomings of questionnaires they are used frequently in applied research. For this project the results of 4 different questionnaires were used:

1. The so-called EUROSTAT questionnaires, designed by EUROSTAT in 2009 to obtain an overview of data owners and time coverage per parameter of each AEI in all Member States. The EUROSTAT questionnaire was sent to national contact points.
2. The so-called DireDate questionnaire, designed by the DireDate consortium to obtain detailed information on 1) types of organizations involved and 2) application of methods for data collection and data processing. The DireDate questionnaire included various versions, specifically designed agri-environmental data and information related to the EU Water Framework Directive (WFD), the EU Nitrates Directive, the EU National Emissions Ceiling Directive (NECD), the EU Rural Development Programme (RDP), the United Nation Framework Convention on Climate Change (UNFCCC), and the EU Integrated Pollution Prevention Control Directive (IPPC). However, only questionnaires related to the RDP were sent out, using the contact details from DG Agri.

3. The so-called RAMSOIL questionnaires, previously designed by the EU RAMSOIL consortium, which was led by the DireDate coordinator. The objective of this questionnaire was to collect information on differences in methods used by MS to assess risks related to soil degradation. Questionnaires were modified towards specific threats and one overarching questionnaire was developed for policy makers. It is this last questionnaire that provided information that was also relevant for the objectives of DireData. The RAMSOIL policy questionnaire was distributed using contact details from the European Soil Bureau Network (ESBN) and personnel networks.
4. The so-called streamlining questionnaire which was developed and distributed by DG environment in April 2010. The objective of this questionnaire was to explore options for streamlining reporting procedures for different directives under DG Environment.

The EUROSTAT, Diredate and RAMSOIL questionnaires are presented in Annexes 2, 3 and 4 respectively. Below, a summary of these questionnaires is provided.

3.1.1. EUROSTAT questionnaires

During the last three years, there has been intensive discussion between representatives of EUROSTAT and National Statistical Offices within the EU-27 on the content of the next series of farm structure surveys, which starts in 2010 with the census of agricultural holdings in an additional survey (SAPM, survey on agricultural production methods). The challenge is to address these additional data needs without significantly increasing the burden on respondents (Charlier, 2001). To adequately address this challenge current data collection systems should be analyzed and understood. Therefore, EUROSTAT sent out questionnaires to all EU Member States in November 2009.

The EUROSTAT questionnaire was rather straightforward (see Annex 2); information could be provided for each parameter about involved organizations, NUTS levels and time coverage by the respondent. Notwithstanding its relative simplicity, the interpretation of the results required a conceptual framework specified towards data collection procedures, which can be considered as an elaboration of the left parts of Figures 1 and 2. Evidently, the flow of data and information differs between different Member States and for different AEIs.

The EUROSTAT questionnaires were analysed for the 12 so-called key-AEIs which were selected jointly with EUROSTAT and are listed in Table 1.

Table 1: The 12 selected first priority AEIs for specific analysis in DireDate.

	AEI	Possible EU data sources	DPSIR
1	Mineral fertilizer consumption	FAOSTAT, EFMA, fertilizer surveys	D
2	Consumption of pesticides	ECPA, pesticide regulation	D
3	Irrigation	FSS	D
4	Energy use	SIRENE	D
5	Soil cover	FSS, to be defined	*S*
6	Tillage practices	Future SAPM	D
7	Manure storage	FSS, future SAPM	D
8	Intensification/extensification	FADN, milk statistics, FSS	D
9	Gross nitrogen balance	FSS, EFMA, FADN, EMEP, SAPM, fertilizer surveys	P
10	Risk of pollution by phosphorus	Fertiliser surveys, soil map	P
11	Ammonia emissions	UNECE, EMEP	*P*
12	Greenhouse gas emissions	UNECE, EMEP	P
13	Soil quality	European Soil database, CLC, LUCAS, fertilizer surveys	S

3.1.2. DireDate questionnaires

Tailor-made questionnaires were developed for responsible reporting organizations of the WFD, UNFCC, NECDD, ND, IPPC and RDP. The philosophy behind these questionnaires was to focus on the data and information related to a specific EU agri-environmental policy. The questions were related to:

- Number of organizations involved in data collection and reporting.
- Methods of data collection
- Methods of data processing

To facilitate interpretation of the results, predefined classes were provided for each item (annex 3). The DireDate questionnaire was sent to RDP contact points.

3.1.3. RAMSOIL questionnaires

In a previous EU project coordinated by Alterra, questionnaires were sent out to policy makers in all EU member states to assess the adoption of different assessment methodologies on soil threats. Although the objective of the RAMSOIL project deviated from the current project, some results may still be valuable and the so-called policy questionnaire was re-assessed with the objective of the current project. A detailed description of the RAMSOIL questionnaire can be found in van Beek et al. (2010) and in Annex 4.

The RAMSOIL questionnaire included ‘open’ and ‘closed’ questions. The policy questionnaire was rather descriptive in the methodology for the risk assessment methodology used; which indicators, which thresholds, and what motivation. Results of the questionnaire were stored in a database, which is accessible via www.ramsoil.eu.

3.1.4. Streamlining questionnaires

In April 2010 DG Environment sent out a questionnaire to all Member States on streamlining reporting needs for the Water Framework Directive (WFD) and Nitrates Directive, from hereon referred to as 'streamlining questionnaire'. The objective of the questionnaire was to explore the options for one reporting systems for different Directives under DG Environment. The DireDate consortium received access to the responses to the streamlining questionnaire and these were re-examined for the objectives of DireDate. Results can not be named next to a reply for reasons of confidentiality which complicates objective interpretation. The lay-out of the streamlining questionnaire is presented in Annex 5. The streamlining questionnaire contained 'open' questions.

3.2. Case studies

Two case studies have been carried out to obtain detailed understanding of data collection-processing-reporting for. Case studies were performed in Poland and in The Netherlands and focused on 4 key AEIs which were selected together with EUROSTAT. These indicators are:

1. Fertilizer consumption
2. Gross nitrogen balance
3. GHG emissions
4. NH_3 emissions

These AEIs have been selected because of their key roles in agri-environmental policies. The data collection-processing-reporting for these specific AEIs were analysed by literature review and expert consultation.

3.3. Expert interviews

As a supplement to the DireDate questionnaire interviews in person (1) and by telephone (6) were performed to obtain 'on the ground' stories. The introductory script for the telephone interviews is attached in Annex 6. For the telephone interviews the contact details provided by DG Agri were used.

3.4. Assessment of UNFCC and CLRTAP inventory reports

Conducted studies targeted on steps and processes in the preparation and formal reporting of two AEI's (GHG emissions and ammonia emissions) in all EU Member States. For these purposes the following information has been used:

- National Greenhouse Gas Emission Inventory Reports for 2010 for UNFCCC (prepared by MS in connection with the obligations following from the UN Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol) located on the website: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php;
- National Annual Emission Inventory Reports to United Nations Economic Commission for Europe (UNECE) which is prepared by MS in connection with the obligations following from the Convention on Long-range Transboundary Air Pollution (CLRTAP) and located on the website: http://www.ceip.at/submissions-under-clrtap/2010-submissions/.

4. Results

4.1. Case studies

To get detailed understanding of the data collection – processing – reporting chain for AEIs in the EU Member States case studies were carried out in Poland and The Netherlands for the following AEIs: fertilizer consumption, N balance, NH_3 emissions and GHG emissions. The data flow scheme for Poland is shown in Figures 3-6 and for The Netherlands in Figures 7-11.

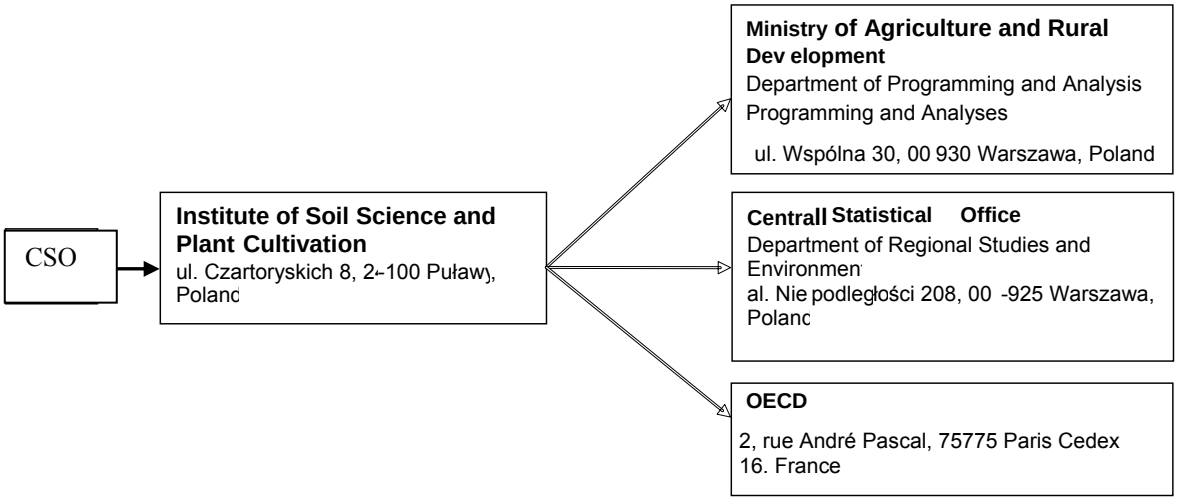
4.1.1. Data processing – reporting chains in Poland

Mineral fertilizer consumption

Figure 3: Data collection - processing – reporting chain for mineral fertilizer consumption in Poland.

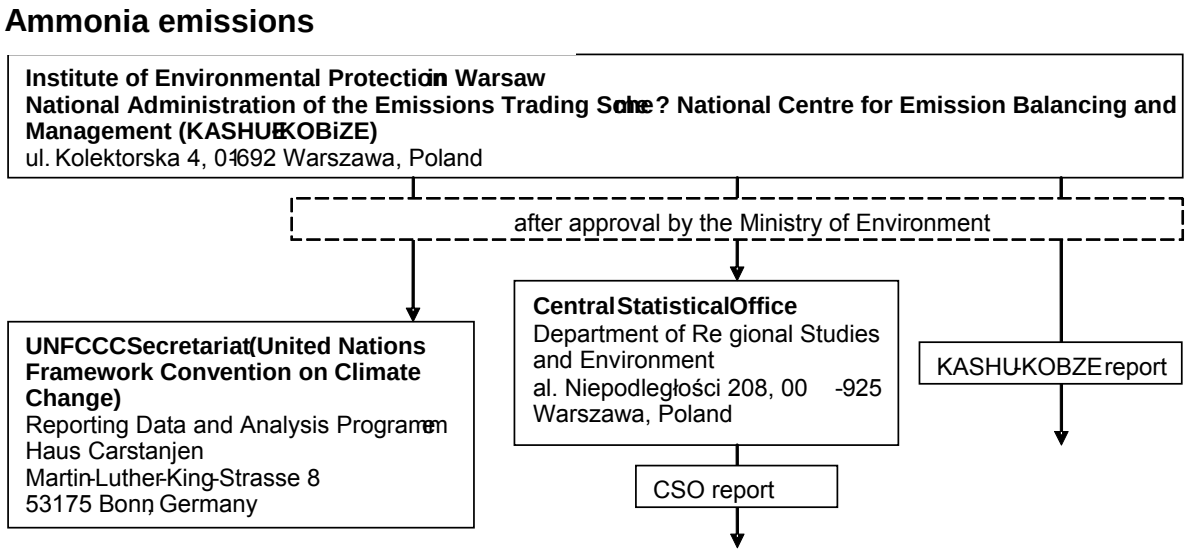
Gross Nutrient Balances

Figure 4: Data collection - processing – reporting chain for Gross nitrogen balance in Poland



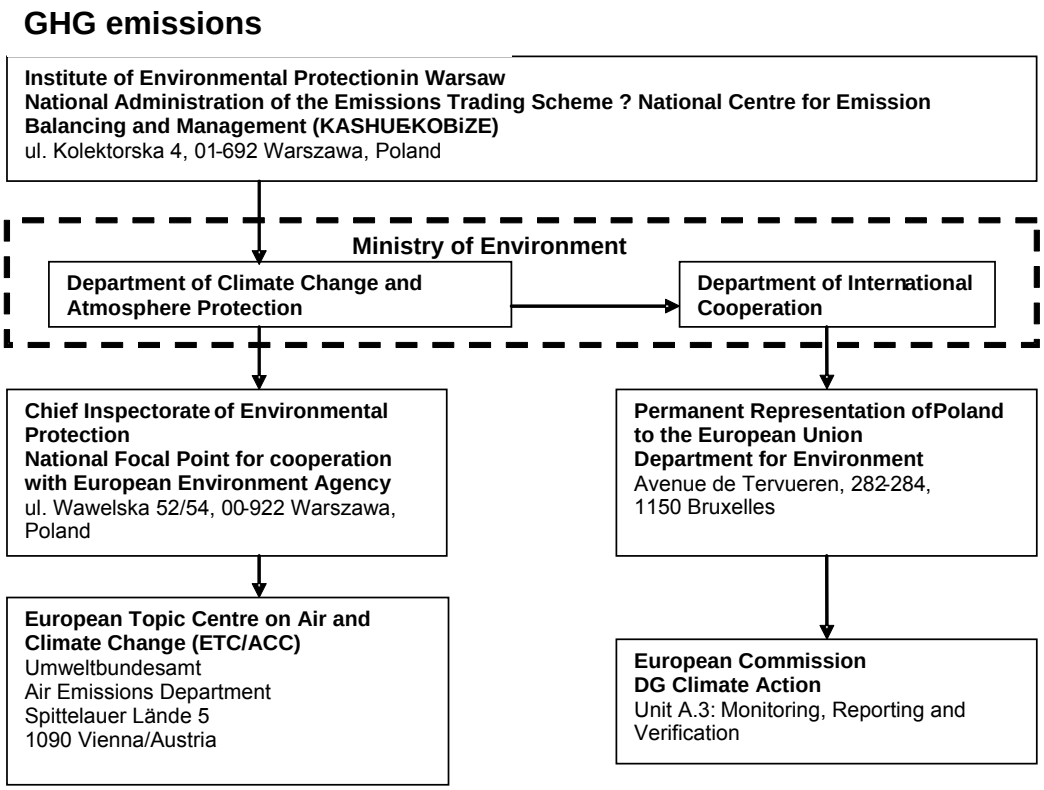
NH_3 emissions

Figure 5: Data collection - processing – reporting chain for ammonia emissions in Poland



GHG emissions

Figure 6: Data collection -processing – reporting chain for GHG emissions in Poland



The Polish example shows that the data collection - processing - reporting process depends on the type of agri-environmental indicator (AEI). In case of "mineral fertilizer consumption" indicator this process was relatively simple (Figure 3), as only one institution is involved in the whole chain of data collection – processing - reporting. The data regarding to the mineral fertilizers consumption were compiled directly by the Central Statistical Office and was based on the results from the sample survey "Land use, sown area, and livestock" conducted in individual farms and surveyed in state and cooperative farms and companies with public and private property share. Central Statistical Office presents the information on "mineral fertilizer consumption" only in its own publications (reports).

Rather simple is also the data collection - processing - reporting chain concerning the „nitrogen balance" indicator (Figure 4). This indicator was elaborated in the Institute of Soil Science and Plant Cultivation based on statistical data from CSO and appropriate coefficients from literature. The Institute of Soil Science and Plant Cultivation sends the Gross Nitrogen Balance results directly to the Ministry of Agriculture and Rural Development, the Central Statistical Office, and OECD. The Institute also presents the results in its own publications.

From the four analysed AEIs, the most complex and complicated are the GHG and ammonia emissions data collection - processing - reporting chains (Figures 5 & 6). Those indicators are produced directly by National Administration of the Emissions Trading Scheme National Centre for Emission Balancing and Management (KASHUE-KOBiZE) at the Institute of Environmental Protection. But in this process many other institutions participate (which are not show in Figures 5 and 6). Indicators are presented in own publications and are transferred to the Central Statistical Office, UNFCCC Secretariat, European Topic Centre on Air and Climate Change (ETC/ACC) and the European Commission. Two intermediates are involved in indicators transfer to the last two organizations. It seems that from an organizational point of view, this is not the optimal solution, and perhaps can be simplified.

It was found that a complete overview of the data collection - processing - reporting chains in Poland can be obtained most easily from the Institution that "produced" the AEIs. These institutions are different for different AEIs; in the current example of four AEIs, there are three such institutions. There is not any institution (unit) with a comprehensive overview on all AEIs. Discussions with colleagues from other new Member States suggest rather similar situations; there is not a single institution (unit) in a Member State with a comprehensive overview of all AEIs. Furthermore, there are no easily accessible documents that provide overviews of the data collection – processing - reporting chains for the different AEIs; this overview has to be obtained through interviews and discussions. Our findings suggest that full characterisation of the data collection – processing - reporting chains for all AEIs for all Member States requires a considerable investment (a large-scale project).

4.1.2. Data processing – reporting chains in the Netherlands

The data collection - processing – reporting chains for the key AEIs in The Netherlands seem more complex than those in Poland. In 2010, three ministries were involved, i.e. the Ministry of Housing, Spatial Planning and Environment (responsible for the reports of UNFCCC, NECD, IPPC and ND), Ministry of Transport and Water (responsible for reports of the WFD) and the Ministry of Agriculture, Nature and Food Quality (responsible for reports of the RDP). First, an overview is presented showing the relevant institutions and second a detailed analysis for each of the AEIs is presented.

In the overview, the institutions involved in the data collection - processing – reporting chains are presented. Institutes that are linked to a particular ministry are visualized using the same colour. The

collection of original (primary) data is shown in bright yellow. Agri-environmental data is made publicly accessible through two websites, viz. www.emissieregistratie.nl, for gaseous emissions and www.cbs.statline.nl, for statistical data on, amongst others, fertilizer consumption, gross nitrogen balances and agricultural performance.

Figure 7: Overview of institutions involved in the data collection - processing - reporting chains of agri-environmental data in the Netherlands

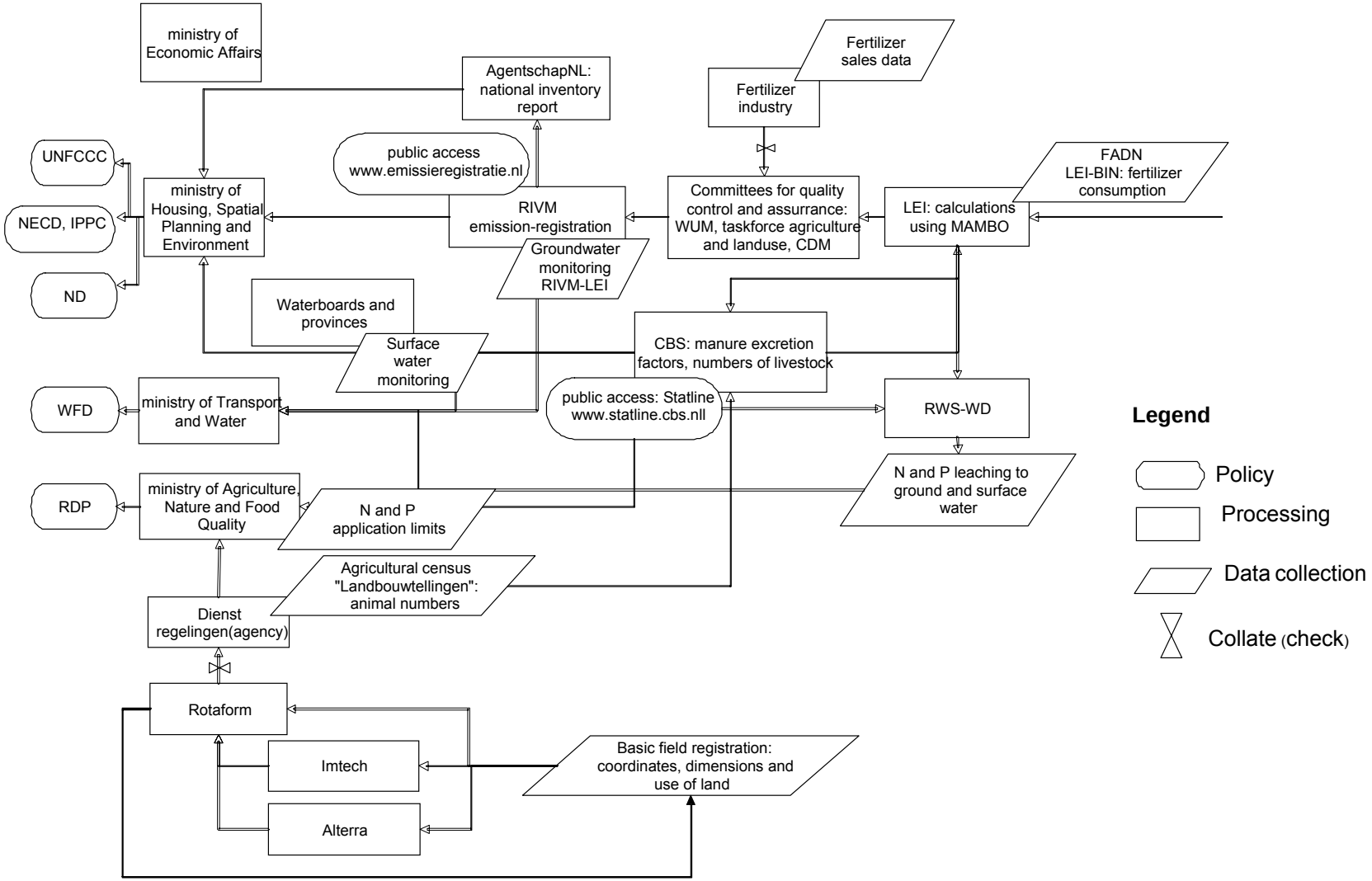
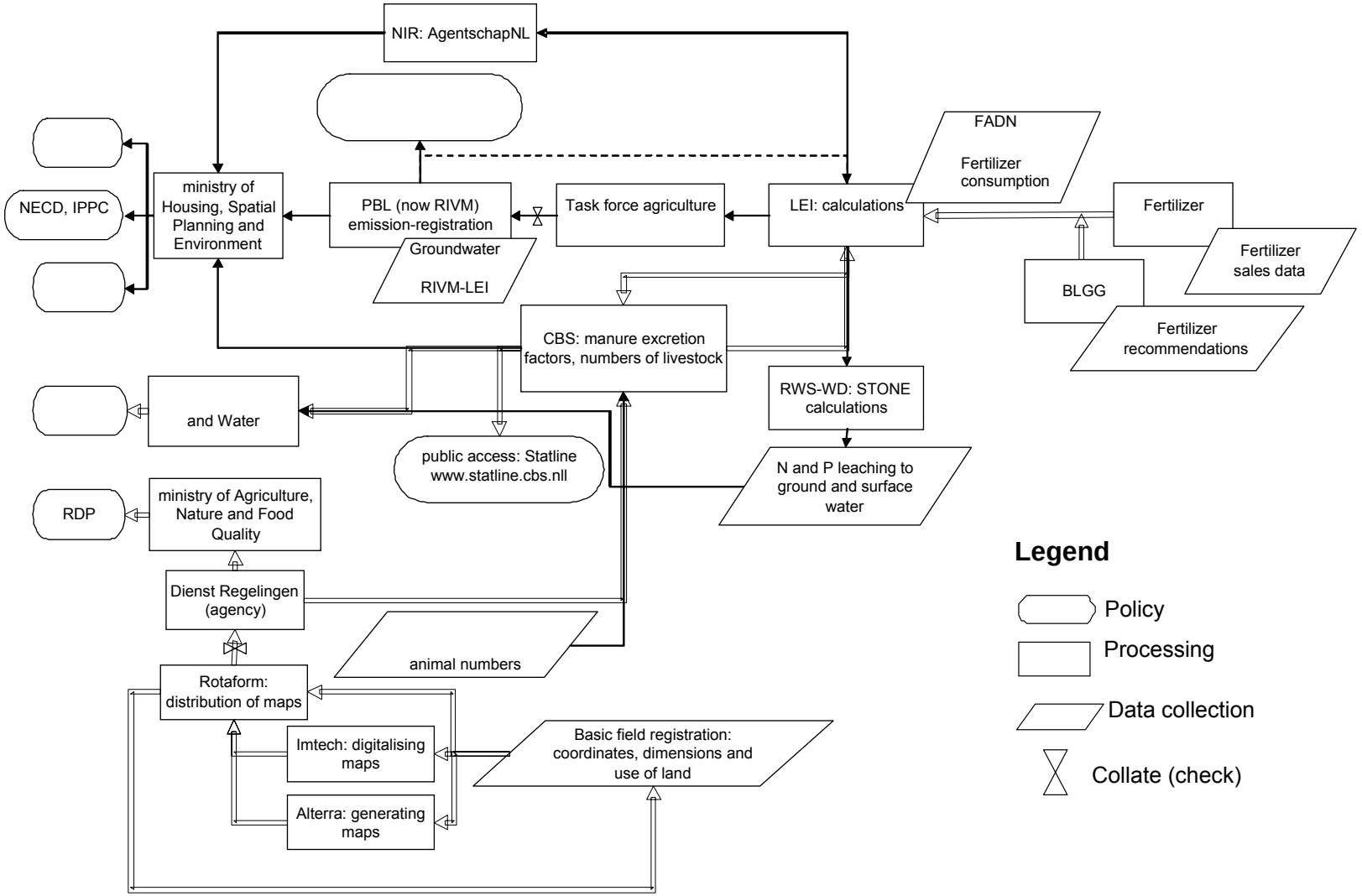
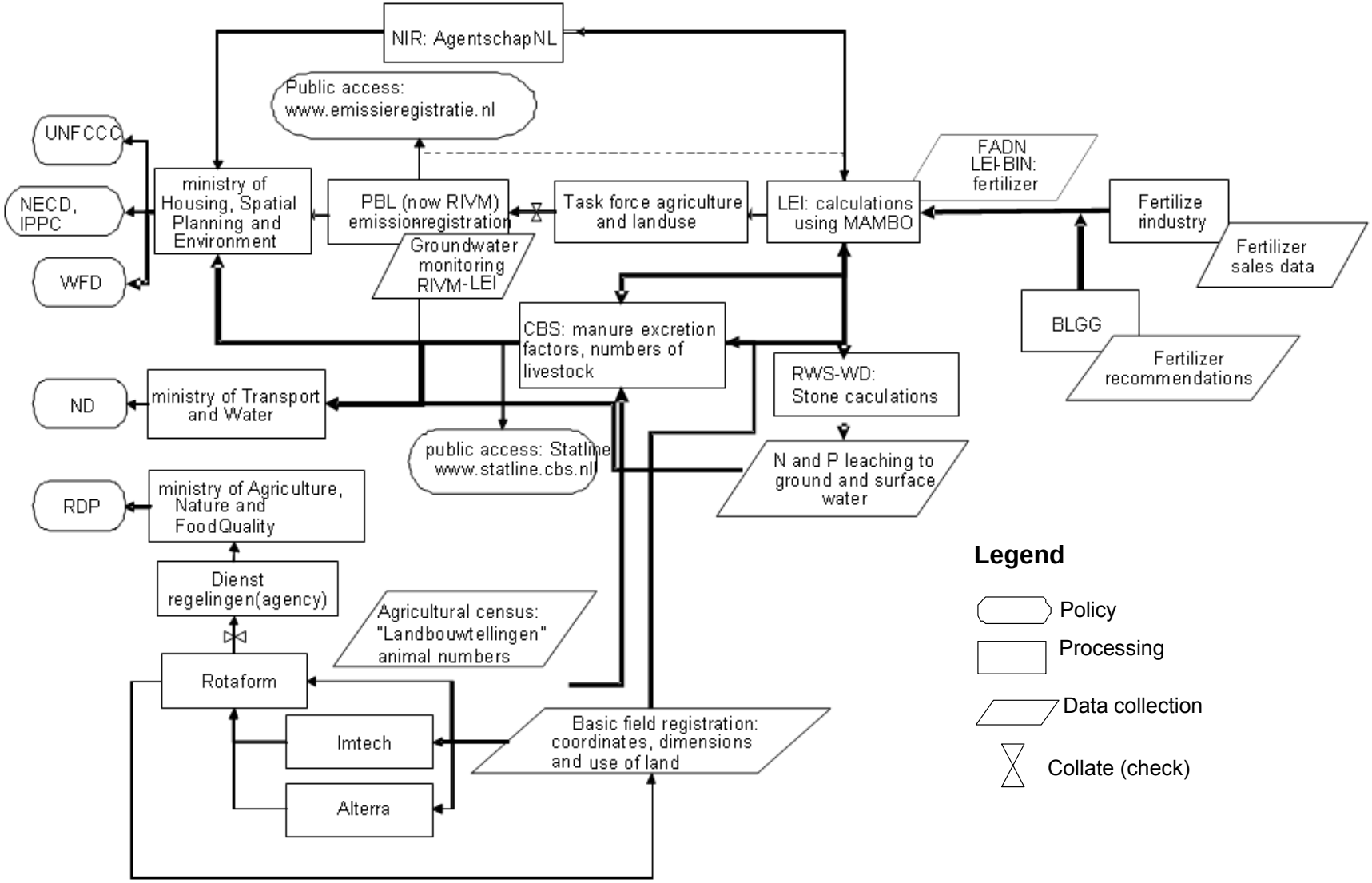


Figure 8: Data collection - processing – reporting chain for fertilizer consumption in the Netherlands



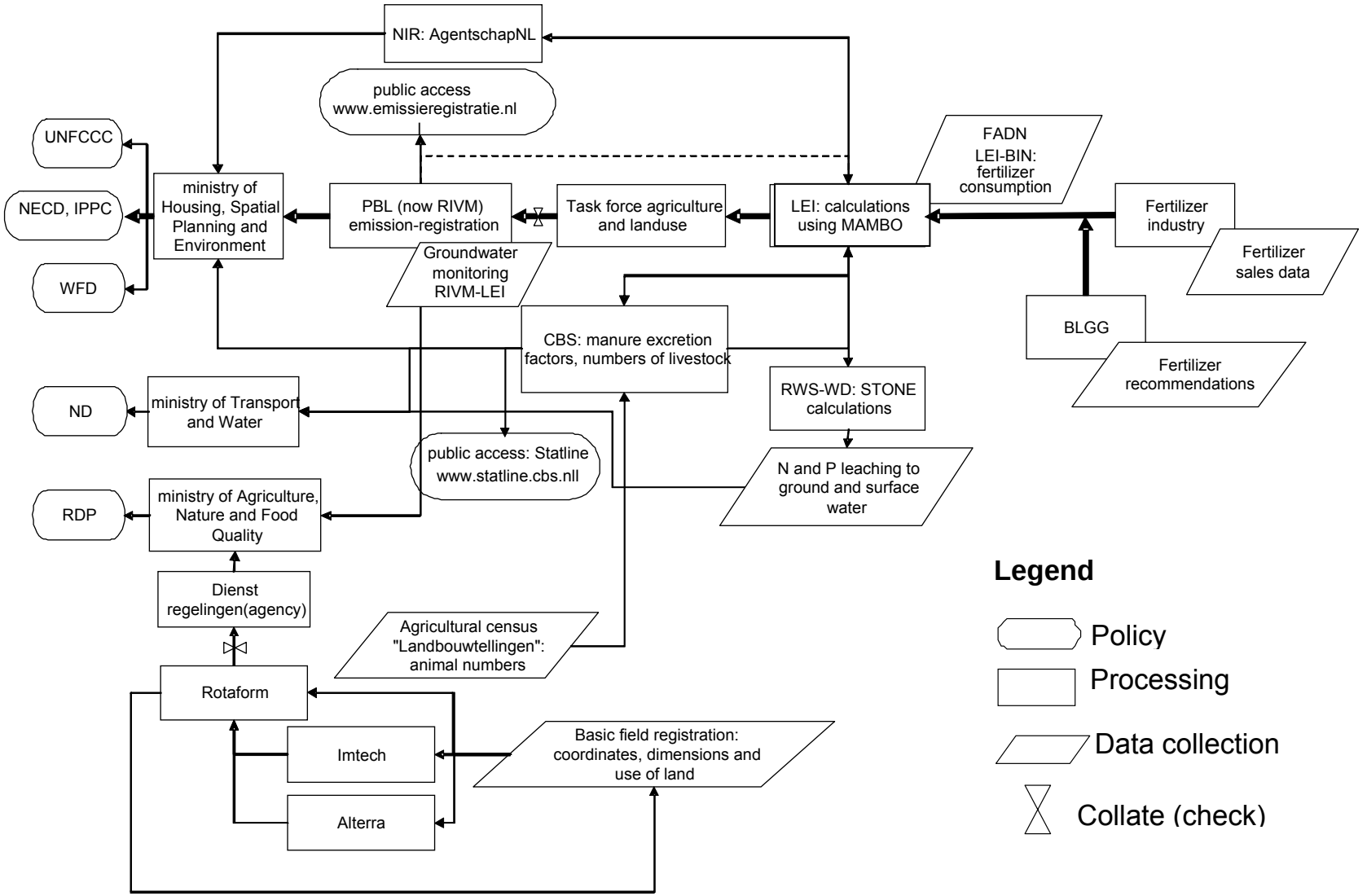
NP balances

Figure 9: Data collection - processing – reporting chains for Gross nitrogen and phosphorus balances in the Netherlands



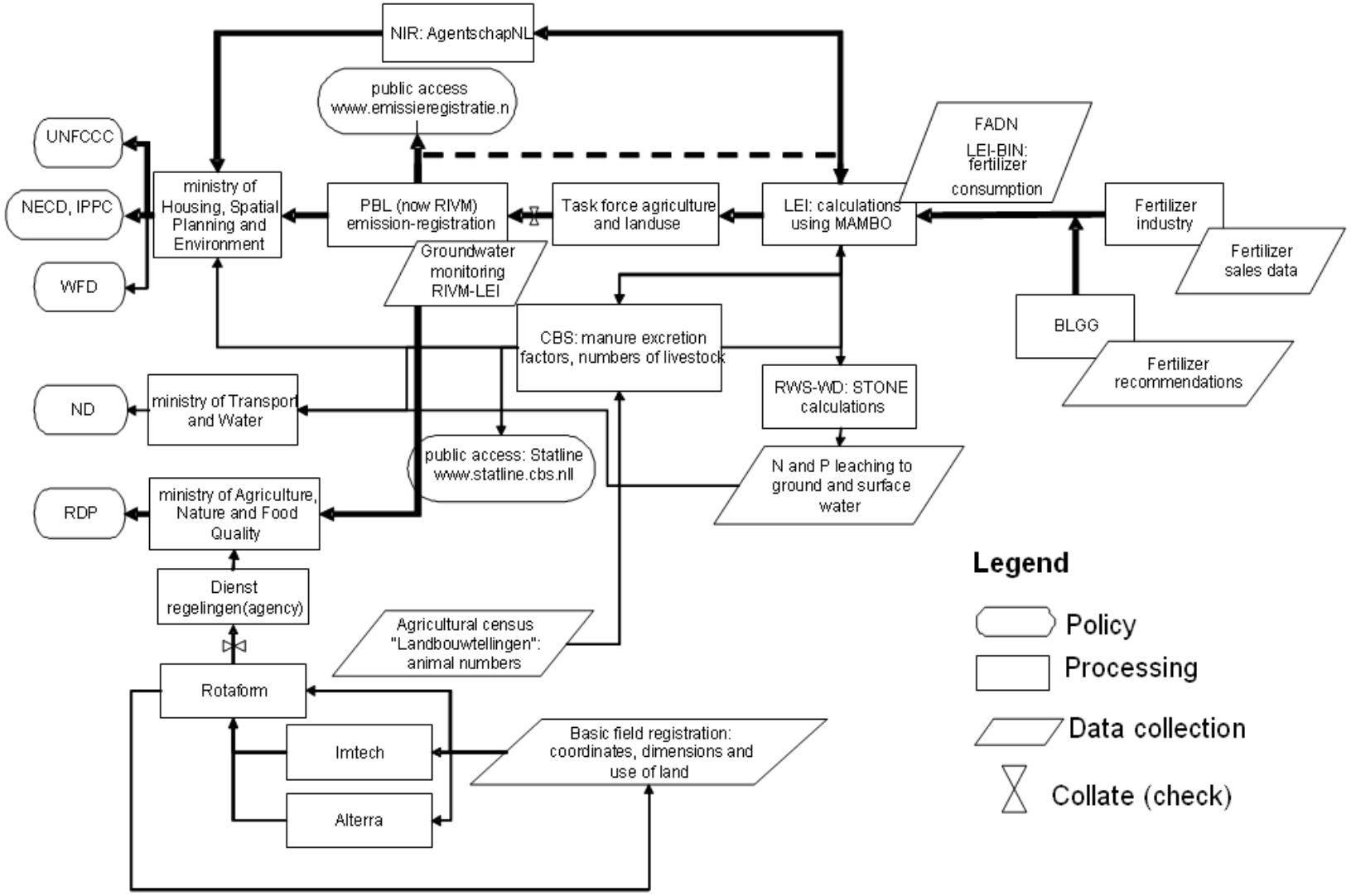
NH_3 emissions

Figure 10: Data collection - processing – reporting chains for NH3 emissions in the Netherlands



GHG emissions

Figure 11: Data collection - processing – reporting chains for GHG emissions in the Netherlands



From a comparison of Figures 3-6 for Poland with Figures 7-11 for The Netherlands the data collection – processing – reporting chains in Poland are less complicated that those in The Netherlands. In part, this apparent difference could be the result of differences in personal notions, as the analyses for Poland and The Netherlands have been made by different researchers. Differences are especially visible in the case of the AEI 'fertilizer consumption'. In Poland, the basis of the processing is the farmers' survey carried out directly by the Central Statistical Office. In The Netherlands the processing involves among others a simulation model (Mambo), for partitioning the total amount of fertilizer sales supplied by fertilizer industry over the various regions and crops. The processing involves also institutions in charge of the dimensioning of farm land areas and field sizes. In Poland the information of fertilizer consumption is distributed only via a CSO publication, in The Netherlands through various channels and not always with proper referencing to the original source. However, there is the possibility, as suggested above, that the data collection – processing – reporting chains shown in Figures 3-6 for Poland represents 'simplified' overviews. For example, Figure 4 suggests that the Institute of Soil Sciences and Plant Cultivation in Pulawy is the only institute involved in data collection and processing of the Gross Nitrogen Balance. Possibly, this Institute utilizes lots of information directly and indirectly from other Institutions as well, especially as regards the regional differentiation of the N outputs of the balance.

In The Netherlands the flow of data and information from its origin at farm level to its final publication by authorized organizations to the EU-27 is complex. Several organizations are involved in the process of data analyses, processing, checking, verification, etc. This complexity likely has historical and cultural backgrounds, but in part is also the result of the process of privatization and short-term (sub) contracting through open competition. It may also explain why nobody has an overview of the whole data collection – processing – reporting chains. Generally, involved (responsible) persons oversee only a part of the chain. Further, our analyses indicate that changes and ad hoc decisions occur often, based on identified conflicts and inconsistencies in data. For instance, currently there are three organizations involved in dimensioning farm land area and field sizes used for estimating fertilizer consumption in The Netherlands:

1. Through 'Rotaform' digital maps are developed, which are sent to the farmers: 'basic field registration'.
2. Farmers can visualize changes in field size on these maps and the maps are sent to Alterra and 'Imtech' after which new maps are generated.
3. Data from Imtech and Alterra are brought together at Rotaform and are sent to the coordinating and responsible organizational body (Dienst Regeling, an agency of the Ministry of Agriculture, Nature and Food Quality).

In principle, such a data loop could be simplified easily by merging the three organizations involved in the production of maps. Note also that the organizations may change over time (as indeed has happened) as the various tasks are tendered in open competition. This tendering approach is valid for more countries and hence the type and number of organizations may change over time (every 2 to 4 years). Our analyses and observations indicate that there are no persons who have the complete overview of the entire data chain. Another observation is that in The Netherlands use is made of complex simulation models (Mambo, STONE), whereas in Poland more use is made of simple calculations and expert judgements. In addition, the inclusion of control moments ('checks') is different for the countries; it is not immediately clear where checks are made and on the basis of which criteria.

4.1.3. Additional Information

Additional analyses of the data collection – processing – reporting chains for mineral fertiliser consumption, gross nitrogen balance and GHG and ammonia emissions were made on the basis of the reports submitted to EUROSTAT, FAO, OECD, UNFCCC and CLRTAP. It follows that:

1. The source of data on mineral fertiliser consumption for EUROSTAT is European Fertiliser Manufacturers Association (EFMA; from 2010 called "Fertilizers Europe"; http://fertilizerseurope.wordpress.com/)
2. The database contains industry estimations of fertilizers use (tonnes of active ingredient) between 1997 and 2008 for Austria, Belgium, Luxembourg, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Hungary, Malta, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom, Norway, and Switzerland. Yet the main source of FAO fertilizer data are the annual questionnaires sent to countries. Additional data sources include national statistical publications, country project reports, studies available in other FAO Divisions, economic journals, national statistics internet websites, country trade data received from custom departments and industry experts. A new questionnaire format was adopted in 2006, which collects data on a fertilizer product basis, which are then converted to nutrients and validated for consistency regarding summary totals of production, imports, exports, consumption and including domestic availability for the three types of straight fertilizers: nitrogenous (N); phosphates (P_20_5); potash (K_20), and as well as complex fertilizers (NP, NPK). The fertilizer data is reviewed with regard to the quantities allocated for non fertilizer use, fertilizer used for crop production, fertilizer used to manufacture other NPK compounds or blends among others.
3. For nutrient balances, the countries belonging to the Organization for Economic Co-operation and Development (OECD) have an obligation to submit yearly calculations on soil surface N and P balances (Csathó and Radimszky, 2009). The database for calculation of the annual soil surface balances over the period 1985-1997 for 28 OECD Member countries[1] is available on the website: http://www.oecd.org/document/29/0,3343,en_2649_33793_1890205_1_1_1_1,00.html In the OECD database nitrogen balances are available only for 17 EU countries: Austria, Belgium, Czech Republic, Denmark, Germany, Finland, France, Greece, Hungary, Ireland, Italy, The Netherlands, Poland, Portugal, Spain, Sweden, United Kingdom[2].

1 There are currently 32 members of the OECD, and the number is expected to increase to 34 after Estonia and Israel join the organization. OECD consists of 21 countries included in the EU. They are:
- Founding members of OEEC (1948): Austria, Belgium, Denmark, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Sweden, and United Kingdom.
- Admitted later to OEEC (listed chronologically with year of admission): Germany (1955), Spain (1959).
- Admitted later to OECD (listed chronologically with year of admission): Finland (1969), Czech Republic (1995), Hungary (1996), Poland (1996), Slovakia (2000), Slovenia (2010).
Country invited (on 10 May 2010) to join the OECD, but not yet member is Estonia.
The European Commission participates in the work of the OECD alongside the EU Member States.
Source: http://en.wikipedia.org/wiki/Organisation_for_Economic_Co-operation_and_Development

2 On the IRENA Indicator Fact Sheet IRENA 18.1 – Gross nitrogen balance (located on the website: http://epp.EUROSTAT.ec.europa.eu/portal/page/portal/agri_environmental_indicators/documents/IRENA%20IFS%2018.1%20-%20Gross%20nitrogen%20balance_FINAL.pdf) are available nitrogen balance reported at national level for 1990 and 2000. The indicator is based on balances submitted to the OECD or by using EU-15 wide data sets. Data was extracted from the spreadsheets provided by EU Member States to the OECD. The Member States that have not provided data include the United Kingdom, Sweden, Belgium (Wallonia), Spain, Greece, and Luxembourg. The Swedish Board of Agriculture provided national and regional balances, with only a breakdown of balances for arable land. France provided national balances, but without including nutrients from atmospheric deposition.

4. Gross Nitrogen Balances are made according to a uniform OECD methodology. Theoretically, the results determined in individual countries should be comparable. However, in practice the accuracy of GNB estimation in different countries is questionable (see e.g. Annex 10). This is indicated in, inter alia, the paper of Velthof et al. (2009), in which nitrogen surplus at a state level were compared, using the OECD method (which is mainly based on data provided by states supplemented with data from Eurostat and FAOSTAT) and nitrogen surplus evaluated for these states by the MITERRA-EUROPE model – table 2. MITERRA-EUROPE has a uniform approach for all countries using data from Eurostat and FAOSTAT and uniform calculation procedures.

Table 2: Mean N surpluses of the gross balance of selected countries in 2000 according to OECD and MITERRA-EUROPE

Results are presented only for countries that are included in OECD database for 2000 [Velthof et al. 2009, modified]

Country	N surplus (NS) kg N·ha^{-1}		$NS_{MITERRA-EUROPE} - NS_{OECD}$ kg N·ha^{-1}	NS_{OECD} as a percent of $NS_{MITERRA-EUROPE}$ %
	OECD	MITERRA-EUROPE		
Austria	58	61	3	95,1
Belgium	217	196	-21	110,7
Czech Republic	68	68	0	100,0
Denmark	136	124	-12	109,7
Finland	58	95	37	61,1
France	52	90	38	57,8
Germany	125	124	-1	100,8
Greece	15	62	47	24,2
Hungary	51	56	5	91,1
Ireland	83	115	32	72,2
Italy	41	77	36	53,2
Luxembourg	177	77	-100	229,9
Netherlands	274	285	11	96,1
Poland	46	63	17	73,0
Portugal	47	46	-1	102,2
Slovak Republic	55	24	-31	229,2
Spain	26	68	42	38,2
Sweden	53	64	11	82,8
United Kingdom	51	82	31	62,2

As follows from the table 2, only in the case of Czech Republic nitrogen surpluses were the same according to the OECD and the MITERRA-EUROPE model. For other states, there were differences in nitrogen surplus between the two methods, sometimes very significant. This indicates that methods for nitrogen surpluses evaluation, in individual states, however based on OECD methodology may not differ. This may be a result in some parts of different areas for cropped land and grassland.

Part of the uncertainty of GNB results obtained in different countries can be explained by the different approach used in the GNB performance, as the examples of some countries illustrate (Annex 10). In Malta the data needed to complete the balance is achieved on the basis of special survey conducted by the Statistical Office. In Finland, the N balance is calculated on the basis of data from the Finnish Rural Centers, in Slovenia and Poland the balance of nitrogen is calculated on the basis of the standard data of the Statistical Office. In Malta, any nitrogen fixation by legumes and atmospheric deposition are not included in the GNB.

Detailed reasons for inaccuracies in estimating nitrogen balance in these countries are (among other reasons):

- differences in excretion coefficients used among different countries
- annual variation in N content of grains
- uncertainty of data concerning the N fertilizer use
- difficulty in determining amounts of fixed N
- poorly documented manure storage in national statistics and field application methods on farms (estimation of ammonia volatilization from manure based on various coefficients that are dependent on manure storage and treatment)
- disregarding of all sources of nitrogen sources
- lack of unified coefficients for the calculation of the N-balance
- Unreliability of expert evaluations.

Empirical evidence shows that the current Gross Nitrogen Balance data collection and reporting leads to guestimates and duplicates (biased and different results).

According to Velthof et al. (2009): "*A method based on estimates provided by the various countries may provide indeed the "best" estimates. However comparison between countries may be hampered when the methods used by the countries differ. A uniform calculation method for nutrient balances is more suitable if countries or regions have to be compared or when policies on a European scale have to be evaluated, but it needs the same quality of data for all countries. The N surplus is an important environmental indicator, which is used in policy, but also for calculations of N emissions from agriculture. Evidently, there is scope for developing uniform and accurate data acquisition approaches so as to improve the estimates of N surpluses".*

The analysis conducted above shows that the procedures and practices of collecting data and reporting of various agri-environmental indicators in the EU-27 are at different stages of development. Existing manners of recording mineral fertiliser, consumption and nitrogen balance possess considerable limitations and defects. For example, the nitrogen balance system for the OECD does not cover all EU-27 countries[3] and does not give access to current N-balances. In turn the system of recording mineral fertiliser consumption by EUROSTAT bases itself on industry estimate of fertilizers use only in tonnes of active ingredient not per ha or application rate to crop.

Comparing the results for the various AEIs for Poland it can be concluded that the data collection – processing – reporting chains for AEIs are more developed, when they are more integrated into institutional platform of international cooperation. The best developed AEIs are GHG emissions and

[3] Nutrient balances OECD does not cover all EU states, but EUROSTAT has taken over the nutrient balances, so they will be available for all MS (comments on the Third Progress Report by Annemiek Kremer)

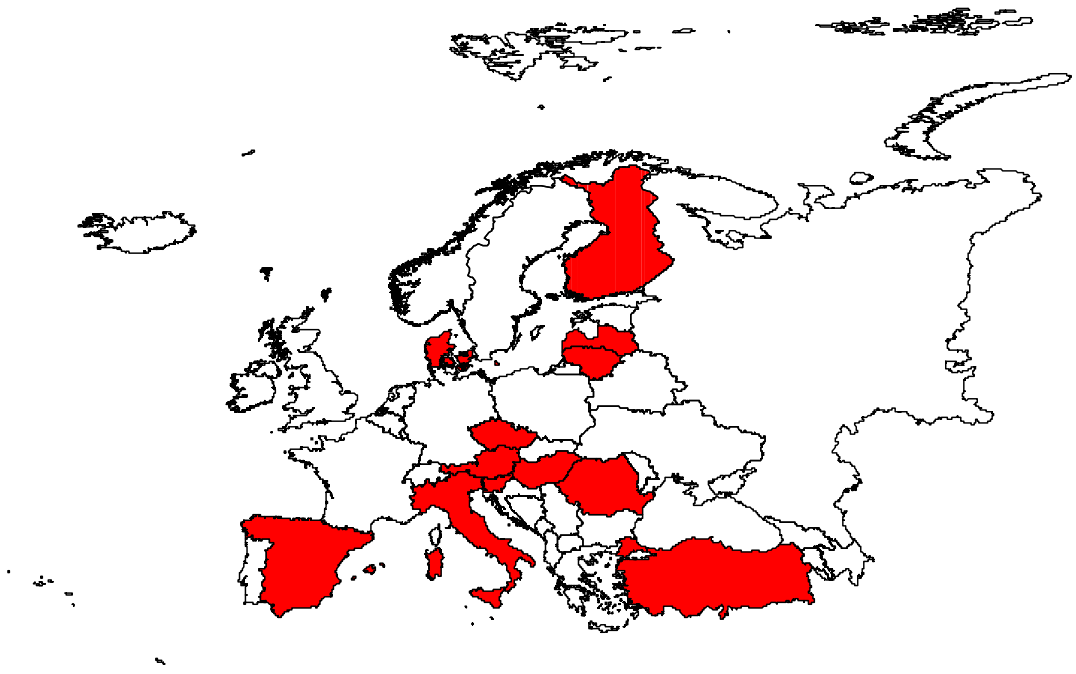
ammonia emissions, to a lesser degree the gross nitrogen balance and the least developed concerns mineral fertiliser consumption. In contrast, the data collection – processing – reporting chains for the key AEIs in The Netherlands all seem well developed, but ultimately has resulted in a complex non-transparent data colleting and reporting systems with numerous institutions involved, and with numerous checks and balances, but which seems far from efficient. Likely, the best data collecting –reporting system lies somewhere in between those of Poland and The Netherlands.

4.2. EUROSTAT questionnaires

In 2009, EUROSTAT distributed questionnaires to all member states on AEI data collection and availability (see Annex 2). The questionnaire focused on the availability of data at NUTS level[4], the data ownership and the time coverage. Respondents could add additional information, which was done by quite a number of respondents. However, the return rate of fully completed questionnaires was low (44%), with more responses from South and Central Europe than form Northwest Europe (Figure 10).

Figure 12: Response to EUROSTAT questionnaire

The countries highlighted in red returned the questionnaire by November 2009.



[4] NUTS1 = land, state or large region (97 in EU27), NUTS2 = district or province (271 in EU27), NUT3 = subregion (1303 in EU27).

Also, the completeness and quality of the returned questionnaires was variable and some respondents (e.g., Finland, Italy) left many open spaces. Moreover, the interpretation of the questionnaires differed between respondents. Some respondents interpreted the questions as 'planned activities' and referred frequently to the future SAPM, whereas others interpreted the questions as 'current activities and methodologies'. This complicated a proper analysis of the questionnaires.

In the following tables (3 to 15) the data sources and spatial scales are summarized per AEI. The column 'complete' refers to the completeness of the data requirements of the AEI, i.e. many AEI consist of an integration of several parameters. Sometimes only 1 or 2 parameters are covered, whereas other parameters are not (yet / fully) collected. Type of responsible data owner (e.g. governmental, research, etc) is listed in Annex 1.

Table 3: Summary of questionnaire response for mineral fertilizer consumption

MS	Data owner	Scale (NUTS)	complete	Comments
AT	AMA	2	Yes	Data at NUTS2 level based on transaction data. No distinction to different crop/farm types
CZ	CZSO	1,3	No	
DK	PDIR	1,3	No	Directorate of plants (PDIR) produces annual statistics
DE	DESTATIS	1	No	
ES	MARM	0, 2	no	
IT	ISTAT	1,2	No	ISTAT
FI	Information Centre of the Finnish Ministry of Agriculture and Forestry (= Tike) & Finnish Environment Institute (= SYKE) & MTT Agrifood Research Finland (= MTT) & Finnish Food Safety Authority (= Evira)	No data	No	In process
HU	AERI (NUTS1), HCSO (NUTS2)	1,2	no	AERI data only on quantity of sold fertilizers. HCSO data only for enterprises (biased)
LT	x	x	x	x
LV	CSB	3	yes	
MT	National statistics office	1	no	
RO	NIS	3	?	Available by 2013?
TR	Ministry of Agriculture and rural affairs	1	No	
SI	Statistical office of the republic of Slovenia	0,1	yes	

Table 4: Summary of questionnaire response for consumption of pesticides

	Data owner	Scale	complete	Comments
AT	BMLFUW	0		At present only sales accounts available. Working on systems that records application dates and crops.
CZ	CZSO	1,3	no	
DK	Environmental protection agency (MST)	1	No	Only total consumption, no differentiation to crops
DE	Federal office of consumer protection and food safety (BVL), Federal Research Centre for Cultivated Plants	0	Yes	
ES	MARM	0, 2	no	
IT	ISTAT, Agenzia Provinciale per la Prezione dell'ambiente della pvovincia autonome di Trento.	1,2	no	Sales data (not per crop)
FI	Tike and Evira	1	No	Sales data
HU	AERI	1	No	Only sales data, not on consumption
LT	Plant protection agency, Statistics Lithuania	2	yes	
LV	CSB	1	yes	
MT	National statistics office	1	yes	
RO	NIS	3	?	Available by 2013?
TR	x	x	x	x
SI	x	x	x	

Table 5: Summary of questionnaire response for irrigation

	Data owner	Scale	complete	Comments
AT	x	0		Partly based on agricultural structure levy. In 2010 levy per production category is foreseen (SAPM) that will allow for more detailed information
CZ	CZSO			No subdivision to types of irrigation, only yes/no questions.
DK	Statistics Denmark			Only irrigated areas, no subdivision to crops
DE	Destatis	2		Only total area
ES	MARM	0, 2		
IT	x	X		x
FI	Tike	3		In progress
HU	HCSO	2,3	no	No crop data available. UAA data can be calculated
LT	Statistics Lithuania	2		
LV	CSB, LSIAE	3	yes	
MT	National statistics office	3	Yes	Available in 2010
RO	NIS	3	yes	
TR	Turkstat	1,3	no	
SI	Statistical office of the republic of Slovenia	3	yes	

Table 6: Summary of questionnaire response for energy use

	Data owner	Scale	Complete	Comments
AT	x	x	x	Calculated from the agricultural energy balance
CZ	x	x	x	
DK	Statistics Denmark	1	Yes	
DE	Destatis	2	Yes	
ES	EUROSTAT (?)	0	Yes	
IT	x	x	X	X
FI	Tike, TK	n/a	x	Only for greenhouses
HU	Energy centre Pbc	1	y	
LT	Ministry of agriculture	2,3,4	y	
LV	CSB	3	n	
MT	x	x	x	x
RO	x	x	x	x
TR	x	x	x	x
SI	Statistical office of the republic of Slovenia	0,1	yes	Estimation of annual use of energy by fuel type is prepared at the level of Slovenia in the framework of Economic Accounts for Agriculture for the calculation of costs of used energy in agriculture. Estimation by type of energy is made for all agricultural holdings, agricultural department collects data only for the agricultural enterprise sector.

Table 7: Summary of questionnaire response for soil cover

	Data owner	Scale	complete	Comments
AT	BMLFUW	X	yes	More information is expected with introduction of SAPM. On principle also the annual INVEKOS information can be used.
CZ	CZSO	x	Yes	Number of days when arable area is covered with plants is not monitored.
DK	x	x	x	There are data for the number of hectares with winter crop for rye, wheat, barley and oak.
DE	Destatis	2		Partly covered (UAA under vegetative cover is not covered)
ES	x	x		X
IT	x	x		X
FI	Tike			Data collection starts in 2010
HU	HCSO	2	no	
LT	Statistics Lithuania	2,3,4	no	
LV	CSB	5?	no	
MT	National statistics office	x	No	Data will be available in 2010
RO	NIS	3	?	Available by 2013
TR	Turkstat	3	no	
SI	Statistical office of the republic of Slovenia	2,3	no	

Table 8: Summary of questionnaire response for tillage practices

	Data owner	Scale	Complete	Comments
AT	BMLFUW	3	yes	No data yet, expected from SAPM
CZ	CZSO	x	Yes	
DK	x	x	X	x
DE	Destatis	2		
ES	MARM	0, 2		
IT	X	X		x
FI	Tike	x	X	Data collection starts in 2010
HU	No data	x	x	x
LT	Statistics Lithuania	2,3,4	no	Future SAPM (not yet collected)
LV	CSB	5	no	
MT	National statistics office	x	no	Data available by 2010
RO	NIS	?	?	Available by 2013?
TR	x	x	x	x
SI	Statistical office of the republic of Slovenia	?	yes	

Table 9: Summary of questionnaire response for manure storage

	Data owner	Scale	Complete	Comments
AT	BMLFUW	3	yes	Data collected as part of agricultural levy. Additional data are available via AS 2010 and SAPM
CZ	CZSO	x	Yes	Starts in 2010
DK	Statistics Denmark	3	Yes	
DE	Destatis	2,3	Yes	
ES	MARM	0, 2, 3	Yes	
IT	x	x	X	x
FI	Tike	3	Y	
HU	HCSO	2,3	Y	
LT	Statistics Lithuania	2,3,4	No	Future SAPM
LV	CSB	5	yes	
MT	National statistics office	x	no	Data available by 2010
RO	NIS	3	Yes	Data available by 2013
TR	x	x	x	x
SI	Agricultural institute of Slovenia	5	yes	

Table 10: Summary of questionnaire response for intensification/extensification

	Data owner	Scale	Complete	Comments
AT	BMLFUW, book accounts	3	Yes	Data originate from INLB and are annually available. Possible improvements of data are being discussed.
CZ	Institute of agricultural economics and information, CZSO, ministry of agriculture	x	Yes	
DK	Statistics Denmark	3	Yes	After modification of data
DE	Federal ministry of food, agricultural and consumer protection (BMELV), BLE, Destatis	1		DG agri should be able to calculate data from input
ES	MARM, INE	0,2,3	yes	
IT	x	x		x
FI	MTT, Tike	1, 2	yes	
HU	HCSO	1,2,3	yes	
LT	Lithuanian Institute for Agrarian Economics, Statistics Lithuania	2,3,4	yes	
LV	CSB	3	y	
MT	MRRA	1	yes	No cereals in Malta
RO	NIS, MAFRD	3	yes	
TR	Turkstat	3	no	
SI	Statistical office of the republic of Slovenia, Agricultural institute of Slovenia, Ministry of Agriculture, forestry and food Service	1	yes	

Table 11: Summary of questionnaire response for gross nitrogen balance

	Data owner	Scale	Complete	Comments
AT	x	x	x	Data are available at national level (UBA). Future development at regional level is foreseen
CZ	CZSO	x	Yes	Manure application not surveyed per crop
DK	Aarhus University	1		Soil surface and farm gate balances
DE	Destatis, BMLEV	1,2,3	No	Nitrogen surplus is calculated by BMELV. Is this equal to gross nitrogen balance?
ES	MARM	3	Yes	
IT	ISTAT	1,2	No	
FI	Syke	3	Yes	Gross N and P balances are calculated at Rural Centre -levels in 1990-2005 and will be calculated for Regional Development Centres in 1990-2008
HU	HCSO, RISSAC	1,2,3	no	RISSAC responsible for calculating N balance (OECD methodology). No data on crop level
LT	Statistics Lithuania	2,3,4	No	Data at crop level is missing. Expected from future SAPM.
LV	x	x	x	Methodologies will be elaborated by Latvia University of Agriculture
MT	National statistics office, MRRA	1,3	No	Availably by 2010
RO	NIS	3	no	Partly available by 2013
TR	x	x	x	x
SI	Statistical office of the republic of Slovenia, Ministry of Agriculture, forestry and food Service, Ministry of the Environment, spatial planning and Energy, Environmental Agency of the Republic of Slovenia.	1,3	No	

Table 12: Summary of questionnaire response for risk of pollution by phosphorus

	Data owner	Scale	Complete	Comments
AT	x	x	x	Indicator is produced using several input data (e.g. number of animals, feeding systems, manure management, etc). Is already produced by UBA (Umweltbundesamt)
CZ	x	x		x
DK	Directorate of plants	1		Soil map is n/a Annual data on fertilizer use
DE	DESTATIS	1	no	National sales volume
ES	MARM	3		
IT	x	x	x	x
FI	MTT, Syke			
HU	AERI, HCSO, ministry of Environment and water	1	Yes	Only annual data on total fertilizer sales
LT	x	x	x	x
LV	x	x	x	Methodologies will be elaborated by Latvia University of Agriculture
MT	x	x	x	x
RO	x	x	x	
TR	x	x	x	x
SI	Ministry of Agriculture, Forestry and Food	x	no	

Table 13: Summary of questionnaire response for ammonia emissions

	Data owner	Scale	Complete	Comments
AT	UBA	x	Yes	Readily available from UBA
CZ	x	x		x
DK	Environmental research center (DMU)	4 and lower		
DE	UBA	0	yes	
ES	MARM	2	yes	
IT	Ispra (ex-APAT)	3	yes	
FI	Finnish Environment Institute	3	yes	
HU	HCSO	1,2,3	no	
LT	Ministry of environment	2	yes	
LV	Latvian Environment, geology and meteorology agency	1	yes	
MT	x	x	x	x
RO	National environmental protection agency	1	no	
TR	x	x	x	x
SI	Environmental Agency of the Republic of Slovenia, Agricultural Institute of Slovenia	1	yes	

Table 14: Data owners for greenhouse gas emissions

	Data owner	Scale	Complete	Comments
AT	UBA	X	yes	Readily available from UBA
CZ	x	x		x
DK	DMU	1		
DE	Destatis, UBA	0	yes	
ES	MARM	2		
IT	Ispra (ex APAT)	3	yes	
FI	Syke	3	yes	
HU	HCSO	1	yes	
LT	Ministry of environment	2	y	
LV	Latvian Environment, geology and meteorology agency	1		
MT	MEPA	1	yes	
RO	National environmental protection agency	1		
TR	Turkstat	1	yes	
SI	Environmental Agency of the Republic of Slovenia, Agricultural Institute of Slovenia	1	yes	

Table 15: Summary of questionnaire response for soil quality

	Data owner	Scale	Complete	Comments
AT	x	x		No data available!
CZ	Ministry of agriculture of the Czech Republic			
DK	x	x		x
DE	x	x		x
ES	JRC soil database	0	yes	
IT	Ispra	1,2		
FI	MTT			
HU	x	x	x	x
LT	State land survey institute	2	Yes	
LV	x	x	x	x
MT	x	x	x	x
RO	ICPA	5	yes	
TR	x	x	x	x
SI	x	x	x	

The tables above clearly demonstrate the complexities of analyzing the questionnaires:

- The spatial coverage of the questionnaire return is biased towards Southern and Central Europe; there are no responses from North-west European countries.
- The questionnaires have a variable interpretation among Member States; sometimes the questionnaires are interpreted as future outlooks, whereas other Member States interpreted the questionnaires as a reflection of the actual (current) situation.

Based on the tables above a synthesis of the data-owners was derived (table 16). The majority of the respondents (33%) indicated that the data was owned by a statistical office. However, in 40% of the cases the data owner was unknown, which likely means that the data was not collected.

Table 16: Ownership of data

Data owner*	Number of answer	% of cases
Go	37	10
S	122	33
R	34	9
A	13	3
O	6	2
C	13	3
NA (no answer)	147	40
Total cases	372	100

G=Government, S=Statistical Office, R=Research, A=Agency, O=Other and C= Commercial party.

Differences between Member States were considerable (Table 17). For example, in Austria most data were owned by the Ministry (55%), in Finland by research institutes (42%), whereas for Germany and Romania most data were owned by statistical offices (respectively 55% and 65%). Moreover, in Italy 81% of the requested data was not owned (likely not collected). In Romania this was only 6%, but for Romania the questionnaire was also interpreted as a future outlook (hence not yet reality).

Table 17: Data owners per respondent (% of cases)

Member state	G	S	R	A	O	C	NA
AT	55	0	0	0	0	0	45
CZ	3	48	6	0	0	3	39
DE	6	55	0	10	0	0	29
DK	3	19	26	10	0	3	39
ES	0	29	0	0	0	0	71
IT	0	10	0	0	10	0	81
FI	26	0	42	0	0	19	13
HU	0	42	10	0	10	6	32
LT	13	39	10	0	0	3	35
LV	0	45	3	10	0	6	35
MT	10	42	0	3	0	0	45
RO	3	65	13	10	0	0	10
TR	8	33	0	0	0	0	59
SI	10	58	0	16	0	0	16

NA = not applicable (in general due to absence of answer).
G=Government,
S=Statistical Office,
R=Research,
A=Agency,
O=Other and
C= Commercial party.

The questionnaires also clearly illustrated the complexities involved in collecting various (sub)parameters, supporting indicator values and coefficients. Main bottlenecks were the soil coverage index value (part of AEI 11.1 soil cover, 92% NA), 'Atmospheric deposition' (part of AEI 15 gross nitrogen balance, 75% NA), 'Soil characteristics" (part of AEI 16 risk of pollution by phosphorus, 75% NA). Table 18 provides an overview of the data owners per AEI and (sub) parameters/supporting indicators.

Table 18: Data owners per AEI (% of respondents)

#	AEI	Sub-parameters	G	S	R	A	O	C	NA
5	Mineral fertiliser consumption	Absolute volumes of N consumption	17	50	0	0	0	17	17
		Absolute volumes of P (P2O5) consumption	8	42	0	0	0	17	33
		Application rates per crop of N	8	25	0	0	8	8	50
		Application rates per crop of P (P2O5)	8	17	0	0	8	8	58
6	Consumption of pesticides	Consumption of pesticides active substances per crop	8	25	8	17	0	25	17
7	Irrigation	Total irrigable area	8	75	0	0	0	0	17
		Area irrigated once/year	8	58	0	0	0	8	25
8	Energy use	Final energy consumption in agriculture by type of energy	8	25	0	0	8	8	50
11.1	Soil cover	Area cultivated with different crops	17	50	0	0	0	0	33
		Soil coverage index values	8	0	0	0	0	0	92
		Soil cover in winter with normal winter crop, cover or intermediate crop, and plant residues	8	33	0	0	0	0	58
11.2	Tillage practices	Area managed by conservation tillage (low tillage)	17	50	0	0	0	0	33
		Area managed by zero tillage (direct seeding)	8	42	0	0	0	0	50
		Area managed by conventional tillage	8	50	0	0	0	0	42
11.3	Manure storage	Type of storage for farm manure and slurry	17	75	0	0	0	0	8
12	Intensification/ intensification	Expenditures for inputs	33	17	33	0	0	0	17
		Milk yields	25	42	0	8	0	8	17
		Cereal yields	17	58	0	0	0	0	25
15	Gross nitrogen balance	Harvested and forage crop area	0	50	17	0	0	0	33
		Livestock numbers by category	0	58	17	0	0	0	25
		Fertiliser consumption by crop	0	17	17	0	0	0	67
		Manure application by crop	0	50	17	0	0	0	33
		Atmospheric deposition	0	0	25	0	0	0	75
		Crop yields	17	25	17	0	0	0	42
16	Risk of pollution by phosphorus	Phosphorus consumption	0	8	25	8	0	0	58
		Soil characteristics	0	0	17	8	0	0	75
18	Ammonia emissions	Ammonia emission from agriculture	8	8	17	33	8	0	25
19	GHG emissions	CH4 and N2O (ktonnes CO2 equivalents) emissions from agriculture	8	17	17	33	8	0	17
20	Water abstraction	Water abstraction rates	25	33	0	8	0	8	25
21	Soil erosion	Land Use data	8	0	33	8	0	0	50
26	Soil quality	Soil characteristics	8	0	25	0	8	0	58

NA = not applicable (in general due to absence of answer).G=Government, S=Statistical Office, R=Research, A=Agency, O=Other and C= Commercial party.

4.2.1. Spatial scales

The questionnaires also requested information on spatial scales at parameter level. In 53% of all cases (out of 372) a distinctive NUTS level was mentioned (being 1, 2, or 3). However, in 44% of the cases no answer was given and in 3% of the cases the answer was unclear, but differences between Member States were considerable (Table 19). This table illustrates that, apparently, many respondents were not aware of the spatial scale to which their answers related.

Table 19: Indication of NUTS level per Member State (% of data entries)

MS	NUTS level mentioned	No answer	Unclear answer
AT	42	55	3
CZ	6	94	0
DE	68	32	0
DK	61	6	32
ES	29	71	0
IT	29	71	0
FI	55	39	6
HU	61	39	0
LT	71	29	0
LV	77	23	0
MT	45	55	0
RO	87	13	0
TR	42	58	0
SI	84	16	0
Total average	54	43	3

Due to the integration of several parameters into one AEI, NUTS levels can differ within AEIs (Table 20). Obviously the NUTS level of the AEI is determined by the parameter with the lowest NUTS level.

Table 20: NUTS level mentioned per Member State (all AEIs)

	NUTS level												
	0	**1**	**2**	**3**	**4**	**5**	**1,2**	**1, 3**	**1,3,5**	**2, 3**	**2,3,4**	**3, 5**	**4, 5**
AT	1		4	8									
CZ	1							1					
DE	2	7		2		8			1			1	
DK		11		6				1					1
ES	1		8										
IT		1	1	2			5						
FI	1	2	9	5									
HU		7	3	1			2			6			
LT			7							3	12		
LV		4		11		5		4					
MT		10		4									
RO	3	1		19		4							
TR	1	4											
SI	2	4		3									
Total	12	51	32	61	0	17	7	6	1	9	12	1	1

NUTS levels indicate the spatial scale going from a low spatial scale (0) towards detailed scales at the level op regions (2) or provinces (3,4 and 5). Sometimes a combination of spatial scales is used.

Per AEI the used NUTS levels are summarized in Table 21.

Table 21: NUTS levels mentioned per AEI (all questionnaires)[5]

#	AEI	Sub-parameters	NUTS level*					
			0	1	2	3	4	5
5	Mineral fertiliser consumption	Absolute volumes of N consumption		7	3	4		
		Absolute volumes of P (P2O5) consumption		4	2	2		
		Application rates per crop of N		2	1	2		
		Application rates per crop of P (P2O5)		1	1	2		
6	Consumption of pesticides	Consumption of pesticides active substances per crop	2	5	2	1		
7	Irrigation	Total irrigable area			3	6	1	1
		Area irrigated once/year			3	6	1	1
8	Energy use	Final energy consumption in agriculture by type of energy		2	1	2	1	
11.1	Soil cover	Area cultivated with different crops			2	2	1	2
		Soil coverage index values						
		Soil cover in winter with normal winter crop, cover or intermediate crop, and plant residues			1	2	1	1
11.2	Tillage practices	Area managed by conservation tillage (low tillage)			2	3		2
		Area managed by zero tillage (direct seeding)			2	3		2
		Area managed by conventional tillage			2	3		2
11.3	Manure storage	Type of storage for farm manure and slurry			3	7	1	2
12	Intensification/ extensification	Expenditures for inputs	1	3	2	3		
		Milk yields		2	1	7	1	
		Cereal yields			3	7	1	
15	Gross nitrogen balance	Harvested and forage crop area		2	3	6	1	1
		Livestock numbers by category		2	4	4	1	
		Fertiliser consumption by crop		3	2	2		
		Manure application by crop		3	5	4	1	
		Atmospheric deposition		2	1	1		
		Crop yields		3	3	3	1	
16	Risk of pollution by phosphorus	Phosphorus consumption		3	1			1
		Soil characteristics		1	1			1
18	Ammonia emissions	Ammonia emission from agriculture	1	3	1	2	1	1
19	GHG emissions	CH4 and N2O (ktonnes CO2 equivalents) emissions from agriculture	2	5	1	1		
20	Water abstraction	Water abstraction rates	2	2	1	1		1
21	Soil erosion	Land Use data		2	1	1		1
26	Soil quality	Soil characteristics		1	2			1

* NUTS levels are an indicator for spatial scales to which an AEI refers and increase from low NUTS level to high NUTS level (i.e. a higher NUTS level refers to a more detailed spatial scale).

[5] Excluding Turkey and Slovenia.

4.2.2. Data overlaps

Data overlaps are defined as 'collecting data more than once by different organizations/owners'. Data overlaps can potentially occur at national level and at EU level. Based on the EUROSTAT questionnaires, data overlaps at national level are minimal (see columns 'data owner' of Tables 3 to 15. Data overlaps at EU level are analyzed in Table 22. This analysis shows that AEIs depend on multiple data sources which can entail a risk of unharmonized data.

Table 22: Data sources per AEI for primary data*

(collection at national level) and reporting towards the EU-27 and other organizations[6]

	AEI	Parameter	Data collection	Reporting
5	Mineral fertiliser consumption	Absolute volumes of N consumption	Fertilizer surveys	OECD, FAOStat, EFMA
		Absolute volumes of P (P2O5) consumption	Fertilizer surveys	OECD, FAOStat, EFMA
		Application rates per crop of N	Fertilizer surveys	OECD, FAOStat, EFMA
		Application rates per crop of P (P2O5)	Fertilizer surveys	OECD, FAOStat, EFMA
6	Consumption of pesticides	Consumption of pesticides active substances per crop	Pesticide regulation	Eurostat
7	Irrigation	Total irrigable area	Farm surveys	FSS
		Area irrigated once/year	Farm surveys	FSS
8	Energy use	Final energy consumption in agriculture by type of energy	Book accounts	SIRENE
11.1	Soil cover	Area cultivated with different crops	Farm surveys	FSS
		Soil coverage index values	Farm surveys	To be defined
		Soil cover in winter with normal winter crop, cover or intermediate crop, and plant residues	Farm surveys	Future SAPM
11.2	Tillage practices	Area managed by conservation tillage (low tillage)	Farm surveys	Future SAPM
		Area managed by zero tillage (direct seeding)	Farm surveys	Future SAPM
		Area managed by conventional tillage	Farm surveys	Future SAPM
11.3	Manure storage	Type of storage for farm manure and slurry	Farm surveys	FSS, SAPM
12	Intensification/ extensification	Expenditures for inputs	Book accounts	FADN
		Milk yields	Book accounts	Milk statistics
		Cereal yields	Book	FADN, crop statistics

[6] Excluding Turkey and Slovenia.

	AEI	Parameter	Data collection	Reporting
			accounts	
15	Gross nitrogen balance	Harvested and forage crop area	Farm surveys	FSS and crop statistics
		Livestock numbers by category	Farm surveys	FSS
		Fertiliser consumption by crop	Farm surveys	EFMA, Fertiliser surveys
		Manure application by crop	Farm surveys	Fertiliser surveys, SAPM
		Atmospheric deposition	Modelling	EMEP
		Crop yields	Farm surveys	FADN
16	Risk of pollution by phosphorus	Phosphorus consumption	Book accounts	Fertiliser surveys
		Soil characteristics	Soil map (ESDAC)	European soil database, CLC, LUCAS, Fertiliser surveys
18	Ammonia emissions	Ammonia emission from agriculture	Modelling	UNECE / EMEP
19	GHG emissions	CH_4 and N_2O (ktonnes CO_2 equivalents) emissions from agriculture	Modelling	UNECE / EMEP
20	Water abstraction	Water abstraction rates	Modelling	OECD - EUROSTAT JQ, Water pilot projects
21	Soil erosion	Land Use data	Modelling	CLC, LUCAS + PESERA model
26	Soil quality	Soil characteristics	Soil map (ESDAC)	European soil database, CLC, LUCAS, Fertiliser surveys
**Similar colours represent data overlap when similar data are collected by different organizations.*				

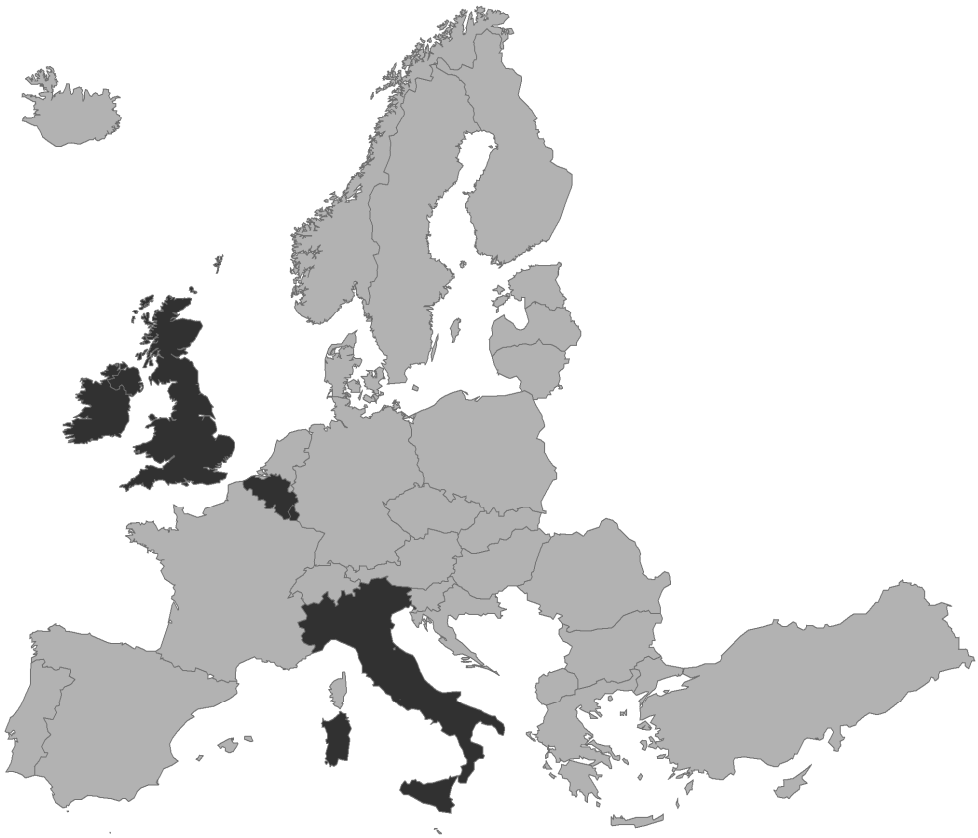
From the assessments of the responses to the EUROSTAT questionnaires the following conclusions can be drawn:

- The EUROSTAT questionnaires are an important source of information. However, through its limited return rate the results do not give a complete (representative) overview.
- As with all questionnaires the EUROSTAT questionnaire suffers from personal biases; questions are interpreted in different manners depending on the respondent, which complicates unequivocal interpretation of the results.
- Many AEIs are partly available. Most often basic data at farm level is readily available, but in-farm information is missing.
- Many AEIs (i.e. depending on multiple parameters) have multiple data sources which brings along a risk of using unharmonized data.
- Typical flow pathways of information can be distinguished for different AEIs. The most used pathway was SR (39%), followed by GR (32%) and RR (29%).

4.3. DireDate questionnaires

The DireDate questionnaire (Annexes 3 and 7) dealt with the data collection – processing – reporting chains of AEIs required for reporting the implementation of the Rural Development Programme (RDP) in EU Member States. The questionnaire was returned by UK, Scotland, Luxembourg, Ireland, Belgium and Italy only (Figure 13).

Figure 13: Origin of responses of the DireDate questionnaire dealing with data collection – processing – reporting chains of AEIs required for reporting the implementation of the RDP in EU Member States.



Although the return rate was disappointingly low, some results could be defined:

- Many organizations are involved in data collection – processing – reporting chains of AEIs required for reporting the implementation of the Rural Development Programme (RDP) in EU Member States. Even for a single parameter often two or more organizations are involved.
- Data collection for the AEIs needed for reporting about the implementation of the RDP occurs through a mixture of methods, including GIS & remote sensing, census, monitoring and simulation modelling.
- The responsible organizations do not always know how data is collected and/or processed.

- Often only a selection of the parameters, part of the evaluation of the RDP, is collected.
- Authorized organizations tend to focus on formal procedures and less on expert evaluation.
- Data aggregation predominantly occurs through calculating arithmetical means.

4.4. Streamlining questionnaire

The so-called streamlining questionnaires (Annex 5) were returned by 23 Member States. By far, it has the highest return rate of all questionnaires assessed in this report. Because of the open questions the interpretation of data is more complex. Yet, the following results have been derived from this questionnaire:

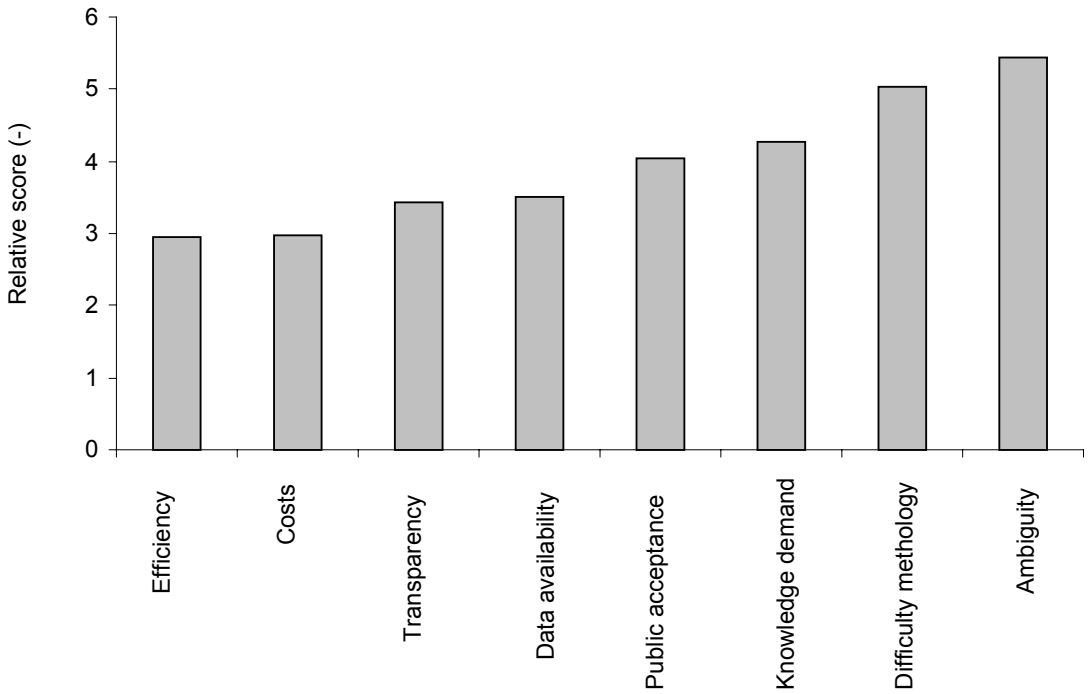
1. Often one governmental organization (most often a Ministry) is responsible for the data collection and reporting, because of legal formalization and financial capacities.
2. However, apart from the responsible organization, many other organizations are involved in the data collection – processing – reporting chains of AEIs required for reporting the implementation of the RDP in EU Member States, especially in decentralized countries with federal governments.
3. There is a large difference between levels of detail between different respondents.
4. Some countries have distinct organizations for data collection and reporting for surface water and for ground water.
5. Most Member States have random quality checks, but one respondent remarked that a recent comparison between two databases with similar data for different reporting activities detected a systematic deviation between numbers of stations as reported for the Water Framework Directive (WFD) and the State of the Environment (SoE): WFD distinguishes between four surface water categories, whereas for SoE-reporting stations located in Transitional Waterbodies were reported as river monitoring stations. This can lead to misunderstandings. The respective MS is planning to implement data consistence checks between both reporting databases for identical stations.
6. The formal strategy of 'report once, use many' is highly welcomed by Member States, but several Member States note that prior to streamlining there should be a phase of harmonization:
    a. There are several barely reconcilable differences between different EU Directives such as the content of the required reports (state of groundwater bodies, effectiveness of measures in the Nitrates Directive, State of the Environment report), timeframe of reports (WFD every six years, Nitrates Directive every 4 years, SoE every year), different data bases for the individual reports and EU-wide requirements for the analysis and evaluation of data.
    b. The level of detail and reporting units under different Directives are different, in particular there are differences with regards to the methods of aggregating monitoring results (aggregating measured data to a status for WFD quality elements respectively for WFD-waterbody status versus disaggregated data).
7. Many MS use some method for data aggregation. However, as one MS states: "used technique (models and/or statistical approaches) depends on the institute drawing up the report. Within the guidance documents there is often room for interpretation which ends up in different results if done by different people".

8. MS do not agree on the issue of providing raw data to the EU-27 to be aggregated centrally. Most arguments are related to loss of relevant background information.

4.5. RAMSOIL questionnaires

The so-called RAMSOIL questionnaire was send out to policy makers and scientists working in the field of soil quality in all EU Member States in 2006. We received 12 completed policy questionnaires which originated from Portugal, Netherlands, Poland, Denmark, Greece, Hungary (2) and Belgium (2). The questionnaires revealed that for policy makers the adoption of a methodology to assess risks of soil degradation is mainly determined by the efficiency and the costs of the methodology and much less by the quality of the methodology (Figure 14). Likely, the economic costs and efforts required for the whole data collection – processing – reporting chains of AEIs are more important determinant for selecting a methodology and procedure than the quality associated with these methodologies and procedures.

Figure 14: Ranking of important adoption criteria by policy makers going from very important (low relative score) to less important (high relative score)



The most important decision factor to adopt or withdraw a methodology/procedure was the cost efficiency. The majority (54%) of the respondents reported that the methodology/procedure is still under development, while 34% of the respondents reported that the methodology/procedure was in practice (Data not shown). The majority of the methodologies/procedures (58%) were used by an institution (Ministries were not responsible) and there were only few officially recognized methodologies/procedures (11%). Likewise, the answer to the question 'for what reason was the methodology/procedure

developed?' 72% of the respondents reported 'for science', while only 14% reported 'legislation'. The origin of the methodology/procedure was not known by 14% of the respondents. These results show that the development of the methodology/procedure is mainly established as expert knowledge by scientists and that the adoption by policy makers still has to be made. Scientists are generally specialists; this is reflected in the question whether the considered methodology/procedure is mono-risk (79%) or multi-risk (10%). Hence, integration of different soil degradation threats is still far from achieved.

4.6. Expert interviews

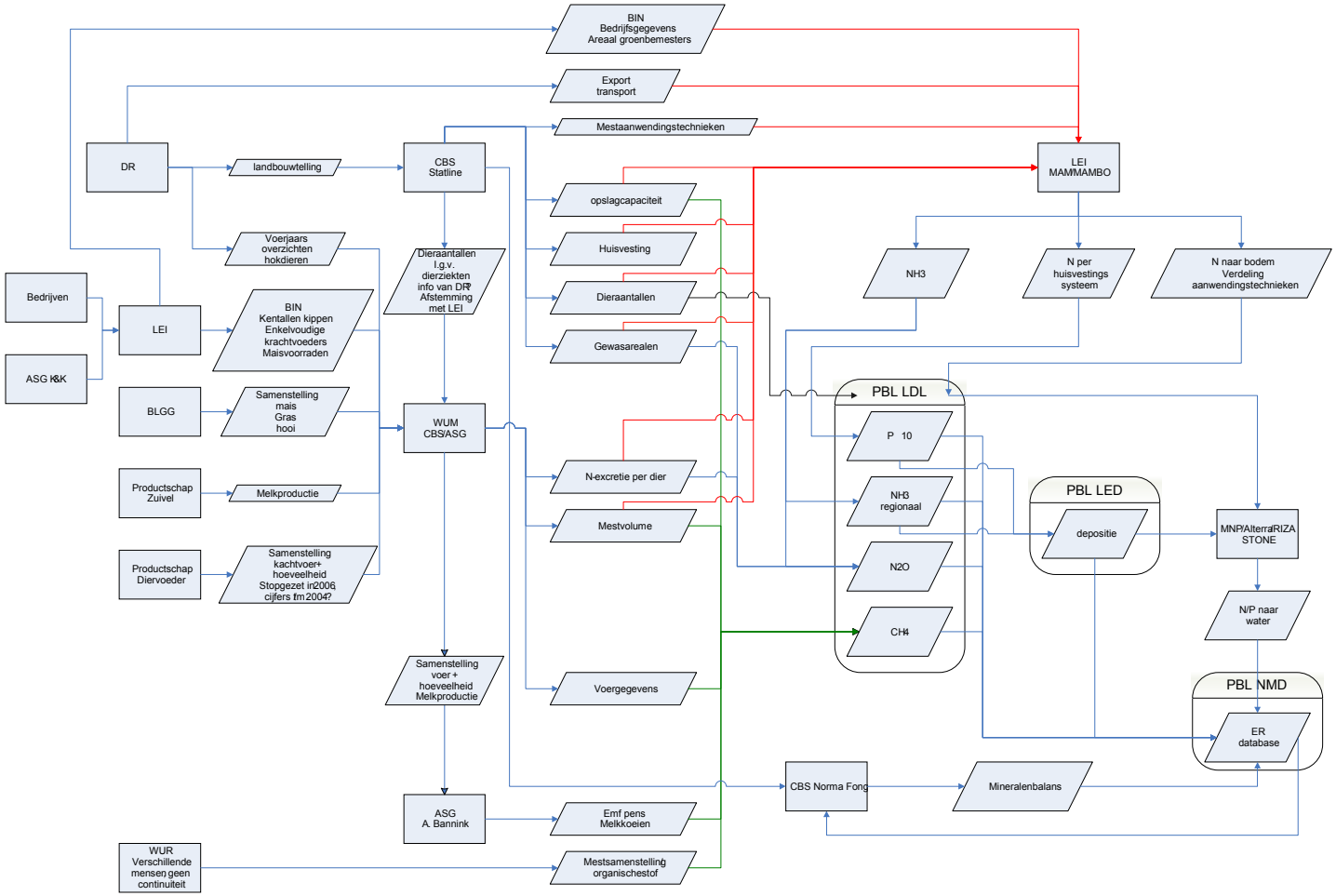
4.6.1. In-depth interviews

On June 25 an interview was held with head of the Emission Registration (ER) in The Netherlands.

In the ER emissions of 350 different substances to water, air and soil are estimated (calculation) for The Netherlands by a joint effort of 70 experts, distributed over 10 independent institutes. The Netherlands and France are the only two countries in Europe which have a synchronized system for the estimation of emissions.

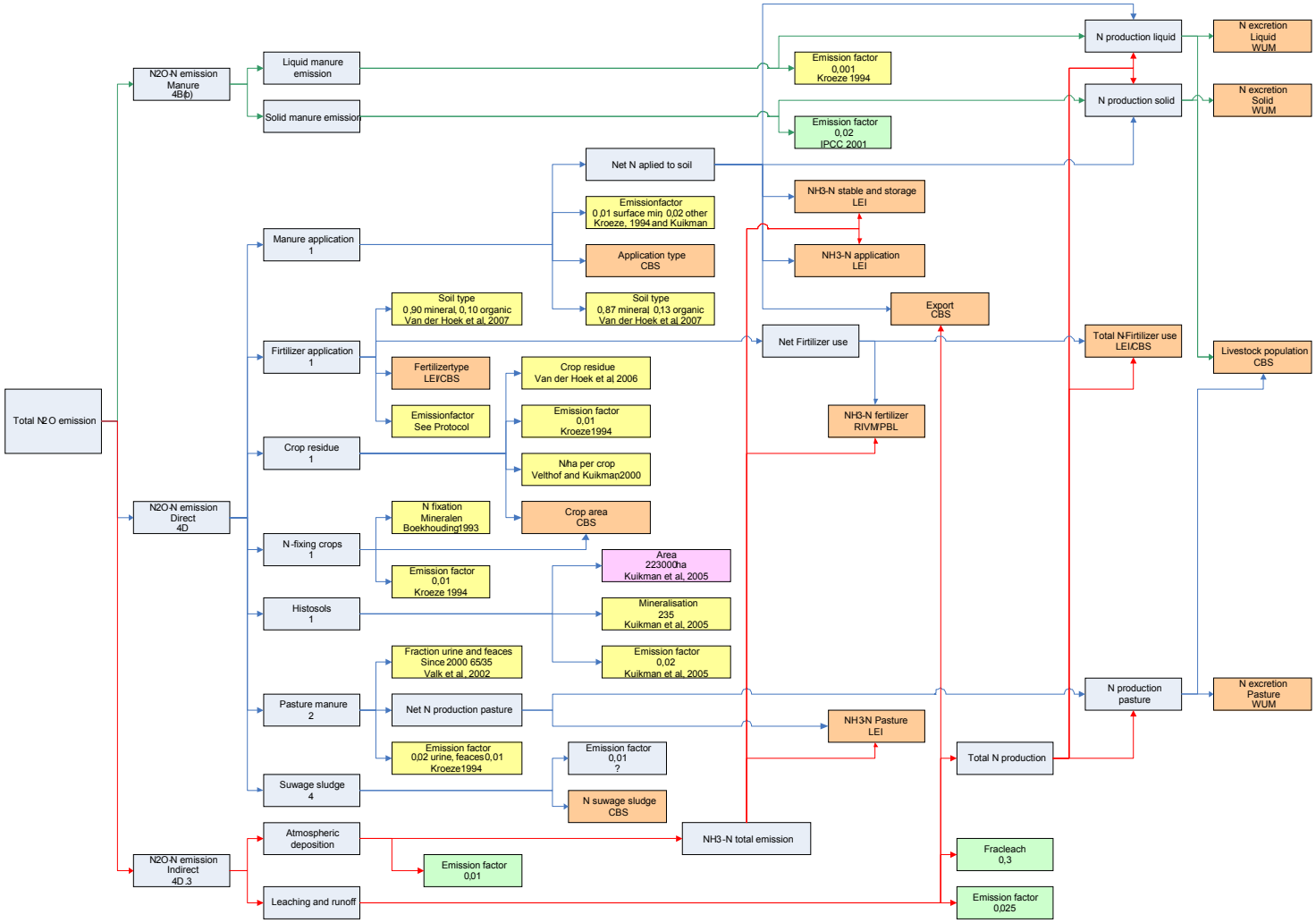
In the Netherlands the national statistical office (CBS) is part of the ER consortium. In other countries this is complicated by the Aarhus convention on access to information. In the figures 15 to 17 below the data flow (overall and separate for N_2O and CH_4) are visualized. The contribution of Infomill is not shown in these graphs. Infomill is part of Agentschap NL and supports the government in its reporting obligation. I.e. the official reports are generally processed by Infomill and not by the ministries itself.

Figure 15: Data collection – processing – reporting chain for environmental data in the Netherlands from the Emissieregistratie perspective



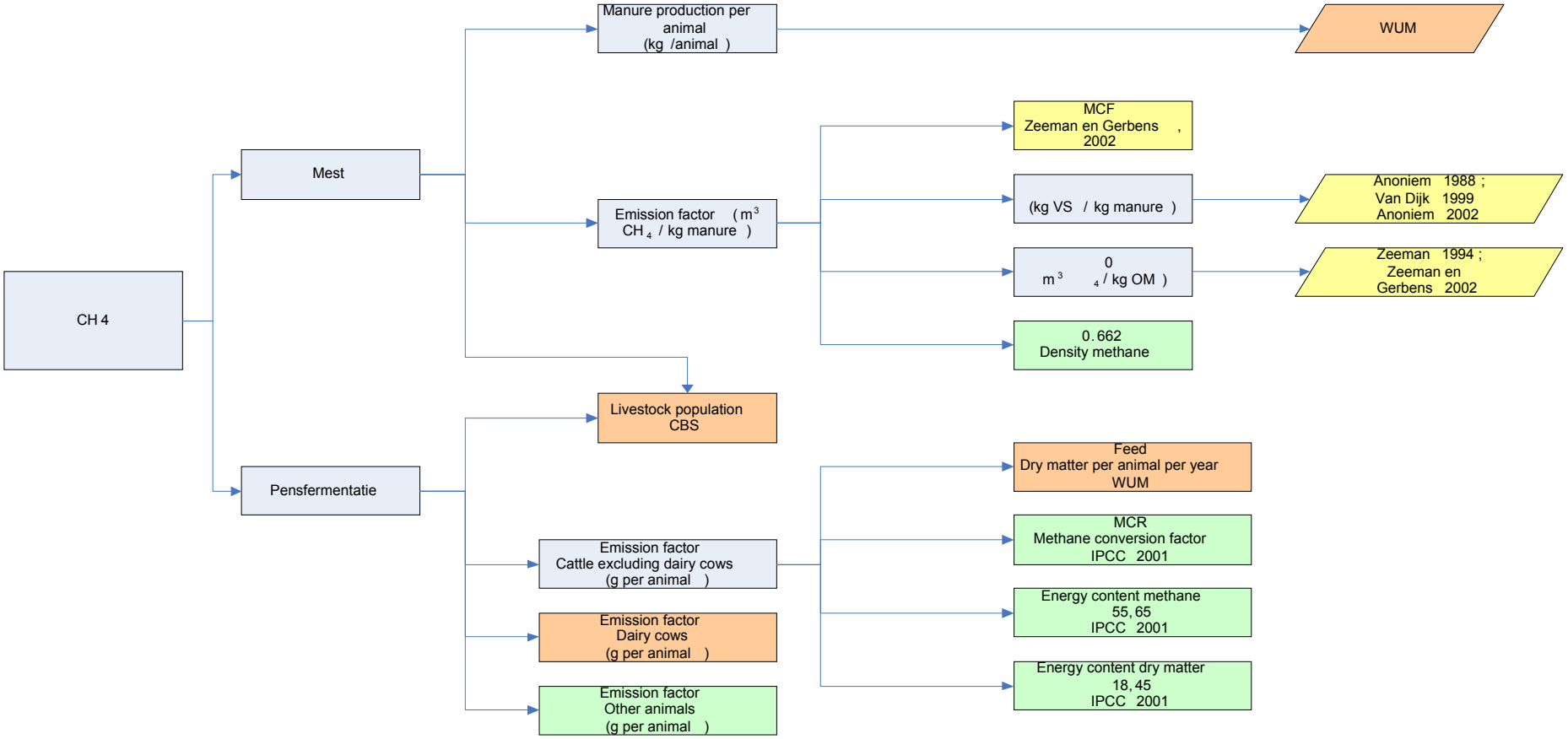
source: S. van der Sluis, PBL, 2010

Figure 16: Data collection – processing – reporting chain for N_2O emissions in the Netherlands



source: S. van der Sluis, PBL, 2010

Figure 17: Data collection – processing – reporting chain for CH_4 emissions in the Netherlands



source: S. van der Sluis, PBL, 2010

According to the head of the ER part of the complexity concerning data collection in the EU-27 is due to the EC itself. For example, there are 6 definitions of CO_2 emissions in Europe, which is one of the reasons that different data sources yield different information. There is a need for harmonization of definitions at EC level.

According to the results of the Streamlining project in The Netherlands, the following possibilities for streamlining of monitoring requirements need to be considered:

- There seems overlap between the reports for the National Emission Ceilings and CRLTAP. Two reports are made for in part similar reporting obligations, but with different deadlines (31 dec for the NECD, 15 February for CRLTAP). A streamlining option would result in one single report for ammonia and nitrogen oxide emissions for both reporting obligations; the fact that CRLTAP covers more substances need not be a problem here. Differences in scope and definitions between CRLTAP and NECD should be harmonized.
- The IPPC revision offers several streamlining opportunities. In general, monitoring requirements related to the revised IPPC should be streamlined. For instance, IPPC and E-PRTR categories should be aligned, and also definitions under LCPD and E-PRTR may be further harmonised. The proposed monitoring by facilities on their environmental performance in relation to the permit requirements could be integrated with E-PRTR. It should be clarified how the monitoring requirements for LCPD, WID and VOC are connected to the BREF monitoring and the guidance document for E-PRTR.
- There is much to gain by integrating the various reporting tools and formats. This also solves the categorization problems (NACE, IPCC, SNAP, IPPC etc), and can clearly identify their differences (aviation, international shipping etc). The best solution would be to have a single categorization for CRF, NFR, IPPC and E-PRTR. This would mean that the EC would adapt the categorization for IPPC/E-PRTR to a UN-categorization.
- The possibility to combine the NIR (for UNFCCC) and IIR (for CRLTAP) reports into a single report is not something that can be decided at the European level. However, member states could experiment with this, on a voluntary basis.
- Currently companies report their CO_2 emission both for E-PRTR and for ETS; but due to differences in definitions and scope, the CO_2 figures are different. It would be desirable if a company could report the same CO_2 emission for both purposes. Relevant aspects to be considered are the definition of categories of activities and definitions of combustion installations. The Netherlands is carrying out a project to investigate streamlining possibilities.
- For the MS the NIR of the 15th of January is very early and leaves little time to deliver data with the desired quality. This is caused by the need for the EU-27 to deliver its own NIR. It is suggested that the process to create the EU-NIR is automated and less time consuming.

4.6.2. Telephone interviews

Various interviews were held via the telephone with official national contact person of DG Agri.

The informant of Country 1 states it has a rather pragmatic approach when it comes to impact indicators. Yearly, a team of experts judge whether the impact of a measure is: low, high or moderate. According to this person there are no problems with indicators, but the problems occur when impacts have to be quantified. The informant suggests that their assessment in classes may be applicable to other countries as well. Additionally they outsource scientific studies to make relationships between measures and output of

indicators, but it is often hard to get statistically significant results. Also the lack of a control (reference) is considered problematic, because without a control group it is impossible to give quantitative data on impacts of directives.

The informant of Country 2 explains that data is collected by the National Institute for Statistics (NIS). The NIS sends out a questionnaire to the farmers and they return the questionnaire to the NIS. Also accountancy data from the industry is used. It is possible to make cross-checks but the respondent is not aware that this is being done. If it is done, it is performed by a service under the ministry. The informant recognizes problems in duplications of data collection. Sometimes similar data from farmers is requested by the NIS and the Ministry. Farmers complain about these double information requests. Another problem is that there are very few environmental data available for interpolation, especially from forestry. This is caused by shortage of manpower (budget). The respondent eliminates data that seems useless to them, without discussing this. The informant is working on the identification of similar data requests. There is a strong demand for harmonization of definitions among EU Directives. Also, this informant has experienced that within DGs similar information was asked for and the respondent argues that there should be more coordination between DG Environment and EUROSTAT to prevent repeated requests.

The informant of Country 3 uses a payment tool to link data collection to payment schemes to farmers. According to the informant this is a very effective tool and efficient yet comprehensive system especially for axes 1 (competitiveness) and 2 (environment). For axes 3 (support rural life) and 4 (link between rural and local actors) more difficulties are experienced. Through the tool the link between farmers and government is very tight: the requests for payments directly result in provision of data. Payments are performed by regional offices of the ministry without interference with the National Statistical Office (NSO). The NSO processes and collects different data, but the informant is not very aware of their activities. The informant knows that the NSO has many general data, but also has a large retention time. Notably the last survey was in 2000. The informant is not aware of any simulation model or other tools being used to process data. According to the informant impact indicators should be redefined. At present they are too complex. Although the respondent understands the logic behind the impact indicators it is currently too complex and can not be quantified accurately. Also the definition changed since the introduction of several Directives which further complicates comparison. According to the informant EUROSTAT may have a role in initiating the harmonization of definitions of impact indicators. The informant has experienced a lot of problem with the SFE, which is really difficult to use. The informant appreciates the idea behind the tool, but in its present form it is a burden in stead of a support.

The main point of the informant of country 4 is that it takes some time before impacts of programmes can be measured (e.g. number of farm birds). The informant knows that data is exchanged between different directives, but he is not aware of any differences between definitions. The informant experiences that the system is becoming more and more detailed and stricter and it is difficult to obtain commitment by the farmers. For the farmers it is difficult to see the necessity of e.g. monitoring the number of farm birds. For this country several sub regions are united in a cooperation and reports are processed by a different institute. The cooperation also has a working group that is preparing a list of indicators that could or should be removed from the reporting obligations. This list is not yet finalized, but once it is, it will be discussed with the EU. The informant thinks that the initiative of improving the current system has to come from experts. These experts should discuss with the national program coordinators to initiate improvements. The informant does not see a role for EUROSTAT in this sense; according to his view EUROSTAT is a more administrative office and not an expert organization.

Country 5 is still in the process of starting to collect data for EUROSTAT. They specified that quantified data collection was very difficult to collect and that so far no organisation is responsible for national data collection, nor could the informants give names for people who are responsible for this process.

Before 2006 data collection in country 6 was not carried out on a national level. In the past, different regions collected their own data, but since 2006 one national organisation collects all data for EUROSTAT which includes data from the national statistical office, and regional data. These data are standardized according to the needs for EUROSTAT and so far the latest updates have been made until 2007/2008. Through this standardization it makes it very easy to compare and understand different indicators and it is an accessible way to exchange information.

Some data for identifying indicators cannot be collected. About 10 of the more than 100 (sub) indicators, give problems with finding the values from regional offices. The main bottleneck can be found in the methodology with which indicators have to be described in which especially environmental indicators give problems. The method with witch data has to be collected does not always anticipate the diverse local conditions (for example for bio-indicators) which can be found in the different regions. These differences can be substantial and cannot be found back in the final data collection. Several indicators do not apply for the region in which they should be used.

Overall: this way of reporting several indicators is considered an improvement and simplification of the system which makes it more efficient to collect data. However local diverse conditions cannot be reported back adequately.

4.7. Assessment of UNFCC inventory reports and CLRTAP

4.7.1. GHG emissions

Pursuant to the United Nations Framework Convention on Climate Change (UNFCCC) and in accordance with Article 5, paragraph 2 of the Kyoto protocol Member States and European Union (EU) are committed to develop, publish and regularly update national emission inventories of greenhouse gases (GHGs).

The preparation and reporting of the inventories are guided by the UNFCCC guidelines (UNFCCC 2006) and they are based on the following IPCC methodologies to ensure the comparability, accuracy and completeness of the inventories:

- Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (1996 IPCC GL),
- IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories 2000 (GPG 2000),
- IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry 2003 (GPG LULUCF 2003)

Some countries also used national methodologies that better reflects their national situation. These methodologies have to be compatible with the IPCC Guidelines and IPCC good practice guidance and were prepared on the basis of well-documented research. The Member States and also the European Union as a whole implemented quality assurance and quality control (QA/QC) procedures in order to comply with the IPCC good practice guidance. The EU QA/QC programme describes the quality objectives and the inventory quality assurance and quality control plan for the EU GHG inventory including responsibilities and the time schedule for the performance of the QA/QC procedures. In National Greenhouse Gas Emission Inventory Reports for 2010 for UNFCCC are included GHG inventories for the years 1990-2008. Analysis of these reports indicate that, systems of collection and reporting data concerning greenhouse gas emissions by member states are differential – see Annex 6. In

every system there is one entity with “political responsibility”, which manages all process and approves the final report and the entity or entities with “technical responsibility”, and which collects and elaborates data and prepares the final report; often in collaboration with other entities or experts.

In most EU-27 countries, the political responsibility for the preparation of the report lies at the Ministry of Environment or Ministry of similar competence. Exceptions are:

- Belgium, where the entity approving the report is the National Climate Commission
- Germany, where the entity approving the report is the National Co-ordinating Committee
- Portugal - The Portuguese Environmental Agency (APA)/Ministry for the Environment and Land Use Planning
- England - UK Government Department of Energy and Climate Change (DECC)

There are countries where one institution is responsible for both technically preparation and final approval of the report. They are:

- Finland - Finnish Office of Statistics,
- Slovenia - Environmental Agency of the Republic of Slovenia and
- Ireland - Environmental Protection Agency (EPA).

The responsibility for the calculation and reporting of greenhouse gas emissions can be various types of institutions (Table 23):

- Agencies (most EU-27 countries),
- Research institutes (Czech Republic, Denmark, Estonia, Italy, Poland and Slovakia) and one University (Greece),
- Statistical Office (e.g. Finland)
- Association (in France it is French association)
- Services (e.g. Hungarian Meteorological Service),
- Company's (e.g., in Portugal and Latvia)
- Other non-governmental organizations (e.g., Lithuania).

Table 23: Institutions responsible for calculation of greenhouse-gases emission

Agencies	Research institutions (RI)/ Universities (U)	Other
Austria	Czech Republic (RI)	Finland (Statistics Office)
Belgium	Denmark (RI)	France (French association)
Bulgaria	Estonia (RI)	Hungary (Meteorological Services)
Germany	Greece (U)	Latvia (company)
Ireland	Italy (RI)	Lithuania (non governmental organization)
Luxemburg	Poland (RI)	Portugal (company)
The Netherlands	Slovakia (RI)	
Romania		
Slovenia		
Sweden		
UK		

Usually, a system of data collection and reporting on greenhouse gas emissions is central. Only in Belgium, it has a regional character, i.e. bodies that are responsible for preparing the national report are located in three regions: the Flemish Region, Walloon and Brussels Capital Region. Each region has its own legal and institutional arrangements.

Evaluation of systems for collecting and reporting data on greenhouse gas emissions can be done also in terms of their complexity, i.e. the number of institutions involved in the process. This number can vary from one institution (simple system) to a number of cooperating institutions (complex system). An example of simple system is the system operating in Ireland, where the institute EPA is responsible for the overall operation of the national greenhouse gas inventory system. By contrast, a system of data collection and reporting in Estonia is an example of a complex system in which the four key institutions work together: the Estonian Ministry of the Environment, Estonian Environment Information Centre (EEIC), Tallinn University of Technology (TUT) and the Estonian Environmental Research Centre (EERC).

4.7.2. NH_3 emissions

Reporting ammonia emissions to the Executive Body of the Convention on Long-range Transboundary Air Pollution (CLRTAP) is required to fulfil obligations in compliance with the implementation of Protocols under the Convention. Parties are required to submit reports using the Guidelines for Estimating and Reporting Emission Data under the CLRTAP.

Based on National Annual Emission Inventory Reports, an analysis was made on the completeness and complexity of the data collecting – processing – reporting chain (see Annex 7). Reports of individual Member States dealt with varying reporting periods (Table 24).

Table 24: Periods of ammonia emissions reporting under the CLRTAP Convention by Member States

No	Country	Periods of NH_3 reporting*
1	Austria	1980-2008
2	Belgium	1990-2008
3	Bulgaria	2008
4	Cyprus	1990-2008
5	Czech Republic	2007-2008
6	Denmark	1980-2008
7	Estonia	1990-2008
8	Finland	1980-2008
9	France	1980-2008
10	Germany	1990-2008
11	Greece	2008
12	Hungary	2008
13	Ireland	1987, 1990-2008
14	Italy	np
15	Latvia	1990-2008
16	Lithuania	2008
17	Luxemburg	np
18	Malta	2000-2008
19	The Netherlands	1990-2008
20	Poland	2007-2008
21	Portugal	1990-2008
22	Romania	2007-2008
23	Slovakia	2000-2008
24	Slovenia	1980-2008
25	Spain	1980-2008
26	Sweden	1980-2008
27	United Kingdom	1980-2008
**np = not present*		

The methodologies are to some extent taken directly from the Good Practice Guidance and the EMEP/CORINAIR Emission Inventory Guidebook (CORINAIR). The methodologies are also in accordance with the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines) and, in general, in line with IPCC's Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (Good Practice Guidance). The main suppliers of data for NH_3 inventory were Central Statistical Offices.

In most cases, the institution which prepared the inventory of greenhouse gases emissions was also responsible for the inventory of ammonia emissions, apart from Hungary, Finland and Lithuania. The preparation of the Hungarian NH_3 inventory is the result of various institutions and experts of different field of interest. The responsibility of the Finnish national system for preparation of air emission inventories is divided between Statistics Finland (reporting of greenhouse gases) and the Finnish Environment Institute (reporting of air pollutants). In Lithuania responsible for the inventory of NH_3 is Institute of Physics, and for GHG inventory - Centre for Environmental Policy.

Countries are obliged to use the same inventory procedures for the whole reporting periods. If the methodologies and procedures are revised, the revised methodology should be used again or the whole reporting period. MS Reports can contain various data gaps for years in the reporting period. Sometimes NH_3 emissions are not provided for a single year, or even for several years. The analysis shows that the data collection and reporting systems for GHG emissions and ammonia emissions in EU Member States are generally well organized.

5. Discussion

5.1. Some introductory statements

The development of harmonized data collecting – processing – reporting chains and systems for agri-environmental data and information across all EU Member States is still in its infancy. Possibly, lessons can be learned from other disciplines that face comparable complexities, but on a different, less complicated subject. For instance in Charlier and Franco (2001) an interesting review is provided on the monitoring and interpretation of the EU labour force survey (LFS). They report that, compared to other datasets, the LFS allows for a rather high inter-comparability between countries and that this is due to:

1. The recording of the same set of characteristics in each country;
2. A close correspondence between the EU list of questions and the national questionnaires;
3. The use of the same definitions for all countries;
4. The use of common classifications
5. There is one organization for data processing; EUROSTAT is centrally processing the data.

Charlier and Franco (2001) conclude that "differences in the national LFS questionnaires are still one of the main sources for the lack of comparability in the results".

Applying these findings to the current data collecting – processing – reporting chain for agri-environmental data and information in EU Member States reveals the following:

1. There is as yet no uniform and agreed set of data, parameters and coefficients for estimating the agreed AEIs. Tasks 1 and 2 of DireDate are dealing with this aspect further.
2. As the questionnaires are established in part at European level, there seems to be a close correspondence between the EU list of questions and the national questionnaires.
3. There is still some confusion about data needed for the AEIs, parameters and coefficients. As one informant expressed it; there are 6 different definitions of CO_2 emissions used in EU.
4. There are differences in classification systems across EU-27, for example for livestock categories, soil types, crop types, etc.
5. Data are processed and reported by various organizations.

Many of the observations indicated above follow from the diversity in history and culture between Member States. However, some of the observations may follow also from the subsidiary principle. It should be noted also that harmonization and standardization of methodologies and procedures is not easy and may take a long time before such harmonized and/or standardized methodologies and procedures will have been implemented in all institutions across all Member States. Quite often parallel 'systems' may occur side by side. For example, although the decimal system for areal estimates has been implemented long time ago, farmers in many EU Member States use their own system next to the system of (hect)ares.

The introduction of harmonization of survey questionnaire raises 2 immediate problems:

- - A change in the questions may contribute to a possible 'break' in time series and
- - Countries have national specific needs and recommended changes do not always fit with the national specific needs.

In on the longer term, harmonization of data collecting – processing – reporting systems for agri-environmental data and information across all EU Member States will increase the effectiveness and efficiency of these systems, and will contribute to increased comparability (level playing field) and increased transparency. Therefore, harmonization of data collecting – processing – reporting systems for agri-environmental data and information across all EU Member States seems essential.

During the last couple of years several questionnaires have been sent out to national contact points for data collection and reporting obligations for AEIs. Clearly, there is a strong demand at EU level for information and clarification about AEIs and current systems in Member States. However, there is a certain 'questionnaire fatigue' among the respondents. This can be concluded from the low response rates to the EUROSTAT questionnaires and the DireDate questionnaires, but also from the responses from the Streamlining questionnaire. Although this questionnaire achieved a high return rate (of 23 MS) the level of detail in answers highly differs which complicates objective interpretation and some MS bluntly referred to previous reports or left questions open. The fatigue may also be the result of asking questions that the respondents can not answer easily or rapidly. This holds especially also for the AEIs; it appears that nobody has the overview of the data collecting – processing – reporting chains for all AEIs in Member States. Further, nobody has the overview of all reporting requirements of Member States as regards agri-environmental policies. The consequence of the 'questionnaire fatigue' is also that the characterisation and analysis of the data collection – processing – reporting systems for agri-environmental data and information in Member States in this report is only a partial characterisation and analysis. It is well possible that the results and views presented in this report are not common views and that a further analysis and characterisation on the basis of more in-depth information from all Member States would yield different results.

5.2. Characterisation of data collecting-processing-reporting systems

According to its definition, a system is 'a set of interacting or interdependent entities forming an integrated whole'. Most systems share common characteristics, including:

- systems have structure, defined by parts and their composition
- systems have behaviour, which involves inputs, processing and outputs of material, energy or information
- systems have interconnectivity: the various parts of a system have functional as well as structural relationships between each other
- systems by themselves have functions or groups of functions[7]

Evidently, all Member States have 'data collecting and reporting systems' complying with the aforementioned definition. However, Member States do not have 'common data collecting and reporting

7 Source: http://en.wikipedia.org/wiki/System

systems'. All Member States collect, process and report agri-environmental data and information, but these activities are not included in coherent structures and do not constitute an organized and harmonious whole. Rather, Member States have parallel systems of collecting, processing and reporting of agri-environmental data on a rather ad hoc basis. The best of these are developed for the collection and reporting of GHG and ammonia emissions. They operate under uniform standards and requirements and they are integrated with each other at the European level. This harmonisation and integration has been achieved through political agreements under the UN Framework Convention on Climate Change and the Convention on Long-range Transboundary Air Pollution. Interestingly, all Member States comply with the reporting guidelines of the UNFCCC and UNECE-CLRTAP, albeit with differences in the use of Tier levels.

The definitions, methodologies and reporting guidelines for GHG emissions and ammonia emissions are more developed and institutionalized than those for most other AEIs. As a result, Member States have much more degrees of freedom for developing their own interpretations, notions and methodologies for reporting these other AEIs. This is specifically relevant also in relation to the aforementioned outsourcing and tendering of sub tasks.

Adequate collection and processing of agri-environmental data and information is a highly demanding task, requiring in-depth expertise and (financial) resources, which national institutions often do not sufficiently have. A possible solution is the outsourcing of specific sub tasks through tendering. In this way, tasks will be executed in principle in the most cost-effective way, with the best expertise available. Typically, such a tender is opened every 4 years. As a consequence, the institutions and companies carrying out the tasks may change every four years. The tendering of data collection and reporting obligations is likely to be the most cost-effective procedure, but harbours the risk that methodologies, procedures and networks change every four years, unless strict protocols and cooking book like templates are prescribed and used.

Based on the collected information from Poland and The Netherlands and the in-depth interviews with many experts, it can be formulated (expressed) that 'a common data collection and reporting system for AEIs' does not exists. Current evidence suggests that there is also no trend towards such common system; on the contrary, the current trend of outsourcing activities through tendering suggests that the dynamics in notions, procedures and methodologies increase, also because of the lack of protocols, cooking book like templates and guidance documents for many of the agri-environmental data and information.

5.3. State-of-the-art of the AEIs

Task 1 of DireDate reports on the definition, description and data requirements of the 28 AEIs (Vinther et al., 2011). The report shows that some AEIs are more developed and better described in terms in data requirements than others.

EUROSTAT is collecting and compiling the AEIs of all Member States. Currently, the database for the 28 AEIs is in development (Table 25). The data needed for establishing the AEIs are grouped into the following four categories:

- Farm management practices,
- Agricultural production systems,
- Pressures and risks to the environment,
- State of natural resources,

This database is available on the website: http://epp.EUROSTAT.ec.europa.eu/portal/page/portal/agri_environmental_indicators/indicators_overview. Most AEIs are sub-divided into one main and one or more supporting indicators. The main indicators are defined in order to represent the agri-environmental concepts the best developed within the DPSIR analytical framework, while the supporting indicators provide basic, additional or contextual information for analysing and interpreting the figures of the (main) indicators.

Statistical data related to farm management and agricultural production systems largely originate from the Farm Structure Surveys (FSS) implemented by Member States on the base of EU legislation and disseminated by EUROSTAT. FSS data used for these indicators include cultivated areas and livestock, as well as some more specific data such as irrigated areas. Administrative records of DG AGRI also provide data for the indicators based on agricultural policies e.g. rural development measures. In addition, there are a number of indicators based on data collected by the EEA through their network, or by external stakeholders like the Common Bird Monitoring project. Further, data for some AEIs are derived from models developed by the JRC.

In the EUROSTAT database, there are 32 main and 32 supporting indicators (total = 64). Of these, 23 (10 main and 13 supporting) are published in the EUROSTAT database. The remaining 41 (22 main and 19 supporting, equivalent to 64% of all indicators) are still under development and/or not published in the EUROSTAT database.

In the database, the following eight main indicators are lacking:

- Energy use – AEI 8
- Risk of land abandonment - AEI 14
- Soil erosion – AEI 21
- Genetic diversity - AEI 22
- Water quality – Nitrate pollution - AEI 27.1
- Water quality – Pesticide pollution - AEI 27.2
- Landscape – state and diversity – AEI 28

In additions, the following eight supporting indicators are lacking in the EUROSTAT database:

- Intensification/extensification - AEI 12
- Specialisation - AEI 13
- Risk of land abandonment - AEI 14
- Gross nitrogen balance - AEI 15
- Pesticide risk – AEI 17
- Population trends of farmland Birds - AEI 25
- Soil quality - AEI 26
- Water quality – Pesticide pollution - AEI 27.2

For two indicators there is no data source (both main and supporting):

- Risk of land abandonment - AEI 14
- High nature value farmland - AEI 23

In conclusion, already a lot of agri-environmental data and information has been submitted by Member States to the EUROSTAT database. Our study does not include an assessment of the quality and completeness of the submitted agri-environmental data and information. We recommend that the proper balance has to be found between adding data and information for missing AEIs and improving the quality of the agri-environmental data and information that is being collected already. This balance should be defined also by the priorities of the Agri-Environmental Policies.

Table 25: General information on the EUROSTAT agri-environmental indicators (AEI) database

No	Indicator	Measurement	Data source	Status
1	Agri-environmental commitments	Main indicator: Share of area under AE commitments/UAA	DG AGRI	Published
		Supporting indicator: Area under AE commitments (per category); Area under AE commitments within Natura 2000 sites; Share of agricultural holdings with agri-environmental commitments; Share of total expenditure for AE payments/ total rural development expenditure; AE payments/UAA		Under preparation
2	Agricultural areas under Natura 2000	Main indicator: Share of UAA under Natura 2000/UAA	EEA; DG AGRI	Under preparation
		Supporting indicator: UAA under Natura 2000; Area of habitat types dependent on extensive agriculture under Natura 2000; Share of Natura 2000 payments/total RD expenditure		
3	Farmers' training level and use of environmental farm advisory services	Main indicator: Number (share) of farmers having made use of environmental farm advisory services per year	DG AGRI EUROSTAT: FSS	Under preparation
		Supporting indicator: Share of farmers having only practical experience, basic agricultural training or full agricultural training		Published
4	Area under organic farming	Main indicator: Share of areas under organic farming/UAA	DG AGRI; EUROSTAT: FSS	Published
		Supporting indicator: Area under organic farming		

No	Indicator	Measurement	Data source	Status
5	Mineral fertiliser consumption	Main indicator: Application rate by crop of N (nitrogen) and P (Phosphorus)	European Fertiliser Manufacturers Association (EFMA)	Under preparation
		Supporting indicator: Absolute volume by crop of N (nitrogen), P (Phosphorus) and K (potassium)		Published
6	Consumption of pesticides	Main indicator: Application rates of different pesticide categories	European Crop Protection Association (ECPA)	Under preparation
		Supporting indicator: Used/sold quantities of pesticide categories		Published
7	Irrigation	Main indicator: Share of irrigable areas/UAA	EUROSTAT: FSS	Published
		Supporting indicator: Irrigable areas, irrigated areas; irrigated crops; irrigated area/UAA; irrigation methods		
8	Energy use	Main indicator: ?	DG AGRI: FADN; EUROSTAT: FSS, SIRENE	Under preparation
		Supporting indicator: Annual use of energy at farm level by fuel type (GJ/ha)		
9	Land use change	Main indicator: Percentage of the total agricultural area that has changed to artificial surfaces compared to a reference period	EEA: CLC; EUROSTAT: LUCAS	Under preparation
		Supporting indicator: Land use change from agricultural land to artificial surfaces (ha)		
10.1	Cropping patterns	Main indicator: Share of the main agricultural land types/UAA	EUROSTAT: FSS	Published
		Supporting indicator: Area occupied by the main agricultural land types (arable crops, permanent grassland and permanent crops)		
10.2	Livestock patterns	Main indicator: Livestock density (total livestock/UAA) and grazing rate (grazing livestock/fodder area)	EUROSTAT: FSS	Published
		Supporting indicator: Number and share of major livestock types (cattle, equidae, goats, sheep, pigs and poultry)		Published

No	Indicator	Measurement	Data source	Status
11.1	Soil cover	Main indicator: Share of the year where the arable area is covered by plants or plant residues Supporting indicator: Days of the year when the arable area is covered by plants or plant residues	EUROSTAT: FSS; FOOTPRINT cultivation calendars	Under preparation
11.2	Tillage practices	Main indicator: Share of arable areas under conservation tillage/total arable area Supporting indicator: Arable areas under conservation tillage and zero tillage	EUROSTAT: future SAPM	Under preparation
11.3	Manure storage	Main indicator: Share of farms having storage facilities for solid dung, liquid manure and slurry Supporting indicator: Number of farms having storage facilities for solid dung, liquid manure and slurry	EUROSTAT: FSS and future SAPM	Published
12	Intensification/extensification	Main indicator: Share of low, medium, high-input farms (based on average input expenditure/UAA) Supporting indicator: ?	DG AGRI: FADN	Published
13	Specialisation	Main indicator: Share of specialised and mixed farm types Supporting indicator: ?	EUROSTAT: FSS	Published
14	Risk of land abandonment	Main indicator: ? Supporting indicator: ?	?	Under preparation
15	Gross nitrogen balance	Main indicator: Potential surplus of nitrogen on agricultural land (kg N/ha/year) Supporting indicator: ?	OECD - EUROSTAT	Under preparation
16	Risk of pollution by phosphorus	Main indicator: Potential surplus of phosphorus on agricultural land (kg P/ha/year) Supporting indicator: Vulnerability to phosphorus leaching/run-off	OECD - EUROSTAT	Under preparation
17	Pesticide risk	Main indicator: Index of risk of damage from pesticide toxicity and exposure Supporting indicator: ?	HAIR project	Under preparation
18	Ammonia emissions	Main indicator: Distance to NEC targets	EEA	Published

No	Indicator	Measurement	Data source	Status
		Supporting indicator: Emissions of NH3 in tonnes; Share of agriculture in total ammonia emissions		
19	Greenhouse gas emissions	Main indicator: Share of agriculture in GHG emissions Supporting indicator: GHG emissions from agriculture	EEA - UNFCCC	Published
20	Water abstraction	Main indicator: Share of agriculture in water use Supporting indicator: Water use for irrigation (m3/year)	OECD - EUROSTAT	Under preparation
21	Soil erosion	Main indicator: ? Supporting indicator: Estimated soil loss by water erosion and by wind erosion (T/ha/year)	JRC: PESERA	Under preparation
22	Genetic diversity	Main indicator: ? Supporting indicator: Number and range of crop varieties and livestock breeds; Share in production of main crop varieties registered and certified for marketing; Number of breeds per total livestock population for different types of livestock; Distribution of risk status of national livestock breeds in agriculture	FAO & others	Under preparation
23	High nature value farmland	Main indicator: Share of estimated HNV Farmland/UAA ? Supporting indicator: Estimated area HNV Farmland	?	Under preparation
24	Renewable energy production	Main indicator: Share of primary energy from crops and by-products as of total energy production Supporting indicator: Production of primary energy from crops and by-products; Area of energy crops and short rotation forestry; Supported areas for renewable energy production	DG AGRI	Under preparation
25	Population trends of farmland Birds	Main indicator: Farmland bird population index Supporting indicator: ?	Pan-European Common Bird Monitoring	Under preparation

No	Indicator	Measurement	Data source	Status
			project	
26	Soil quality	Main indicator: Average (?) humus content (%) in the topsoil	JRC: European Soil Database	Under preparation
		Supporting indicator: ?		
27.1	Water quality – Nitrate pollution	Main indicator: ?	EEA: Eionet Water	Under preparation
		Supporting indicator: Share of agriculture in total nitrate pollution; Nitrate concentration in water bodies		
27.2	Water quality – Pesticide pollution	Main indicator: ?	EEA: Eionet Water	Under preparation
		Supporting indicator: ?		
28	Landscape – state and diversity	Main indicator: ?	EUROSTAT: FSS; EEA: CLC; Protected areas, etc.	Under preparation
		Supporting indicator: Typology of farmed landscapes; Changes/ landscape type; Land-cover change		
Source: http://epp.EUROSTAT.ec.europa.eu/portal/page /portal/agri_environmental_indicators/indicators_overview				

5.4. Perceptions about agri-environmental indicators

Agri-environmental indicators have been defined as "simplified statements to assess the complicated interactions between agricultural and agri-environmental policies, agricultural practices and the environment" (Andersen, 2002). Indeed, scientists often find the definition of AEIs (too) simple, when evaluating the complicated interactions between agricultural and agri-environmental policies, agricultural practices and the environment. On the other hand, experts involved in the data collection – processing and reporting chain find the definitions of AEIs, and especially the data requirements, (too) complicated, at least for the short term. The latter notion is supported by a number of observations obtained from the questionnaires and interviews:

- Statistic offices in Denmark and The Netherlands reported that nobody has a complete overview of the data collecting – processing - reporting chain for AEIs and about the state-of-the-art data availability in their countries. The AEIs cover a very broad range of expertises and competences.
- In the opinion of the Swiss Federal Statistical Office (FSO) expressed in relation to CPSA meeting on 12-13 November 2009 on "Collecting data for the agri-environmental indicators"[8]:
    - "In the proposed questionnaire, it seems we have not the same definition of what is an indicator"

[8] Source: E-mail from Swiss Federal Statistical Office FSO to ESTAT DL AGRI-ENVIRONMENTAL INDICATORS

  - "It is clear that we can fill the questionnaire only very partially. Most of the requested data are not available in Switzerland and they will not be available in the near future".
- According to the Germany Federal Ministry of Food, Agriculture and Consumer Protection[9]:
  - „In Germany, only a small share of the data required are available at national level"
  - "We should also work on improving definitions for the list of parameters contained in the June questionnaire".
- In the opinion of Head of the Emission Registration in The Netherlands part of the complexity concerning data collection in the EU-27 is due to the EC itself. There is a need for harmonization of definitions at EC level as well[10].

In his essay "Why do things become more complex?" W. Brian Arthur (1993) examines a common observation in societies: "increasing complexity over time of various items and phenomena that are simple by nature". He concludes that "Complexity tends to increase as functions and modifications are added to a system to break through limitations, to handle exceptional circumstances, or to adapt to a world itself more complex". His solution is 'system innovation', i.e., a complete redesign of the existing systems, and thereby creating positive change. This could be a basis for the recommendations to be developed further in Tasks 4 and 5 of DireDate: "to create a framework for setting up a sustainable system for collecting a set of data from farmers and other sources that will serve primarily European and national statisticians for creating the agreed 28 Agri-Environmental Indicators and thus serve policy makers, agricultural and environmental researchers, observers of climate change, as well as other environmental issues linked to agriculture". A complete redesign of the current agri-environmental data collecting-processing-reporting systems would involve a large investment at the short-term, but may yield a common, harmonized and drastically slimmed down agri-environmental data collecting-processing-reporting system.

National Statistical Institutes and Offices are the most important source of agri-environmental data and information. According to the EUROSTAT Questionnaire, National Statistical Institutes and Offices are 'owner' of 56% of the available data, Ministries are 'owner' of 16% of the available data, scientific institutes 14% and governmental agencies are 'owner' of 7% of the available data. Hence, National Statistical Institutes and Offices have key position and role in the management of agro-environmental indicators.

However, National Statistical Offices and Institutes are faced with multiple constraints. To be able to set up common, uniform and adequate data collecting and reporting systems, they require support in the form of appropriate instructional materials and staff training. Further, they need additional financial resources, which seems another complication. As informed by Florian Kohler from Swiss Federal Statistical Office (FSO), in the commentary to the EUROSTAT questionnaire, citation: „*Moreover in the near future, we don't plan to develop new statistics especially for this questionnaire. No extra-resource will be given for this topic*".

5.5. Guesstimates and duplicates

Here, guesstimates are defined as 'data that has a verifiable origin somewhere, but that has become vague and untraceable through multiple manipulations'. For instance, this may occur when data passes through several organizations and each organizations carries out some kind of data manipulating without taking

[9] Document CPSA/AE/083 from 24/11/2009 and Circular Note from 11/12/2009

[10] Opinion obtained by Christy van Beek during consultation with Wim van der Maas 25 June 2010

into account previous or next manipulations. Duplicates may occur when policy reports demand for similar data and when these data are collected, processed and reported by different departments without much tuning. An example is the Gross Nutrient Balances (GNB), which has to be reported for the Sustainable Development Indicators, Rural Development Programs, HELCOM, OECD, EUROSTAT, and a multitude of other initiatives. The risk occurs that the Gross Nutrient Balances are processed and reported in a different manner.

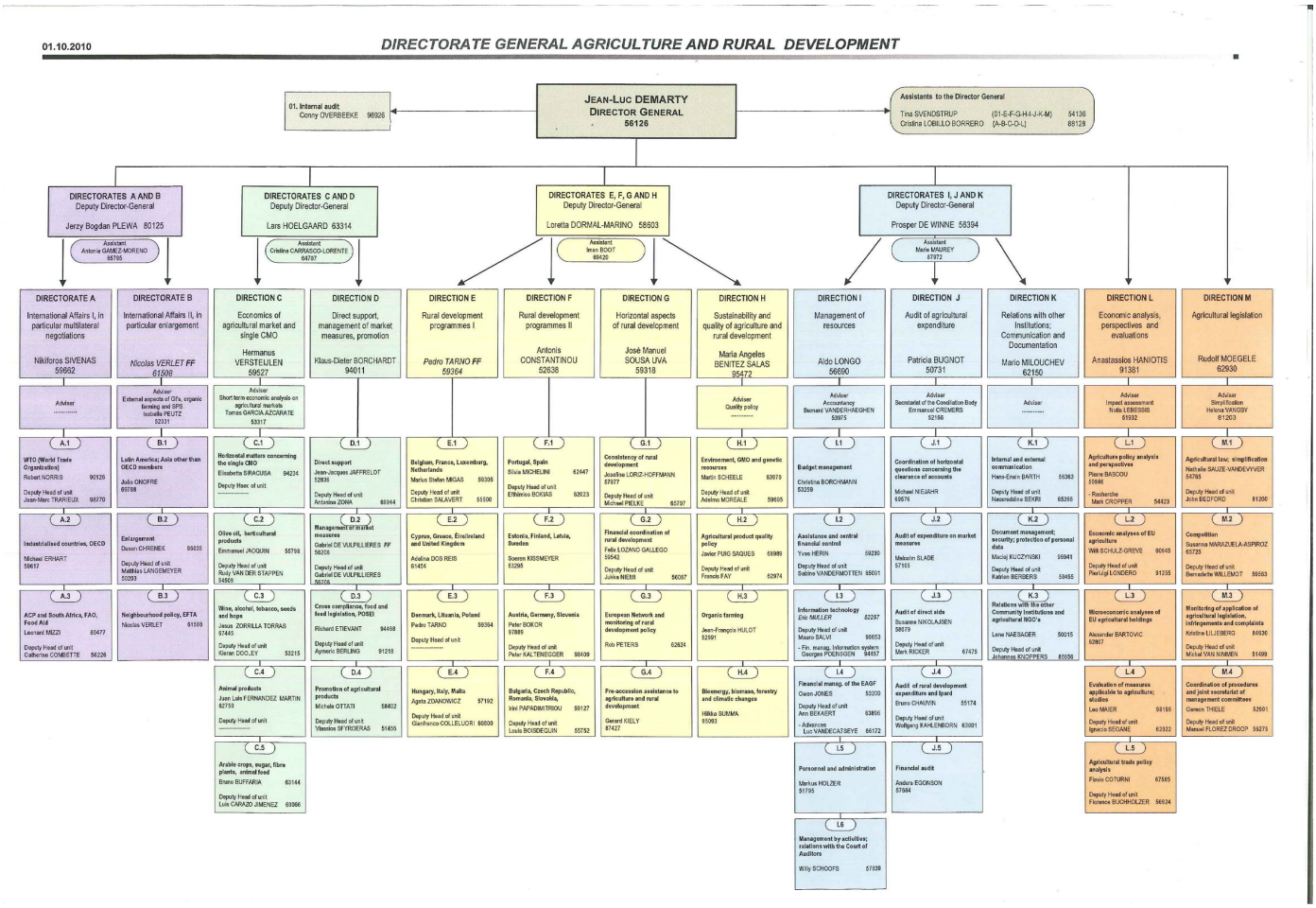
Although we paid special attention to the possible occurrence to 'guesstimates' and duplicates in questionnaires and interviews, we did not manage to make a quantitative assessment of the occurrences of these. Guesstimates and duplicates do occur but we do not know whether their occurrences significantly affects the accuracy of the agri-environmental data and information, and the effectiveness and efficiency of the data collecting-processing-reporting systems.

5.6. Overview at EC level

In the previous chapters main emphasis was given to the characterisation of the agri-environmental data collecting-processing-reporting systems of Member States. The view emerged that numerous organizations are involved, and essentially no one has a complete overview. The fragmented organization of the agri-environmental data collecting-processing-reporting is not unique for Member States; it holds as well for the many Departments of the European Commission involved in assessing agri-environmental data and information. There roles and tasks are often not clear and it seems that one department sometimes does not know the other departments request similar but slightly different agri-environmental data and information.

Figure 16 shows the organigram of DG Agri. Similar organigrams exist for other DGs. Also the position of EUROSTAT is not always clear; fom the telephone interviews it was noted that some respondents see EUROSTAT as an organization to develop guidelines and to steer monitoring activities, whereas other regard EUROSTAT as a mere data provider and/or data base.

Figure 18: Organigram of Directorate-General Agriculture and Rural Development (DG Agri)



6. Best practice recommendations for data collection

Several general recommendations can be made to improve the collection of agri-environmental data and information in the Member States of the EU-27. More specific recommendations are provided in the Reports of Task 1 (Vinther et al, 2011), Task 2 (Wilson et al., 2011), Task 3 (Amon et al., 2011) and Tasks 4&5 (Velthof et al., 2011) .

The first recommendation relates to the complaints of the Member States about differences in formats, units, spatial and temporal scales of the agri-environmental data and information requested by the European Commission for policy reporting: hence, an effort should be made to harmonize the formats, units, spatial and temporal scales of the agri-environmental data and information for policy reporting. This harmonization will greatly facilitate the processing and reporting of the agri-environmental data and information by the Member States to the European Commission.

The second recommendation relates to the lack of overview and the low organizational coherence of the agri-environmental data collecting-processing-reporting systems in Member States. We recommend a clearer description and appointment of roles, tasks and responsibilities for the organizations involved. Given also the current tasks and responsibilities it seems reasonable to propose that in each Member State of the EU-27 (see also Figure 17):

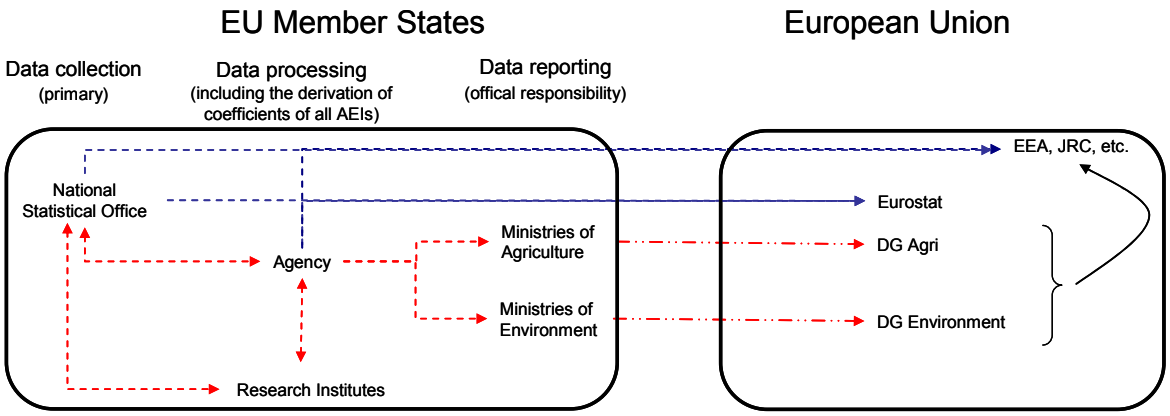
- National statistical offices should have key roles in the collection and processing of basic (primary) data.
- Independent agri-environmental agencies should have key roles in assessing and updating the coefficients needed for some of the AEIs and possibly in the establishment of protocols and guidance documents for the estimations of AEIs.
- Research organizations and universities should have key roles in the development of coefficients help the agency in charge of estimating the AEIs or national statistical office to update coefficients and the descriptions of the AEIs.
- National ministries have final responsibility for reporting and send the reports towards the responsible DGs. Furthermore they have the financial responsibility for setting up sustainable data collection – processing – reporting systems.

The framework in Figure 17 has the advantage that formal reports are detached from data flows.

The third recommendation is to assign a national coordinator who oversees and coordinates the data collection, processing and reporting procedures, and who seeks for synergies in the activities. At present there are very few countries in which one person oversees all activities, but this would greatly facilitate the transparency and the effectiveness and efficiency of the data collection – processing – reporting chains.

Figure 19: Recommended flow of reports and data from EU member states towards the EU

In blue are data flows, in red flows of formal reports



The fourth recommendation is the set-up of Task Forces for the development and approval of protocols and guidelines for uniform data collecting – processing - reporting of agri-environmental data and information across the EU-27. Experts from all Member States should be involved in these Task Forces, while DG Eurostat should have a coordinating and stimulating role. The protocols and guidelines should be updated on a regular basis (once in ~five years) to be able to incorporate new insights from science, policy and practice. The institutional structure with quality control and assurance, and uniform protocols and formats for reporting of GHG and ammonia emissions may serve as a model for the creation of uniform and harmonious data collecting and reporting systems.

The fifth recommendation is that Member States describe the data collection and processing procedures in easy accessible reports, based in part on the recommendations of the Task 4&5 report of DireDate (Velthof et al., 2011) and the aforementioned protocols and guidlines. Compliance to the procedures described in these report would greatly facilitate the transparency and the effectiveness and efficiency of the data collection – processing – reporting chains.

7. Conclusions

- Data collecting and reporting systems for of agri-environmental data and information in EU Member States are spread over various organizations and institutions. None of the Member States has an institution specifically targeted to data collection and reporting for all of agri-environmental data and information.
- Member States have complains about the reporting burden implemented by the European Commission. They have also complains about the lack of tuning of and consistency between the various reporting requirements for agri-environmental data and information.
- National Statistical offices seem the most obvious organizations to collect and report agri-environmental data. However, they rely on the support of many other institutions.
- None of the Member States has an integral overview of the data collecting and reporting systems for all agri-environmental data and information, including AEIs; Member States do not have a coordinator or coordinating institution for all AEIs data collecting and reporting.
- The procedures and practices for data collection and reporting of AEIs differ between Member States; Member States have developed their own procedures and practices.
- Agri-environmental data relevant for the agreed 28 AEIs is not always collected at uniform spatial scales and temporal resolutions across the EU Member State. Further, some of the required agri-environmental data is missing in some Member States.
- Successful elements of different data collection procedures should be identified and made applicable for use by other Member States. This could facilitate the building of good quality data collecting and reporting system for AEIs across the EU-27.
- AEIs with a firm foundation in agreed international conventions and protocols, such as for greenhouse gases and ammonia emissions, have a much more uniform data collecting and reporting system across the EU-27 than AEIs without agreed international conventions and protocols. This suggests that political agreements between Member States about protocols for uniform data collecting and reporting system across the EU-27 would facilitate the establishment of a uniform and harmonious functioning system for estimating AEIs accurately.
- The institutional structure with quality control and assurance and uniform protocols and formats for reporting of GHG and ammonia emissions may serve as a model for the creation of uniform and harmonious data collecting and reporting systems for all AEIs across EU-27.
- It would be appropriate to strengthening (by political decisions) the responsibility and domains of the National Statistical offices for the coordination of AEIs data collection and reporting.

8. Cited literature

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9. Annexes

Annex 1: Type of organization holding national data

Table: Types of main responsible organizations for data collection as mentioned in the Eurostat questionnaire

Member State	Organization	Data owner
CZ	CZSO	S
DE	Destatis	S
ES	MARM	G
FI	Tike	R
HU	HCSO	S
LV	CSB	S
RO	NIS	S
AT	BMLFUW	G
MT	MRRA	G
AT	UBA	G
DK	DMU	R
MT	MEPA	A
DE	UBA	G
SI		

** G=Government, S=Statistical Office, R=Research, A=Agency, O=Other and C= Commercial party.*

Annex 2: Eurostat questionnaire

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
0	**Transversal data**	Utilised agricultural area (ha)	FSS						
		Number agricultural holdings	FSS						
		Number of farmers	FSS						
		Rural development expenditure	AGRI						
	Coefficients	Agro-pedo-climatic conditions	European soil and weather databases - JRC						
		Livestock units conversion coefficients	FSS definitions						
		Livestock excretion rates							
		Nitrogen fixation							
		N Atmospheric deposition	EMEP						

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
		Index values of period of soil coverage	To be defined: JRC? Footprint project?						
1	**Agri-Environmental commitments**	Area under agri-environmental commitments (Reg. 2075/92 + 1257/99) by type of measure	MS report to AGRI	Area under agri-environmental commitments (per category: 16 + total)	UAA under nutrient management plans				
					UAA under integrated farming				
					UAA under IPM				
					UAA under biodiversity management plans				
				Share of area under agri-environmental commitments in total utilised agricultural area					
		Number of agricultural holdings with agri-environmental commitments	MS report to AGRI	Share of agricultural holdings with agri-environmental commitments/total number of agricultural holdings					
		Total expenditure for agri-environmental payments	MS report to AGRI	Share of total expenditure for agri-environmental payments/ total rural development					

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
				expenditure					
				Number of Agri-environmental commitments per utilised agricultural area					
					Farms using soil nutrient testing				
2	**Agricultural areas under Natura 2000**	Utilised agricultural area under Natura 2000	MS Report to ENV/EEA	Utilised agricultural area under Natura 2000					
				Utilised agricultural area under Natura 2000 per total utilised agricultural area					
		Area of habitat types threatened by abandonment of agriculture under Natura 2000	MS report to ENV/EEA	Area of habitat types threatened by abandonment of agriculture under Natura 2000					
		Natura 2000 payments	MS report to AGRI	Share of Natura 2000 payments / total rural developments expenditure					
		Rural development expenditure	MS report to AGRI						

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
					Bird habitats areas threatened by intensive agricultural practices				
3	**Use of environmental farm advisory services and farmers' training level**	Number of farmers having only practical experience	FSS	Percentage of farmers having only practical experience					
		Number of farmers having basic training	FSS	Percentage of farmers having basic training					
		Number of farmers having full agricultural training	FSS	Percentage of farmers having full agricultural training					
		Number of farmers having made use of environmental farm advisory services per year	MS report to AGRI	Percentage of farmers having made use of environmental farm advisory services per year					
4	**Area under organic farming**	Area under organic farming (Reg. 889/2008)	AGRI Admin data, FSS, Farm to Fork (Reg. 834/2007)	Area under organic farming	UAA under certified organic farm management				
				Share of areas under organic farming per total utilised agricultural area					

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
5	**Mineral fertiliser consumption**	Absolute volumes of N consumption	FAOSTAT, EFMA, Fertiliser surveys	Absolute volumes of N					
		Absolute volumes of P (P2O5) consumption	FAOSTAT, EFMA, Fertiliser surveys	Absolute volumes of P (P2O5)					
		Application rates per crop of N	EFMA, Fertiliser surveys	Application rates per crop of N					
		Application rates per crop of P (P2O5)	EFMA, Fertiliser surveys	Application rates per crop of P (P2O5)					
6	**Consumption of pesticides**	Consumption of pesticides active substances per crop	ECPA, Pesticide Regulation	Quantity of pesticides active substance used	Quantity of pesticides active substance used (sold)				
				Application rates of different pesticide categories by crop					
7	**Irrigation**	Total irrigable area	FSS	Irrigable area					
				Irrigable area per total utilised agricultural area					
		Area irrigated once/year	FSS	Irrigated area					
				Irrigated area per total utilised agricultural area	Irrigated area per total utilised agricultural area				

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
				Irrigated crops (10 + tot)					
				Irregated area per type of irrigation (3)	Irrigated area per type of irrigation				
8	**Energy use**	Final energy consumption in agriculture by type of energy	SIRENE	Annual use of energy at farm level by fuel type per total utilised agricultural area (GJ/ha)	Share of direct on-farm energy consumption				
9	**Land use change**	Land use change from agricultural land to artificial surfaces	CORINE Land cover, LUCAS	Land use change from agricultural land to artificial surfaces (ha)	Conversion of agricultural land to and from other land uses				
				Percentage of the total agricultural area that has changed compared to a reference period					
10	**Cropping patterns**	Area managed by different types of cropping systems	FSS	Area occupied by the major agricultural land types					
				Share of agricultural land types per total utilised agricultural area					
10	**Livestock patterns**	Livestock number by category	FSS	Number of major livestock types (cattle, sheep, goats, pigs and poultry)					
				Share of major livestock types					
				Livestock density index (livestock units per					

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
				utilised agricultural area)					
				Grazing stocking rate: livestock units of cattle, sheep and goats per grassland and forage crops					
11	**Soil cover**	Area cultivated with different crops	FSS	Days of the year when the arable area is covered by plants or plant residues	UAA under vegetative cover all year				
		Soil coverage index values	To be defined: JRC? Footprint project?						
		Soil cover in winter with normal winter crop, cover or intermediate crop, and plant residues	future SAPM						
11	**Tillage practices**	Area managed by conservation tillage (low tillage)	Future SAPM	Area managed by conservation tillage (low tillage)	UAA under soil conservation practices				
		Area managed by zero tillage (direct seeding)		Area managed by zero tillage (direct seeding)					
		Area managed by conventional tillage		Area managed by conventional tillage					
11	**Manure storage**	Type of storage for farm manure	FSS, SAPM	Type of storage for farm manure and slurry					

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
		and slurry							
12	**Intensification/ extensification**	Expeditures for inputs	FADN	Share of low, medium, high input farms					
		Milk yields	Milk statistics	Milk yields					
		Cereal yields	FADN, crop statistics	Cereal yields					
13	**Specialisation**	Agricultural area managed by different farm types	FSS	Utilised agricultural area managed by different farm types					
				Share of specialised farms by type					
14	**Risk of land abandonment**			Index of risk abandonment?					
		FNVA/AWU per farm	FADN						
15	**Gross nitrogen balance**	Harvested and forage crop area	FSS and crop statistics	Gross Nitrogen Balance	Gross Nitrogen Balance				
		Livestock numbers by category	FSS						
		Fertiliser consumption by crop	EFMA, Fertiliser surveys						
		Manure application by crop	Fertiliser surveys, SAPM						

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
		Atmostpheric deposition	EMEP						
		Crop yields	FADN						
16	**Risk of pollution by phosphorus**	Phosphorus consumption	Fertiliser surveys	Gross Phosphorus Balance / P Risk index?	Gross Phosphorus Balance				
		Soil characteristics	Soil map						
					Phosphate water contamination derived from agriculture				
					sites with phosphate concentration exceeding drinking standards				
17	**Pesticide risk**	Pesticide active substance consumption by crop	ECPA, Pesticide Regulation	Pesticide risk index	Risk of damage to terrestrial and aquatic environments, and human health, from pesticide toxicity exposure.				
		Area cultivated with different crops	FSS						
		Pesticide active substance properties	EFSA						
18	**Ammonia emissions**	Ammonia emission from agriculture	UNECE / EMEP	Share of agriculture in ammonia emissions	Share of agriculture in ammonia emissions				
				Distance to NEC targets					
19	**GHG emissions**	CH4 and N2O (ktonnes CO2	UNECE / EMEP	Gross agricultural GHG emissions	Gross agricultural GHG emissions				

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
		equivalents) emissions from agriculture							
				Share of agriculture in GHG emissions	Share of agriculture in GHG emissions				
20	**Water abstraction**	Water abstraction rates	OECD - Eurostat JQ, Water pilot projects	Water use for irrigation (m^3/year)					
				Share of agriculture in water use	Agricultural water use in total national utilisation				
					Agriculture's use of **groundwater** in total national utilisation				
21	**Soil erosion**	Land Use data	CLC, LUCAS + PESERA model	Estimated soil loss by water erosion (t/ha/year)					
					UAA affected by water erosion				
				Estimated soil loss by wind erosion (t/ha/year)					
					UAA affected by wind erosion				
22	**Genetic diversity**	Number of crop varieties and livestock breeds	FAO	Number and range of crop varieties and livestock breeds	Number of crop varieties and livestock breeds **registered and certified**				
				Share in production of main crop varieties registered and certified for marketing	Share in production of main crop varieties				

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
				Number of breeds per total livestock population for different types of livestock	Share in production of main breeds				
				Distribution of risk status of national livestock breeds in agriculture	Distribution of risk status of national livestock breeds in agriculture				
					Status of plant and livestock genetic resources under in situ and ex situ national conservation programmes				
					Wild species that use agricultural land as primary habitat				
					Share of UAA under transgenic crop				
23	**High nature value farmland**	Estimated area High Nature Value Farmland	EEA, CORINE Land Cover, FADN	Estimated area High Nature Value Farmland					
				Estimated area High Nature Value Farmland per total utilised agricultural area.	Share of agricultural semi-natural habitats areas				
24	**Production of renewable energy**	Production of primary energy from crops and by-products (Ktons)	Future Energy statistics?	Production of primary energy from crops and by-products (Ktons)					
		Area of land devoted to energy	Future FSS, EurostatRES,	Area of energy crops by type (3)					

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
		crops	others?						
25	**Population of farmland birds**	Farmland bird population counts	Pan-European Common Bird Monitoring project	Farmland bird population index	Population of a selected group of breeding birds				
26	**Soil quality**	Soil characteristics	European soil database, CLC, LUCAS, Fertiliser surveys	Agri-environmental soil quality index					
				Productivity index					
				Fertilizer response rate					
				Production stability index					
				Soil environmental quality index					
27	**Water quality- Nitrate pollution**				Nitrate water contamination derived from agriculture				
					sites with phosphate concentration exceeding drinking standards				
27	**Water quality- Pesticide pollution**				Sites with one or more pesticides present in surface and groundwater				

INDICATOR		PARAMETERS	EU DATA SOURCE	DATA TRANSFORMATION	OECD DATA NEEDS	MEMBER STATE DATA AVAILABILITY			
						NUTS	DATA OWNER	TIME COVERAGE	COMMENTS-LINKS
					sites with pesticide concentration exceeding drinking standards				
28	**Landscape - State and diversity**	livestock denstity, N-input	FSS	impact of farming practices on landscape					
		Agriculturally linked linear elements	LUCAS	landscape structure					
		(Rural tourism) to be better defined	Member States statistics	landscape appreciation					
		Number of agricultural classes / nr. of crops	CLC, LUCAS, FSS	landscape structure					
	ozone layer	Methyl bromide use and ozone depletion		replaced by 1,2 D (dichloropropane) as soil fumigant insecticide					

Annex 3: Diredate RDP questionnaire

Falenty/Wageningen, June 2010

Dear Sir, Madam,

The Member States of the European Union are required to report to the European Commission on a regular basis about the implementation of agri-environmental policies, including the Water Framework Directive (WFD), Nitrates Directive (ND), National Emission Ceiling Directive (NECD), Rural Development Program (RDP), Integrated Pollution Prevention Control Directive (IPPC), and United Nation Framework Convention on Climate Change (UNFCCC). These reports have in common that they require various agri-environmental data and information collected at farm level. Commonly, these reports are made by various governmental departments in the Member States, and the required agri-environmental data and information are collected and processed by many institutions and organizations. Many Member States consider the burden of collecting and reporting data to be high.

In order to streamline the data collection and reporting systems for different EU policies, DG Eurostat of the European Commission has requested the DireDate consortium[11] to 'analyze and characterize the current data collection and reporting systems in the Member States for a number of EU policies, and to develop recommendations for improving data quality and lowering the data and information collection burdens'.

To analyze and characterize the current data collection system, we have prepared a brief questionnaire to be completed by the person(s) responsible for the national data collection and/or reporting. The attached questionnaire refers to the **RDP**[12] and focuses on a selected number of key agri-environmental data. The aims of the questionnaire are

To make an inventory in each Member State of the type and number of organizations involved in the collection, processing and reporting of the required agri-environmental data and information; and

To make an inventory in each Member State of the methods used for collecting and processing of the required agri-environmental data and information.

Guidelines to complete the questionnaire are provided at the end of this letter.

We would very much appreciate your assistance in completing this questionnaire. Completing the questionnaire may take between 10 and 30 minutes. We have received your name through DG Eurostat and, when applicable, we kindly request you to forward this message and the questionnaire to the person most suited to complete the questionnaire for your country[13]. Please inform us about the contact details and affiliation of this person, so that we can trace the questionnaires. To be able to obtain 'on the ground stories' we will try to call you by telephone during the period of August - September 2010.

Please return your questionnaire before August 27, 2010.

We thank you in advance for your cooperation.

Yours sincerely,

Stefan Pietrzak (ITP, Poland) and Christy van Beek (Alterra, Netherlands) on behalf on the DireDate consortium

[11] The DireDate Consortium consists of 5 research institutions, namely Alterra (NL), ITP (PL), Technical University of Wien; BOKU (AT), ADAS (UK) and University of Aarhus (DK)

[12] Notably, similar questionnaires are prepared for WFD, ND, NECD, RDP, UNFCC and IPPC.

[13] For decentralized countries you may select one representative unit (e.g. department or region).

Additional information for completing the questionnaire:

This questionnaire consists of three parts. In the first part (Part A) an inventory is made of the organizations that are involved in the collection of a selected number of key agri-environmental data, In the second part (Part B) an inventory is made of the methods used for collecting these key-data and in the third part (Part C) and inventory is made of the data processing prior to reporting. The examples refer to the WFD, but also apply for other policies.

Part A: Number of organizations involved in data collection and reporting.

Often, several organizations are involved in data collection. Here, we distinguish:

Primary data collection: these are the organizations that collect the data on the ground, at farm or field level.

Secondary data collection: these are the organizations that process and aggregate the collected data so as to making them representative for a certain region/area.

Tertiary data collection: these are the organizations that format and interpret the data and make the formal report, following the reporting guidelines of the EU Agri-Environmental policy.

Authorized organization: this is the organization that is formally responsible for reporting (most often a Ministry).

Note that the secondary and tertiary data collection levels may not be present in all Member States; in this case please report 'not applicable' (n.a.). In the last column ('other purposes') we would like to know whether the data is sent to other reporting organizations for policy support.

Example: Information route for fertilizer use under the WFD in The Netherlands.

Indicator	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes
Water quality	4 (LEI, RIVM, WaterBoards, Provinces)	4 (LEI, RIVM, WaterBoards, Provinces)	1 (RWS-WD)	1 (Ministry of Transport and Water)	ND, sent to Ministry of Agriculture, Nature and Food Safety via National Statistical Office

Note that no tertiary data collection is involved in this system.

Part B: Methods of data collection.

Primary data can be collected using different methods. In this section we would like to know which method is used to collect the data, if possible broken down to parameter level (as shown in the example). We distinguished the following methods (more than one may be applied).

Census (i.e. counting and measurements at each site)

Surveys (i.e. selected samplings)

Monitoring (i.e. repeated measurements at same site)

GIS and Remote sensing

Simulation modelling

Expert judgment

Other, please specify

Example: Methods of data collection for fertilizer use under the WFD in the Netherlands.

Indicator	Primary data collection
Water quality	3

Part C: Methods of data processing.

In every step of the data and information collection – reporting route that is distinguished in part A of this questionnaire, data is either collected or aggregated, synthesized etc., using various possible methods and procedures. For secondary, tertiary data collection and reporting, we may distinguish:

Checks on completeness: filling in missing data using

Interpolation

Additional samplings and surveys

Expert judgment

Other, please specify

Checks on consistency using

Comparison with other inventories

Comparison with previous reports

Other, please specify

Data aggregation using

Advanced statistical methods

Arithmetic means

Other, please specify

Quality control and assurance

Formal procedures for data quality

Expert judgment

Other, please specify

Example: Methods of data processing for fertilizer use under the WFD in the Netherlands.

Indicator	Secondary data collection	Tertiary data collection	Authorized organization	Remarks
Water quality	1d (no gap filling)a, 2ab,	3a	4a	

When you have completed the questionnaire, please save the worksheet indicating your country name in the name of the file and send it via email to Christy.vanbeek@wur.nl or via postal mail to:

Alterra, p/o Christy van Beek
PO Box 47
6700 AA Wageningen
The Netherlands

PART A: ORGANIZATIONS INVOLVED IN DATA COLLECTION

Parameter	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes?
Land cover and land use					
Areas of extensive agriculture					
Water quality					
Gross nutrient balances					
Water use					
Areas at risk for soil erosion					
GHG emissions from agriculture					

PART B: METHODS OF DATA COLLECTION

Parameter	Primary data collection
Land cover	
Areas of extensive agriculture	
Water quality	
Gross nutrient balances	
Water use	
Areas at risk for soil erosion	
GHG emissions from agriculture	

PART C: METHODS OF DATA PROCESSING

Parameter	Secondary data collection	Tertiary data collection	Authorized organization	Remarks
Land cover				
Areas of extensive agriculture				
Water quality				
Gross nutrient balances				
Water use				
Areas at risk for soil erosion				
GHG emissions from agriculture				

Annex 4: RAMSOIL-policy questionnaire

RISK ASSESSMENTS METHODOLOGIES

The RAMSOIL project

RAMSOIL (Risk Assessment Methologies for SOIL Threats) is a joint European project. The objective of RAMSOIL is to provide an inventory of the different risk assessments methodologies for soil threats regarding agricultural soils that are currently used in the European Union. This is done to provide scientific support to the EC, and to identify options for harmonization of the different methodologies. The selected soil threats for this project are: Erosion, Organic Matter Decline, Salinization, Compaction and Landslides (described by the EU Thematic Strategy on Soils).

What we would like to know from you

This questionnaire has been sent to you to examine the current situation of methodologies for risk assessments in your country and to assess its pros and cons. It is, however, possible that your country has not yet implemented risk assessment methodologies. In that case we would like to ask you to complete the questionnaire for the preferred risk assessments methodologies.

An example of a RAM methodology for landslides

Description of the methodology: number of past landslides per km^2, in combination with a ground behaviour map to predict landslides in an area with active landslide history.

Threshold: High risk for landslides occur when more than 1 landslide occurs every 25 years.

This questionnaire

The questionnaire consists of 28 questions, which are divided over 6 sections: a general section, applicable to all soil threats and 5 sections for each soil threat. We ask you to please fill out this questionnaire and send it back to us via E-mail (ramsoil@wur.nl). It will take approximately 10 minutes to complete this questionnaire. We kindly request you to return the questionnaire to us no later than May 15, 2007. In case we have accidentally addressed the wrong person, please forward this questionnaire to the one in charge. It is very important to have a representative coverage of Europe as, based on this questionnaire, options for harmonization of risk assessment methodologies in the EU will be selected. As soon as we have analyzed the responses, the results will be corresponded to you, to provide you insight into pros and cons of certain methods and, hence, to strengthen your soil policy. Also, you will be invited for the final workshop on harmonization of RAMs for soil threats in the EU, which is scheduled for January 2009. For questions regarding this questionnaire please send an E-mail to ramsoil@wur.nl with contact details and we will contact you, or visit the RAMSOIL website at **www.ramsoil.eu**. In case you use more than one RAM for a specific soil threat, please multiply this questionnaire and describe and indicate the relative importance of each RAM in the text box at the end of this questionnaire.

If you don't have a RAM at present, please complete the questionnaire considering the method you would preferably use!

Contact information

Your Name:

E-mail:

Telephone number:

Institute / company / Governmental body:

Address:

Country:

1. General information

In this section some general questions about your soil policy and some specific questions which are valid for all soil threats are addressed.

1.1 Do you know the EU thematic strategy for soil protection coming into force in the next years?

O Yes

O No

1.2 What is your official responsibility?

O I am responsible for the implementation of the RAMs for all soil threats.

O I am responsible for the implementation of the RAMs for one or a few soil threats, namely

O organic matter decline O soil erosion O compaction

O soil salinization O landslide O soil contamination

O soil sealing

O I am an advisor to a governmental body. Please specify your position:

O Other, please specify:

1.3 Which of the following soil threats included in the EU thematic strategy can be identified in your country?

O organic matter decline

O soil erosion

O compaction

O soil salinization

O landslide

O soil contamination

O soil sealing

Please answer the questions in the table below for each soil threat, by putting an 'x' in the boxes.

		Erosion	Compaction	Landslides	Salinization	Organic matter decline	Remarks
What is the current status of the RAM?	RAM used in practice						
	RAM in development						
	Don't know						
Is the RAM mono-risk or multirisk (e.g. combined assessment of erosion and landslides)	monorisk						
	multirisk (please indicate what threats are combined)						
	Don't know						
What is the legal status of the RAM?	Official recognized assessment						
	Official assessment in development						
	Assessment methodology used by an institution						
	Don't know						
How long is the methodology used in practice?	< 2 years						
	2 – 5 years						
	5 – 10 years						
	> 10 years						
	Don't know						
What is the geographical scale of the RAM?	Local						
	Regional						
	Municipal						
	National						
	Don't know						
Is the existing RAM aimed at complying with EU, national, regional regulation?	Regional						
	National						
	EU						
	Global						
	Don't know						
For what reason was the RAM developed?	Science						
	Legislation						

		Erosion	Compaction	Landslides	Salinization	Organic matter decline	Remarks
	Don't know						
Is the RAM linked to community policy targets, objectives or legislation?	No						
	Yes, indirectly						
	Yes, directly						
	Don't know						
Is the RAM sensitive to changes in the phenomenon/process that it is meant to measure?	Slow, delayed response						
	Intermediate response						
	Fast, immediate response						
	Don't know						
Is the RAM used for monitoring purposes?	Yes						
	No						
	Don't know						
Is the RAM based on qualitative (e.g. questionnaires to farmers), quantitative (e.g. monitoring network) and/or modelled states/trends?	Qualitative, expert based						
	Qualitative, weighting-rating						
	Qualitative, other						
	Quantitative, monitoring network						
	Quantitative other						
	Modelled, empirical						
	Modelled, process-based						
	Combination (please indicate)						
	Don't know						
What types of information are used?	Field observations						
	Remote sensing						
	GIS						
	Laboratory analysis						
	Other						
	Don't know						

		Erosion	Compaction	Landslides	Salinization	Organic matter decline	Remarks
Is the RAM based on low/medium/high quality statistics or data?	Low						
	Medium						
	High						
	Don't know						
Are there time series available?	No						
	Yes, occasional data source						
	Yes, regular data source						
	Don't know						
If yes, at what time interval are data collected?	Yearly						
	Once every 1- 5 years						
	Once every 5-10 years						
	Other (please specify)						
	Don't know						
Are results clear and easy to understand?	Not at all						
	Fairly clear						
	Very clear						
	Don't know						
Is the RAM based on existing statistics and data sets?	Statistics						
	Data set						
	Other (please specify)						
	Don't know						
Are the statistics or data needed for compilation easily accessible?	No						
	Yes, but requires lengthy processing						
	Yes						
	Don't know						
Is the setup of a (new) monitoring network required?	No						
	Yes, but as additional measurements to an existing monitoring network						
	Yes						

		Erosion	Compaction	Landslides	Salinization	Organic matter decline	Remarks
	Don't know						
In case of an existing database, to whom is it accessible?	General public						
	Administration officers						
	Scientists						
	Others (please specify)						
	Don't know						

1.5 Could you please rank the following arguments from 1 to 8 (1 being the most important and 8 being least important) for using or preferring your RAM for each soil threat?

	Erosion	Compaction	Landslides	Salinization	Organic matter decline	Remarks
Costs						
Knowledge demand						
Efficiency						
Data availability						
Difficulty methology						
Public acceptance						
Ambiguity						
Transparency						

1.6 The EU has identified several factors ('common criteria') that can be used for risk assessments for all soil threats. Please indicate (by putting a 'x') in the table on the next page which information is used for the risk assessment of each threat.

		Compaction	Erosion	Landslides	Organic matter Decline	Salinization	Remarks
Miscellaneous	Occurrence/density of existing landslides						
	Bedrock						
	Seismic risk						
Soil data	Soil typological unit (STU) (soil type)						
	Soil texture (STU level)						
	Soil texture/clay content						
	Soil density, hydraulic properties (STU level)						
	Soil organic carbon (total and humus concentration)						
	Soil organic carbon (stock)						
	Soil organic matter (STU level)						
	Topsoil and subsoil texture (STU level)						
	Topsoil and subsoil bulk density (STU level)						
Climate and landuse	Climate						
	Agro-ecological zone						
	Land cover (e.g. forestry, nature, agriculture)						
	Land use (e.g. land management, farming systems)						
	Topography (e.g elevation, slope gradient, slope length)						
Hydrogloy	Hydrological conditions						
	Soil hydraulic properties						
	Irrigation areas, chemical properties of irrigated water and type of irrigation techniques						
	Groundwater information						
	Soil texture (STU level)						
	Soil texture/clay content						
	Soil density, hydraulic properties (STU level)						
	Soil organic carbon (total and humus concentration)						

2. Erosion

2.1 How would you describe the RAM you currently use / prefer to use for erosion?

2.2 Please provide the person/organisation for obtaining detailed information on the RAM for erosion:

Name institute

Email address contact person:

2.3 Please list (and if possible, attach) the most important references (preferably digital and in English or other international languages) on the RAM for erosion.

2.4 Please list the most important weblink related to the RAM for erosion.

2.5 Which process is characterised with the methodology?

O Water erosion

O Wind erosion

O Both

2.6 What type of data are currently being collected additionally to the ones listed in 1.5 and specifically for soil erosion?

O climate O soil O topography

O lithology O land cover O management practices O soil erosion rate

3. Compaction

3.1 How would you describe the RAM you currently use / prefer to use for erosion?

3.2 Please provide the person/organisation for obtaining detailed information on the risk assessment methodology for compaction:

Name institute

Email address contact person:

3.3 Please list (and if possible, attach) the most important references (preferably digital and in English or other international languages) on the RAM for compaction.

3.4. Please list the most important weblink related to the RAM for compaction.

4. Lanslides

4.1 How would you describe or what is the name of the RAM you currently use / prefer to use for erosion?

4.2 Please provide the person/organisation for obtaining detailed information on the risk assessment methodology for landslides:

Name institute

Email address contact person:

4.3 Please list (and if possible, attach) the most important references (preferably digital and in English or other international languages) on the RAM for landslides.

4.4 Please list the most important weblink related to the RAM

4.5 Please indicate what type of information is available for landslides.

	Yes	No	Remarks
Date of events			
Location and map of the processes:			
Information on the triggering event			
Estimation of the damages (if any):			
Photographs of the event			

5. Salinisation

5.1 How would you describe or what is the name of the RAM you currently use / prefer to use for erosion?

5.2 Please provide the person/organisation for obtaining detailed information on the risk assessment methodology for salinization:

Name institute

Email address contact person:

5.3 Is the RAM aimed at:

O only salinity

O only sodicity

O salinity and sodicity

5.4 Please list (and if possible, attach) the most important references (preferably digital and in English or other international languages) on the RAM for salinization.

5.5 Please list the most important weblink related to the RAM for salinization.

6. Organic matter decline

6.1 How would you describe or what is the name of the RAM you currently use / prefer to use for erosion?

6.2 Please provide the person/organisation for obtaining detailed information on the risk assessment methodology for organic matter decline:

Name institute

Email address contact person:

6.3 Please list (and if possible, attach) the most important references (preferably digital and in English or other international languages) on the RAM for soil organic matter decline.

6.4 Please list the most important weblink related to the RAM for soil organic matter decline.

Text box for comments

Thank you for your valuable cooperation!

Please send your questionnaire to ramsoil@wur.nl or to RAMSOIL project team, Alterra, PO Box 47, 6700 AA, Wageningen, The Netherlands

Visit us at **www.ramsoil.eu**

Annex 5: Streamlining questionnaire

1. Institutional setup:

1.1. As regards water monitoring under WFD, Nitrates Directive and SOE, please explain who is responsible for

a) undertaking the monitoring

b) data collection and preparation

c) reporting.

1.2 In case there are different organizations involved at each of the steps of the process is there a coordination mechanism in place? If yes, how is the consistency between the reported data ensured?

2. Streamlining:

2.1. Would your Member State support the process of streamlining reporting falling under the three reporting streams WFD, NiD and SOE , if not already in place?

3. Monitoring networks:

3.1 What is the overlap of monitoring stations under WFD, NiD and SOE? And for which parameter(s) the measurements are taken?

3.2. What is the current status of monitoring network(s) used for reporting under WFD, NiD and SOE?

3.3. If monitoring networks has been changed recently, could you briefly inform when and what was the main change?

3.4. If there are any changes envisaged in the future, could you indicate what type of changes are planned as well as the timeline?

3.5. What is the frequency (no. of samples per year) of monitoring from which data is provided under reporting for WFD, NiD and SOE? If it differs for water categories and parameters, please specify or include ranges as necessary. SEE ANNEX 3.

3.6. If the data are later aggregated for reporting under WFD, NiD and SOE, could you inform what type of aggregation is made in addition to the one specified in reporting guidelines? Please explain what exactly you are doing to follow the different guidance documents.

3.7. Are the aggregation techniques used the same for each of the reporting streams? Please explain what exactly you are doing to follow the different guidance documents.

Do you see advantage of providing raw data that are later aggregated at the EU level by using the same techniques?

Annex 6: Interview script

Dear Sir, Madam,

This is <your name> from <your organization> in <your country>. I am calling you in relation to the Eurostat questionnaire that we sent out on June 29. ....(let person confirm E-mail)

Eurostat has requested the DireDate consortium to make an inventory of current data collection and reporting structures related to agri-environmental indicators.

As explained in the letter attached to the questionnaire we would also like to hear some on the ground stories. Are you the correct person to approach?.....(let person explain his/her position and responsible policy).

Would you be so kind to make a few minutes time to explain the current methods of data collection in your country to me? (let person confirm)

1. Please explain the current way of data collection: who is in charge, how is information flowing?
2. What are current bottlenecks? Do you think the system is efficient?
3. What kind of improvements would you like to see?
4. What is the role of Eurostat in this?

The remained of the interview depends on the course of the interview.

Annex 7: Returned Diredate questionnaires

Luxembourg

PART A: ORGANIZATIONS INVOLVED IN DATA COLLECTION

Parameter	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes?
Land cover and land use	a) annual agricultural census: SER[14]	STATEC[16]	STATEC	STATEC	
	b) Aerial photographies: Administration du Cadastre et de la Topographie[15]	Transfert into a geographical information system (GIS) by the ASTA[17]	ASTA	ASTA	
	c) Census « biophysical occupation of the ground» by the Administration for nature and forest (ANF)	ANF	ANF	ANF	
Areas of extensive agriculture	a) Less favored areas: Simulation by the ASTA	ASTA	SER	SER	
	b) agri-environmental measures: data collection by ASTA	ASTA	ASTA	ASTA	
Water quality	AGE[18]	AGE	AGE	AGE	
Gross nutrient balances	SER	SER	SER	SER	
Water use	n.a.	n.a.	n.a.	n.a.	

[14] SER: Service d'Economie Rurale Administration from the Ministry of agriculture

[15] Administration of the Land register and Topography

[16] Service central de la statistique et des études économiques: national institution for statistics

[17] ASTA: Administration des services techniques de l'agriculture, Administration from the Ministry of agriculture

[18] AGE : Administration de la Gestion de l'Eau, administration from the Ministry of Home Affairs and the Greater Region

Parameter	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes?
Areas at risk for soil erosion	Actually not available but foreseen in the future under the responsibility of the ASTA				
GHG emissions from agriculture	SER STATEC AEV[19] : for sewage sludge fraction used in agriculture (sludge spreading on fields)	SER STATEC AEV: sewage sludge ASTA: for some specific parameters, mainly for animals' waste management system (expert judgment)	AEV MDDI-DEV[20]	MDDI-DEV	

PART B: METHODS OF DATA COLLECTION

Parameter	Primary data collection
Land cover	a) Agricultural census: 1 b) Aerial photographies: 4 c) Census « biophysical occupation of the ground» 4
Areas of extensive agriculture	LFA: 5 AEM: 7 administrative data
Water quality	2 & 3 5 6
Gross nutrient balances	7: data obtained from primary statistics, expert studies and literary data.
Water use	n.a.
Areas at risk for soil erosion	5
GHG emissions from agriculture	1 2 3 6

[19] Administration de l'Environnement from the Ministry of Sustainable Development and Infrastructure

[20] Ministry of Sustainable Development and Infrastructure

PART C: METHODS OF DATA PROCESSING

Parameter	Secondary data collection	Tertiary data collection	Authorized organization	Remarks
Land cover	annual agricultural census: 1b, 2c, (3 c: no agregation) 4a			
Areas of extensive agriculture	1) LFA: n.a. 2) agri-environmental mersures:1.d. no gap filling/ 2.a, & b	3. no aggregation 4 b.		
Water quality	1. d. no gap filling 2. checks on coherence	3c no aggregation 4.a.		
Gross nutrient balances	1 a 2 a & b 4 a & b			
Water use	n.a.			
Areas at risk for soil erosion	n.a.			
GHG emissions from agriculture	Use of primary statistics from SER and ASTA 1b & c 2 c	1 a 2 a & b 4 a & b	1 a 2 a & b 4 a & b	

Italy

PART A: ORGANIZATIONS INVOLVED IN DATA COLLECTION

Parameter	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes?
Land cover and land use	Autonomous Province of Bolzano - South Tyrol - Urban Planning Division			Autonomous Province of Bolzano - South Tyrol - Urban Planning Division	
Areas of extensive agriculture				ISTAT	
Water quality	**Autonomous Province of Bolzano -** Environment Agency, Office for water			**Autonomous Province of Bolzano -** Environment Agency, Office for water	

Parameter	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes?
	protection			protection	
Gross nutrient balances				ISPRA	
Water use				ISTAT	
Areas at risk for soil erosion	Autonomous Province of Bolzano - South Tyrol - Urban Planning Division, Geology Office			Autonomous Province of Bolzano - South Tyrol - Urban Planning Division, Geology Office	
GHG emissions from agriculture	Autonomous Province of Bolzano - Environment Agency			Autonomous Province of Bolzano - Environment Agency	

PART B: METHODS OF DATA COLLECTION

Parameter	Primary data collection
Land cover	GIS and Remote sensing
Areas of extensive agriculture	Census
Water quality	Monitoring
Gross nutrient balances	Simulation modeling
Water use	Census
Areas at risk for soil erosion	As by low enacted
GHG emissions from agriculture	Simulation modeling

PART C: METHODS OF DATA PROCESSING

Parameter	Secondary data collection	Tertiary data collection	Authorized organization	Remarks
Land cover			Autonomous Province of Bolzano - South Tyrol - Urban	The available data arise from the CORINE project based on aerial photographs of 1997 and concluded in year 2000. At present, a pilot study is carried
Areas of extensive agriculture			ISTAT*	* As Managing Authority for the rural development program of the Autonomous Province of Bolzano - South Tyrol we don't have detailed information
Water quality			**Autonomous Province of Bolzano -** Environment Agency, Office	In the whole Province of Bolzano no area is considered nitrate vulnerable zone. The focus is on surface water.
Gross nutrient balances			ISPRA*	* As Managing Authority for the rural development program of the Autonomous Province of Bolzano - South Tyrol we don't have detailed information

Parameter	Secondary data collection	Tertiary data collection	Authorized organization	Remarks
Water use			ISTAT*	* As Managing Authority for the rural development program of the Autonomous Province of Bolzano - South Tyrol we don't have detailed information
Areas at risk for soil erosion			Autonomous Province of Bolzano - South Tyrol - Urban	* As Managing Authority for the rural development program of the Autonomous Province of Bolzano - South Tyrol we don't have detailed information
GHG emissions from agriculture			Autonomous Province of Bolzano - Environment Agency*	* As Managing Authority for the rural development program of the Autonomous Province of Bolzano - South Tyrol we don't have detailed information

Belgium

PART A: ORGANIZATIONS INVOLVED IN DATA COLLECTION

Parameter	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes?
Land cover and land use					
Areas of extensive agriculture					
Water quality					
Gross nutrient balances					
Water use					
Areas at risk for soil erosion					
GHG emissions from agriculture	5 (VLM, ADSEI, AMS, VITO, VMM)	1 (VMM)	1 (VMM)	1 (VMM)	1 (FOD Health, DG Environment)

PART B: METHODS OF DATA COLLECTION

Parameter	Primary data collection
Land cover	
Areas of extensive agriculture	
Water quality	
Gross nutrient balances	
Water use	
Areas at risk for soil erosion	
GHG emissions from agriculture	1., 2., 3., 4., 5., 6.

PART C: METHODS OF DATA PROCESSING

Parameter	Secondary data collection	Tertiary data collection	Authorized organization	Remarks
Land cover				
Areas of extensive agriculture				
Water quality				
Gross nutrient balances				
Water use				
Areas at risk for soil erosion				
GHG emissions from agriculture	1ac; 2ab	3ab	4a	

Northern Ireland

PART A: ORGANIZATIONS INVOLVED IN DATA COLLECTION

Parameter	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes?
Land cover and land use	Department of Agriculture and Rural Development for Northern Ireland	Department of Agriculture and Rural Development for Northern Ireland	Rural Payments Agency (UK)	Department for Environment, Food and Rural Affairs	Department of the Environment for Northern Ireland
Areas of extensive agriculture	Department of Agriculture and Rural Development for Northern Ireland	Department of Agriculture and Rural Development for Northern Ireland	Rural Payments Agency (UK)	Department for Environment, Food and Rural Affairs	Department of the Environment for Northern Ireland
Water quality	n.a.				
Gross nutrient balances	n.a.				
Water use	n.a.				
Areas at risk for soil erosion	n.a.				
GHG emissions from agriculture	n.a.				

PART B: METHODS OF DATA COLLECTION

Parameter	Primary data collection
Land cover	1,2,3,4,6
Areas of extensive agriculture	1,2,3,4,6
Water quality	n.a.
Gross nutrient balances	n.a.
Water use	n.a.
Areas at risk for soil erosion	n.a.
GHG emissions from agriculture	n.a.

PART C: METHODS OF DATA PROCESSING

Parameter	Secondary data collection	Tertiary data collection	Authorized organization	Remarks
Land cover	1d (no gap filling), 2ab, 3b, 4ab	3b	4a	
Areas of extensive agriculture	1d (no gap filling), 2ab, 3b, 4ab	3b	4a	
Water quality	n.a.			
Gross nutrient balances	n.a.			
Water use	n.a.			
Areas at risk for soil erosion	n.a.			
GHG emissions from agriculture	n.a.			

Scotland

PART A: ORGANIZATIONS INVOLVED IN DATA COLLECTION

Parameter	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes?
Land cover and land use	1 (Scottish Government (by means of Agricultural Census))	n/a	1 (Scottish Government)	1 (Scottish Government)	
Areas of extensive agriculture	1 (Scottish Government (by means of Agricultural Census))	n/a	1 (Scottish Government)	1 (Scottish Government)	
Water quality	1 (Scottish Environment Protection Agency)	n/a	1 (Scottish Government)	1 (Scottish Government)	
Gross nutrient	1 (Defra)	1 (Defra)	1 (Scottish Government)	1 (Scottish Government)	Air Quality Directive, the

Parameter	Primary data collection	Secondary data collection	Tertiary data collection	Authorized organization	Other purposes?
balances					Water Framework Directive, Habitats Directive.
Water use	n/a				
Areas at risk for soil erosion	1 (SEPA, proxy data on Sediment Load/Suspended Particulate Matter)	n/a	1 (Scottish Government)	1 (Scottish Government)	
GHG emissions from agriculture	1 (AEA Technology)	n/a	1 (Scottish Government)	1 (Scottish Government)	

PART B: METHODS OF DATA COLLECTION

Parameter	Primary data collection
Land cover	1
Areas of extensive agriculture	1
Water quality	3
Gross nutrient balances	7. Based on a wide range of data sources/methods including livestock numbers, crops areas, crop production estimates, fertiliser use, land use, disposal of sewage sludge on farmland.
Water use	n/a
Areas at risk for soil erosion	3
GHG emissions from agriculture	7. Based on a wide range of data sources/methods including fuel consumption, CO2 emissions, industrial process emissions, agricultural emissions (survey), land use (survey data, modeled), waste disposal emissions.

PART C: METHODS OF DATA PROCESSING

Parameter	Secondary data collection	Tertiary data collection	Authorized organization	Remarks
Land cover	n/a	1c, 2b, 4b	1c, 2b, 4b	
Areas of extensive agriculture	n/a	1c, 2b, 4b	1c, 2b, 4b	
Water quality	n/a	1c, 2b, 4b	1c, 2b, 4b	
Gross nutrient balances	Cannot comment on Defra procedures.	1c, 2b, 4b	1c, 2b, 4b	
Water use	n/a	1c, 2b, 4b	1c, 2b, 4b	
Areas at risk for soil erosion	n/a	1c, 2b, 4b	1c, 2b, 4b	
GHG emissions from agriculture	n/a	1c, 2b, 4b	1c, 2b, 4b	

Annex 8: Characterisation of MS data collection and reporting system

Case study for GHG emissions in connection with the obligations following from the UN Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol

Summary

All countries that have signed and ratified the Kyoto protocol on climate change have the obligation to report annual national total greenhouse gas emissions per sector. For this reporting prescribed formats are provided by the UNFCCC in which each countries is requested to illustrate its data collection system. In this report the data collection systems of EU countries are put together to illustrate current data collection procedures. A first assessment of the differences between member states reveal that:

Countries use very different ways of visualizing their data collection systems going from rather conceptual (e.g. The Netherlands and Portugal) towards specific (e.g. Latvia and Romania).

Data collection systems are complex and involve multiple institutions for data collection, aggregation, interpretation and reporting.

Introduction

Conducted analysis of an inventory of greenhouse gas emissions by MS under obligations following from the UN Framework Convention on Climate Change and its Kyoto Protocol. The information provided on the website of the UNFCCC was used to analyze the National Greenhouse Gas Emission Inventory Report for 2010.

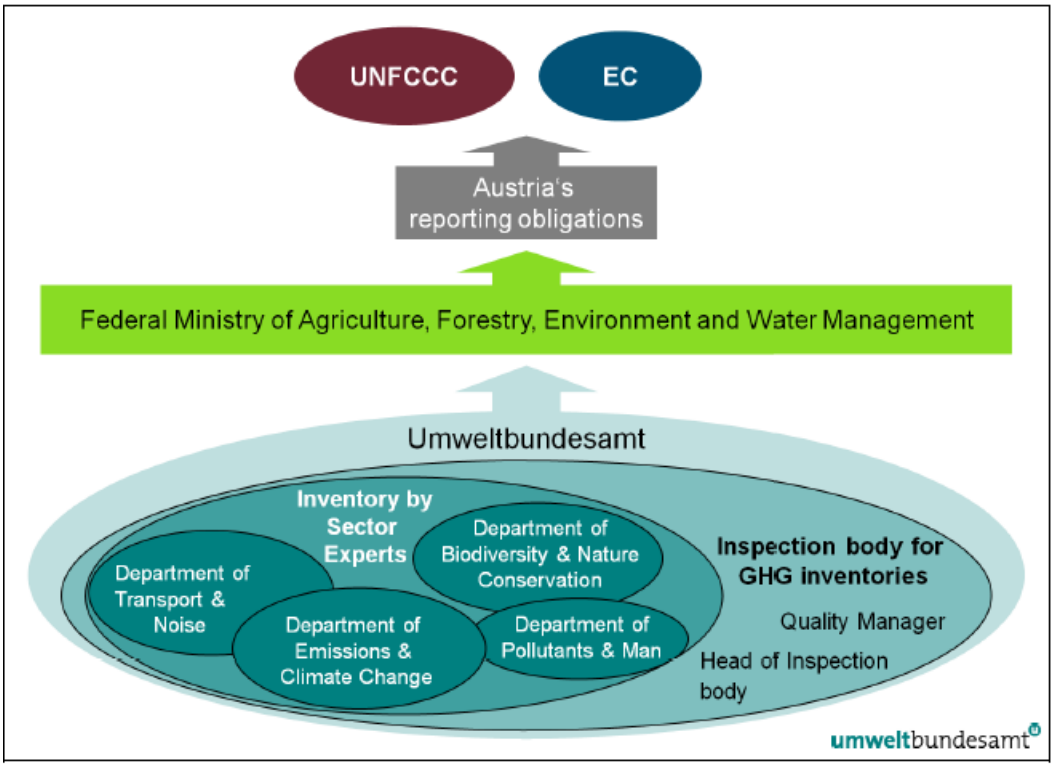
The reports included GHG inventories for the years 1990-2008. The GHG emission estimates are based on methodologies elaborated by the Intergovernmental Panel on Climate Change (IPCC) and recommended by the UNFCCC. According to these guidelines country specific methods have been used where appropriate giving more accurate emission data. Each MS implemented a Quality Assurance and Quality Control plan in order to improve transparency, consistency, comparability and completeness of GHG inventory. The main supplier of data for GHG inventory were Central Statistical Offices. In conducted analysis concentrated on the characterisation GHG data collection and reporting system in MS. This characterisation was prepared to use fragments of text and figures and tables from the National Greenhouse Gas Emission Inventory Reports. The data source each time are listed.

Organizations involved in data collection and reporting system

AUSTRIA

Austria's reporting obligations to the UNFCCC, UNECE and EC are administrated by Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW). Responsible for the preparation of the GHG inventory on behalf BMLFUW is Umweltbundesamt. Within the Umweltbundesamt the department of Emissions and Climate Change is responsible for the preparation of the between sector experts from departments within the Umweltbundesamt -see Figure 1.

Figure 1: Responsibilities in the Austrian National System for greenhouse gas inventories



Main data sources for activity data and emission values from agriculture are:

- Data Sources for Activity - National Studies, national agricultural statistics obtained from Statistik Austria;
- Data Emission Calculation - Umweltbundesamt, based on studies by: University of Natural Resources and Applied Life Sciences, Research Center Seibersdorf;

Source: Austria's National Inventory Report 2010. Submission under the United Nations Framework Convention on Climate Change and under the Kyoto Protocol. REPORT REP-0265 Vienna, 2010 Owner and Editor: Umweltbundesamt GmbH Spittelauer Lände 5, 1090 Vienna/Austria p. 770

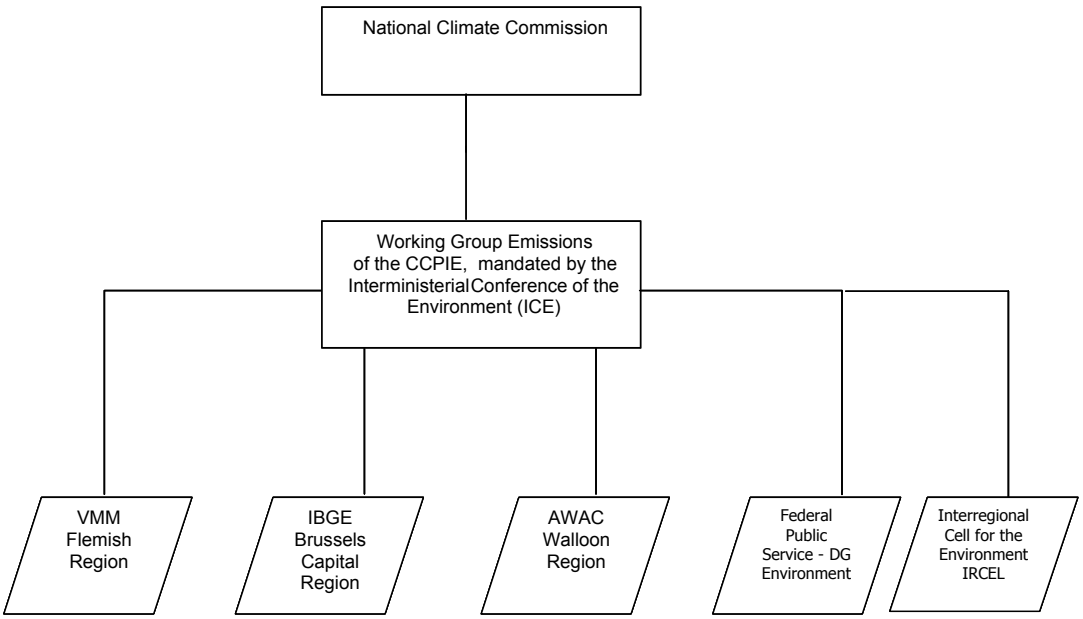
BELGIUM

In the Belgian federal context, major responsibilities related to environment lie with the regions. Each region implements the necessary means to establish their own emission inventory. Obviously, this requires some co-ordination to ensure the consistency of the data and the establishment of the national inventory. This co-ordination is one of the permanent tasks of the Working Group on « Emissions » of the Coordination Committee for International Environmental Policy (CCIEP). This working group consists of representatives of the 3 regions and of the federal public services.

The Interregional Environment Unit (CELINE - IRCEL) is responsible for integrating the emission data from the inventories of the three regions and for compiling the national inventory. The National inventory report is than formally submitted to the National Climate Commission.

Entities responsible for the performance of the main functions of the Belgian Inventory System, as well as main institutional bodies in relation with the decision process as regards this system, are presented hereafter in Figure 2.

Figure 2: Entities responsible for the performance GHG inventory in Belgium



The bodies who take responsibility for the preparation of inventories in the three regions are:

- The Department Air, Environment and Communication of the Flemish Environment Agency (VMM) in the Flemish Region;
- The Walloon Agency for Air and Climate (AWAC);
- The Brussels Environment (BIM-IBGE) in the Brussels Capital Region.

Each region has its own legal and institutional arrangements, which are detailed in the NIS.

The Directorate General Environment of the Federal Public Service for Health, Food Chain Safety and the Environment (FPS - DG Environment) is involved in its capacity of UNFCCC National Focal Point of Belgium and registry administrator.

The Directorate General Energy of the Federal Public Service Economy, SMEs, Self-employed and Energy (FPS - DG Energy) is responsible for the top-down estimation of energy-related CO2 emissions using the IPCC “reference approach”.

The Working group on Emissions of the Coordination Committee for International Environmental Policy (CCIEP) (referred to below as “CCIEP-WG Emissions”) plays a central role in the coordination of the national GHG inventory.

The Interregional Cell for the Environment (IRCEL-CELINE) is the single national entity with overall responsibility for the preparation of the Belgian GHG inventory. IRCEL-CELINE operates as national compiler of greenhouse gas emissions in Belgium.

The National Climate Commission is in charge of the approval of the inventory reports.

Source: Belgium’s greenhouse gas inventory (1990-2008) National Inventory Report submitted under the United Nations Framework Convention on Climate Change and the Kyoto Protocol April 2010 p. 227

BULGARIA

The Executive Environment Agency (ExEA) is responsible for the whole process of inventory planning, preparation and management. As it is illustrated in Figure 3 the preparation of the inventory has an institutional "home" that is ultimately responsible for managing the process and has a legal authority to collect data and submit it on behalf of the Bulgaria.

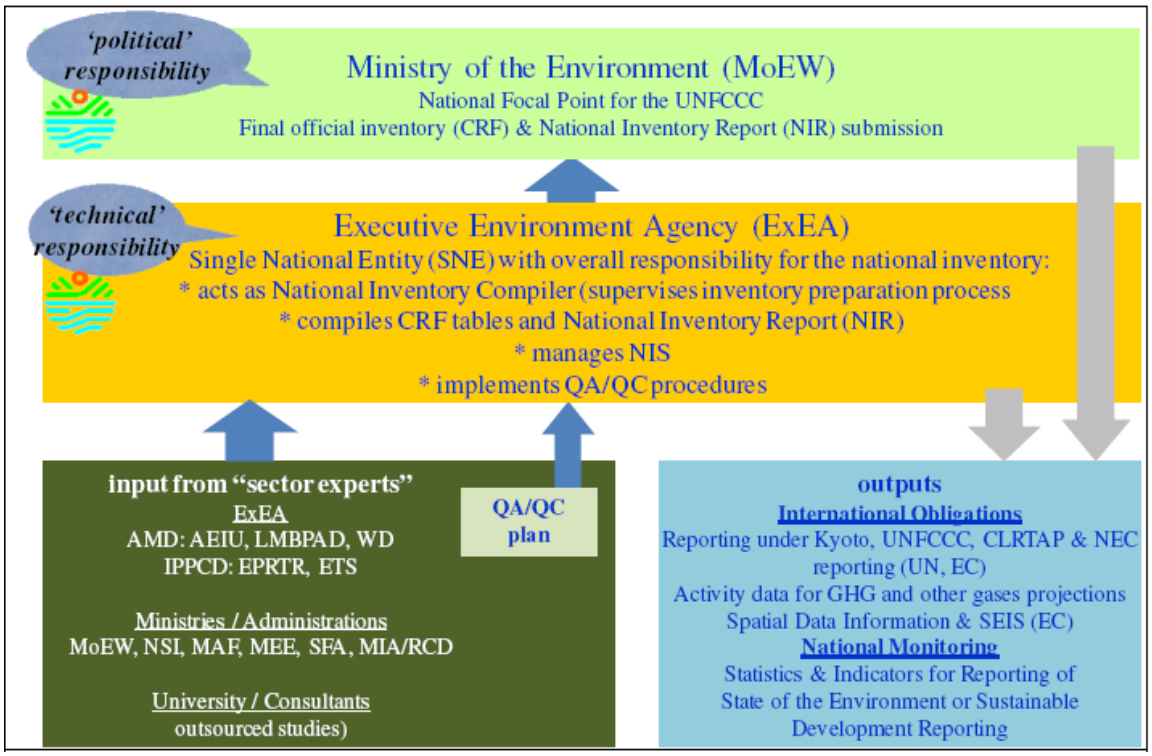
The Bulgarian Government by Ministry of the Environment (MoEW), Climate Change Policy Directorate has the political responsibility for compliance with commitments under the UNFCCC and the Kyoto Protocol. Bulgaria's reporting obligations to the UNFCCC, UNECE and EC are being administered by the MoEW.

Data sources for preparation of national GHGs emission inventory in sector Agriculture:

- Data Source of Activity Data – National agriculture statistics;
- Data supplier - MAF Ministry of Agriculture and Food Supply /Statistics Department

The NSI and Ministry of Agriculture and Food (MAF) plays a special role in data collection system for the inventory.

Figure 3: Organizational Chart of the Bulgarian National Inventory System



Source: Bulgaria's National Inventory Report 2010 – Submission under UNFCCC and under the Kyoto Protocol. Executive Environment Agency at the Ministry of Environment and Water, May, 2010 p. 453

CZECH REPUBLIC

The Czech Hydrometeorological Institute (CHMI), under the supervision of the Ministry of the Environment, is designated as the coordinating and managing organization responsible for the compilation of the national GHG inventory and reporting its results. The main tasks of CHMI consist in inventory management, general and cross-cutting issues, QA/QC, communication with the relevant UNFCCC and EU bodies, etc.

Sectoral inventories are prepared by sector experts from sector-solving institutions, which are coordinated and controlled by CHMI. The responsibilities for GHG inventory compilation from the Agriculture sectors is Institute of Forest Ecosystem Research Ltd. (IFER).

Official submission of the national GHG Inventory is prepared by CHMI and approved by the Ministry of Environment. Moreover, the MoE secures contacts with other relevant governmental bodies, such as the Czech Statistical Office, the Ministry of Industry and Trade and the Ministry of Agriculture.

Collection of activity data is based mainly on the official documents of the Czech Statistical Office (CSO), which are published annually, where the Czech Statistical Yearbook is the most representative example.

Source: National greenhouse gas inventory report of the Czech Republic, NIR (reported inventories 1990 - 2008) NIR was compiled by the Czech GHG inventory team from institutions involved in National Inventory System, NIS: KONEKO, CDV, CHMI, IFER, CUEC coordinated by CHMI with contribution of MoE and OTE submission under the UNFCCC and under the Kyoto Protocol, Prague, April 2010, p. 267

DENMARK

On behalf of the Ministry of the Environment and the Ministry of Climate and Energy NERI is responsible for the calculation and reporting of the Danish national emission inventory to EU and the UNFCCC (United Nations Framework Convention on Climate Change) and UNECE CLRTAP (Convention on Long Range Transboundary Air Pollution) conventions. Hence, the National Environmental Research Institute (NERI), University of Aarhus, prepares and publishes the annual submission for Denmark to the EU and UNFCCC of the National Inventory Report and the GHG inventories in the Common Reporting Format, in accordance with the UNFCCC guidelines. Further, NERI is responsible for reporting the national inventory for the Kingdom of Denmark to the UNFCCC. NERI is also the body designated with overall responsibility for the national inventory under the Kyoto Protocol for Greenland and Denmark.

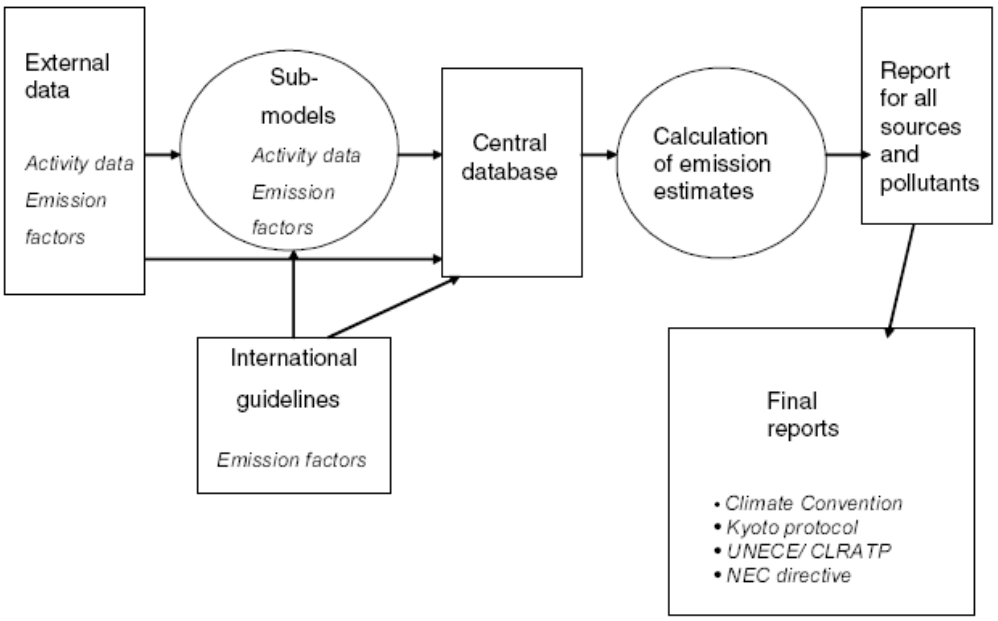
The work concerning the annual greenhouse emission inventory from agriculture is carried out in cooperation with other Danish ministries, research institutes, organisations and companies presented in table 1.

Table 1: List of institutes involved in the emission inventory for the agricultural sector

References	Link	Abbreviation	Data/information
National Environmental Research Institute, University of Aarhus	www.dmu.dk	NERI	- reporting - data collecting
Statistics Denmark – Agricultural Statistics	www.dst.dk	DSt	- No. of animal - milk yield - slaughter data - land use - crop production - crop yield
Faculty of Agricultural Sciences, University of Aarhus	www.agrsci.dk	FAS	- N-excretion - feeding situation - animal growth - N-fixed crops - crop residue - N-leaching/runoff - NH3 emissions factor
The Danish Agricultural Advisory Centre	www.lr.dk	DAAC	- stable type (until 2004) - grassing situation - manure application time and methods - field burning of agricultural residue
Danish Environmental Protection Agency	www.mst.dk	EPA	- sewage sludge used as fertiliser - industrial waste used as fertiliser
The Danish Plant Directorate	www.pdir.dk	PD	- synthetic fertiliser (consumption and type) - stable type (from 2005)
The Danish Energy Authority	www.ens.dk	DEA	- manure used in biogas plants

The background data (activity data and emission factors) for estimation of the Danish emission inventories is collected and stored in central databases located at NERI. Figure 4 shows a schematic overview of the process of inventory preparation.

Figure 4: Schematic diagram of the process of inventory preparation



Activity data for livestock is on a one-year average basis from the agriculture statistics published by Statistics Denmark (2007). Data concerning the land use and crop yield is also from the agricultural statistics. Data concerning the feed consumption and nitrogen excretion is based on information from the Faculty of Agricultural Science, University of Aarhus.

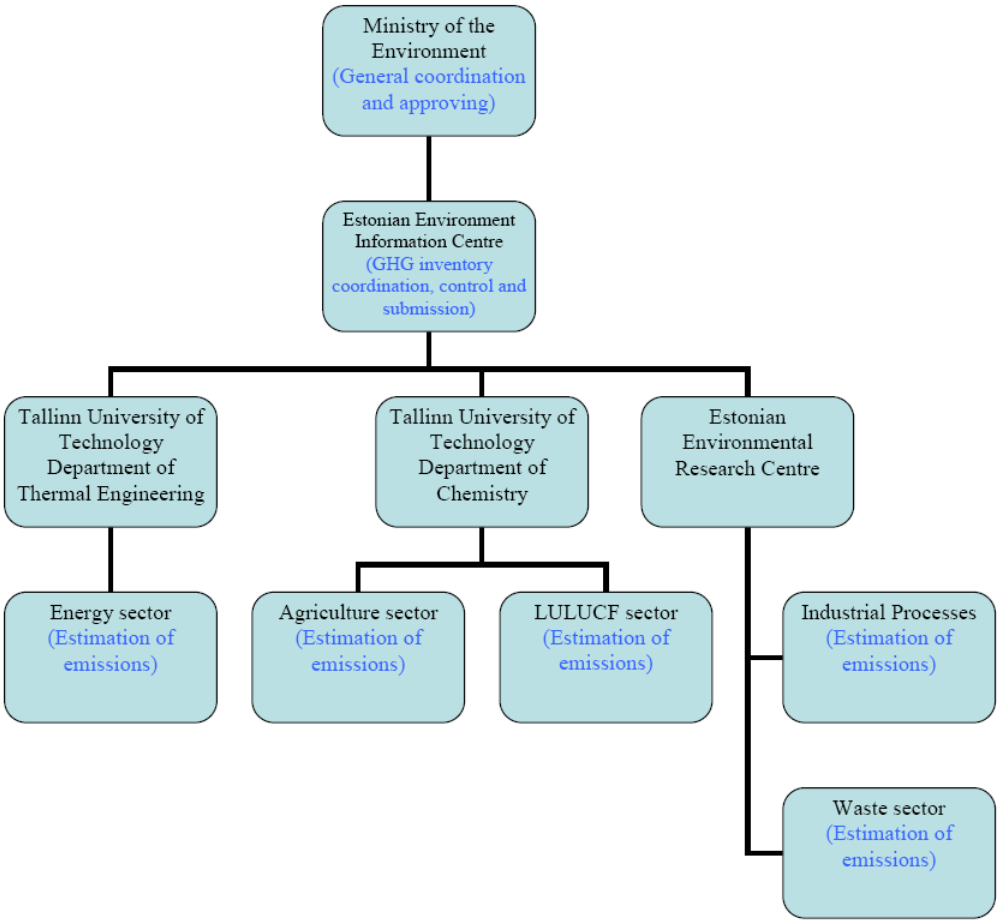
Source: Denmark's National Inventory Report 2010 Emission Inventories 1990-2008 – Submitted under the United Nations Framework Convention on Climate Change and the Kyoto Protocol NERI Technical Report no. 784 2010 National Environmental Research Institute Aarhus University, Maj 2010, p. 1182

ESTONIA

Single national entity with overall responsibility for the Estonian greenhouse gas inventory is the Estonian Ministry of the Environment (MoE). The inventory is produced in collaboration between the MoE, Estonian Environment Information Centre (EEIC), Tallinn University of Technology (TUT) and The Estonian Environmental Research Centre (EERC).

The four core institutions: MoE, EEIC, EERC and TUT work together to fulfil the requirements for the national system. The overview of the allocation of responsibilities is shown in Figure 5.

Figure 5: National System for GHG inventory in Estonia. Source: National Greenhouse Gas Inventory System in Estonia



Activity data used in the estimates from Agriculture is obtained mainly from the Statistical Office of Estonia. Other information sources used in estimates of GHG emissions from agriculture sector are: - Estonian Animal Recording Centre (fat content of milk and number of cows,which give birth);- Scientific publications (a model of gross intake by pigs) – table 2.

Table 2: List of institutions (datasets) involved in the emission inventory for the agricultural sector

References	Link	Abbreviation	Data
Tallinn University of Technology	www.ttu.ee	TUT	- activity data gathering; - estimation of emissions; - reporting (the CRF tables, the NIR).
Statistics Estonia – Agricultural Statistics	www.stat.ee	ESO	- collection and reporting of data on livestock population, quantities of crop produced and amounts of fertilizers applied on fields.
Estonian Animal Recording Centre	www.jkkeskus.ee	EARC	- collection and reporting of data on milk production, fat content in milk, and percentage of cows that give birth. - dairy cattle population by dairy-cattle breed.
Estonian Environment Information Centre	www.keskkonnainfo.ee	EEIC	- providing with CORINE land cover map. - collection and reporting of data on amounts of sludge used for improvement of environment (on agricultural fields)

Source: Greenhouse Gas Emissions In Estonia 1990-2008 National Inventory Report to the UNFCCC secretariat Tallinn 2010 p.415

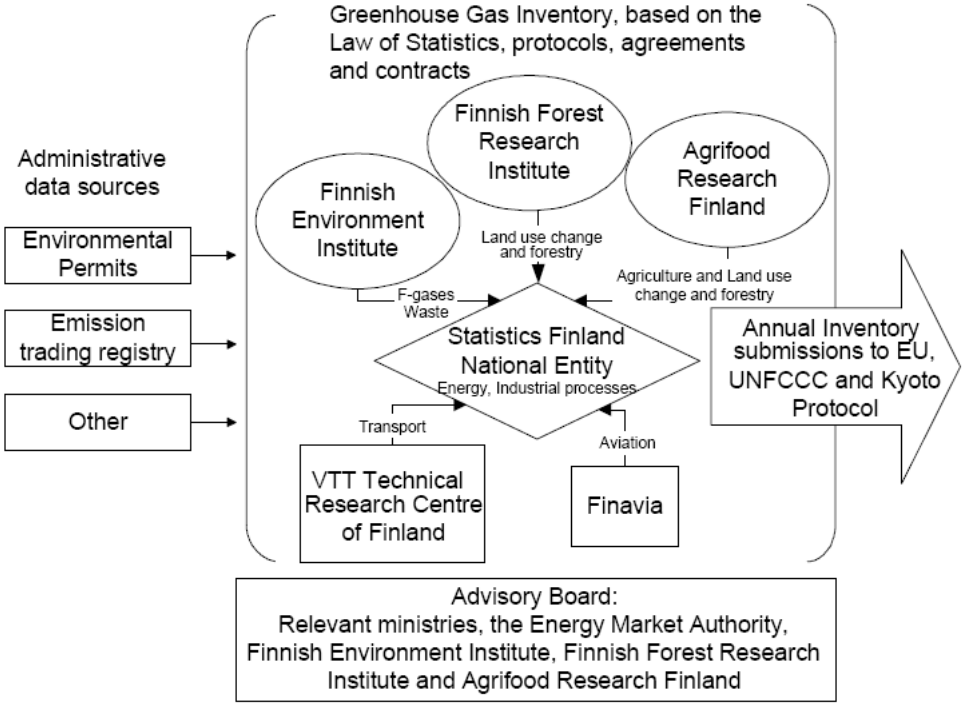
FINLAND

Statistics Finland as the general authority of the official statistics of Finland is independently responsible for greenhouse gas inventory submissions under the UNFCCC, the Kyoto Protocol and the EU monitoring mechanism. Statistics Finland has made the inventory calculations, as well as the descriptions of the methodologies and other information included in the national inventory report.

Finland's inventory system includes in addition to Statistics Finland the expert organisations that have previously taken part in the emission calculation. With regard to this co-operation, separate agreements are made with the Finnish Environment Institute, MTT Agrifood Research Finland and the Finnish Forest Research Institute. Statistics Finland also acquires parts of the inventory as purchased services from VTT (Technical Research Centre of Finland) and Finavia (former Civil Aviation Administration).

The National System for the Greenhouse Gas Inventory in Finland is presented in Figure 6.

Figure 6: The National System for the Greenhouse Gas Inventory in Finland



Main data sources used in the Finnish greenhouse gas inventory from agriculture:

- Matilda database of the Ministry of Agriculture and Forestry
- Yearbook of Farm Statistics
- Finnish Trotting and Breeding Association
- MTT Agrifood Research Finland
- Finnish Environment Institute (SYKE)
- Published literature

Source: Greenhouse Gas Emissions in Finland 1990-2008. National Inventory Report under the UNFCCC and the Kyoto Protocol 25 May 2010 p. 470

FRANCE

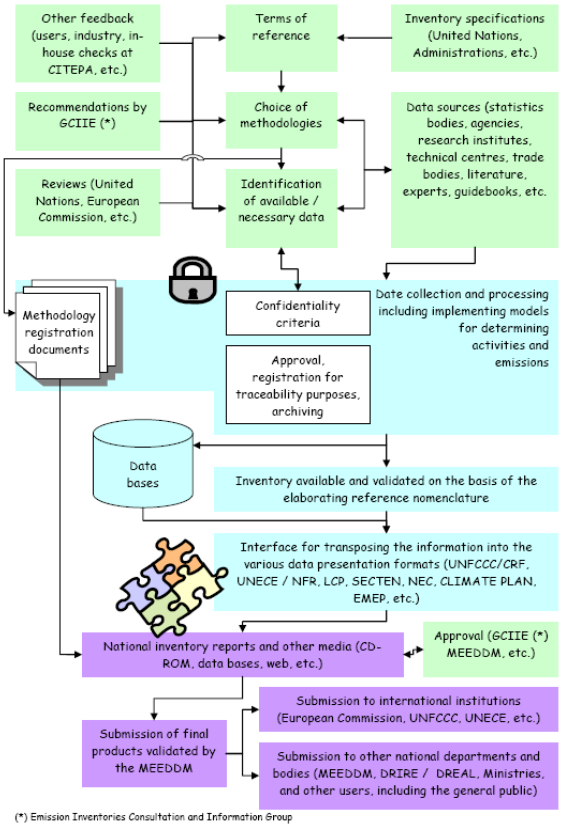
Responsibility for the definition and control of work of the national system of emissions inventory of pollutants in the atmosphere (SNIEPA) Ministry of Ecology, Energy, Sustainable Development and Marine Affairses (MEEDDM). The MEEDDM takes in coordination with other departments concerned of the decisions relevant to the ise-up and operation of SNIEPA especially the institutional, legal or procedural.

The MEEDM has entrusted CITEPA (Interprofessional Technical Centre for Studies on Air Pollution or Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique) with the following tasks: preparing the emission inventories with regard to methods and preparing their updating, data collection and processing, data storage, production of the reports and various means of disseminating the information, control and quality management. CITEPA assists the MEEDDM in overall coordination of the National Air Pollutant Emissions Inventory System.

The MEEDDM steers the Emissions Inventories Consultation and Information Group (GCIIE)

The National Air Pollutant Emissions Inventory System (SNIEPA) has been designed following the principle of a single core meeting the different requests – Figure 7.

Figure 7: Simplified organization chart of the French inventory system



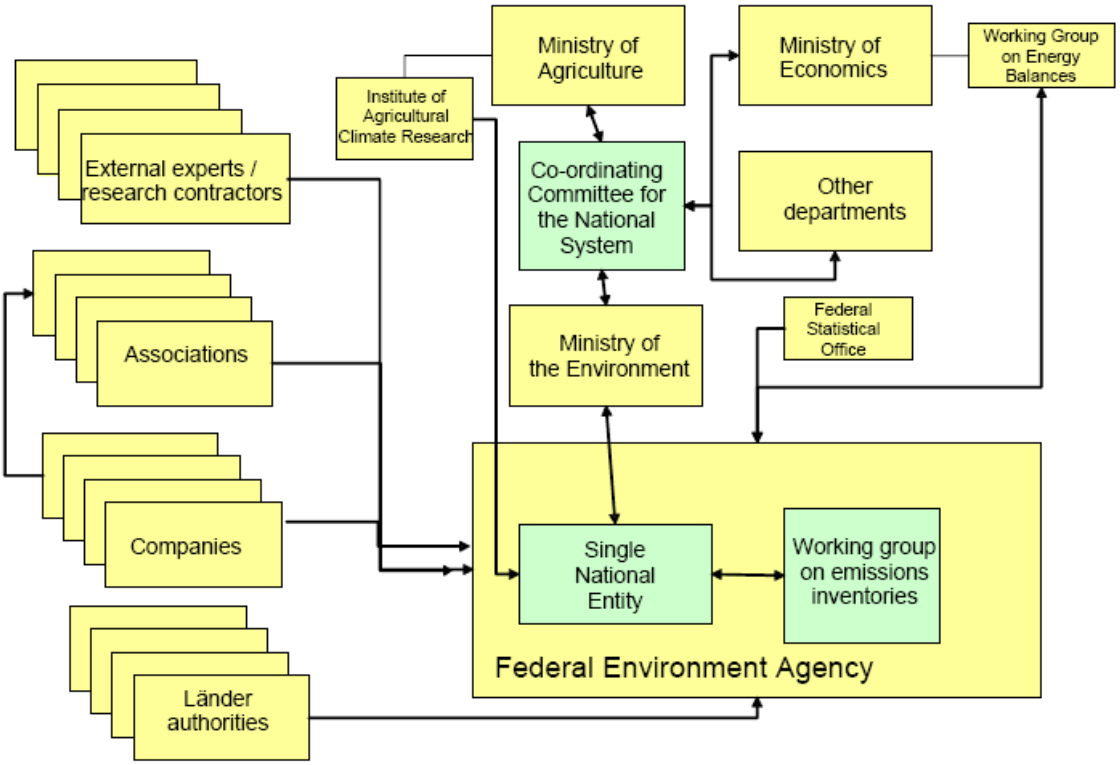
Source: Rapport National D'inventaire pour la France au titre de la Convention Cadre Des Nations Unies Sur Les Changements Climatiques et du Protocole de Kyoto. Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique, Avril 2010, p. 1168

GERMANY

In Germany, the National System of Emissions has been established at the ministerial level, under the leadership of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The System now incorporates other German ministries, including the Federal Ministry of the Interior (BMI), the Federal Ministry of Defence (BMVg); the Federal Ministry of Finance (BMF), the Federal Ministry of Economics and Technology (BMWi), the Federal Ministry of Transport, Building and Urban Development (BMVBS) and the Federal Ministry for Food, Agriculture and Consumer Protection (BMELV). As a result, the process of emissions inventory preparation now includes all of the key institutions that are in a position to make high-quality specialised contributions to it.

The following Figure 8 provides an overview of the structure of the National System in Germany.

Figure 8: Structure of the National System of Emissions (NaSE) in Germany



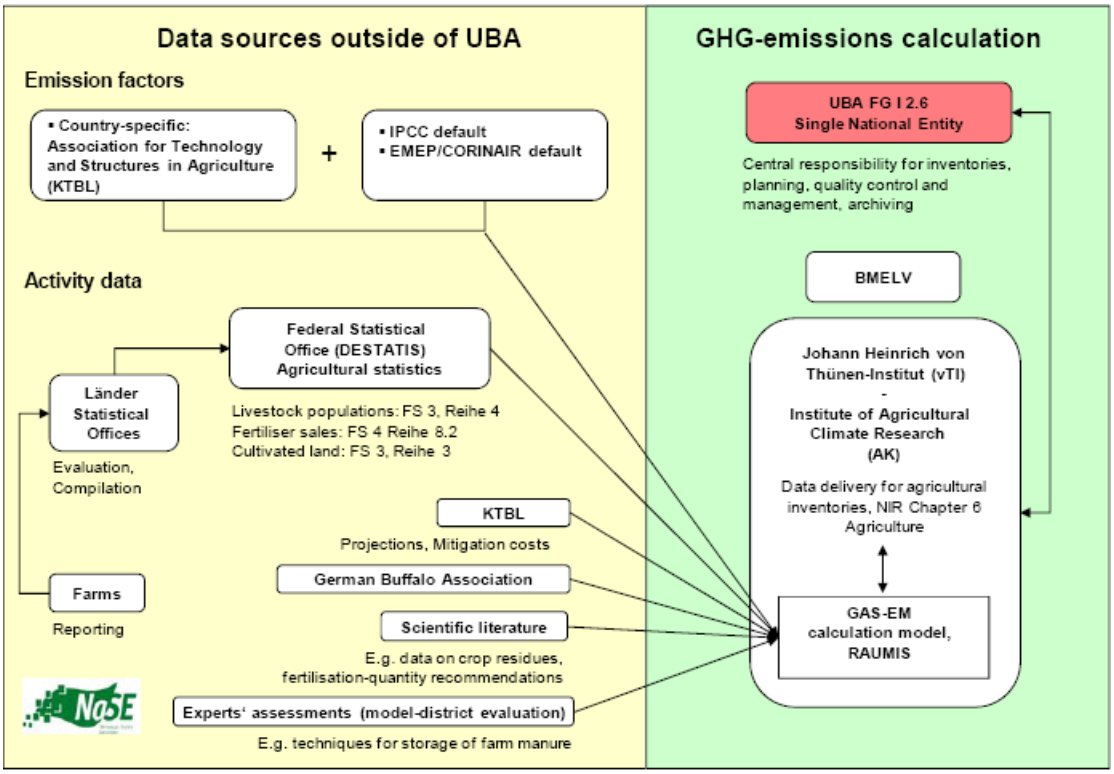
The National Co-ordinating Committee has the tasks of supporting the emissions-reporting process and clarifying open issues pertaining to the National System. In particular, the committee defines key-source and key-sink categories and resolves any pertinent uncertainties. In addition, the National Co-ordinating Committee is responsible for approving inventories and the reports required pursuant to the Kyoto Protocol.

National Emissions Reporting System appointed the Federal Environment Agency to carry out tasks of the national co- ordination agency for emissions reporting (Single National Entity).

The Single National Entity's tasks include planning, preparing and archiving of inventories, describing inventories in the inventory reports and carrying out quality control and assurance for all important process steps. The *Single National Entity* serves as a central point of contact, and it co-ordinates and informs all participants in the *National System*.

Emissions calculations for agriculture are carried out by the von Thünen Institute (vTI) – Figure 9.

Figure 9: Responsibilities and data flows for calculation of greenhouse-gas emissions in the area of agriculture in Germany



Source: National Inventory Report For the German Greenhouse Gas Inventory 1990 – 2008. Submission under the United Nations Framework Convention on Climate Change and the Kyoto Protocol 2010. Federal Environment Agency (Umweltbundesamt) UNFCCC Submission. Dessau, 11 May 2010 p. 672

GREECE

The Ministry of Environment, Energy and Climate Change, MEECC is the governmental body responsible for the development and implementation of environmental policy in Greece, as well as for the provision of information concerning the state of the environment in compliance with relevant requirements defined in international conventions, protocols and agreements. Moreover, the MEECC is responsible for the co-ordination of all involved ministries, as well as any relevant public or private organization, in relation to the implementation of the provisions of the Kyoto Protocol.

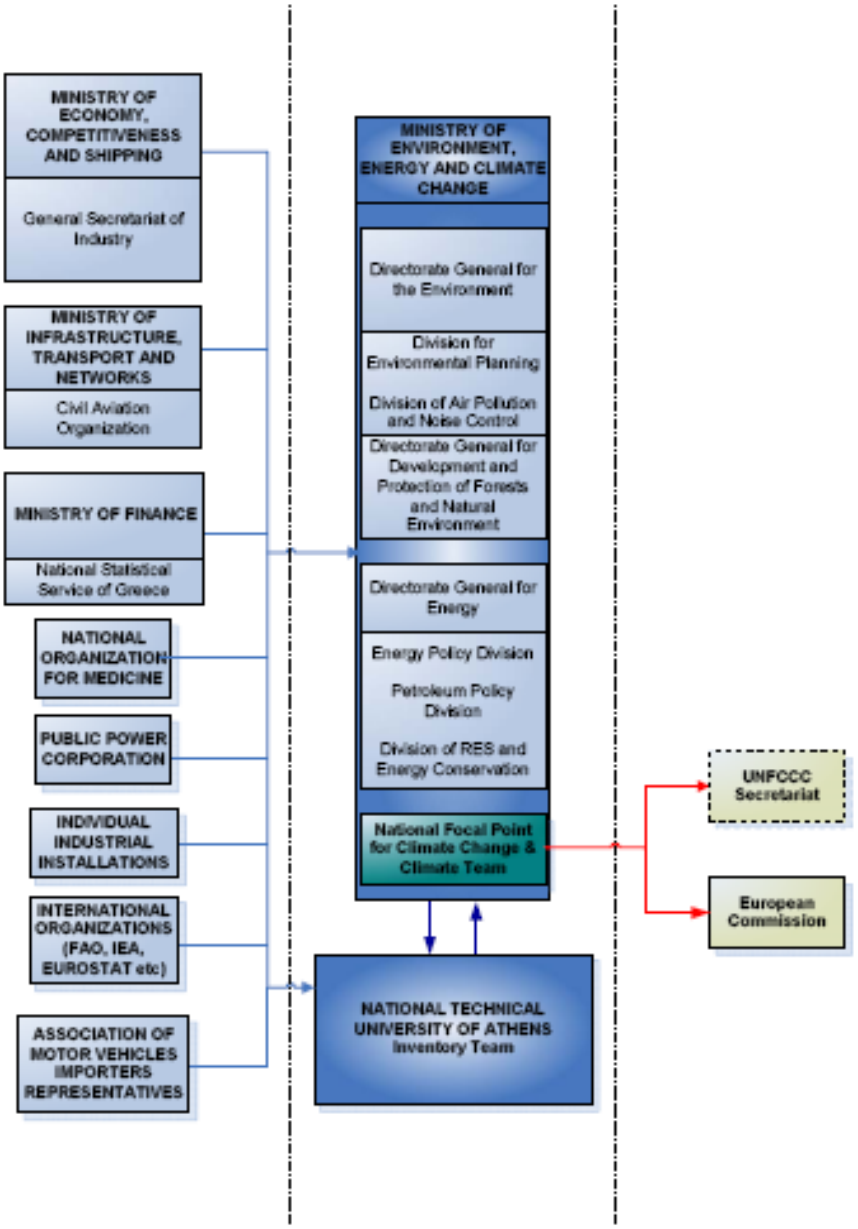
In this context, the MEECC has the overall responsibility for the national GHG inventory, and the official consideration and approval of the inventory prior to its submission.

An overview of the organizational structure of the National Inventory System is presented in Figure 10.

The Ministry of Environment, Energy and Climate Change has assigned, on a contract basis, the National Technical University of Athens (NTUA) / School of Chemical Engineering as the national institution that has the technical and scientific responsibility for the planning, preparation and management of the annual national inventory. In this framework, NTUA (Inventory Team) has the following responsibilities / tasks to fulfill for the GHG inventory preparation:

The Ministry of Environment, Energy and Climate Change has assigned, on a contract basis, the National Technical University of Athens (NTUA) / School of Chemical Engineering as the national institution that has the technical and scientific responsibility for the planning, preparation and management of the annual national inventory.

Figure 10: Organizational Structure of the National Inventory System in Greece



Main data sources used in the Greece greenhouse gas inventory from agriculture:

- National Statistical Service of Greece
- Ministry of Rural Development and Food
- UN Food and Agricultural Organisation
- Pan-Hellenic Association of Professional Fertilizers Producers & Dealers

Source: Annual Inventory Submission Under The Convention and the Kyoto Protocol for greenhouse and other gases for years 1990-2008. Ministry of Environment, Energy and Climate Change, April 2010 p. 406.

HUNGARY

The Minister for Environment and Water has overall responsibility for the Hungarian Greenhouse Gas Inventory and the Hungarian National System for Climate Reporting. He is responsible for the institutional, legal and procedural arrangements for the national system and the strategic development of the national inventory. Therefore the designated single national entity is the Ministry of Environment and Water. Within the ministry, the Climate Policy Unit administers this responsibility by supervising the national system.

For the preparation and development of the inventory a Greenhouse Gas Inventory Division (GHG division) was established in the Hungarian Meteorological Service (OMSZ). This division is responsible for all inventory related tasks, compiles the greenhouse gas inventories and other reports with the involvement of external institutions and experts on a contractual base and supervises the maintenance of the system.

The table 3 summarizes the institutional responsibilities:

Table 3: Tasks of Minister for Environment and Water and OMSZ

Function	Institution	Responsibilities
Single national entity	Ministry of Environment and Water	• Supervision of national system • UNFCCC National Focal Point • Official consideration and approval of inventory
Inventory coordination and compilation	OMSZ GHG division	• Provision of work plan • Contracting consultants • Inventory preparation of Energy, Industry and Waste sector • Completion of CRF and NIR • Archiving • Coordinating QA/QC activities • Reporting to UNFCCC secretariat

Some parts of the inventory (mainly energy, industrial processes and waste) are prepared by the experts of the GHG division themselves; the calculations of other sectors are made by external experts / institutions on contractual basis as follows. The agriculture sector of the inventory has been prepared by the Research Institute for Animal Breeding and Nutrition for several years. This institute collects the data, chooses the calculation method and prepares the inventory.

Source: National Inventory Report for 1985-2008 HUNGARY May 2010 Hungarian Meteorological Service Greenhouse Gas Inventory Division p. 212

IRELAND

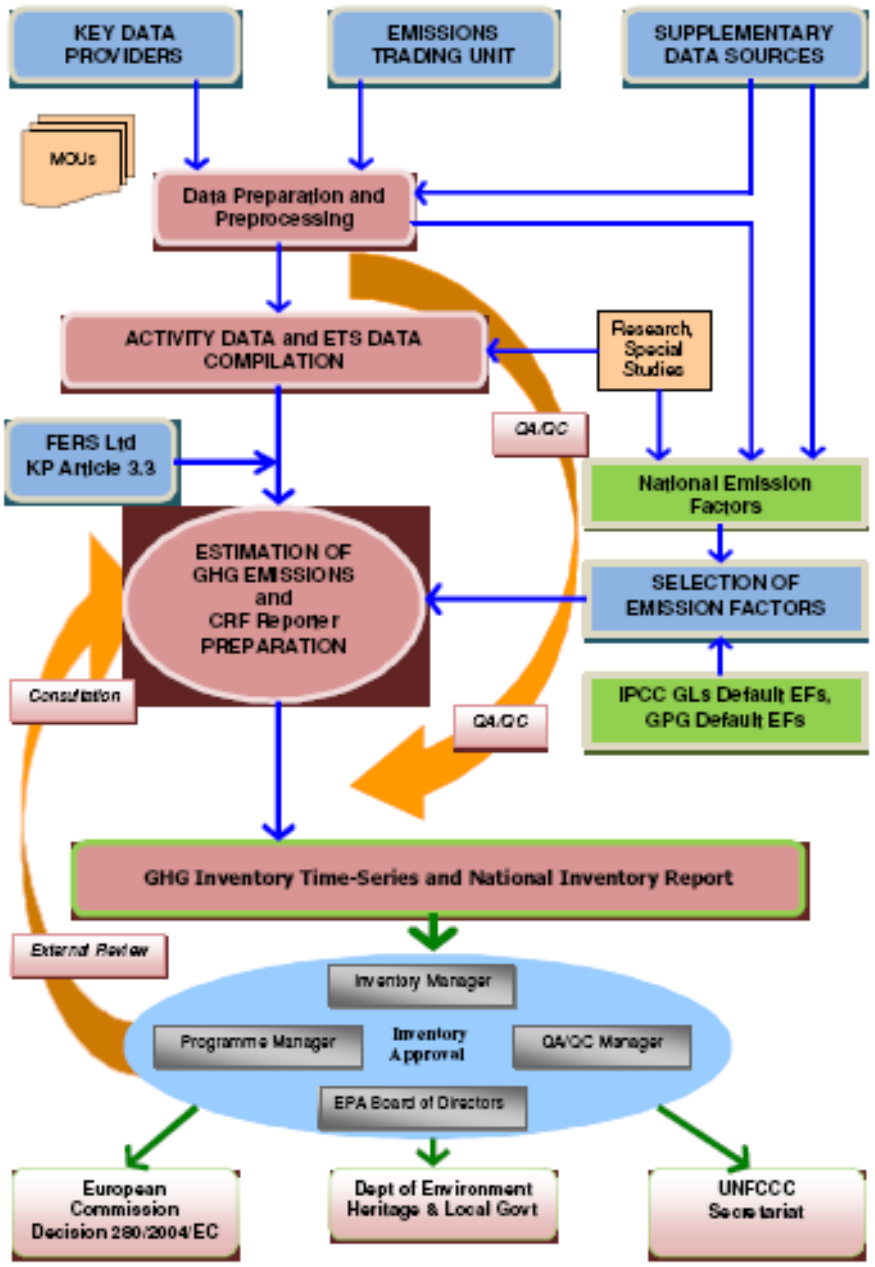
The Environmental Protection Agency (EPA) has overall responsibility for the national greenhouse gas inventory in Ireland's national system and submission of emissions data to the UNFCCC Secretariat and to the Secretariat for the Convention on Long-Range Transboundary Air Pollution (CLRTAP).

The EPA Office of Climate Licensing and Resource Use performs on behalf of Department of the Environment Heritage and Local Government (DEHLG) the role of inventory agency in Ireland and undertakes all aspects of inventory preparation and management and the reporting of Ireland's submissions annually.

The establishment of Ireland's national inventory system was completed by Government Decision, building on the framework that had been applied for many years. Established institutional arrangements directed towards national inventory reporting and involving the EPA, DEHLG and other stakeholders are reorganised, extended and legally consolidated across all participating institutions to strengthen inventory capacity within the EPA, ensuring that more formal and comprehensive mechanisms of data collection and processing are established and maintained for long term implementation. The system puts in place formal procedures for the planning, preparation and management of the national atmospheric inventory and identifies the roles and responsibilities of all the organizations involved in its compilation.

Figure 11 provides a schematic overview of the institutions, procedures and information flows involved in the national system.

Figure 11: National Inventory System Overview in Ireland



Because of the importance of agriculture in the country, Ireland has very extensive and upto- date statistical data on all aspects of the sector, compiled and published by the Central Statistics Office (CSO). This is the official source of the basic data for inventory purposes, except for synthetic fertilizer use and poultry population statistics, for which annual data are obtained from the Department of Agriculture, Fisheries and Food (DAFF). The CSO and DAFF are key data providers whose annual statistical inputs to the inventory agency.

Source: Ireland National Inventory Report 2010. Greenhouse Gas Emissions 1990 – 2008. Reported to the United Nations Framework Convention on Climate Change. M. McGettigan, P. Duffy, B. Hyde, E. Hanley, P. O'Brien, J. Ponzi and K. Black. Environmental Protection Agency p. 364

ITALY

Institute for Environmental Protection and Research (ISPRA), is the single entity in charge of the preparation and compilation of the national greenhouse gas emission inventory.

The Ministry for the Environment, Land and Sea is responsible for the endorsement of the inventory and for the communication to the Secretariat of the Framework Convention on Climate Change and the Kyoto Protocol. The inventory is also submitted to the European Commission in the framework of the Greenhouse Gas Monitoring Mechanism

Different institutions are responsible for statistical basic data and data publication, which are primary to ISPRA for carrying out emission estimates. These institutions are part of the National Statistical System (Sistan), which provides national official statistics, and therefore are required to periodically update statistics; moreover, the National Statistical System ensures the homogeneity of the methods used for official statistics data through a coordination plan, involving the entire public administration at central, regional and local levels. The National Statistical System is coordinated by the Italian National Institute of Statistics (ISTAT) whereas other bodies, joining the National Statistical System, are the statistical offices of ministries, national agencies, regions and autonomous provinces, provinces, municipalities, research institutes, chambers of commerce, local governmental offices, some private agencies and private subjects who have specific characteristics determined by law.

ISPRA has established fruitful cooperation with a number of governmental and research institutions as well as industrial associations, which helps improving some leading categories of the inventory.

Emission factors used for the preparation of the national inventory reflect the characteristics of the Italian agriculture sector. Information from national research studies is considered. Activity data are mainly collected from the National Institute of Statistics (ISTAT, *Istituto Nazionale di Statistica*). Every year, national and international references, and personal communications used for the preparation of the agriculture inventory are kept in the *National References Database.*.

Source: Italian Greenhouse Gas Inventory 1990-2008 National Inventory Report 2010. Annual Report for submission under the UN Framework Convention on Climate Change and the Kyoto Protocol. ISPRA - Institute for Environmental Protection and Research ISPRA, Rapporti 113/2010 s. 459

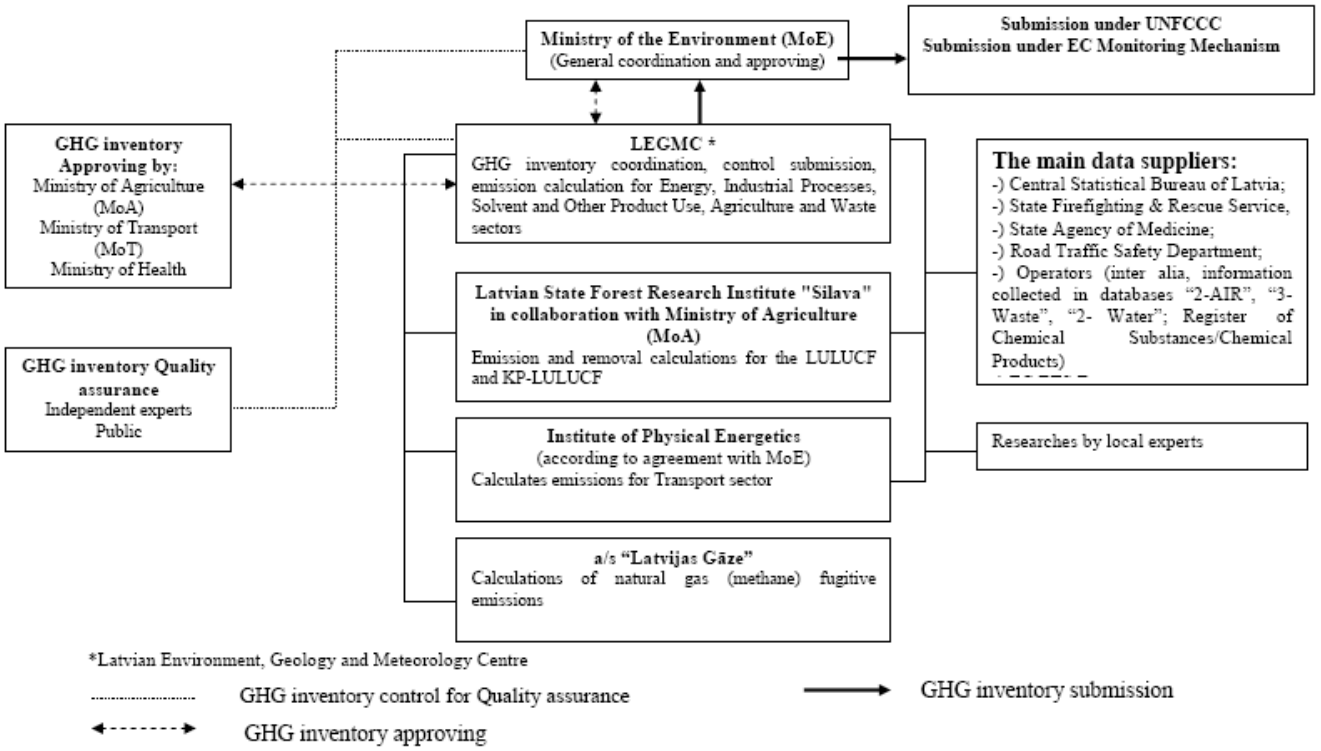
LATVIA

Single national entity with overall responsibility for the Latvian GHG inventory is the Ministry of the Environment of the Republic of Latvia (MoE) Climate Policy and Technology Department. MoE coordinate policy related to climate change and renewable energy in Latvia.

Latvian Environment, Geology and Meteorology Centre (LEGMC) is a governmental limited liability company and is responsible for preparing GHG inventory. The main data supplier for the Latvian GHG inventory is the Central Statistical Bureau of Latvia (CSB). LEGMC has signed additional agreement for the supply of the necessary data too. Mainly LEGMC contacted with five CSB experts.

The detailed responsibilities of the institutions involved in preparing activity data and calculating emissions are summarized in the Figure 12.

Figure 12: Structure of National Inventory System in Latvia



Latvian Environment, Geology and Meteorology Centre compiles national GHG inventory collaborating with other involved institutions and submit it for the approving by relevant ministries. Ministry of the Environment submits national inventory report to the UNFCCC Secretariat and to the European Commission.

Source: Latvia's National Inventory Report. Resubmitted Under UNFCCC and the Kyoto Protocol. Latvian Environment, Geology and Meteorology Centre (LEGMC), Ministry of the Environment of the Republic of Latvia, Climate Policy and Technology Department 2010. p. 416.

LITHUANIA

The final responsibility for the preparation of the annual GHG inventory report and its submission to the European Commission and the Secretariat of the UNFCCC is placed on the Ministry of Environment within which the inventory is coordinated by the Climate Change Division of the Environmental Quality Department. Ministry of Environment annually submits GHG inventory reports to European Commission and UNFCCC secretariat.

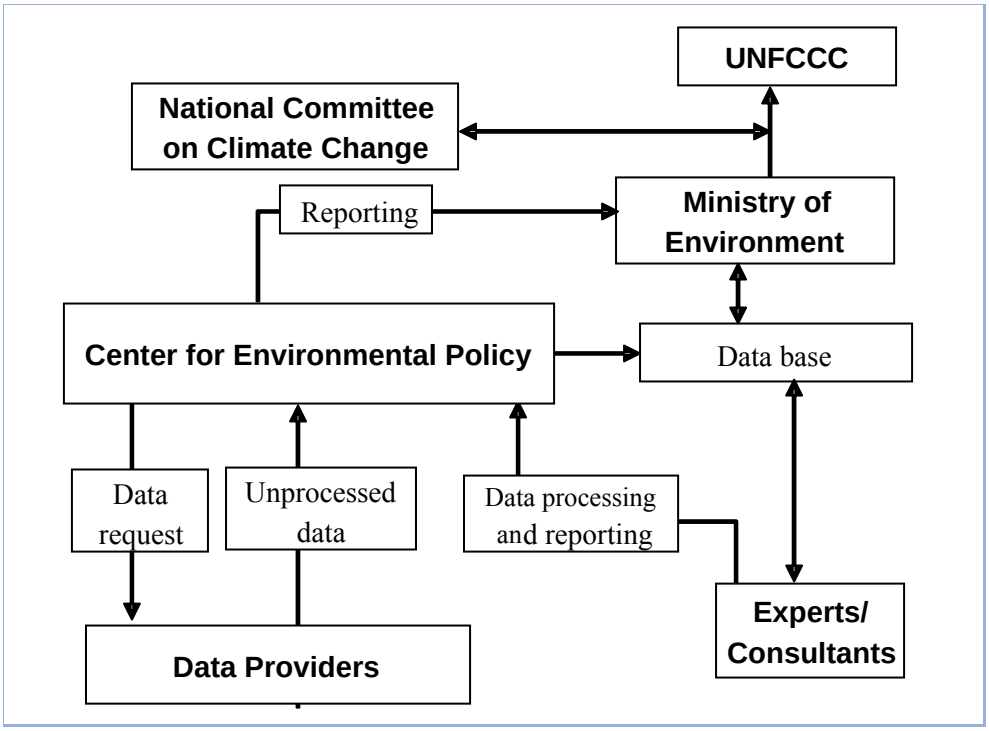
Inventory preparation is coordinated by the Center for Environmental Policy, which is responsible for the compilation of the final report based on the sectoral reports provided by experts/consultants. Before submission, reports are forwarded to the National Climate Change Committee for final approval.

The GHG Inventory Experts Team is formed from leading Lithuanian specialists in areas related to GHG emissions.

The most important data providers are Statistics Department of Lithuania, Environmental Protection Agency, Lithuanian Energy Institute, State Forest Survey Service, Lithuanian Forest Research Institute, Institute of Physics, Lithuanian Institute of Agrarian Economics, Lithuanian Institute of Agriculture, Geological Survey of Lithuania, industry companies etc.

The principle diagram showing institutions responsible for the preparation of the GHG inventory in Lithuania and their interaction is shown in Figure 13.

Figure 13: Institutional set-up for GHG inventory in Lithuania



Source: National Greenhouse Gas Emission Inventory Report 2010 of the Republic of Lithuania (Reported Inventory 1990-2008). Center for Environmental Policy Vilnius, December 2009 s. 193

LUXEMBOURG

Responsible for the preparation of Luxembourg's National Greenhouse Gas Inventory as well as the preparation of the NIR is the Air and Noise Division of the Environment Agency, under the political responsibility of the Ministry of Sustainable Development and Infrastructures (MDDI).

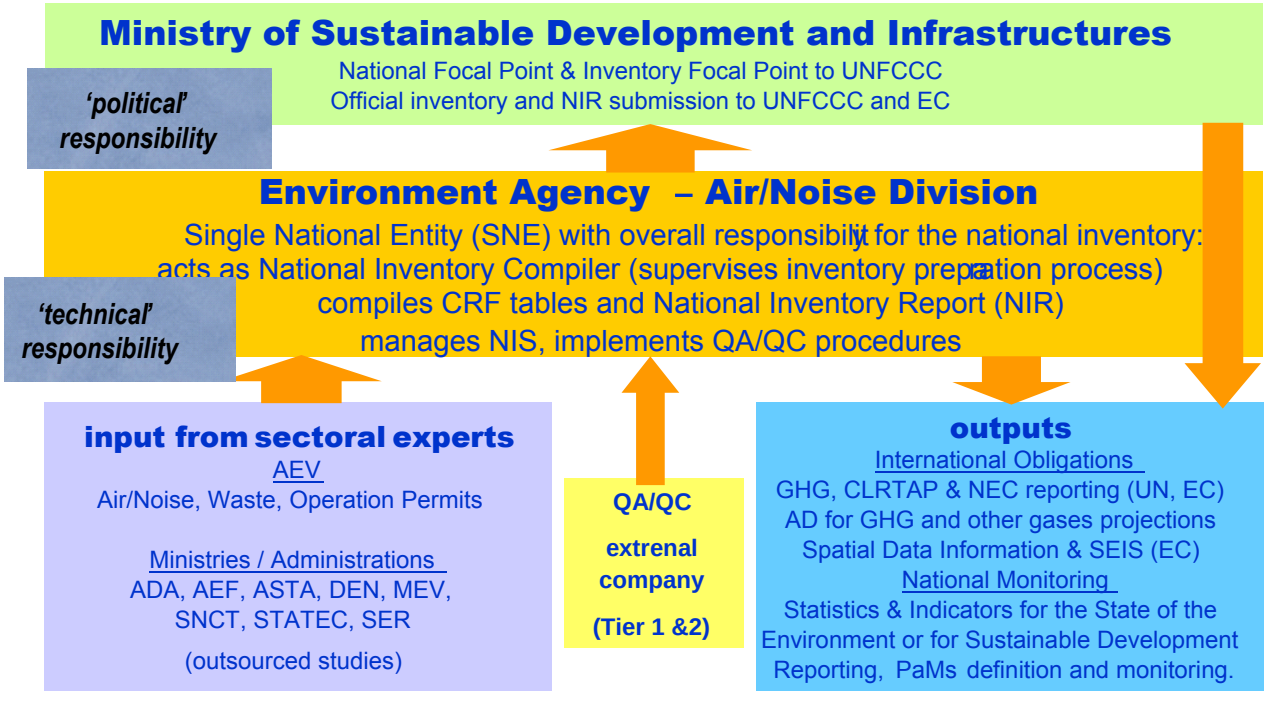
The Environment Agency has the "technical" knowledge and responsibility for the GHG Inventories. Ministry officially submits the inventories and their related reports to the UNFCCC Secretariat and the European Commission.

Figure 14 summarizes the organization of the GHG reporting in Luxembourg in accordance with the national Regulation for the setting-up of a National Inventory System (NIS).

Data used to produce the annual air emission (including GHG) inventories are mainly:

- taken from official statistics published by the National Statistical Institute (STATEC);
- coming from information supplied directly by facilities (annual reports, emission measurement reports);
- extracted from statistical information received from other ministries (Ministry of Economic Affairs and External Trade for energy (IEA Joint Questionnaires), Administrations under the authority of the Ministry of Agriculture for agriculture, etc.);
- on occasion, from specific surveys or questionnaire and from expert judgements.

Figure 14: Luxembourg's National Inventory System



Source: Luxembourg's National Inventory Report 1990-2008. Submission under the United Nations Framework Convention on Climate Change and voluntary submission under the Kyoto Protocol. Luxembourg, 2010 Ministère du Développement durable et des Infrastructurs – Administration de l'Environnement Draft 27 May 2010 p. 375

THE NETHERLANDS

The Ministry of Housing, Spatial Planning and the Environment (VROM) has overall responsibility for climate change policy issues including the preparation of the inventory.

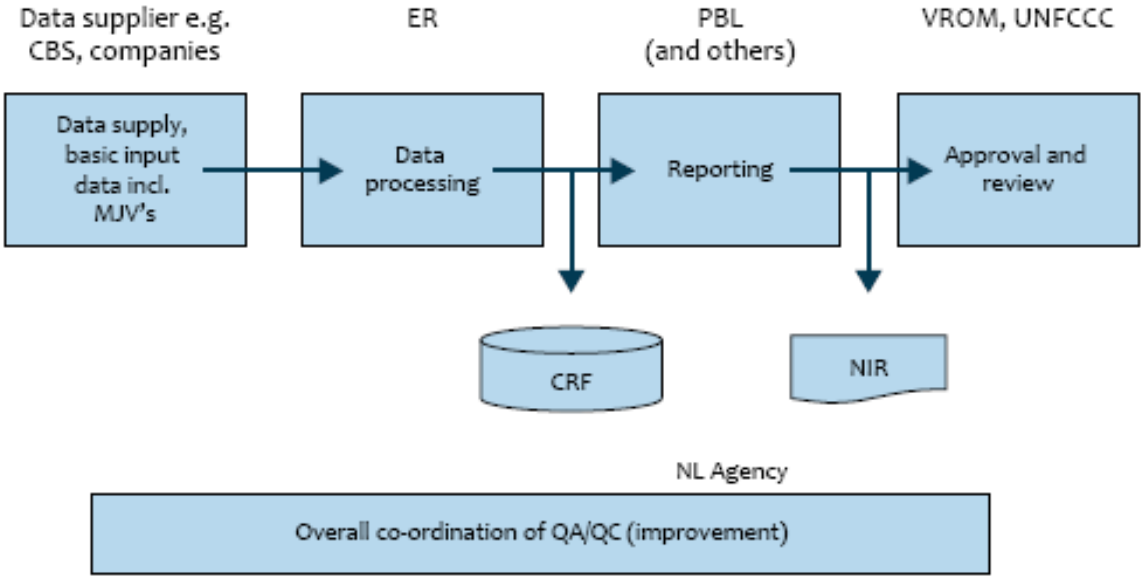
Since 1 January 2010, National Institute for Public Health and the Environment (RIVM) has been assigned by VROM to take over the role of Netherlands Environmental Assessment Agency (PBL) as coordinating institute for compiling and maintaining the pollutants emission register/inventory Dutch Pollutant Release & Transfer Register system (PRTR), containing about 350 pollutants including the greenhouse gases.

The main objective of the PRTR is to produce an annual set of unequivocal emission data that is up-to-date, complete, transparent, comparable, consistent and accurate. In addition to RIVM, various external agencies contribute to the PRTR by performing calculations or submitting activity data. These include: CBS (Statistics Netherlands), PBL, TNO (Netherlands Organisation for Applied Scientific Research), NL Agency, Centre for Water Management, Deltares and several institutes related to the Wageningen University and Research Centre (WUR).

The NIR part 1 is prepared by RIVM as part of the PRTR project. Most institutes involved in the PRTR also contribute to the NIR (including CBS and TNO). In addition, NL Agency is involved in its role as NIE. NL Agency also prepares the NIR part 1 and takes care of integration and submission to the UNFCCC in its role as NIE. Submission to the UNFCCC only takes place after approval by VROM.

The primary process of preparing the greenhouse gas inventory in the Netherlands is summarised in Figure 15.

Figure 15: The greenhouse gas inventory process in The Netherlands



Source: Greenhouse Gas Emissions in the Netherlands 1990-2008 National Inventory Report 2010 Netherlands Environmental Assessment Agency (PBL), Bilthoven, April 2010, PBL report 500080017/2010 p. 230

POLAND

The unit responsible for compiling the GHG inventory is the National Centre for Emissions Management (KOBiZE) established in the Institute of Environmental Protection supervised by the Ministry of Environment.

The emission calculation, choices of activity data, emission factors and methodology are performed by KOBiZE. KOBiZE is collaborating with a number of individual experts as well as institutions when compiling inventories. Among the latter are: Central Statistical Office (GUS), Agency of Energy Market (ARE), Institute of Ecology of Industrial Areas in Katowice (IETU), Motor Transport Institute (ITS) as well as Office for Forest Planning and Management (BULGiL).

Prior to submission the elaborated inventories undergo internal process for the official consideration and approval. The responsibility for approval GHG inventories lies on the Ministry of Environment.

Source: Poland's National Inventory Report 2010 Greenhouse Gas Inventory for 1988□2008. Submission under the UN Framework Convention on Climate Change and its Kyoto Protocol Reporting entity: National Administration of the Emissions Trading Scheme − National Centre for Emission Balancing and Management (KASHUE-KOBiZE) at the Institute of Environmental Protection Warszawa May 2010 p. 270

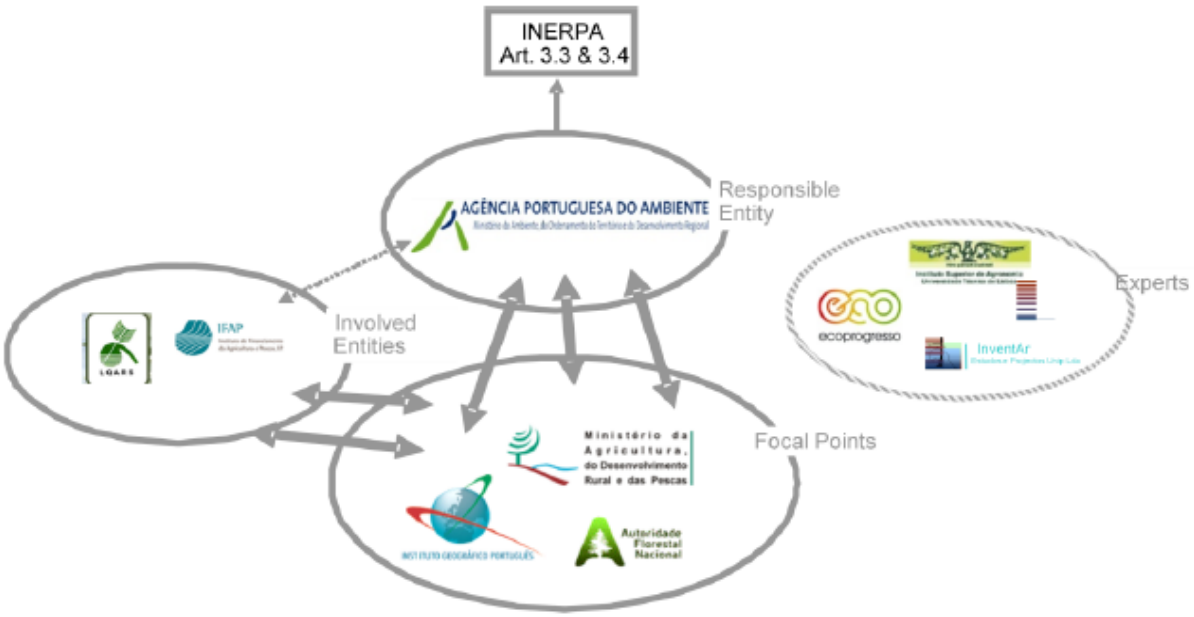
PORTUGAL

National Inventory System of Emissions by Sources and Removals by Sinks Air Pollutants - (SNIERPA) was created. This system contains a set of legal, institutional and procedural arrangements that aim at ensuring the accurate estimation of emissions by sources and removals by sinks of air pollutants, as well as the communication and archiving of all relevant information.

The Portuguese Environmental Agency (APA)/ Ministry of Ministry for the Environment and Land Use Planning, is the Responsible Body responsible for the overall coordination and updating of the National Inventory of Emissions by Sources and Removals by Sinks of Air Pollutants (INERPA); the inventory's approval, after consulting the Focal Points and the involved entities; and its submission to EC and international bodies to which Portugal is associated, in the several communication and information formats, thus ensuring compliance with the adopted requirements and directives.

InventAr, Estudos e Projectos Unip Lda (INVENTAR), was contracted by APA to work in close collaboration with the inventory team on the calculation of emission estimates. INVENTAR also provides technical advice concerning all aspects of inventory development: methodologies, sources of information and emission factors, and participates in the annual definition of priorities concerning the MDP. However many other institutions and agencies contributed to the inventory process, providing activity data, sectoral expert judgement, technical support and comments. The structure of the information system is outlined in Figure 16.

Figure 16: National Inventory of Emissions by Sources and Removals by Sinks of Air Pollutants (INERPA) system in Portugal



Source: Portuguese National Inventory Report On Greenhouse Gases, 1990 - 2008 Submitted Under the United Nations Framework Convention on Climate Change and the Kyoto Protocol, Edition Portuguese Environmental Agency. Amadora, April, 15th 2010 p. 628.

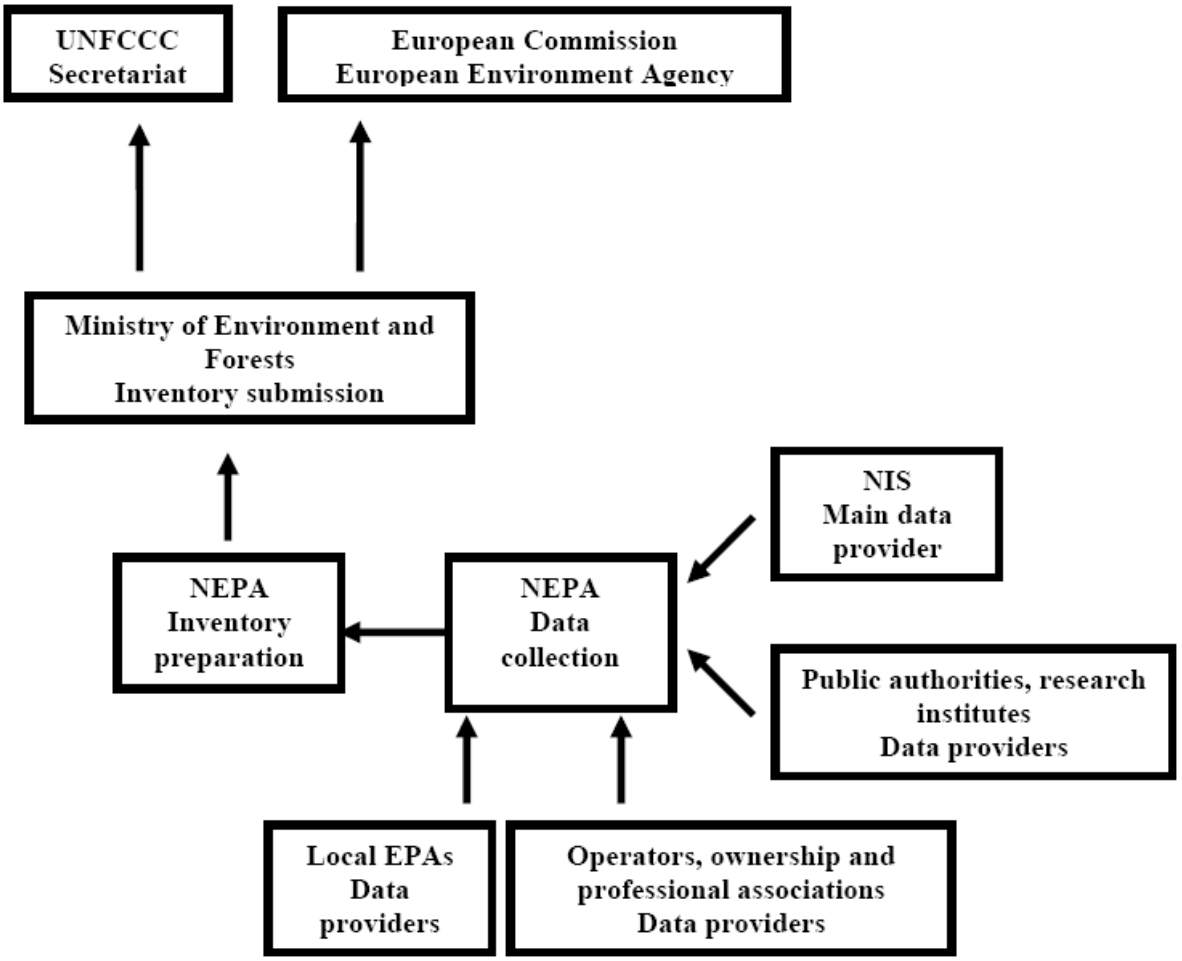
ROMANIA

The competent authority, which is responsible for administrating the National System for the estimation of anthropogenic greenhouse gas emissions levels from sources and removals by sinks, is the National Environmental Protection Agency (NEPA), under the subordination of the Ministry of Environment and Forests.

The main activity data supplier is the National Institute for Statistics (NIS) through the yearly-published documents like the National Statistical Yearbook and the Energy Balance.

The inventory system currently used in Romania is presented in the Figure 17.

Figure 17: Current national inventory system description in Romania



Source: Romania's Greenhouse Gas Inventory 1989-2008 National Inventory Report March 2010. Ministry of Environment and Forests. National Environmental Protection Agency. p. 298

SLOVAKIA

The Ministry of the Environment of the Slovak Republic (MŽP) is responsible for national environmental policy including climate change and air protection issues as National Focal Point.

Slovak Hydrometeorological Institute (SHMÚ) is the organisation authorised by the Ministry of the Environment of the SR to provide yearly and according to the approved status for environmental services, including GHG emissions` inventory. Range of services, competencies, time schedule and financial budget are updated and agreed annually, too.

At the SHMÚ established the Department of Emissions (OE) as Single National Entity with delegated responsibilities. The process of preparing and management of emission inventories is the main workload of the OE. There is permanent staff covering positions of the emission experts working at the Department complemented with several external experts working on annual contracts renewed every year. Emission experts cooperate also with the other SHMÚ units (Climatology, Meteorology and Water Management) and other institutions and the state administration.

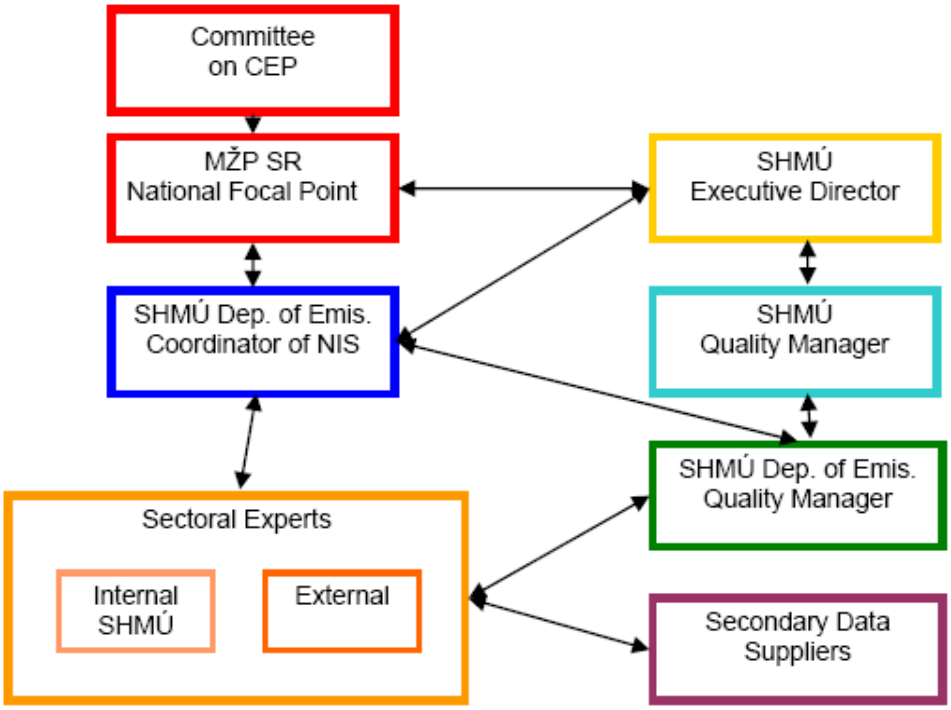
Commission on Climate-Energy Package (CEP) consists of the state secretaries of all concerned ministries. In addition to the co-ordination and development of the strategy for attaining the objectives of CEP in the Slovak Republic the Commission deals also with climate change and adaptation in a broader context of fulfilling the international commitment of the Slovak Republic in this field. Commission on CEP will take part in approval process of GHG emission inventory submissions.

Under the Commission on CEP was created the expert level group for preparing documents and proposals for policies and measures in climate change. This expert group includes expert from other relevant ministries and ministry of the environment.

The SHMÚ is annually updating the incoming information and activity data with the corresponding statistical information from the Statistical Office of the SR and other national statistics.

The structure and responsibilities of the National Inventory System of the Slovak Republic is presented in the Figure 18.

Figure 18: The structure and responsibilities of the National Inventory System of the Slovak Republic



Source: Slovak Republic. National Inventory Report 2010 Greenhouse Gas Emission Inventory 1990–2008 Submission under The UNFCCC including reporting elements under the Kyoto Protocol. Slovak Hydrometeorological Institute, Ministry of the Environment of the Slovak Republic. Bratislava, April 15, 2010 p. 102

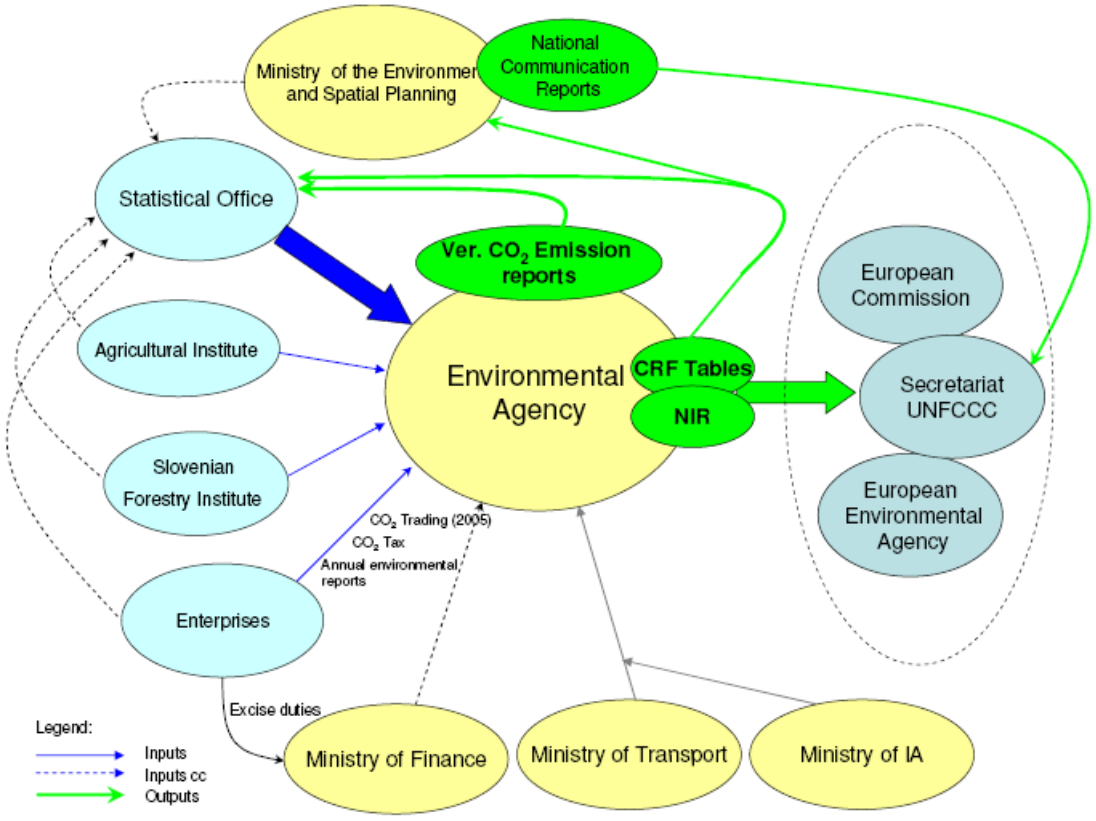
SLOVENIA

In Slovenia, the institution responsible for GHG inventories is the Environmental Agency of the Republic of Slovenia. The Environmental Agency is charged with both the overall coordinating of activities that are necessary for the development of emission inventories, as well as with implementing inventories for the purposes of reporting to the United Framework Convention on Climate Change (UNFCCC) and to the European Commission.

The Environmental Agency cooperates with numerous other institutions and administrative bodies which relay the necessary activity data and other necessary data for the inventories – Figure 19.

The chief sources of data are the Statistical Office of the Republic of Slovenia (SORS) and the Ministry of Environment and Spatial Planning. Emissions from Agriculture are calculated in cooperation with the Slovenian Agriculture Institute (KIS).

Figure 19: Data flow in the Slovenian Inventory System



Source: Slovenia's National Inventory Report 2010. Submission under the United Nations Framework Convention on Climate Change and under the Kyoto Protocol. Environmental Agency of the Republic of Slovenia, Ljubljana, April 2010 p. 281

SPAIN

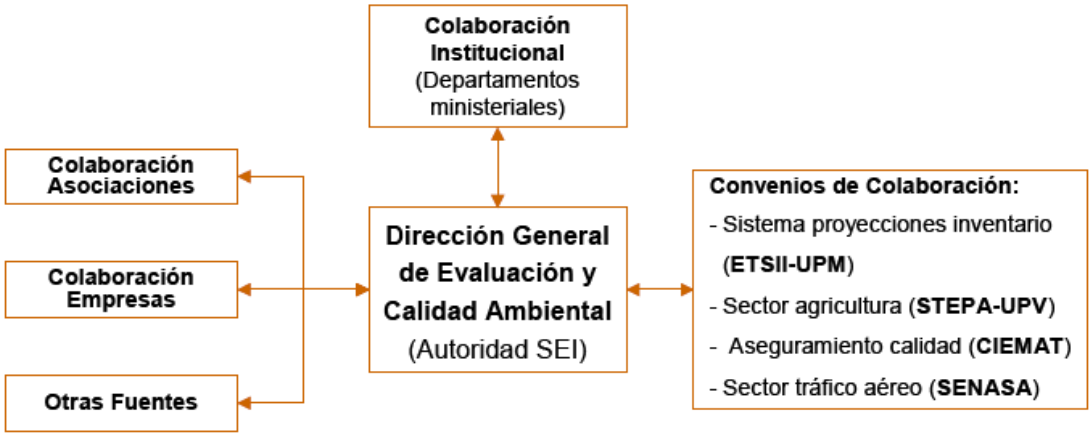
The Directorate General of Quality and Environmental Assessment (DGCE), Ministry of Environment and Rural and Marine Affairs (MARM) is the National Authority for the National Inventory System for Atmospheric Pollutant Emission. Within the DGCE is the Strategic Environmental Information Unit (UIAE) the entity that is assigned to conduct the inventory and processing the information gathered from various sources.

The proposed national inventory of air pollutants, prepared by the DGCE, is referred by the Minister for Environment and Rural and Marine Environment of the Government Delegate Commission for Economic Affairs for approval.

The DGCE also established to support the development and implementation of the Spanish System Inventory (SEI) collaboration agreements with various entities, mainly research institutes and university departments, among those include STEP-UPV (Systems and Technologies of Animal Production - Universidad Politécnica de Valencia) for the agriculture sector – Figure 20.

It also serves as background information for the development of environmental accounts of the National Institute of Statistics, with the inventory, comprised within the National Statistical Plan in allocating a proper number of statistical operation as discussed below.

Figure 20: Coordination of resources for the Spanish System Inventory by DGCE



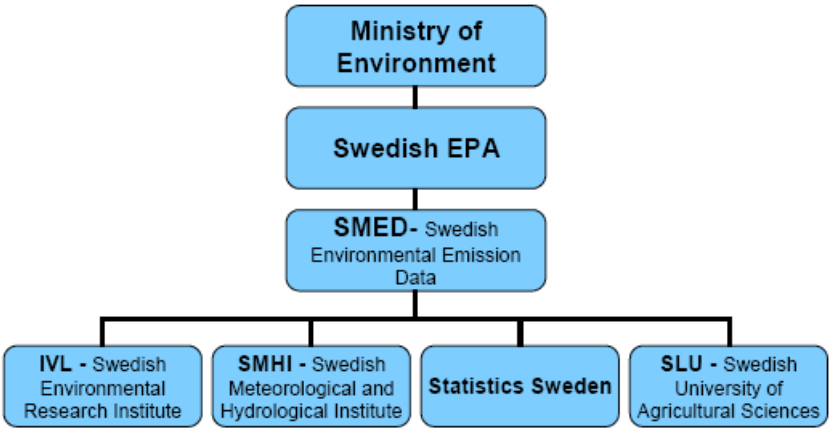
Source: Inventario de Emisiones de Gases de Efecto Invernadero de España e Información Adicional Años 1990-2008 Comunicación a la Secretaría del Convenio Marco Sobre Cambio Climático y Protocolo De Kioto. Ministerio de Medio Ambiente, y Medio Rural y Marino Secretaría de Estado de Cambio Climático D.G. de Calidad y Evaluación Ambiental D.G. Oficina Española de Cambio Climático Abril de 2010 p. 659

SWEDEN

The inventory system currently used in Sweden is presented in Figure 21. The Swedish Ministry of Environment has overall responsibility and submits the inventory report to the European Commission and to the UNFCCC secretariat. The Swedish Environmental Protection Agency (Swedish EPA) co-ordinates the activities for developing the inventory report and is also responsible for the final quality control and quality assurance of the data before it is submitted.

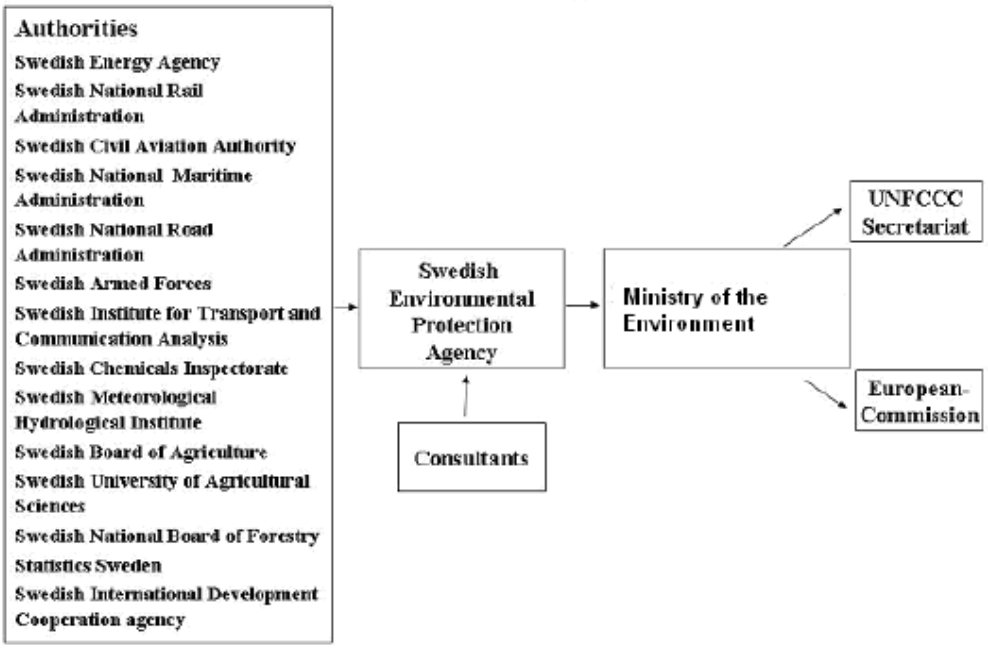
A consortium called Swedish Environmental Emissions Data (SMED), composed of Statistics Sweden, the Swedish Meteorological and Hydrological Institute (SMHI), the Swedish Environmental Research Institute AB (IVL) and the Swedish University of Agricultural Sciences (SLU). These organizations collect data and calculate emissions for all sectors.

Figure 21: The Swedish inventory system



The Figure 22 describe in broad terms which organizations are involved in the work of compiling documentation for the yearly inventory report and for other reporting to the European Commission and the Convention (UNFCCC).

Figure 22: Bodies that contribute information relevant to the preparation yearly inventory report on GHG emissions in Sweden



Source: National Inventory Report 2010 Sweden. Submitted under the United Nations Framework Convention on Climate Change and the Kyoto Protocol. Swedish Environmental Protection Agency, p. 296 + Annexes s. 139

UNITED KINGDOM

UK Government Department of Energy and Climate Change (DECC) has overall responsibility for the UK Greenhouse Gas Inventory and the UK National System and carries out this function on behalf of Her Majesty"s Government and the Devolved Administrations (Wales, Scotland and Northern Ireland). DECC is responsible for the institutional, legal and procedural arrangements for the national system and for the strategic development of the national inventory.

The UK Greenhouse Gas Inventory is compiled and maintained by AEA under contract to the Climate Energy, Science & Analysis (CESA) in the UK Department of Energy and Climate Change.

AEA under contract to DECC performs the role of Inventory Agency and is responsible for all aspects of national inventory preparation, reporting and quality management. AEA prepares the national atmospheric emissions inventory (NAEI) which is the core air emissions database from which the greenhouse gas inventory (GHGI) is extracted to ensure consistency in reporting across all air emissions for different reporting purposes (UNFCCC, UNECE etc).

Agricultural sector emissions are produced by the Defra's Land Management Improvement Division by means of a contract with North Wyke Research.

Figure 23 shows the main elements the UK National Inventory System, including provision of data to the European Union under the terms of the EU Monitoring Mechanism, and Figure 24 shows key organisational structure of the UK National Inventory System.

Figure 23: Main elements for the preparation of the UK greenhouse gas inventory

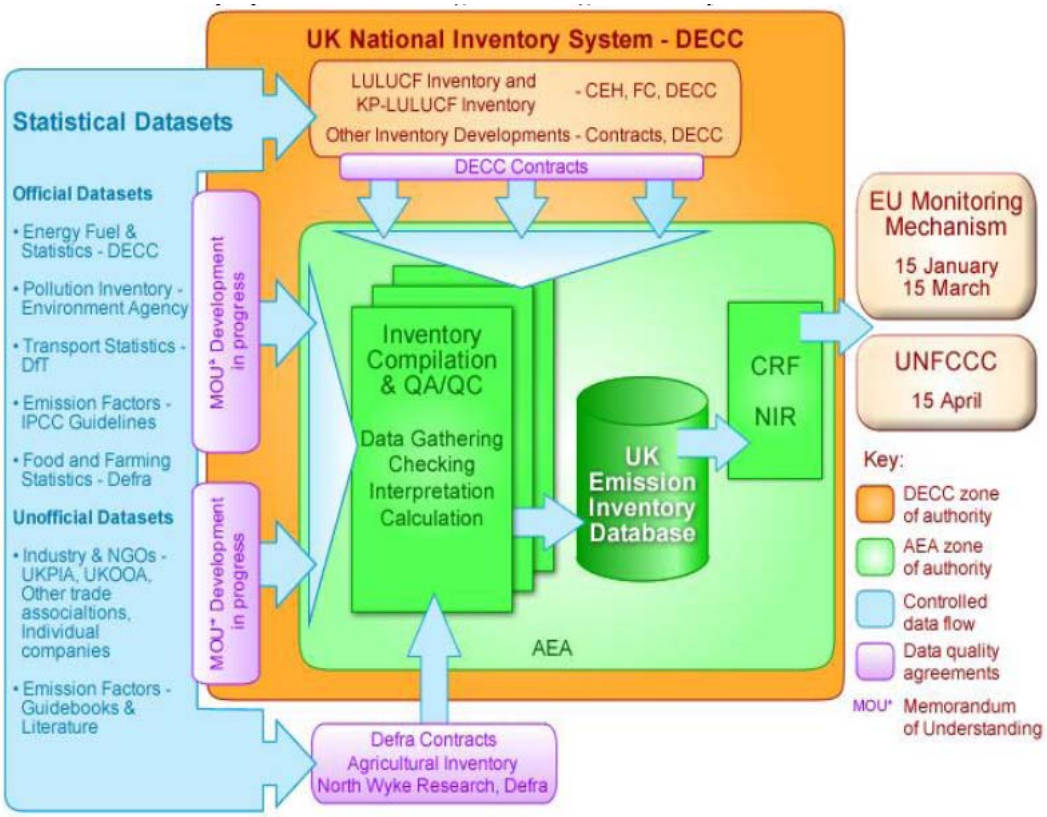
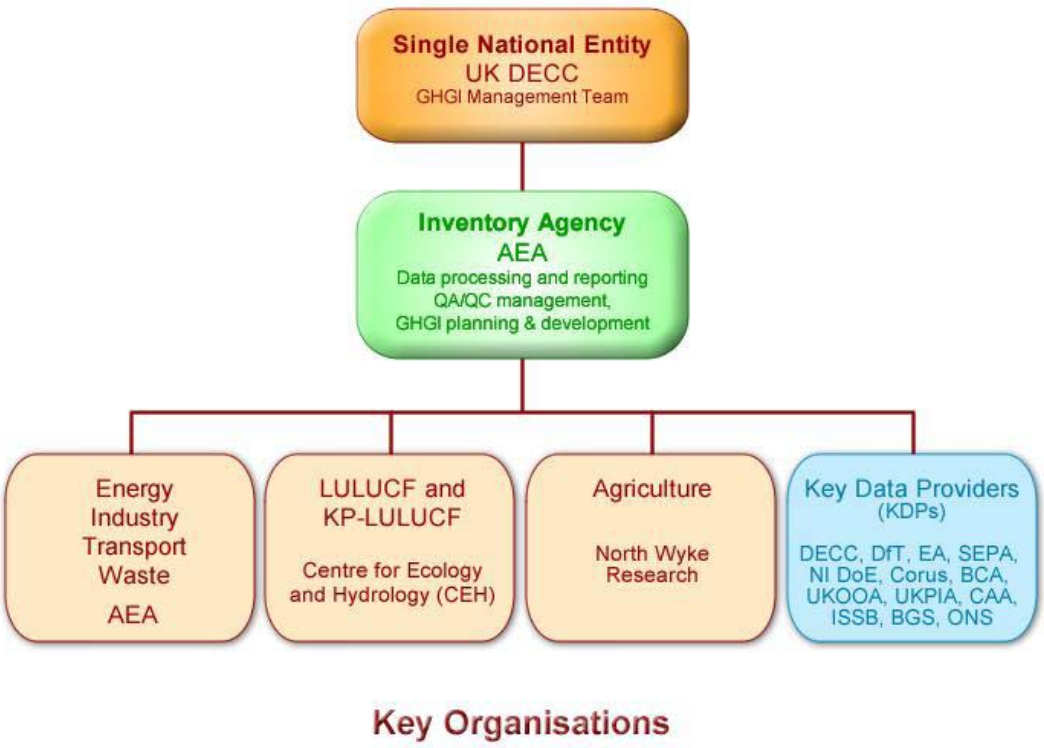


Figure 24: Key organisational structure of the UK National Inventory System

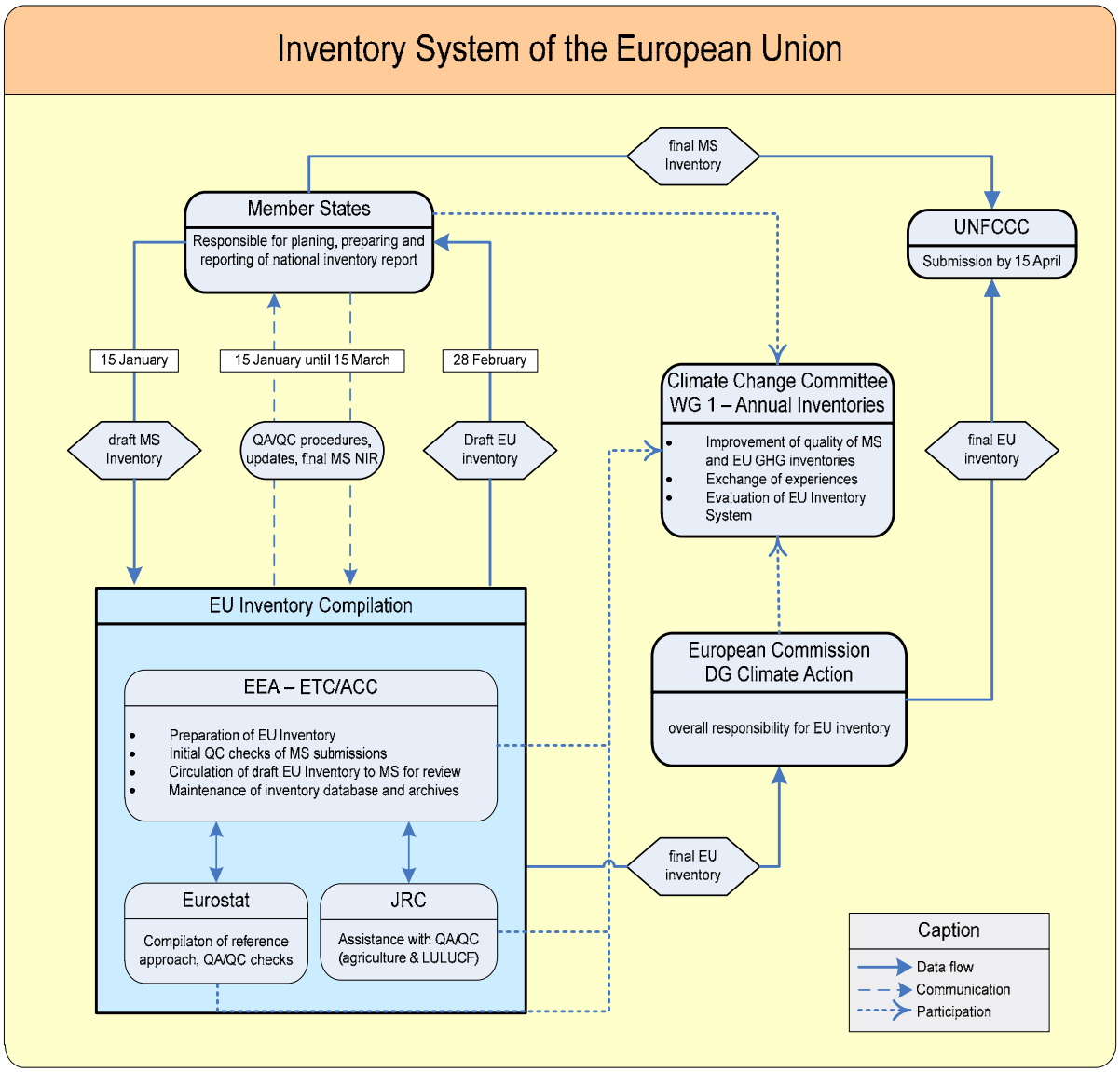


Source: UK Greenhouse Gas Inventory 1990 to 2008: Annual Report for submission under the Framework Convention on Climate Change. Department of Energy and Climate Change. Published by AEA Technology plc. April 2010, p. 330

EUROPEAN UNION

The European Union GHG inventory is based on the annual inventories of the Member States. Figure 25 shows the inventory system of the European Union. The DG Climate Action of the European Commission is responsible for preparing the inventory of the European Union (EU) while each Member State is responsible for the preparation of its own inventory which is the basic input for the inventory of the European Union. DG Climate Action is supported in the establishment of the inventory by the following main institutions: the European Environment Agency (EEA) and its European Topic Centre on Air and Climate Change (ETC/ACC) as well as the following other DGs of the European Commission: Eurostat, and the Joint Research Centre (JRC).

Figure 25: Inventory system of the European Union



The annual EU GHG inventory is required for two purposes.

Firstly, the EU, as the only regional economic integration organisation having joined the UNFCCC and the Kyoto Protocol as a party, has to report annually on GHG inventories within the area covered by its Member States.

Secondly, under the monitoring mechanism, the European Commission has to assess annually whether the actual and projected progress of Member States is sufficient to ensure fulfilment of the EU's commitments under the UNFCCC and the Kyoto Protocol. For this purpose, the Commission has to prepare a progress evaluation report, which has to be forwarded to the European Parliament and the Council. The annual EU inventory is the basis for the evaluation of actual progress.

Source: Annual European Union greenhouse gas inventory 1990–2008 and inventory report 2010. Submission to the UNFCCC Secretariat. 27 May 2010 pp. 860

Organizations involved in data collection and reporting towards the UNFCCC

Table 3: Overview of organizations involved in data collection and reporting towards the UNFCCC with their contact details

No	Country	Institution responsible for calculation of greenhouse-gas emissions)	Authorized organization	Contact details
1	**Austria**	Department of Emissions and Climate Change of the Umweltbundesamt in Vienna	The Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)	Manfred Ritter Umweltbundesamt GmbH Spittelauer Lände 5, 1090 Vienna/Austria
2	**Belgium**	The Interregional Cell for the Environment (IRCEL-CELINE)	The National Climate Commission	Interregional Cell for the Environment (IRCEL-CELINE) Avenue des Arts/Kunstlaan 10-111210 Brussels Telephone +32 (0)2 227 56 77 Fax +32 (0)2 227 56 99 http://www.irceline.be E-mail: biernaux@irceline.be
3	**Bulgaria**	Executive Environment Agency (ExEA)	Ministry of the Environment (MoEW)	Ms. Milya Dimitrova, Director of Climate Change Policy Directorate in MoEW. The National Focal Point
4	**Cyprus**			
5	**Czech Republic**	Czech Hydrometeorological Institute (CHMI)	Ministry of the Environment, (MoE)	Pavel Fott Czech Hydrometeorological Institute Address: Na Sabatce 17, Praha 4 – Komorany, 143 06, Czech Republic Telephone: 00420 244 032 456 Fax: 00420 244 032 468 E-mail: fott@chmi.cz
6	**Denmark**	National Environmental Research Institute, University of Aarhus	Ministry of the Environment and the Ministry of Climate and Energy	National Environmental Research Institute Aarhus University - Denmark http://www.neri.dk

No	Country	Institution responsible for calculation of greenhouse-gas emissions)	Authorized organization	Contact details
7	**Estonia**	Ministry of the Environment (MoE), Estonian Environment Information Centre (EEIC), Tallinn University of Technology (TUT) and The Estonian Environmental Research Centre (EERC)	Ministry of the Environment (MoE)	Ministry of the Environment is Ms. Karin Radiko Adviser of the Climate and Radiation Department Tel. +372 626 2977 Fax. +372 626 2801 Karin.Radiko@envir.ee
8	**Finland**			Dr Riitta Pipatti, Head of Greenhouse Gas Inventory Unit, PB 6 A, FIN-00022 Statistics Finland tel. + 358-9-1734 3543 fax + 358-9-1734 3429 email riitta.pipatti@stat.fi
9	**France**	Interprofessional Technical Centre for Studies on Air Pollution or Centre (Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique) - CITEPA	Ministry of Ecology, Energy, Sustainable Development and Marine Affairses (MEEDDM)	CITEPA: 7, cité Paradis, 75010 PARIS Téléphone + 33 (0)1 44 83 68 83 Télécopie +33 (0)1 40 22 04 83 E-mail infos@citepa.org
10	**Germany**	Federal Environment Agency (UBA)	The National Co-ordinating Committee	Umweltbundesamt (Federal Environment Agency), Wörlitzer Platz 1, 06844 Dessau
11	**Greece**	National Technical University of Athens, NTUA – School of Chemical Engineering (Inventory Team)	Ministry of Environment, Energy and Climate Change (MEECC)	Elpida Politi, Address: Villa Kazouli, Kifisias 241, Athens, Greece, e-mail: e.politi@ekpaa.minenv.gr, tel.: +30210 8089275, fax: +30210 8089239
12	**Hungary**	Hungarian Meteorological Service (OMSZ)	Minister for Environment and Water	Ms. Mónika Gottfried, NFP/GHG, Hungary, Ministry of Environment and Water (Környezetvédelmi és Vízügyi Minisztérium), Fı utca 44-50 / H-1011 Budapest, Hungary, gottfried@mail.kvvm.hu
13	**Ireland**	Environmental Protection Agency (EPA)		Environmental Protection Agency Johnstown Castle Estate, Wexford, Ireland Telephone : +353 53 60600 Fax : +353 53 60699
14	**Italy**	Environmental Protection and Research (ISPRA)	Ministry for the Environment, Land and Sea	Riccardo De Lauretis Telephone +39 0650072543 Fax +39 0650072657 E-mail riccardo.delauretis@isprambiente.it

No	Country	Institution responsible for calculation of greenhouse-gas emissions)	Authorized organization	Contact details
15	**Latvia**	Latvian Environment Geology and Meteorology Centre (LEGMC)	Ministry of the Environment of the Republic of Latvia (MoE) Climate Policy and Technology Department	Agita Gancone LEGMC Maskavas street 165, Riga, LV 1019, Latvia E-mail: Agita.Gancone@lvgmc.lv
16	**Lithuania**	Center for Environmental Policy (Non Governmental Organizations/Civil Society Organizations)	Ministry of Environment	Center for Environmental Policy Juozapaviciaus 6/2, LT-09310 Vilnius, Lithuania Tel.: + 370 5 2727152, fax: +370 5 2728961, e-mail: aapc@aapc.lt
17	**Luxemburg**	Air and Noise Division of the Environment Agency	Ministry of Sustainable Development and Infrastructures	Dr Marc Schuman – Environment Agency Administration de l'Environnement Division Air/Bruit Service Emissions 16 rue Eugène Ruppert L-2459 Luxembourg emission.inventory@aev.etat.lu
18	**Malta**			
19	**The Netherlands**	Netherlands Environmental Assessment Agency (PBL	Ministry of Housing, Spatial Planning and the Environment (VROM)	Wim van der Maas (PBL/IMP) (wim.van.der.maas@rivm.nl) Peter Zijlema (NIE/SenterNovem) (p.zijlema@agentschapnl.nl) Netherlands Environmental Assessment Agency (PBL) P.O. Box 303 3720 AH Bilthoven the Netherlands Tel: +31-30-274 274 5 Fax: +31-30-274 44 79 www.pbl.nl/en
20	**Poland**	National Centre for Emissions Management (KOBiZE) at the Institute of Environmental Protection	Ministry of Environment	01-692 Warszawa, ul. Kolektorska 4 tel. (22) 5696501 fax. (22) 8335754 kashue@kashue.pl http://www.kashue.pl

No	Country	Institution responsible for calculation of greenhouse-gas emissions)	Authorized organization	Contact details
21	**Portugal**	InventAr, Estudos e Projectos Unip Lda (INVENTAR)	Environmental Agency (APA)/ Ministry of Ministry for the Environment and Land Use Planning	Agência Portuguesa do Ambiente Departamento de Alterações Climáticas, Ar e Ruído Rua da Murgueira-Zambujal 2720-865 Amadora – PORTUGAL tel:+351 21 472 14 60 fax:+351 21 471 83 82 e-mail: group.invar@apambiente.pt http://www.apambiente.pt
22	**Romania**	National Environmental Protection Agency (NEPA)	Ministry of Environment and Forests	Sorin Deaconu telephone/fax: +40-21-2071155; e-mail: sorin.deaconu@anpm.ro National Environmental Protection Agency; Splaiul Independentei no. 294, Sector 6, Bucharest, Postal Code 060031; telephone/fax: +40-21-2071155.
23	**Slovakia**	Slovak Hydrometeorological Institute (SHMÚ)	Environment of the Slovak Republic (MŽP)	Dr. Janka Szemesova, Head of Department of Emissions, Slovak Hydrometeorological Institute email: janka.szemesova@shmu.sk)
24	**Slovenia**	Environmental Agency of the Republic of Slovenia		Tajda Mekinda Majaron Phone: +386 (0)1 478 44 27, Fax: +386 (0)1 478 40 51 E-mail: tajda.mekinda-majaron@gov.si
25	**Spain**	Directorate General of Quality and Environmental Assessment (DGCE)/ Ministry of Environment and Rural and Marine Affairs (MARM)		Ministerio de Medio Ambiente y Medio Rural y Marino; Secretaría de Estado de Cambio Climático; Dirección General de Calidad y Evaluación Ambiental Plaza de San Juan de la Cruz s/n E - 28071 Madrid Website: www.mma.es/portal/secciones/calidad_ contaminacion/ecogestion_ecoauditoria/index.htm
26	**Sweden**	Swedish Environmental Protection Agency (Swedish EPA)	Swedish Ministry of Environment	

No	Country	Institution responsible for calculation of greenhouse-gas emissions)	Authorized organization	Contact details
27	**United Kingdom**	AEA Inventory Agency	UK Government Department of Energy and Climate Change (DECC)	Dr S.L Choudrie AEA Group The Gemini Building, Fermi Avenue Harwell Didcot Oxfordshire OX11 0QR UK Tel: +44 (0) 870 190 6409 Fax: +44 (0) 870 190 6318 E-mail: sarah.choudrie@aeat.co.uk

Conclusions

All countries that have signed and ratified the Kyoto protocol on climate change have the obligation to report annual national total greenhouse gas emissions per sector. For this reporting prescribed formats are provided by the UNFCCC in which each countries is requested to illustrate its data collection system. In this report the data collection systems of EU countries are put together. It then appears that:

Countries use very different ways of visualizing their data collection systems going from rather conceptual (e.g. The Netherlands and Portugal) towards specific (e.g. Latvia and Romania).

Data collection systems are complex and involve multiple institutions for data collection, aggregation, interpretation and reporting.

Annex 9: Characterisation of MS data collection and reporting system

Case study for NH_3 emissions in connection with the obligations following from the Convention on Long-range Transboundary Air Pollution

Summary

Reporting emission data to the Executive Body of the Convention on Long-range Transboundary Air Pollution (CLRTAP) is required to fulfill obligations in compliance with the implementation of Protocols under the Convention. Parties are required to submit reports on annual among other things national emissions of NH_3 using the Guidelines for Estimating and Reporting Emission Data under the CLRTAP.

Basing on National Annual Emission Inventory Reports analysis of collection and reporting system of NH_3 in Member States was conducted.

It was stated that in MS, in most cases, the same institutions, which prepare an inventory of greenhouse gases are also responsible for the process of ammonia emissions inventory. Data collection systems are complex and involve multiple institutions for data collection, aggregation, interpretation and reporting. All countries prepared their inventory of NH_3 emission according to the equal methodology, but for different periods.

The analysis show that the data collection and reporting system for ammonia emissions in member countries in general is well-organized.

Introduction

Conducted analysis of an inventory of ammonia emissions by MS under obligations following from the Convention on Long-range Transboundary Air Pollution. To analyze were used the National Annual Emission Inventory Reports to UNECE located on the website: http://www.ceip.at/submissions-under-clrtap/2010-submissions/ .

Reports of individual Member States included varying periods an inventory of ammonia emissions (see table 4 below)

Table 4: Periods of ammonia emissions reporting under the LRTAP Convention by Member States

No	Country	Periods of NH_3 reporting
1	Austria	1980-2008
2	Belgium	1990-2008
3	Bulgaria	2008
4	Cyprus	1990-2008
5	Czech Republic	2007-2008
6	Denmark	1980-2008
7	Estonia	1990-2008
8	Finland	1980-2008
9	France	1980-2008
10	Germany	1990-2008
11	Greece	2008
12	Hungary	2008
13	Ireland	1987, 1990-2008
14	Italy	np
15	Latvia	1990-2008
16	Lithuania	2008
17	Luxemburg	np
18	Malta	2000-2008
19	The Netherlands	1990-2008
20	Poland	2007-2008
21	Portugal	1990-2008
22	Romania	2007-2008
23	Slovakia	2000-2008
24	Slovenia	1980-2008
25	Spain	1980-2008
26	Sweden	1980-2008
27	United Kingdom	1980-2008

The methodologies used for MS emission inventory are to some extent taken directly from the IPCC Guidelines, the Good Practice Guidance and the EMEP/CORINAIR Emission Inventory Guidebook (CORINAIR). The methodologies are also in accordance with the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines) and, in general, in line with IPCC's Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (Good Practice Guidance). The main supplier of data for NH_3 inventory were Central Statistical Offices.

In conducted analysis concentrated on the characterisation NH_3 data collection and reporting system in MS. This characterisation was prepared to use fragments of text and figures and tables from the National Annual Emission Inventory Reports under the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (LRTAP). The data source each time are listed.

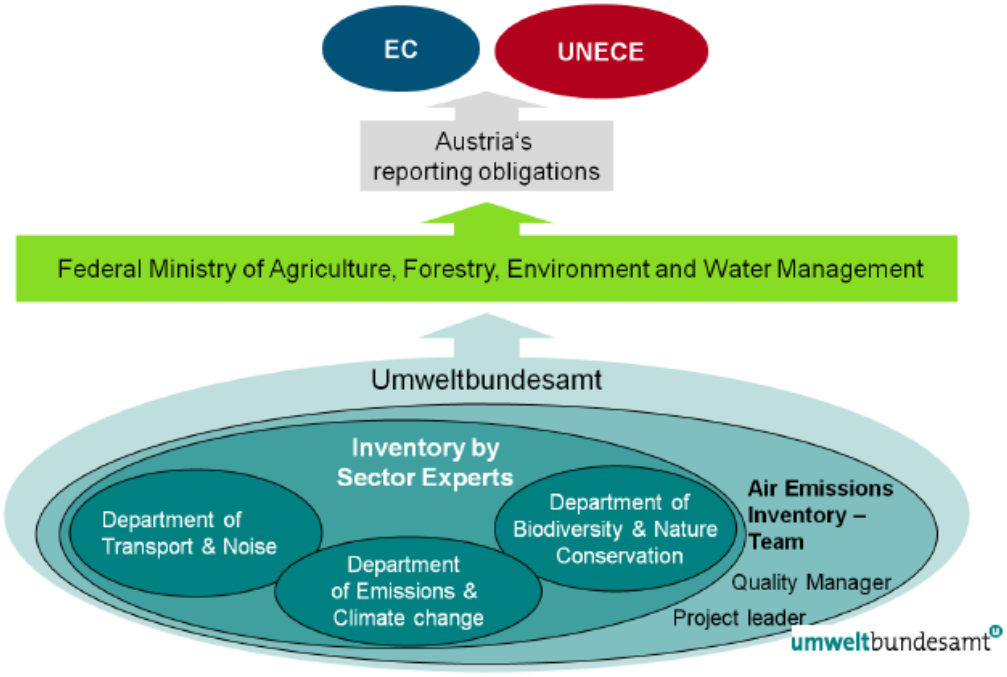
Organizations involved in data collection and reporting system

AUSTRIA

Austria's reporting obligations to the United Nations Framework Convention on Climate Change (UNFCCC), UNECE Convention on Long-range Transboundary Air Pollution (LRTAP) and EC (European Commission) are administered by the Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW). Within the Umweltbundesamt the department of *Emissions & Climate Change* is responsible for the preparation of the Austrian Air Emission Inventory (—Österreichische Luftschadstoff-Inventur OLI) and all work related to inventory preparation. Responsibilities are divided by sectors between sector experts from Departments within the Umweltbundesamt (Figure 26).

Air Emission Inventory-Team is responsible for the compilation of the air emission inventory (UNECE and NEC).

Figure 26: Responsibilities in the Austrian National System for Greenhouse Gas Inventories and Air Emission Inventories



In 2008 the Umweltbundesamt commissioned the University of Natural Resources and Applied Life Sciences with the revision of the national emission model of sector agriculture.

Source: Austria's Informative Inventory Report (IIR) 2010. Submission under the UNECE Convention on Long-range Transboundary Air Pollution REPORT REP-0245 Vienna, 2010 pp. 336.

BELGIUM

In Belgium each region implements the necessary means to establish its own emission inventory in the NFR format. The emission inventories of the three regions are subsequently combined to form the national emission inventory.

Since 1980, the three regions have been developing their own methodologies (depending on various external factors) for compiling their atmospheric emission inventories. Obviously, it requires some coordination to ensure the consistency of the data and the establishment of the national inventory. This coordination is one of the permanent duties of the Working Group on 'Emissions' of the Coordination Committee for International Environmental Policy (CCIEP). In this working group the different actors decide how the regional data will be aggregated to a national total and which data will be sent officially for Belgium – taking into account the specific characteristics and interests of each region as well as the available means. The Interregional Environment Unit (CELINE - IRCEL) is responsible for compiling the emission data from the inventories of the three regions to the national inventory.

In Flanders, the inventory is set up by the Department Air, Environment and Communication of the Flemish Environmental Agency (VMM). The emission inventories of the Walloon region are compiled by the Walloon Agency for Air and Climate (AWAC).The emission inventory in the Brussels-Capital region is compiled by Brussels Environment (the Institute for Environmental Management).

Source: Informative Inventory Report about Belgium's annual submission of air emission data reported in February 2010 under the Convention on Long Range Transboundary Air Pollution CLRTAP March 2010 pp. 36.

BULGARIA

All activities regarding the preparation of emissions inventories are coordinated and managed on the state level by the Ministry of Environment and Water (MOEW).

The Executive Environment Agency (ExEA) is the institution in charge with the overall responsibility for Management of the inventory process for GHG emissions (under UNFCCC) and emissions that are defined in the CLRTAP.

The institutions involved at national and local (sub-national) levels in the emissions inventory are Ministry of Environment and Water (MOEW) respectively Executive Environmental Agency (ExEA), Regional Environment Inspectorates (REI), and National Statistical Institute (NSI) with its regional bodies.

Source: Bulgarian Informative Inventory Report. National Emissions inventory for year 2008. Submission under the UNECE Convention on Long-Range Transboundary Pollution (CLRTAP/EMEP). Ministry Of Environment And Water Executive Environment Agency Sofia, March 2010 pp. 52

CYPRUS

The Department of Labour Inspection (DLI) of the Ministry of Labour and Social Insurance (MLSI) of Cyprus is the competent authority for the control of atmospheric pollution and for the safeguarding of air quality in Cyprus. The DLI has the overall responsibility for the emission inventory and submissions to European Commission and LRTAP Convention secretariat, through its specialized section the «Industrial Pollution Control Section».

The Emission Inventory is produced on an annual basis and various governmental departments contribute to that by submitting activity data.

Source: Cyprus Informative Inventory Report 2008. Ministry of Labour and Social Insurance. Department of Labour Inspection, February 2010 pp. 41

CZECH REPUBLIC

In 1991, the legislation introduced classification of air pollution sources into several categories. The inventory is drawn up from individual emission inventories and mass monitoring of stationary sources and mobile sources. The information is given in the Register of Emissions and Air Pollution Sources (REZZO), which is provided for by the Ministry of the Environment of CR. It is kept by the Czech Hydrometeorological Institute (CHMI).

The total national emissions of ammonia (NH3) from agricultural sources are estimated based on the emission factor approach. Input data concerning livestock numbers are taken from the Czech Statistical Office (CSU), emission factors are country specific and are set by the Ministry of Agriculture of the Czech Republic.

Source: *http://www.ceip.at/submissions-under-clrtap/2010-submissions/*

DENMARK

The National Environmental Research Institute (NERI), Aarhus University, is responsible for the annual preparation and submission to the UNECE-LRTAP Convention of the Annual Danish Emissions Report, and the inventories in the NFR Format in accordance with the guidelines. NERI participates in meetings under the UNECE Task Force on Emission Inventories and Projections and the related expert panels where parties to the convention prepare the guidelines and methodologies on inventories. NERI is also responsible for estimating emissions for reporting to the NEC Directive, but the Danish EPA is responsible for the reporting.

Data on activity and emissions are collected, evaluated and discussed in cooperation with Statistics Denmark, the Danish Institute of Agricultural Sciences, the Danish Agricultural Advisory Centre, Danish Environmental Protection Agency and the Danish Plant Directorate. It means that both the data and the methods used are evaluated continuously according to latest knowledge and information.

Source: Annual Danish Informative Inventory Report to UNECE. Emission inventories from the base year of the protocols to year 2008. NERI Technical Report no. 774 2010. pp. 569.

ESTONIA

The Estonian Environment Information Centre (EEIC) is responsible for collecting, analysis, storage, reporting and publishing of environment-related information and data. The EEIC performs the final data quality control and quality assurance procedure before it is submitted. In preparation of the inventory and in compiling of the basic data the Estonian Environment Information Centre cooperates with Ministry of the Environment, Ministry of Economic Affairs and Communications, Ministry of Agriculture, Statistics Estonia.

Source: Estonian Informative Inventory Report 1990-2008. Estonian Environment Information Centre. Tallinn 2010 pp. 88.

FINLAND

The Finnish Environment Institute (SYKE) is responsible for the national inventory of air pollutants. In preparing the inventory and in compiling the basic data the Finnish Environment Institute cooperates with Statistics Finland, VTT Technical Research Centre of Finland, Finavia, MTT Agrifood Research Finland, the Ministry of the Environment, the Ministry of Trade and Industry, the Ministry of Transport and Communications, Confederation of Finnish Construction Industries RT, Chemical Industry Federation of Finland, Finnish Forest Industries Federation and Technology Industries of Finland.

Source: Air Pollutant Emissions in Finland 1980–2008. Informative Inventory Report to the Secretariat of the UNECE Convention on Long-Range Transboundary Air Pollution 12th March 2010. Finnish Environment Institute. Consumption and Production Centre, Environmental Performance Division Air Emissions Team pp. 235

FRANCE

Responsibility for defining and overseeing National Air Pollutant Emissions Inventory system (known by its acronym SNIEPA) falls to the French Ministry of Ecology, Energy, Sustainable Development and Marine Affairses (MEEDDM).

The MEEDM has entrusted CITEPA (Interprofessional Technical Centre for Studies on Air Pollution or Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique) with the following tasks: preparing the emission inventories with regard to methods and preparing their updating, data collection and processing, data storage, production of the reports and various means of disseminating the information, control and quality management. CITEPA assists the MEEDDM in overall coordination of the National Air Pollutant Emissions Inventory System.

The MEEDDM steers the Emissions Inventories Consultation and Information Group (GCIIE)

Source: National inventories of air emissions in France: organisation and methodology. OMINEA. Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique. Fevivier 2010. pp. 1092.

GERMANY

In Germany, the National System of Emissions has been established at the ministerial level, under the leadership of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The System now incorporates other German ministries, including the Federal Ministry of the Interior (BMI), the Federal Ministry of Defence (BMVg); the Federal Ministry of Finance (BMF), the Federal Ministry of Economics and Technology (BMWi), the Federal Ministry of Transport, Building and Urban Development (BMVBS) and the Federal Ministry for Food, Agriculture and Consumer Protection (BMELV). As a result, the process of emissions inventory preparation now includes all of the key institutions that are in a position to make high-quality specialised contributions to it.

In Germany, emissions reporting is coordinated by a Single National Entity in the Federal Environment Agency (UBA). Since the mid-1990s, when reporting obligations for preparation of emissions inventories of air pollutants and green house gases increased sharply, efforts to harmonise emissions calculation and reporting have been intensified. At the same time, requirements from reporting obligations relative to the UNECE Geneva Convention on Long-range Transboundary Air Pollution and its protocols, to the EU NEC Directive and to EU plant specific reporting obligations, must be taken into account.

For agriculture, emissions calculations are carried out by the von Thünen Institute (vTI).

Source: German Informative Inventory Report. Published by: Umweltbundesamt (Federal Environmental Agency), available: *http://iir-de.wikidot.com/national-inventory-background*

GREECE

No available Informative Inventory Report.

HUNGARY

The preparation of the Hungarian inventory is the common result of independent institutions and experts of different field of interest. The whole course of proceedings was organized, managed, directed, controlled and financed by the Ministry for Environment and Water (Department for Developing Environment, Air, Noise and Traffic), and its experts played active role in preparation of this inventory.

The original base of the calculation was a module of the Hungarian Energy Model, simulating the environmental pollution connected with the fossil fuel combustion, designed by the Hungarian Research Institute for Electrical Power Research (VEIKI). Later on this model was developed and operated by the Institute for Environmental Protection (Economy) (KVI, later KGI). After repeated reorganization, the Environmental Protection and Water Management Research Institute (VITUKI) was responsible for this activity.

In the last years the Ministry initiated the common work of the Hungarian Meteorological Service (OMSz), which institution will be responsible for the inventory and the database of GHGs emissions. Because the course of proceedings is till now in phase of reconstruction, and it seems not yet finished, it is hardly possible to give a final block scheme of the cooperation.

Source: Informative Inventory Report Hungary. Hungarian Ministry for Environment and Water. Department for Air, Noise and Traffic. Budapest 2010. pp. 145

IRELAND

No available Informative Inventory Report.

ITALY

The Institute for Environmental Protection and Research (ISPRA) has the overall responsibility for the emission inventory and submissions to CLRTAP; the institute is also responsible for the communication of the pollutants under the NEC directive as well as to carry out scenarios, jointly with the Agency for New Technologies, Energy and Sustainable Economic Development (ENEA),

A specific unit of the Institute is responsible for the compilation of the Italian Atmospheric Emission Inventory and the Italian Greenhouse Gas Inventory in the framework of both the Convention on Climate Change and the Convention on Long Range Transboundary Air Pollution.

The whole inventory is compiled by the institute; scientific and technical institutions and consultants may help in improving information both on activity data and emission factors of specific activities. All the measures to guarantee and improve the transparency, consistency, comparability, accuracy and completeness of the inventory are undertaken. ISPRA bears the responsibility for the general administration of the inventory, co-ordinates participation in review processes, publishes and archives the inventory results. Specifically, ISPRA is responsible for all aspects of national inventory preparation, reporting and quality management.

ISPRA has established fruitful cooperation with a number of governmental and research institutions as well as industrial associations, which helps improving some leading categories of the inventory.

Source: Italian Emission Inventory 1990-2008. Informative Inventory Report 2010. ISPRA - Institute for Environmental Protection and Research May 2010 pp. 87

LATVIA

Latvia's Informative Inventory Report (IIR) Submitted under the Convention on Long-Range Transboundary Air Pollution is prepared by the Latvian Environment, Geology and Meteorology Centre (LEGMC) cooperating with other institutions, which is the governmental limited liability company. LEGMC implements the state policy in environment protection in the area of information distribution. Its task is to create and maintain Latvia's environmental data and information system, which includes a database on water use and pollution, water decontamination systems, air pollution, hazardous waste and waste disposal sites as well as implementing the national policy in meteorology, climatology, hydrology, air quality and environmental impact assessment of the long-range transfer of pollutants.

Source: Latvia's Informative Inventory Report 1990 – 2008 Submitted under the Convention on Long-Range Transboundary Air Pollution. March 2010 pp. 105

LITHUANIA

The Ministry of Environment has an overall legal responsibility for the preparation of Lithuanian emission inventory and submits reports to CLRTAP. Until year 2005 emission inventory was compiled by Air Division specialists, Environmental Quality Department at Ministry of Environment. Air emission inventory submission for 1990, 1995, 2000, 2005-2008 was prepared by the expert team from Institute of Physics in co-operation with Air Division specialists, Ministry of Environment. Air emission inventory is based mainly on statistics published by Lithuanian Statistics Department (Statistical Yearbooks of Lithuania, sectoral yearbooks on energy balance, agriculture, commodities production etc.), Institute of Road Transport, Registry of Transport (State enterprise "Regitra") and emission data collected by Environment Protection Agency.

Source: Lithuanian's Informative Inventory Report 2008. Submission under the UNECE Convention on Long-range Transboundary Air Pollution. Institute of Physic: Vilnius 2010 pp 44

LUXEMBURG

No available Informative Inventory Report.

MALTA

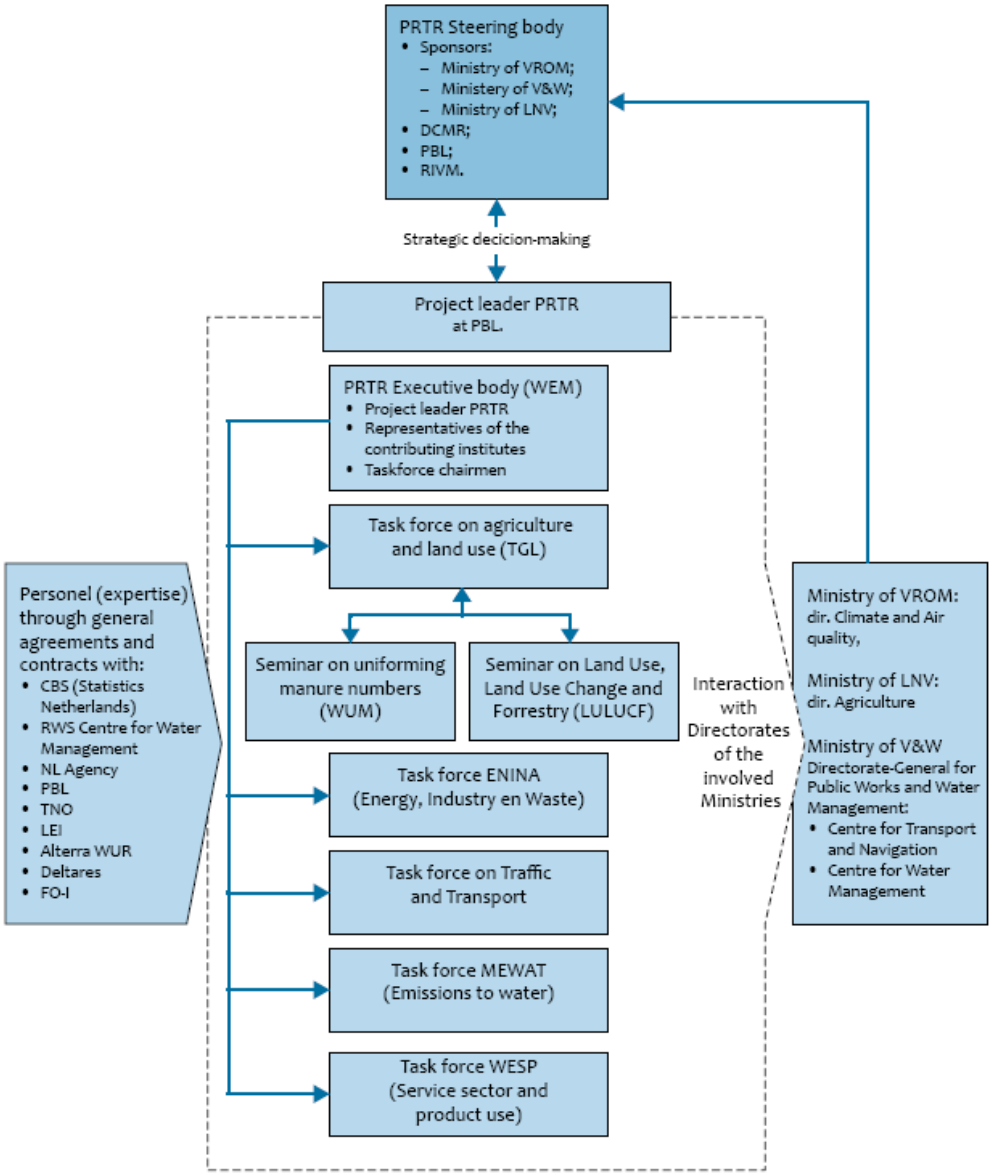
No available Informative Inventory Report.

THE NETHERLANDS

The Dutch Ministry of Housing, Spatial Planning and the Environment (VROM) has the overall responsibility for the emission inventory and submissions to CLRTAP. A Pollutant Release and Transfer Register (PRTR) system has been in operation in the Netherlands since 1974. From 2004 onwards, the Ministry of VROM has outsourced the full coordination of the PRTR to the Emission Registration team (ER-team) at the Netherlands Environmental Assessment Agency (PBL). The year 2010 marks the transition of responsibilities and staff of the ER-team from PBL to the National Institute for Public Health and the Environment (RIVM). This change in institutional arrangement will take effect in the IIR2011.

For the collection and processing of data (according to pre-determined methods), the PRTR is organised in task forces. The task forces are formed by sector experts of the participating institutes. Methods are compiled on the basis of the best available scientific views. Changes in scientific views lead to changes in methods, and to recalculation of the historical emissions. The following task forces are recognized (Figure 27).

Figure 27: The organisational arrangement of the Netherlands Pollutant Release and Transfer Register (PRTR)

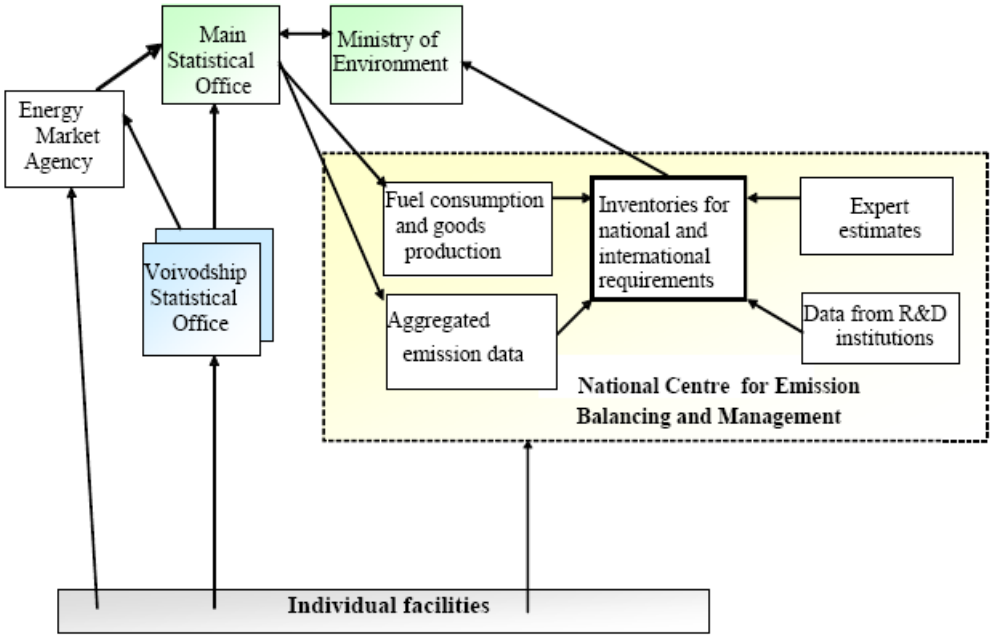


Source: Netherlands Informative Inventory Report 2010. Netherlands Environmental Assessment Agency (PBL), March 2010 pp. 56

POLAND

The inventory system currently existing in Poland is presented in Figure 28. The Polish Ministry of Environment takes the overall responsibility and submits the inventory report to CLRTAP. Since 2000 the National Emission Centre has been commissioned by the MoE to carry out inventories for air pollutants and the GHG gases. The National Emission Centre (NEC), located at the Institute of Environmental Protection, from 2006 has been the part of the National Administration for Emission Trading System. From 2010, following the organizational changes introduced, the inventory team was constituted as Emission Balancing and Reporting Unit (EBRU) located in the National Centre for Emission Balancing and Management (NCEBM). EBRU develops the inventory reports and is also responsible for the final quality control and quality assurance (QA/QC) of the data submitted.

Figure 28: Current system of air emission inventories in Poland



To prepare the LRTAP inventory EBRU collaborates with a number of institutions as well as individual experts. Among the collaborating institutions are: *Central Statistical Office* (GUS), *Institute of Ecology of Industrial Areas* in Katowice (IETU), *Motor Transport Institute* in Warsaw (ITS), *Energy Market Agency* (ARE), *Institute for Land Reclamation and Grassland Farming* (IMUZ).

Source: Poland's Informative Inventory Report 2010 Submission under UN ECE Convention on Long-range Transboundary Air Pollution Instytut Ochrony Środowiska. Krajowy dministrator Systemu Handlu Uprawnieniami do Emisji. Krajowy Ośrodek Bilansowania i Zarządzania Emisjami March 2010 pp 99

PORTUGAL

The Portuguese Environmental Agency (Agência Portuguesa do Ambiente - APA) is the national entity responsible for the overall coordination of the Portuguese inventory of air pollutants emissions.

APA is responsible for: overall coordination and updating of the National Inventory of Emissions by Sources and Removals by Sinks of Air Pollutants (INERPA); the inventory's approval, after consulting the Focal Points and the involved entities; and its submission to EC and international bodies to which Portugal is associated, in the several communication and information formats, thus ensuring compliance with the adopted requirements and directives;

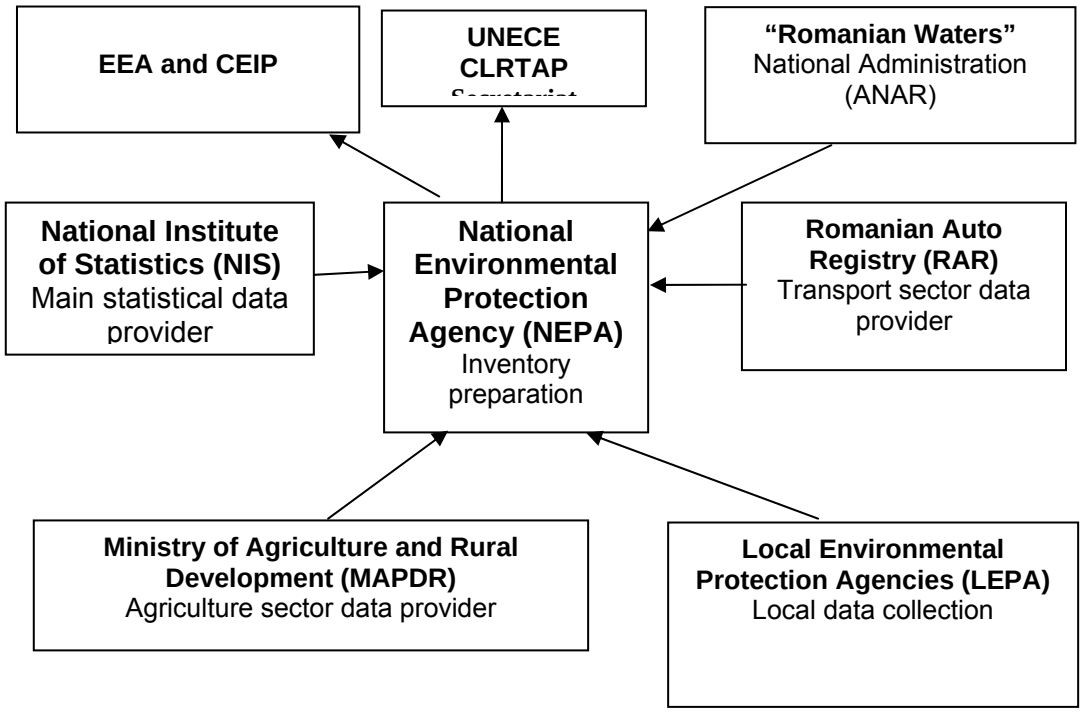
The emissions calculations have been performed by APA and INVENTAR (InventAr, Estudos e Projectos Unip Lda), which also provides technical advice concerning all aspects of inventory development: methodologies, sources of information and emission factors, and participates in the annual definition of priorities concerning the Methodological Development Programme (PDM). However many other institutions and agencies contributed to the inventory process, providing activity data, sectoral expert judgement, technical support and comments.

Source: Portuguese Informative Inventory Report on Air Pollutant Emissions, 1990-2008 Submitted under the UNECE Convention on Long-Range Transboundary Air Pollution. Portuguese Environmental Agency. Amadora March 15th 2010 pp. 386

ROMANIA

The inventory system currently used in Romania is presented in Figure 29. The National Environmental Protection Agency from Romania has the overall responsibility and submits the inventory report to CLRTAP.

Figure 29: Inventory system in Romania.



Source: Romanian Informative Inventory Report 2008. Submission under UNECE Convention on Long-range Transboundary Air Pollution Prepared by the National Environmental Protection Agency March 2010 pp. 103

SLOVAKIA

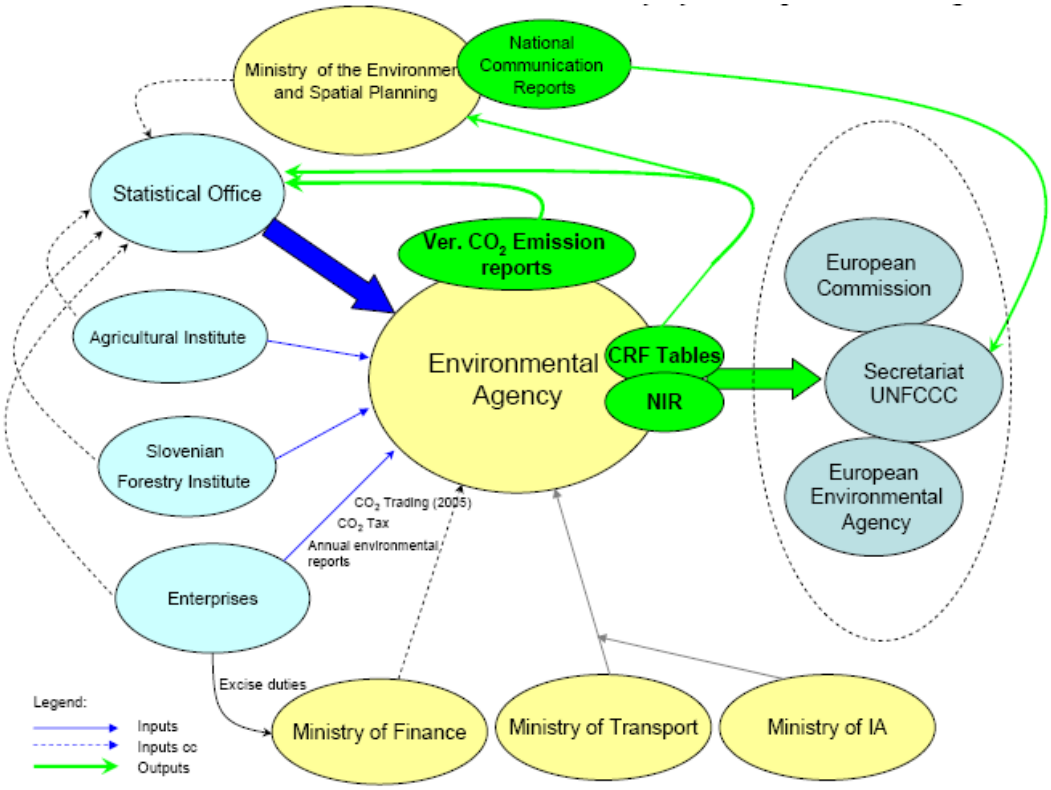
Slovak Hydrometeorological Institute (SHMU) is responsible for preparation of the emission inventories under the CLRTAP and emission projections under NEC Directive. Data are send to the Ministry of Environment of the Slovak Republic and after verification send to the UN ECE secretariat. Inventory preparation under UN FCCC is exercised by the same way. The processes are harmonized under the National Inventory System of the Slovak Republic and coordinated by Slovak Hydrometeorological Institute as Single National Entity.

Source: Slovak Republic Informative Inventory Report 2010 Under the Convention On Long-Range Transboundary Air Pollution Ministry of Environment of the Slovak Republic Slovak Hydrometeorological Institute Bratislava, February 15, 2010 pp. 25

SLOVENIA

In Slovenia, the institution responsible for emission inventories is the Environmental Agency of the Republic of Slovenia (EARS). In accordance with its tasks and obligations to international institutions, the Environmental Agency is obligated to perform inventories of GHG emissions, as well as emissions that are defined in the Convention on Long Range Transboundary Air Pollution (CLRTAP) within the specified time limit. The Environmental Agency cooperates with numerous other institutions and administrative bodies which relay the necessary activity data and other necessary data for performing inventory each year. Data flow in the Slovenian Inventory System is presented in Figure 30.

Figure 30: Data flow in the Slovenian Inventory System



Source: Informative Inventory Report 2010 For Slovenia. Submission under the UNECE Convention on Longe-range Transboundary Air Pollution Environmental Agency of The Republic of Slovenia Ljubljana, March 2010 pp. 82

SPAIN

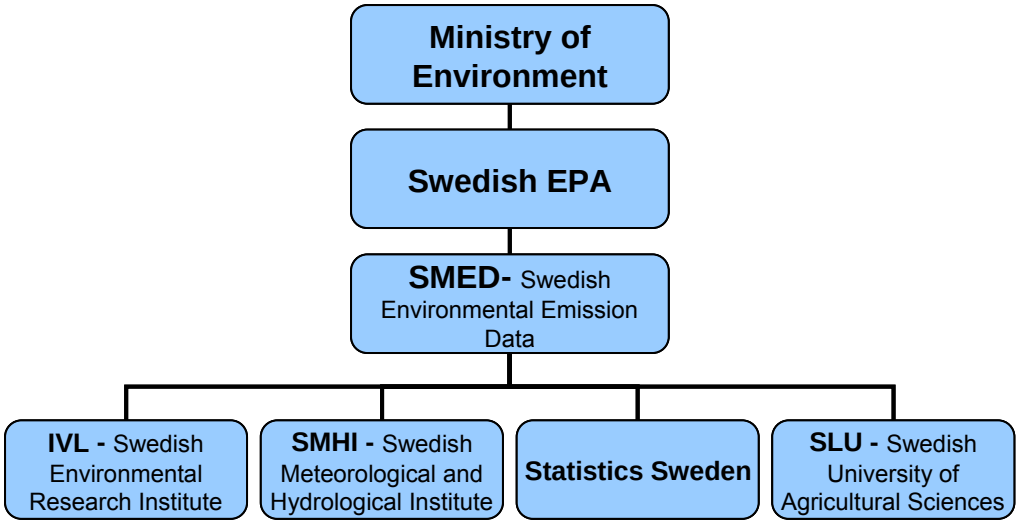
No available Informative Inventory Report.

SWEDEN

The inventory system currently used in Sweden is presented in figure 31. The Swedish Ministry of Environment has the overall responsibility and submits the inventory report to CLRTAP. The Swedish Environmental Protection Agency (Swedish EPA) co-ordinates the activities for developing the inventory report and are also responsible for the final quality control and quality assurance of the data before it is submitted.

A consortium called Swedish Environmental Emissions Data (SMED), composed of Statistics Sweden, the Swedish Meteorological and Hydrological Institute (SMHI), the Swedish Environmental Research Institute AB (IVL) and the Swedish University of Agricultural Sciences (SLU) collect data and calculate emissions for all sectors. SLU is however not involved in estimating emissions for reporting to CLRTAP.

Figure 31: Current national inventory system in Sweden



Source: Sweden's Informative Inventory Report 2010. Submitted under the Convention on Long-Range Transboundary Air Pollution Swedish Environmental Protection Agency pp. 131

UNITED KINGDOM

All UK emission inventories are compiled and maintained by AEA Group, under contract to the Science and Evidence Team, Atmosphere and Local Environment Programme (ALE) of the Department for Environment, Food and Rural Affairs (Defra) and the Climate, Energy, Science & Analysis, Science & Innovation Division of the Department for Energy and Climate Change (DECC) to provide non-GHG emissions inventories and GHG emission inventories respectively.

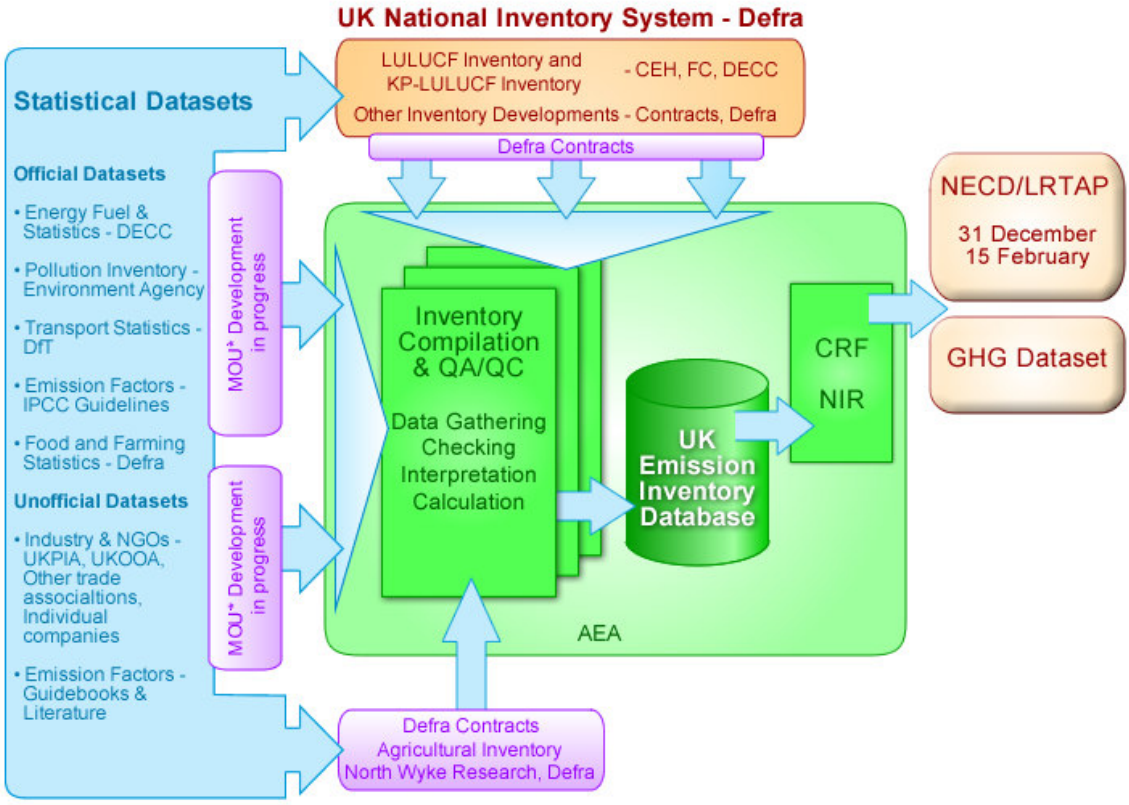
The Science and Evidence Team, Atmosphere and Local Environment Programme (ALE) of the Department for Environment, Food and Rural Affairs (Defra), is the single national entity with overall responsibility to meet the UK Government's commitments to international reporting on air quality pollutant emissions, and as such has the following roles and responsibilities.

Figure 32 shows the main elements of the UK emissions inventory system, including provision of data to international organisations.

Defra is the UK Government Department responsible for submitting the UK's emission inventories under the NEC Directive and the LRTAP Convention.

AEA compiles the emissions inventory on behalf of Defra.

Figure 32: Main elements for the preparation of the UK Emissions Inventory



Key Data Providers are also included on this figure, and include other government departments, including the Department for Energy and Climate Change (DECC) and Department for Transport (DfT), non-departmental public bodies such as the Environment Agency for England and Wales (EA), the Scottish Environment Protection Agency (SEPA), the Northern Ireland Department of Environment (DoENI), the Office of National Statistics (ONS), the Centre for Ecology and Hydrology (CEH), North Wyke Research, private companies such as Corus, and business organisations such as UK Petroleum Industry Association (UKPIA), the British Cement Association (BCA) and Oil & Gas UK.

Source: UK Informative Inventory Report (1970 to 2008) March 2010 pp. 162

Overview of organizations involved in data collection and reporting for NH_3 emissions

Table 5 shows an overview of the different organizations which are responsible for the data collection and reporting for NH_3 emissions.

Table 5: Overview of organizations involved in data collection and reporting for NH3 emissions

No	Country	Institution responsible for the compilation of the air emission inventory	Remarks
1	**Austria**	Department of Emissions and Climate Change of the Umweltbundesamt in Vienna	
2	**Belgium**	The Interregional Cell for the Environment (IRCEL-CELINE)	
3	**Bulgaria**	Executive Environment Agency (ExEA)	
4	**Cyprus**	Department of Labour Inspection (DLI) of the Ministry of Labour and Social Insurance (MLSI)	(the Emission Inventory is produced on an annual basis and various governmental departments)
5	**Czech Republic**	Czech Hydrometeorological Institute (CHMI)	
6	**Denmark**	The National Environmental Research Institute (NERI), Aarhus University	
7	**Estonia**	The Estonian Environment Information Centre (EEIC)	
8	**Finland**	The Finnish Environment Institute (SYKE)	
9	**France**	Interprofessional Technical Centre for Studies on Air Pollution or Centre (Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique) – CITEPA	
10	**Germany**	Federal Environment Agency (UBA)	
11	**Greece**		No available Informative Inventory Report
12	**Hungary**	The preparation of the Hungarian inventory is the common result of independent institutions and experts of different field of interest. The whole course of proceedings was organized, managed, directed, controlled and financed by the Ministry for Environment and Water (Department for Developing Environment, Air, Noise and Traffic), and its experts played active role in preparation of this inventory.	
13	**Ireland**		No available Informative Inventory Report
14	**Italy**	Environmental Protection and Research (ISPRA)	
15	**Latvia**	Latvian Environment Geology and Meteorology Centre (LEGMC)	
16	**Lithuania**	Air emission inventory submission for 1990, 1995, 2000, 2005-2008 was prepared by the expert team from Institute of Physics in co-operation with Air Division specialists, Ministry of Environment.	

No	Country	Institution responsible for the compilation of the air emission inventory	Remarks
17	**Luxemburg**		No available Informative Inventory Report
18	**Malta**		No available Informative Inventory Report
19	**The Netherlands**	The Netherlands Environmental Assessment Agency (PBL)	
20	**Poland**	Emission Balancing and Reporting Unit (EBRU) located in the National Centre for Emission Balancing and Management (NCEBM).	
21	**Portugal**	The Portuguese Environmental Agency (APA) and INVENTAR (InventAr, Estudos e Projectos Unip Lda)	
22	**Romania**	National Environmental Protection Agency (NEPA)	
23	**Slovakia**	Slovak Hydrometeorological Institute (SHMÚ)	
24	**Slovenia**	Environmental Agency of the Republic of Slovenia (EARS)	
25	**Spain**		No available Informative Inventory Report
26	**Sweden**	Swedish Environmental Emissions Data (SMED)	
27	**United Kingdom**	AEA Group	

Conclusions

Reporting emission data to the Executive Body of the Convention on Long-range Transboundary Air Pollution (CLRTAP) is required to fulfil obligations in compliance with the implementation of Protocols under the Convention. Parties are required to submit reports on annual among other things national emissions of NH_3 using the Guidelines for Estimating and Reporting Emission Data under the CLRTAP.

Conducted analysis shows that in each Member State, for the process inventory of ammonia emissions are responsible, in most cases, these same institutions, which prepare an inventory of greenhouse gases. Identified exceptions are Hungary, Finland and Lithuania.

The preparation of the Hungarian NH_3 inventory is the common result of independent institutions and experts of different field of interest. Responsibilities in the Finnish national system for preparation of air emission inventories is divided between Statistics Finland (reporting of greenhouse gases) and the Finnish Environment Institute (reporting of air pollutants). In Lithuania responsible for the inventory of NH3 is Institute of Physics, and for GHG inventory - Center for Environmental Policy

Process of NH_3 emissions inventory in all member countries realized is according to the equal procedure what is his advantage.

Member State submissions contain various data gaps for years in the time series. Emissions of NH_3 are not provided for either a single year, several years or the entire time series.

Annex 10: The approach to the exercise of gross nitrogen balance in selected Member States and the uncertainty of its estimation

FINLAND

Methodology

The N balance calculation in Finland based on data from Finnish Rural Centres. Rural Centers were used instead of other regional districts as N fertilizer data were only available for the Rural Centres. National N balances was calculated on the basis of the regional balances.

The main elements of the N balance calculation were as follows::

Nitrogen inputs

+ Fertilisers (mineral and organic)
+ Livestock manure
+ Biological nitrogen fixation
+ Atmospheric deposition
+ Other inputs (seeds etc.)

Nitrogen outputs

– Harvested yield

The gross nitrogen balance

– Ammonia volatilisation
from fertilisers
from livestock manure

The net nitrogen balance

Data from sales of N fertilizer were obtained from the most important fertilizer suppliers in Finland. The input of manure from different farm animals was calculated according to manure excretion coefficients used in environmental guidelines for livestock production (Ministry of Environment 1998).

The volatilisation of ammonia was calculated according to the coefficients for different farm animals and manure management strategies (Grönroos et al. 1998). Volatilisation of ammonia from mineral fertilizers was estimated as 0.6% of their N content (Pipatti et al. 2000). This coefficient is clearly less than the 10% estimate of the IPCC (2002) as fertilisers used in Finland have low volatilization potential and placement of fertilisers is a standard application method (Pipatti et al. 2000).

Deposition of N was estimated to the measurements of the Finish Environment Institute.

The amount of biological N fixation was calculated from the N content of pea production added to N to N fixed by clover in cultivated in organic farming and in seed production. The amount of N fixed by the clover-grass swards was estimated to be 140 $kg \cdot ha^{-1}$. Associative N fixation was estimated to by 4 $kg \cdot ha^{-1}$

in cereals rye, barley and oats and grasses as timothy and meadow fescue.

Other sources of N entering agricultural soils included seeds and sewage sludge used in agriculture.

Sewage sludge comes from wastewater treatment plants and is used as an organic fertiliser or soil conditioner after composting. The amount of sewage sludge used in agriculture was obtained from the VAHTI-database, maintained by the Finnish Environment Institute and N concentration came from the literature (Kulmala and Esala 2000). In our calculations, sewage sludge N was evenly distributed over the cultivated area. Nitrogen input from seeds was calculated according to recommended seeding rates for each crop and seed nutrient content came from the literature (Tuori et al. 1996), and cultivated area of each crop was obtained from agricultural statistics (Information Centre of the Ministry of Agriculture and Forestry 1991–2005).

Cultivation areas for the different crops and numbers of different farm animals were obtained directly from the 1990–1991 Yearbook of Farm Statistics (Information Centre of the Ministry of Agriculture and Forestry 1990, 1991) and calculated for the Rural Centres by the Information Centre of the Ministry of Agriculture and Forestry for 1992–2005. Crop yields per hectare were taken from national statistics (Information Centre of the Ministry of Agriculture and Forestry 1992–2006), using the data from representative Employment and Economic Development Centres or Rural Business Districts in 1992–2005, when data from Rural Centres were not available. Nitrogen contents of crops were calculated from protein concentrations taken from the Finnish tables of feeding recommendations (Tuori et al. 1996). Calculations were done for the time period 1990–2005.

Uncertainty in N balance calculations

Manure excretion coefficients are usually, as in this calculation, fixed values that are not adjusted for changes in feeding regimes for milk and meat production. Furthermore, there can be considerable differences in excretion coefficients used among different countries (van Eerdt and Fong 1998), which can complicate comparisons among countries if the coefficients are not reliable. The variation in N excretion coefficients can be seen from Table 1, where the default values for OECD and Finnish coefficients for environmental authorities (Ministry of Environment 1998) and for greenhouse gas emission calculations (Statistics Finland 2006) are shown. Considering the coefficients for Finland, values calculated for greenhouse gas emission would probably be the most reliable as they are checked regularly on the basis of recommended animal feeding. In future studies the expertise of animal nutrition should be used in environmental nutrient balance studies when calculating the estimates for manure and nutrient excretion. Concerning other N inputs, the N fertiliser use data that was based on sales statistics can differ from the amount actually applied to crops over a given year (Parris 1998). Biological N fixation is rarely studied in Finland and amounts of fixed N probably vary considerably among fields. Estimation of ammonia volatilisation from manure is based on various coefficients that are dependent on manure storage and treatment. Manure storage and field application methods on farms are poorly documented in national statistics. Volatilised ammonia is readily absorbed by vegetation and soil and thus most volatilised ammonia can be redeposited close to the site of emission (Pitcairn et al. 1998). An alternative method for calculating ammonia volatilisation was suggested by Janzen et al. (2003), who assumed that 30% of soluble manure-N is volatilised and 30% out of that is later deposited on other than agricultural land. This results in 9% output of soluble manure-N from the agricultural system. Probably the OECD recommendation to use gross N balance derives from the difficulties in estimating ammonia volatilisation, which is an important element in net N balance. Crop yield statistics are seldom absolute, especially in the case of grass production and grazing. Annual variation in N content of grains can also introduce error into the balances. Results from an annual survey of the Finnish Food Safety Authority (Salo et al. 2007) suggested that variation of N content in cereals was 0.3–0.5 percentage points over

years and regions. Regional calculations could be improved by using these data.

Source:

Salo T., Lemola R., Esala M. 2007. ***National and regional net nitrogen balances in Finland*** in 1990-2005. Agricultural and Food Science,. Vol. 16(2007) p. 366–375

MALTA

Methodology

The National Statistics Office of Malta (NSO) decided to carry out a full-scale sample survey on the major crops cultivated on the Maltese Islands. These crops surveyed in this report covered 80 per cent of the total crop area. Crop areas of negligible importance were disregarded for the survey. It was foreseen as too complicated to obtain precise information on these areas. The survey was conducted to establish information on the amounts of fertilisers consumed on the major crops cultivated in Malta. Such information is vital if potential risks to consumers, workers and the environment are to be monitored with the aim of reducing them. The survey aimed to establish the extent of fertilisers through a fully stratified sample of farmers.

Survey design

The agriculture and fisheries unit opted for a stratified sample based on the typology of agricultural holdings at the time and also on the size of the utilised agricultural area of the holding. The Neyman optimum allocation method was utilised to extract the sample as this was seen as the best method to obtain a representative sample. This method was seen as the most appropriate as more holdings were chosen from strata with a greater degree of variability.

Data collection

Farmers were informed by mail and were eventually interviewed individually by the enumerators. Two stages were required to collect the data from the farmer. The first stage of data collection, also known as the *summary questionnaire,* was where the interviewer had to fill in information on all parcels within the agricultural holding. This questionnaire gave an overview on the agricultural area of the holding at parcel level. The second part of data collection referred to fertilised areas. The *summary* and *fertilised areas* questionnaires were linked to one another by a unique number. Any crops identified as being fertilised in the summary questionnaire were marked in the fertilised areas questionnaire where detailed information was asked on fertilisers.

Control of the data

The data was immediately vetted after interviewing. The first stage of vetting was undertaken by MRRA officials with experience on fertiliser data. The MRRA officials were to vet the questionnaires on the data received and to identify whether the data collected makes sense. The second stage of vetting was undertaken by NSO officials to check for inconsistencies on how the data was collected.

Difficulties encountered and limitations to the survey

The data collection process is by means no easy task and certain difficulties could not be avoided. The first problem encountered was that the farmer did not keep records implying that it was rather a difficult task in obtaining accurate information. Another problem encountered was that not all farmers are

registered with IACS. As the survey was undertaken at parcel level it was rather complicated for the interviewer to obtain accurate information at parcel level on those holdings not registered with IACS.

The main problem being faced by Malta was not the complexity of the survey itself but the amount of surveys being undertaken by the NSO and other institutions. Being a small country, it is very difficult to extract a reliable sample on any type of statistics if the large holdings, irrespective if it is in the agricultural domain or any other domain outside of agriculture, are not exhaustively surveyed.

The methodology used for calculating the indicator does not take into account certain variables for which no data exists at either regional or national scale. Therefore, it was not possible to carry out a quantitative assessment, such as the nitrogen fixation by legumes. In order to calculate the nitrogen fixation by legumes, a certain amount of basic information is needed, which depends on the type of formula and model used. The types of formula and model to use are generally identified after scientific study has been carried over a period of time. The basic information which is generally used is the N content of the shoots, roots and crop litter of each type of legumes. The complexity of the information required could not be collected within the survey undertaken.

Also atmospheric deposition was not taken into consideration as the calculations required are very complex. It is a known fact that in many EU and non-EU countries this data is collected over a period of time since these have to be computed spatially and temporally. Furthermore, the field elevation has also to be known to be able to calculate the wet and dry deposition. Wet deposition is referred to the precipitation, whereas the dry deposition is the deposition made in normal atmospheric condition (no precipitation). To be able to calculate the wet and dry deposition a continuous monitoring exercise is need together with specialized apparatus which is able to take such measures.

Through the survey it was also not feasible to estimate the input of nitrogen via nitrate-rich irrigation water. Presently, in Malta the usage of water for irrigation for agricultural crops is not measured and hence actual calculations cannot be made.

Finally, the escape of nitrogen to the atmosphere and losses of nitrogen by leaching, were not taken into account as there are no scientific studies that have tried to determine these values experimentally for conditions that are specific to Malta.

The calculations on outputs are mainly based on production statistics at national level. This type of limitation could not be overcome by questioning the farmer directly on crop yields because it would have been impossible for the farmer to remember the total production over the previous agricultural year. Another limitation in this survey is also associated with the nitrogen exported from the farm through the cultivation of secondary crops that are not marketed, ornamental and peripheral plants within the agricultural parcel, and the removal of crop residues.

Source:

Gross Nitrogen Balance for Malta 2007, 2008. Valletta: National Statistics Office p. 28. ISBN 978-99909-73-65-5 website: http://www.nso.gov.mt

POLAND

Methodology

In Poland the nitrogen and phosphorus balances are calculated on the basis of date from Main Statistic Office, published in Statistical Yearbooks. The elements of these balances are given in table 6.

Table 6: Elements of nitrogen and phosphorus balances in Poland

Specification	Elements of nitrogen N and/or phosphorus P balances
Smin	Mineral fertilizers
Sorg	Manure
Smsi	Seeds and tubers
Nsym	Biologically fixed nitrogen
Natm	Nitrogen in atmospheric deposits
Swyn	Uptake with crop yield
SNB	Nitrogen balance; SNB = Sorg + Smin + Smsi + Nsym + Natm – Swyn
SPB	Phosphorus balance SPB = Sorg + Smin + Sms – Swyn

The amounts of nitrogen and phosphorus, Smin, Sorg in mineral fertilizers come directly from the Statistical Yearbook and the amounts in manure are calculated on the basis of information concerning the number and kind of animals in the country. In calculations the number of so called animal places i.e. the average, yearly number of animals is included. The amounts of nutrients in seeds and tubers, Smsi are calculated from the information on the area of main crops and standard values of sowing (planting) density times the content of N and P in these materials. The amount of nitrogen biologically fixed, Ssym by Rhizobia its calculated as the product of leguminous crop area and standard fixing coefficients [Kerschberger et al. 1997] and nitrogen fixed by free living bacteria as a standard value of 4 kg $N \cdot ha^{-1}$. The amount of nitrogen in atmospheric deposits, Satm is estimated for the whole area of Poland as 17 kg $N \cdot ha^{-1} \cdot year^{-1}$ [Szponar 1996]. The uptake of nitrogen and phosphorus with crop yield, Swyn is calculated separately from marketable crop and fodder crop from the crops area and the average yields times the content of N and P in these products [Fotyma et al. 1995, Karklins 2001].

Source:

Kopiński J., Tujaka A., Igras, J., 2006. Nitrogen and phosphorus budgets in Poland as a tool for sustainable nutrients management Acta agriculturae Slovenica, 87 - 1, April 2006 p. 173 – 181 http://aas.bf.uni-lj.si/april2006/18kopinski.pdf

SLOVENIA

Methodology

Data on the balance of nitrogen are calculated on the basis of the data of the Statistical Office of the Republic of Slovenia on the consumption of mineral fertilizers, on the area of utilised agricultural area, on crops and areas of each species of agricultural plants, on the number of domestic animals and dairy farming http://kazalci.arso.gov.si/www.stat.siand on the basis of expert evaluations and literature values for nitrogen content in crops, quantity of nitrogen in livestock manures for each species of domestic animals etc.

Information concerning data quality

- *Indicator advantages and disadvantages*: The data on the balance of nitrogen is calculated on the basis of official records and expert evaluations. Data on the balance of nitrogen are weighed with certain uncertainty, originating in the uncertainty of official evaluations and unreliability of expert evaluations. In the case of expert evaluations, we relied on findings of some researches and expert works, or on the evaluations for comparable OECD members. The OECD does not prescribe unified coefficients for the calculation of the balance of N, therefore it is being left to the countries to rely on their own expert evaluations. Due to the aforementioned, the data on the balance of nitrogen in Slovenia are to a certain extent unreliable however, we estimate that they reflect the actual state relatively well.
- *Relevance, accuracy, robustness, uncertainty*: Reliability of the indicator (archival data): Since the data on the balance of nitrogen are calculated for a longer period (1992-2008), we do not exclude the possibility that the comparability of the data between years can be questionable to a certain extent, because in the mentioned period the data acquisition methodologies for official records were changing. We are observing this mainly in data on crops and areas of each species of agricultural plants.

  Uncertainty of the indicator (scenarios/projections): Scenarios and projections are not available.
- Overall assessment (1 = no major comments, 3 = data to be considered with reservation): Relevance: 2

  Accuracy: 2

  Completeness over time: 2

  Completeness over space: 3

Source:

Gross nitrogen balance in agriculture, Ministry of the Environment and Spatial Planning, Republic of Slovenia.

Environmental Agency of the Republic of Slovenia. .
http://kazalci.arso.gov.si/?data=indicator&ind_id=295&lang_id=94

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