European Evaluation Helpdesk for Rural Development

WHAT IS THE NATIONAL INVENTORY REPORT (NIR) AND WHY IS IT ESSENTIAL FOR THE ASSESSMENT OF GHG EMISSIONS?

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REPORTING ON GHG EMISSIONS IN EUROPE

Each Member State and the European Union as a whole submit to the UNFCCC an annual greenhouse gas (GHG) inventory which is an estimate of emissions and removals of GHGs from sources or sinks in a year. The GHG inventory includes a National Inventory Report (NIR) and the estimate of GHG emissions by sources and removals by sinks in tables following a Common Reporting Format (CRF). The NIR is a report with a pre-defined structure. Firstly, it contains background information on greenhouse gas inventories, the institutional arrangements for the preparation of the inventory and a presentation of national emission and removal related trends that, for EU Member States may go back to 1980. Secondly, it presents detailed information on the methodologies used in the estimations (including references and sources of information), the data sources, emission estimates and trends for each one of the six sources and sink categories: (1) energy, (2) industrial processes and product use, (3) agriculture, (4) land-use, land-use change and forestry (LULUCF), (5) waste and (6) other. Finally, the NIR details all supporting information, including recalculations and changes compared with the previous inventory. All the material of a national GHG inventory including its NIR and CRF tables are available at the UNFCCC's depository. For all EU Member States, NIRs with the same content, information and structure are also kept by the Eionet repository.

WHY IS THE NIR IMPORTANT FOR RDP MANAGERS AND EVALUATORS?

The NIR is very important for rural development policymakers, Managing Authorities and evaluators because: (1) it identifies the sectors, sources and activities responsible for GHG emissions and (2) it facilitates an understanding of emissions and removal trends. This knowledge can support RDP decision-makers to plan their activities at the RDP level, to develop cost-effective mitigation policies and measures, search for best practices and mitigation technology needs, and monitor progress towards policy goals. This knowledge also supports evaluators because it expands the scientific understanding between environmental pollution and effects to sources of pollution and provides a perfect database to serve as an input in impact modelling exercises.

Figure 1 is extracted from the Italian NIR and shows the long-term GHG emissions trend from Italian agriculture. The Italian NIR explains that 'The decrease observed in total emissions (-13.0%) is mostly due to the decrease of CH4 emissions from enteric fermentation (-8.4%) and to the decrease of N2O (-17.5%) from agricultural soils...'. The NIR also explains that 'the main drivers behind these downward trends are the reduction in the number of animals, especially cattle in the whole period and the use of nitrogen fertilisers, mainly due to the European Common Agricultural Policy (CAP) measures'.

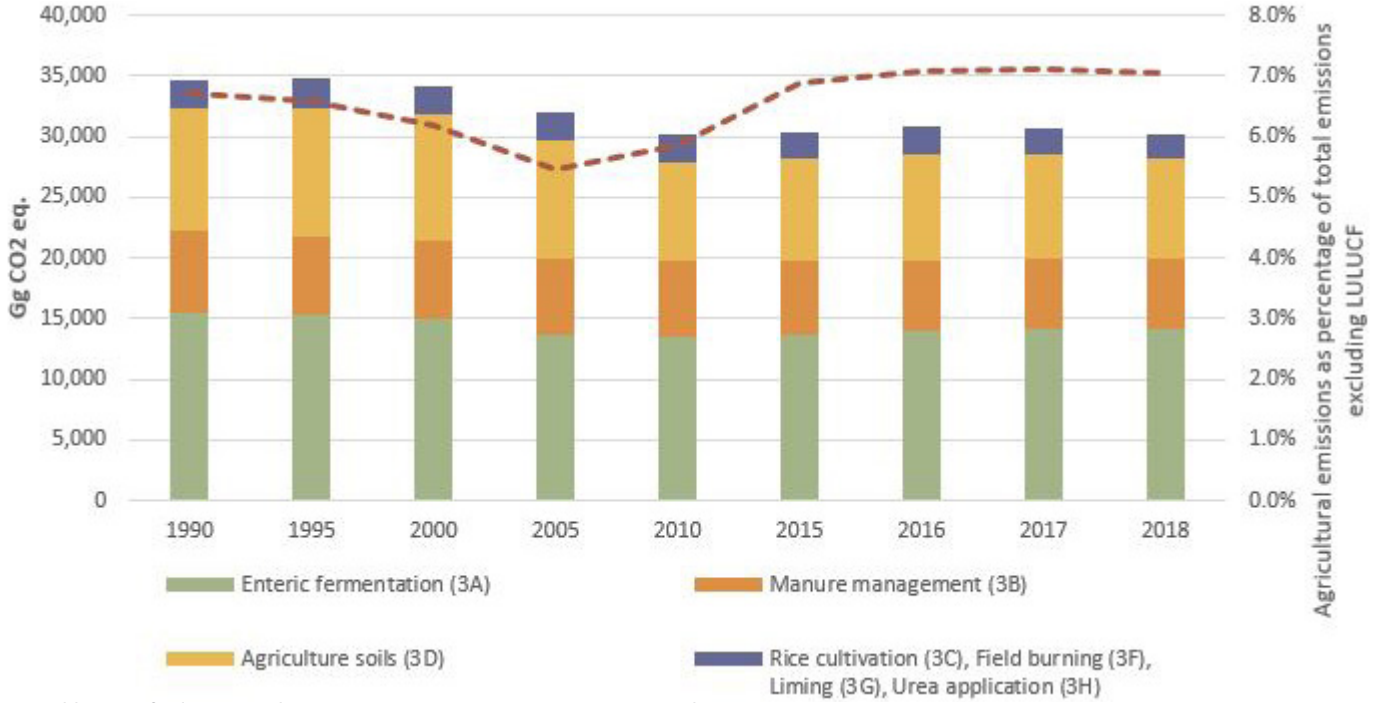
Which are the Key Categories for GHG emissions?

A Key Category is an emission or removal that is prioritised within the national inventory system because its estimate has a significant influence on a country's total inventory of greenhouse gases in terms of the absolute level, the trend, or the uncertainty in emissions and removals. The identification of a Key Category follows quantitative approaches that take account of the level or the trend of GHGs and qualitative criteria. As concerns the level, Key Categories are those that comprise the cumulative 95% of emissions or removals in absolute value. Based on the trend, Key Categories have a

FURTHER INFORMATION

Find more data on GHG Emissions in the AGRI Dashboards https://agridata.ec.europa.eu/extensions/DashboardIndicators/Climate.html?select=EU27_FLAG,1.

Figure 1: Agricultural emission trends, Italy, 1990-2018



Source: Table ES.1. of Italy's National Inventory Report, 2020, page 18. Gg = 1000000 kg.

trend that is significantly different from the trend of the overall inventory, but the level of their emissions or removals may not be large enough to be identified as Key Categories by level. For each Key Category, the NIR determines if specific subcategories are particularly significant, i.e. if they contribute together more than 60% to the Key Category.

All NIRs contain a very detailed Key Category Analysis. The identification of Key Categories is beneficial to rural development managers and evaluators because it enables limited resources available for evaluation to be prioritised. In general, inventory compilers use more detailed higher tier methods for key categories. As such, activity data are well documented and detailed and able to support the use of category-specific methods. Figure 2 is an extract from the Key Category Analysis according to levels of the Irish NIR for the year 2018 submitted in 2020. The table shows aggregate Key Categories.

How are emissions estimated?

The NIR details the methods for estimating emissions (and removals) for each gas which can have various degrees of complexity which are represented by tiers. Three tiers depict the escalating complexity of the methods. Tier 1 (T1) is the simplest method, where the calculation of emissions involves only a simple multiplication of activity data (e.g. the number of animals) by a default emissions factor provided by the IPCC. Tier 2 (T2) uses the same methodological approach as Tier 1, but applies emission factors and other parameters, which are specific to the country. Country-specific emission factors (EFs) and parameters may need more highly stratified activity data for specific regions and specialised land-use categories. Tier 3 (T3) is the most robust methodology for emissions calculations and, usually, are based on models; it can utilise plot data tailored to address national circumstances, can incorporate GIS-based information, and incorporate a greater number of livestock categories. As a result, Tier 3 methods provide estimates of

Figure 2: Key Categories at IPCC Level 2 in 2018

IPCC Category code	IPCC Category (level 2)	GHG	2018 Estimate (Gg CO2 eq)	Level Assessment (%)	Cumulative Total of Level (%)
1.A.3	Transport	CO2	12,083.85	19.83	19.83
3.A	Enteric Fermentation	CH4	11,543.21	18.94	38.77
1.A.1.	Energy Industries	CO2	10,398.45	17.06	55.84
1.A.4	Other Sectors (Comm/Resid/Agric)	CO2	8,763.21	14.38	70.22
3.D.	Agricultural Soils	N2O	5,893.92	9.67	79.89
1.A.2.	Manufacturing Industries and Construction	CO2	4,714.93	7.74	87.63
2.A.1	Cement Production	CO2	1,916.04	3.14	90.78
3.B	Manure Management	CH4	1,426.88	2.34	93.12
2.F.1	Product Uses as Substitutes for ODS - Refrigeration and air-con	HFC	948.52	1.56	94.67
5.A	Solid Waste Disposal	CH4	692.71	1.14	95.81

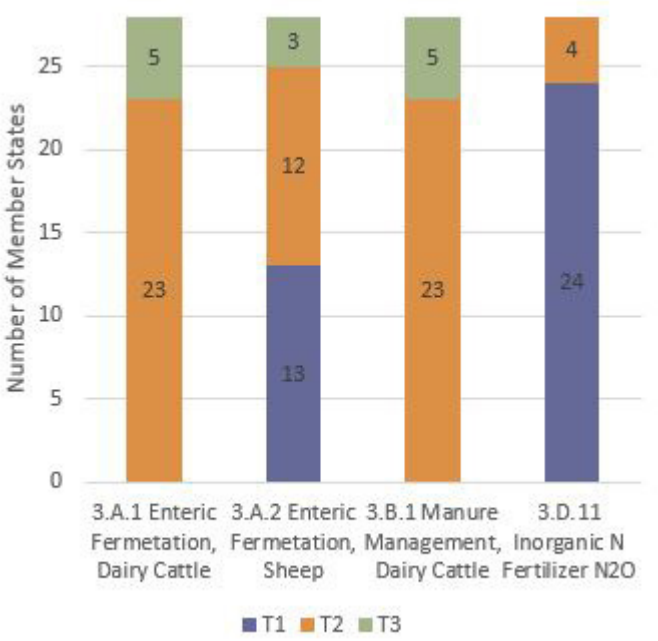
Source: Table 1.3 of Ireland's National Inventory Report, 2020, page 19. Gg = 1000000 kg

greater certainty than lower tiers. The estimation of emissions from key categories is usually based on Tier 2 and 3 methods while non-key categories utilise Tier 1 methods, sometimes with an adaptation of the default emission coefficients.

Progressing from Tier 1 to Tier 3 generally represents a reduction in the uncertainty of GHG estimates, though at a cost of an increase in the complexity of measurement processes and analyses. Lower tier methods may be combined with higher tiers for pools which are less significant. There is no need to progress through each tier to reach Tier 3, although sometimes, data collected for developing a Tier 3 system may be used to develop interim Tier 2 estimates. If existing data allow and recaclculations are feasible, it may be simpler and more cost-effective to transition from Tier 1 to 3 directly than produce a Tier 2 system that then needs to be replaced.

Figure 3 shows that Tier 3 methods are not a frequent choice among the Member States, even for key categories, because of their complexity and demand for detailed activity and scientific data. Estimation of emissions for non-key categories relies on Tier 1 methods. It is evident by the contrast between methods measuring CH4 emissions from enteric fermentation for dairy cattle and sheep or the overwhelming choice of Tier 1 methods for measuring N2O emissions from inorganic N fertilisers.

Figure 3: Distribution of methods by tiers for all Member States and particular sub-categories



Source: Annex III of EU greenhouse gas inventory

RECOMMENDATIONS FOR FUTURE NIR USERS AND EVALUATORS

The NIR and CRF tables are significant sources of information, and RDP managers and evaluators should consult them. The NIR can provide a different standpoint to policymakers because it places agricultural activity emissions and removals in a national and historical perspective. Especially as concerns planning decisions and the development of cost-effective mitigation policies, the NIR ranks the importance of competing categories and subcategories of emitters. For RDP evaluators prior knowledge of the NIR is a requirement because it details the data sources, the methods, the emission factors and other necessary information for the evaluation of the RDP measures.

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