Parallel Session 3

Strategies for mitigation of and adaptation to climate change.

National inventory in the framework of the UNFCCC/Kyoto Protocol as a tool for planning mitigation measures to be included in Rural Development strategies in Italy

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National Greenhouse Gas Inventory

- All Parties to the Climate Convention (UNFCCC) must submit national reports on the implementation of the Convention to the Conference of the Parties (COP).
- **Annex I Parties** must submit an **annual inventory** of their GHG emissions, including data for their base year (1990) and all years since, except for the two years before submission. The inventory is annually reviewed by international review teams. In addition, Annex I Parties shall periodically submit their **national communications**, according to the deadlines established by the Conference of the Parties; the national communications are also reviewed by international review teams.
- Reporting should be in line with the guidelines for national inventories from the Intergovernmental Panel on Climate Change (IPCC).
- In addition, in the Decision of the European Parliament and Council concerning a mechanism for monitoring Community greenhouse gas emissions (280/2004/EC) it is required that Member States establish a *national greenhouse gas inventory system*.

The objectives of the inventory

- Quantify emission levels, identify the main sources and assess the impact on health and environment through appropriate models
- Ensure compliance with national emission limits and reduction commitments undertaken under various international contexts
- Develop strategies and identify abatement priorities through cost-effects analysis and integrated models
- Verify the effects of policies and measures undertaken to reduce emissions at different levels (sectoral, regional, national and international)
- Verify the interaction between sectoral policies, economic accounts and environmental impacts
- Provide comparable and publicly available information through appropriate indicators

Reporting gases

As a minimum, inventories have to include the following GHGs:

- *Carbon dioxide* ($CO_{2)}$
- *Methane* (CH_4)
- *Nitrous oxide* (N_2O)
- *Perfluorocarbons* (PFCs)
- *Hydrofluorocarbons* (HFCs) and
- *Sulphur hexafluoride* (SF_6)

Estimates should also include the following indirect GHGs:
Carbon monoxide (CO), *nitrogen oxides* (NO_x), *non-methane organic volatile compounds* (NMVOC) and *sulphur oxides* (SO_2)

Reporting of actual, annual emissions.

Reporting sectors

The inventory must cover the following sectors:

1. Energy
2. Industrial processes
3. Solvent and other product use
4. Agriculture
5. LULUCF (land use, land-use change and forestry)
6. Waste

International aviation and marine bunker fuel emissions are not to be included in national totals, but reported separately

Each of these sectors is subdivided into different source/sink categories. Emissions and removals have to be reported at the most disaggregated level of each source/sink category

Guidelines used by reporting Parties

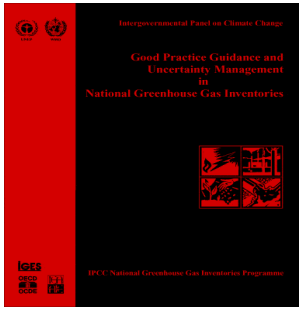
- Revised 1996 IPCC guidelines for national greenhouse gas inventories;

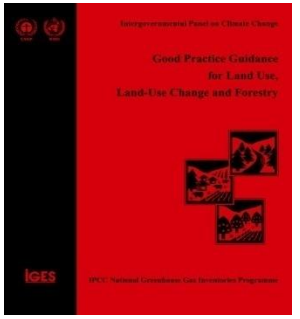
-IPCC Good practice guidance and uncertainty management in national greenhouse gas inventories (2000);

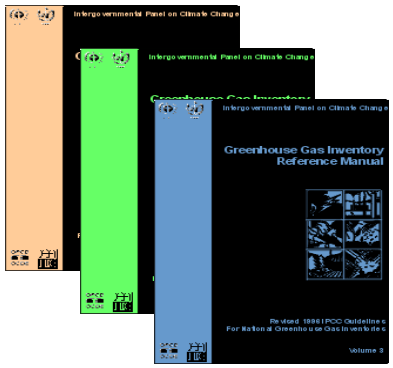
- IPCC Good practice guidance for land use, land use change and forestry (2003);

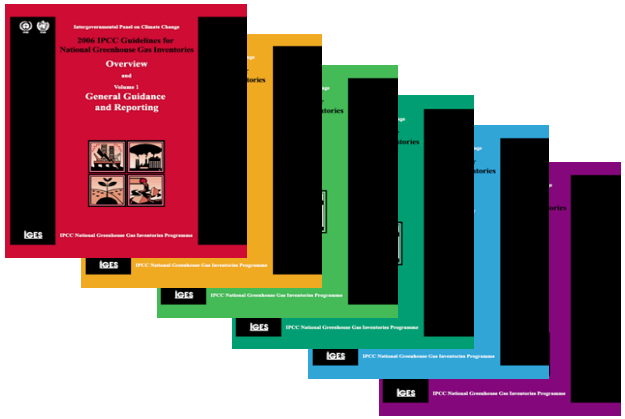
-2006 IPCC Guidelines for national greenhouse gas inventories (2006)

-Reporting for Kyoto Protocol (Art. 3.3 and 3.4): GPG LULUCF, chapter 4









National Greenhouse Gas Inventory: Agriculture

4. Agriculture

A. Enteric Fermentation

1. Cattle

   Option A:

   Dairy Cattle

   Non-Dairy Cattle

   Option B:

   Mature Dairy Cattle

   Mature Non-Dairy Cattle Young Cattle

2. Buffalo
3. Sheep
4. Goats
5. Camels and Llamas
6. Horses
7. Mules and Asses
8. Swine
9. Poultry
10. Other (*i.e. Rabbits*)

…

National Greenhouse Gas Inventory: Agriculture

4. Agriculture

…

B. Manure management

1. Cattle
   - **Option A:**
   - Dairy Cattle
   - Non-Dairy Cattle
   - **Option B:**
   - Mature Dairy Cattle
   - Mature Non-Dairy Cattle Young Cattle
2. Buffalo
3. Sheep
4. Goats
5. Camels and Llamas
6. Horses
7. Mules and Asses
8. Swine
9. Poultry
10. Other livestock
11. Anaerobic Lagoons
12. Liquid Systems
13. Solid Storage and Dry Lot
14. Other AWMS …

National Greenhouse Gas Inventory: Agriculture

4. Agriculture

…

C. Rice Cultivation
   1. Irrigated
   2. Rainfed
   3. Deep Water
   4. Other

D. Agricultural Soils
   1. Direct Soil Emissions
   2. Pasture, Range and Paddock Manure
   3. Indirect Emissions
   4. Other

E. Prescribed Burning of Savannas

F. Field Burning of Agricultural Residues
   1 . Cereals
   2. Pulses
   3 . Tubers and Roots
   4 . Sugar Cane
   5 . Other

G. Other

National Greenhouse Gas Inventory: LULUCF

5. Land Use, Land Use Change and Forestry (LULUCF)

A. Forest Land
   1. Forest Land remaining Forest Land
   2. Land converted to Forest Land

B. Cropland
   1. Cropland remaining Cropland
   2. Land converted to Cropland

C. Grassland
   1. Grassland remaining Grassland
   2. Land converted to Grassland

D. Wetlands
   1. Wetlands remaining Wetlands
   2. Land converted to Wetlands

E. Settlements
   1. Settlements remaining Settlements
   2. Land converted to Settlements

F. Other Land
   1. Other Land remaining Other Land
   2. Land converted to Other Land

G. Other

Rural development and climate change

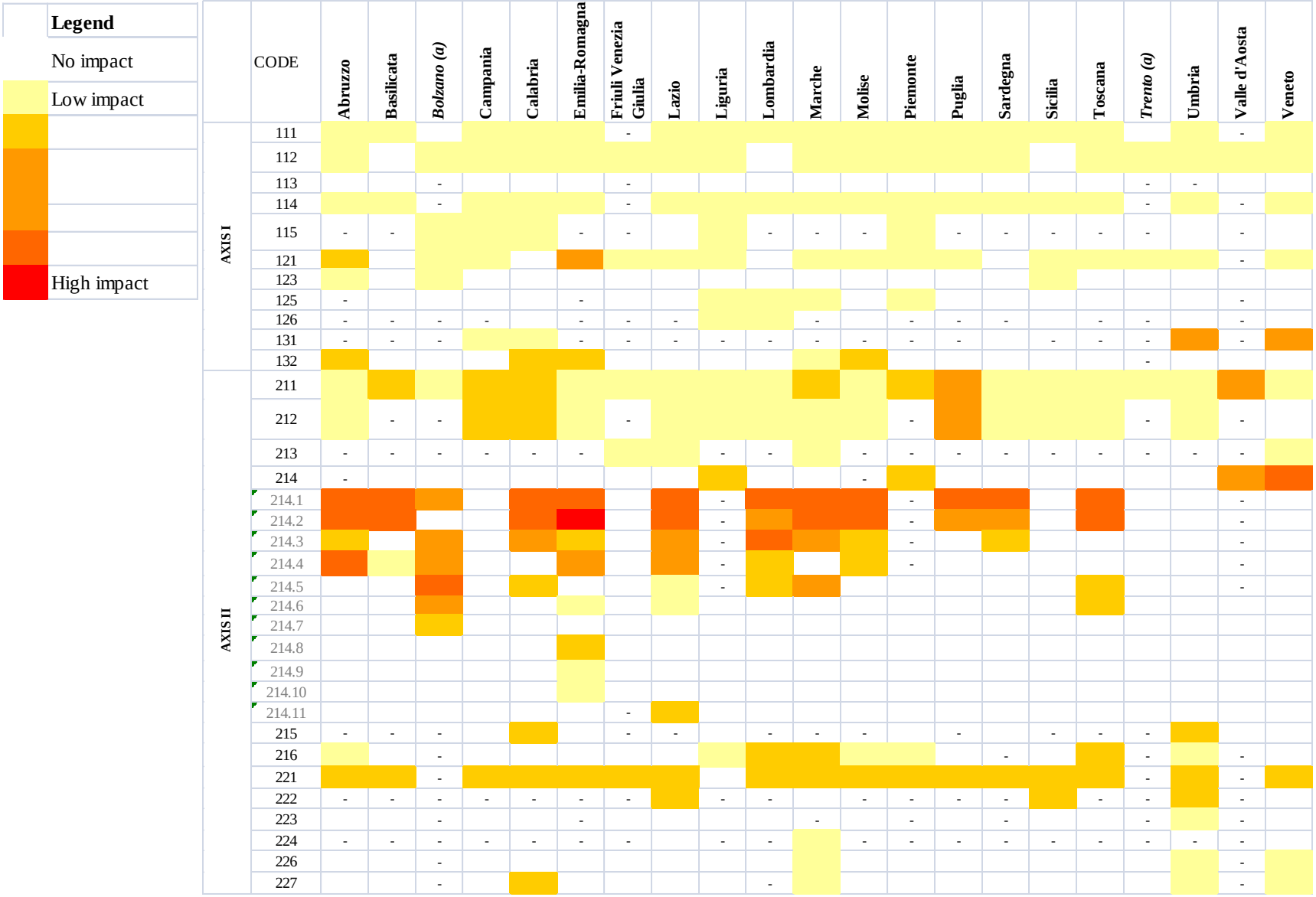
- The role of agriculture in climate change mitigation has been emphasized in the last years, and has been focused as a challenge by the Health Check reform of the Common Agricultural Policy (CAP).

- From the climate change perspective, main GHG emission reduction activities are mainly or exclusively supported by two rural development measures: ***farm modernization*** (code 121) and ***agri-environment*** (code 214). Some activities support the modernization of farms through energy efficient equipment and buildings, and promoting biogas production.

- A study have assessed, quantitatively ex-ante and ex-post, the impact of the Health Check reform in the Italian RDPs. The analysis of RDPs and GHG mitigation targets confirms a moderate impact of activated measures on reduction of methane emissions from manure management through measure code 121 and under code 214.

Rural development and climate change

Evaluation matrix on reduction of N_2O emissions from agricultural soils



Cóndor, R.D., Vitullo, M., Gaudioso, D., Colaiezzi, M. (2011). *The contribution of Rural Development Programmes to mitigate greenhouse gas emissions in Italy*. In Leal Filho, W. (ed), Climate Change and the Sustainable Management of Water Resources, Springer Verlag, Berlin

GHG emissions (without LULUCF), *Gg CO_2 eq.*

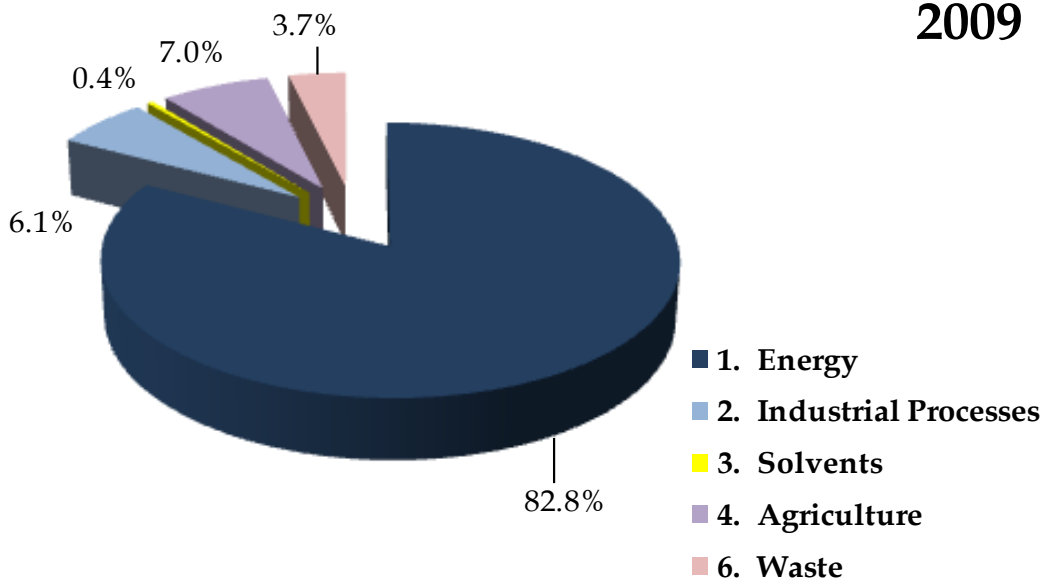
Total GHG emissions, in CO_2 equivalent, excluding emissions and removals from LULUCF sector, **decreased by 5.4%** between 1990 and 2009 (from 519 to 491 Mt CO_2 eq.), whereas the national **Kyoto target** is a reduction of **6.5%** as compared to the base year levels by the period 2008-2012.

ISPRA (2011). *Italian Greenhouse Gas Inventory 1990-2009. National Inventory Report 2011*. Rapporti 139/2011, Roma - Italia.

GHG emissions: sectoral disaggregation

The major contribution to the national GHG emissions is the energy sector (82.8%) followed by the **agriculture (7.0%)** and industrial processes (6.1%) sectors.

The contribution of GHG from agriculture in Italy is below the **European average** which is **10.2%** for the EU-15.

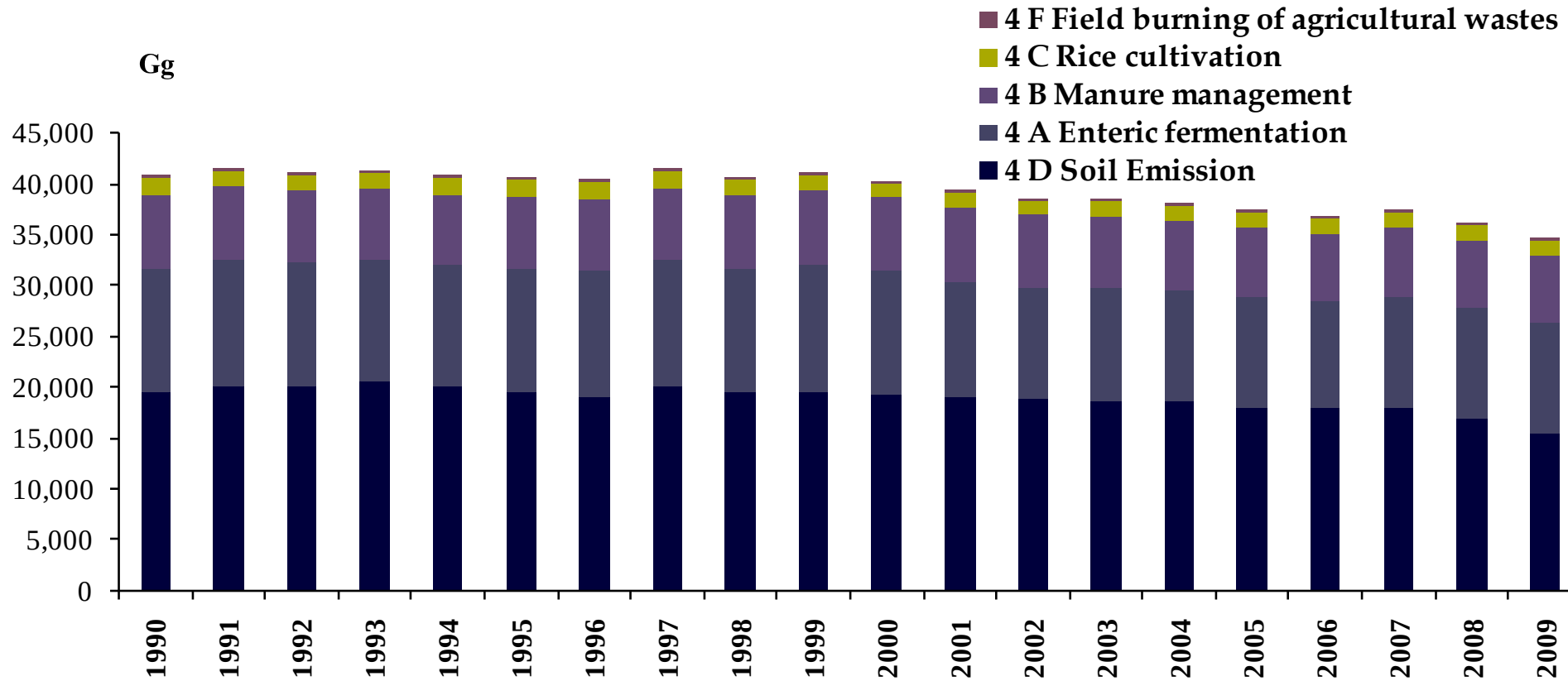


GHG SOURCE AND SINK CATEGORIES	1990	1995	2000	2005	2006	2007	2008	2009
	CO_2 equivalent (Gg)							
4. Agriculture	40,623	40,435	40,044	37,289	36,695	37,311	35,950	34,481
5. LULUCF	-61,795	-79,924	-78,891	-90,542	-96,965	-73,310	-92,828	-94,671
Total GHG emissions (including LULUCF)	**457,362**	**450,027**	**472,749**	**484,351**	**466,947**	**481,259**	**448,921**	**396,449**
Total GHG emissions (excluding LULUCF)	**519,157**	**529,951**	**551,640**	**574,893**	**563,911**	**554,569**	**541,749**	**491,120**

ISPRA (2011). *Italian Greenhouse Gas Inventory 1990-2009. National Inventory Report 2011*. Rapporti 139/2011, Roma - Italia.

GHG emissions: Agriculture

The agriculture sector was responsible for 34.48 Mt of CO_2 eq. in 2009. This sector has been the dominant national source for CH_4 and N_2O emissions, sharing 41% and 69%, respectively. In 2009, CH_4 and N_2O emissions from agriculture have decreased by 11.4% and 17.9%, respectively



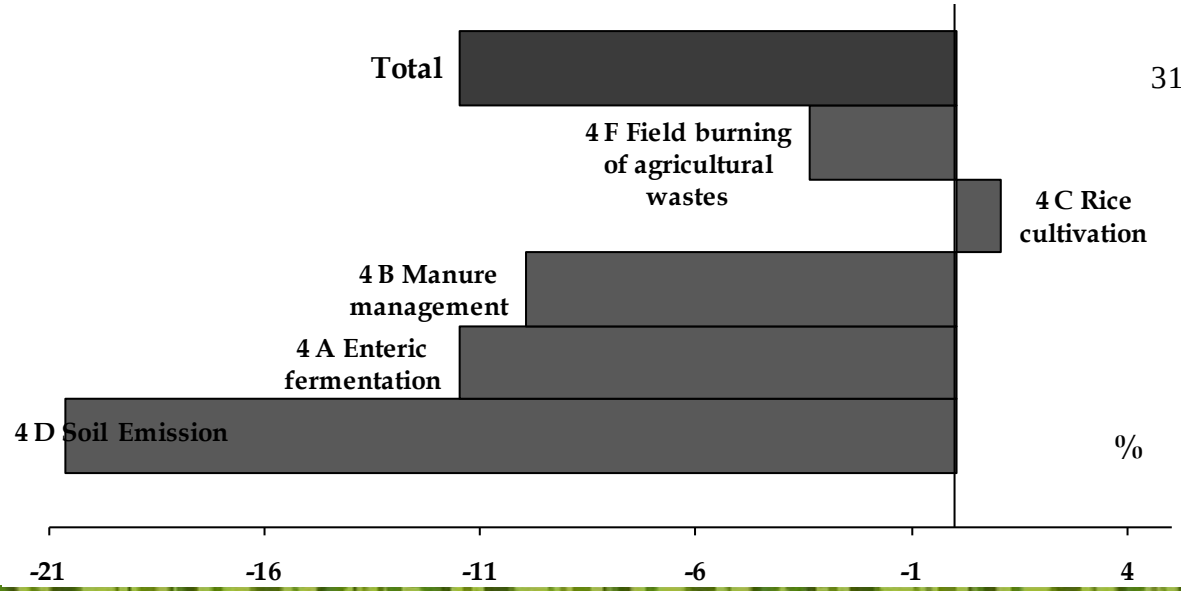
ISPRA (2011). *Italian Greenhouse Gas Inventory 1990-2009. National Inventory Report 2011*. Rapporti 139/2011, Roma - Italia.

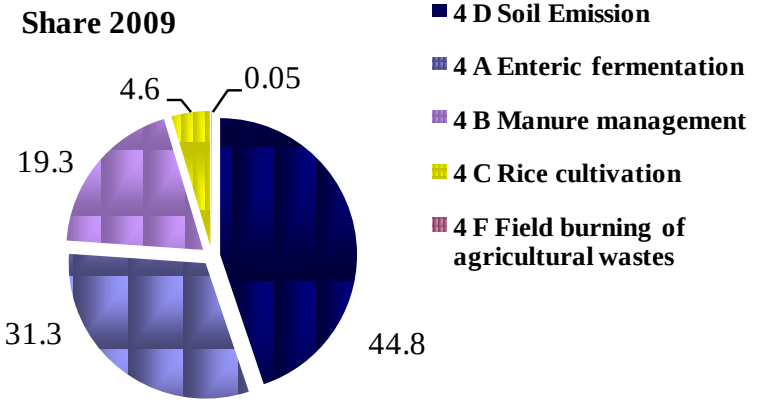
GHG emissions: Agriculture

The trend of GHGs from 1990 to 2009 shows a **decrease of 15.1%** which was mostly due to the reduction of CH_4 emissions from enteric fermentation (-11.5%), and to the decrease of N_2O from agricultural soils (-20.6%).

Main drivers are the reduction in the number of animals, use of fertilizers and agricultural production *(the use of synthetic N-fertilizers have been reduced by 37% in the period 1990-2009).*

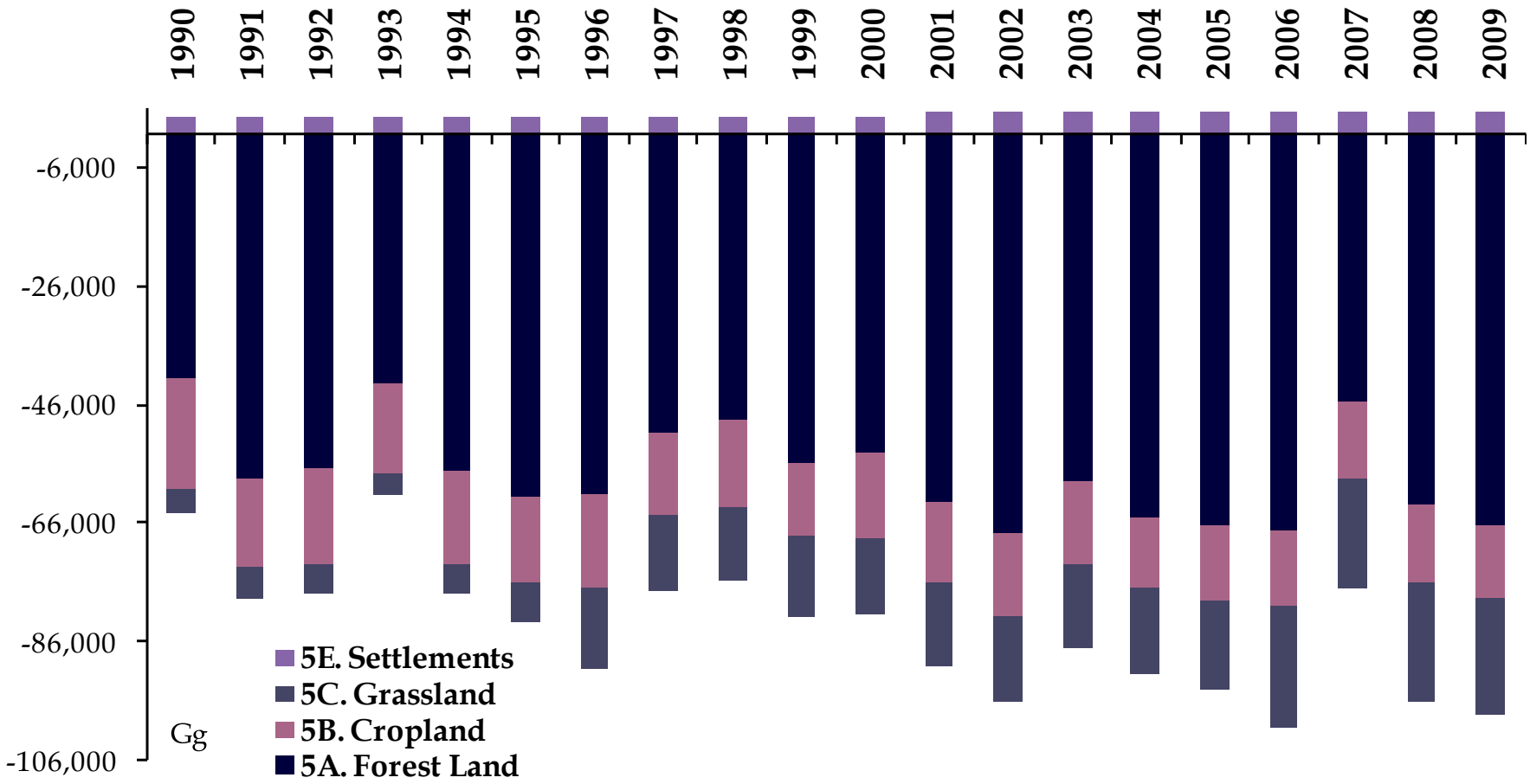
The contribution of GHG from agriculture in Italy is below the European average which is 10.2% for the EU-15.





GHG emissions: LULUCF

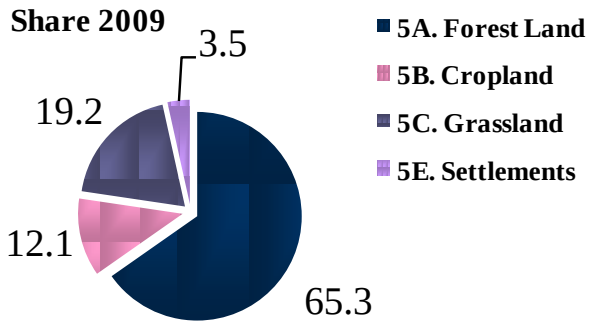
LULUCF is responsible for 94.7 Mt of CO_2 removals from the atmosphere in 2009. From 1990 to 2009 total removals in CO_2 equivalent increase of 53.2%; CO_2 accounts for more than 99% of total emissions and removals of the sector.



ISPRA (2011). *Italian Greenhouse Gas Inventory 1990-2009. National Inventory Report 2011*. Rapporti 139/2011, Roma - Italia.

GHG emissions: LULUCF

Forest land removals share 65% of total CO_2 2009 LULUCF emissions and removals. In particular, the living biomass removals represent 50%, while the removals from dead organic matter and soils stand for 8% and 42% of total 2009 forest land CO_2 removals, respectively.



Member State	Net CO_2 emissions (Gg)			Share in EU15 emissions in 2009
	1990	2008	2009	
Austria	-11,401	-16,744	-16,756	5.4%
Belgium	-3,248	-3,088	-3,128	1.0%
Denmark	-725	-4,829	-2,591	0.8%
Finland	-21,800	-35,100	-47,408	15.3%
France	-46,540	-78,443	-72,866	23.4%
Germany	-70,988	-20,657	-20,642	6.6%
Greece	-1,327	-1,956	-1,956	0.6%
Ireland	-1,165	-2,740	-2,989	1.0%
Italy	-40,919	-61,680	-65,040	20.9%
Luxembourg	239	-362	-393	0.1%
Netherlands	-2,434	-2,004	-2,144	0.7%
Portugal	-4,442	-11,375	-12,131	3.9%
Spain	-18,665	-18,631	-18,629	6.0%
Sweden	-47,590	-34,993	-44,056	14.2%
United Kingdom	-6,313	-9,859	-9,319	-
EU-15	**-271,005**	**-292,601**	**-310,729**	**100.0%**

In 2009, at European level, the LULUCF sector accounted for 298 Mt CO_2 equivalent, an increase by 27% compared to 1990. Italy (31.8%), France (22.5%), Sweden (14.0%), Finland (13.6) and Spain (9.6%) are the largest contributors to the LULUCF sector for EU-15.

If considering the Forestland category, the greatest contribution to removals for EU-15 was given by France (23.4%), Italy (20.9%), Finland (15.3%) and Sweden (14.2%).

GHG trend and projections

In the framework of the Monitoring Mechanism, each Member State should provide data related to policies and measures, and projected GHG emissions.

Agriculture:

Two GHG mitigation measures for the agriculture sector have been included in the trend scenario, according to *Interministerial Committee for Economic Planning* (CIPE) decision:

→ rational use of synthethic N-fertiliser ;

→ recovery of biogas from animal manure.

According to emission projections for the agriculture it is expected a reduction of GHG emissions of 4% by 2020 compared with emission level in 2009.

LULUCF:

A business as usual scenario has been taken into account, as no additional measures are planned in the sector.

An increase of 13% of removals is expected for the LULUCF sector, mainly due to the increase of removals in Forest land category.

Conclusions

→ The **national GHG emission inventory** may be seen as a useful tool for **planning climate change mitigation measures** to be included in Rural Development strategies.

→ Monitoring and evaluation of the **different actions** under the I and II Pillar of the CAP will be fundamental to assess the contribution of climate change mitigation measures into the **trend scenario**.

→ **Monitoring and evaluation of GHG mitigation measures**, included in RDPs, such as the reduction of nitrous oxide emissions from agricultural soils for the agriculture sector, and carbon dioxide removals from afforestation and reforestation measures for the LULUCF sector will be fundamental to **verify climate change targets** under the Health Check reform and future Rural Development commitments.

Thanks for your attention

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