

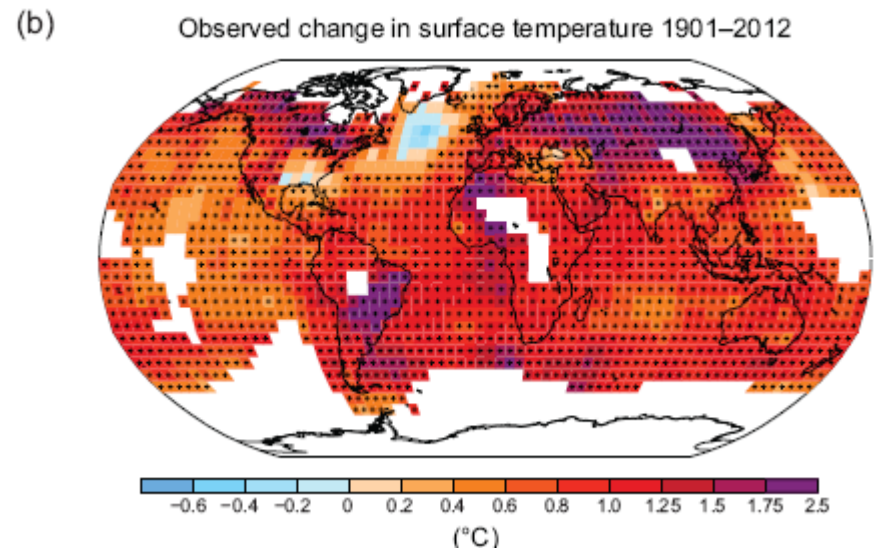
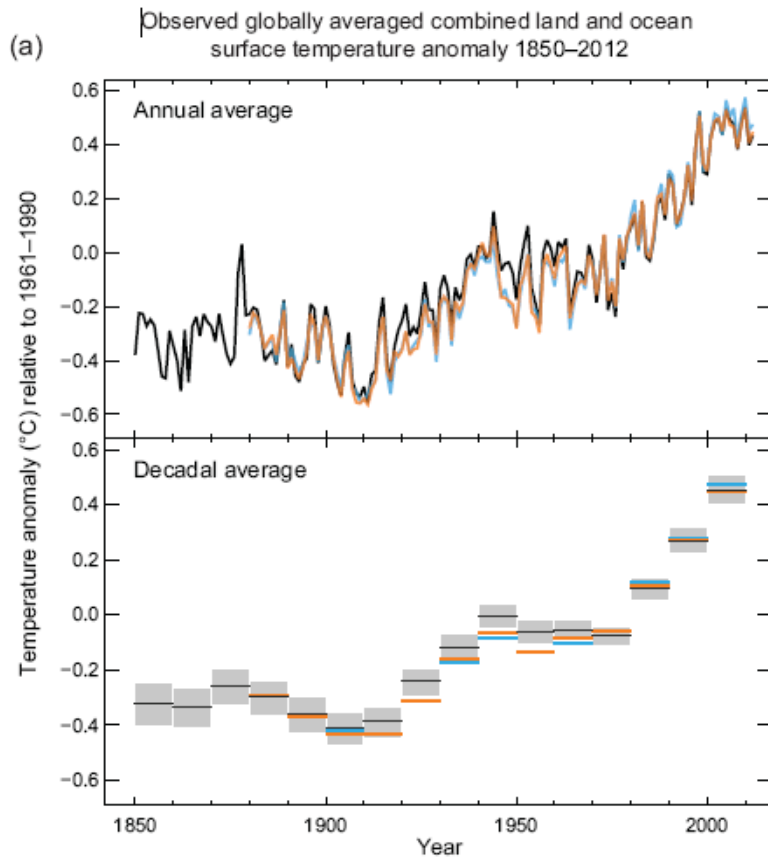


# Climate change - The European context

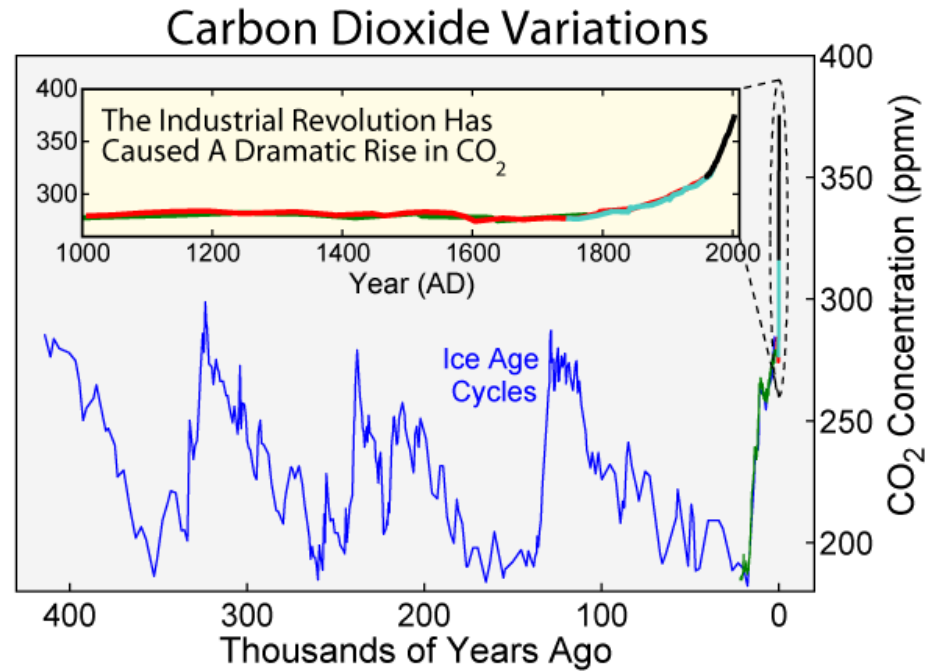
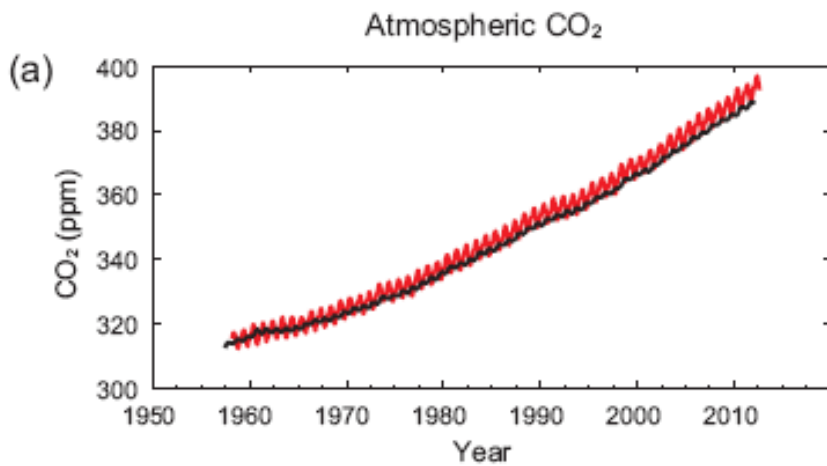


*Herwig Ranner  
DG Agriculture and Rural  
development, Unit H4  
European Commission*

## Our climate is warming – recent assessment

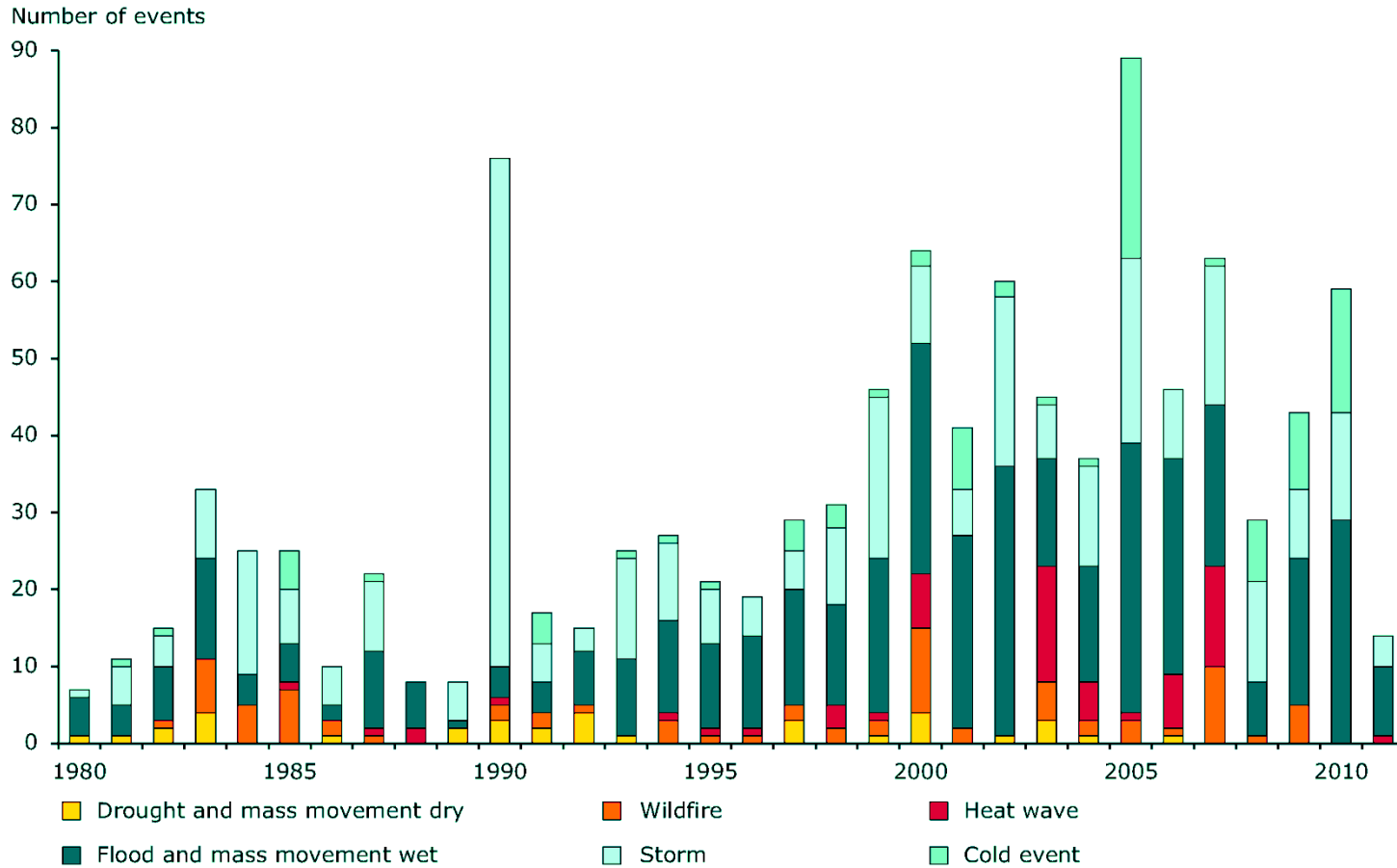


Figures from the 2013  
IPCC WG 1 report



**Worldwide CO<sub>2</sub> concentrations –  
recent figures**

# Extreme weather events





***"Warming of the climate system is unequivocal and some observed changes are unprecedented on time scales of decades to millennia. Changes have been widely observed on land, in the oceans and in the atmosphere. The human influence on climate is clear."***  
***IPCC AR5 WGI, 2013***



**Climate change**

**Emissions GHG**

-

**Mitigation/  
carbon sink**

+

**Impacts**

-

**Adaptation**

+

**Agriculture**

**Biomass  
production  
(bionergy,  
biomaterials)**

+

**Green growth**



## Outline

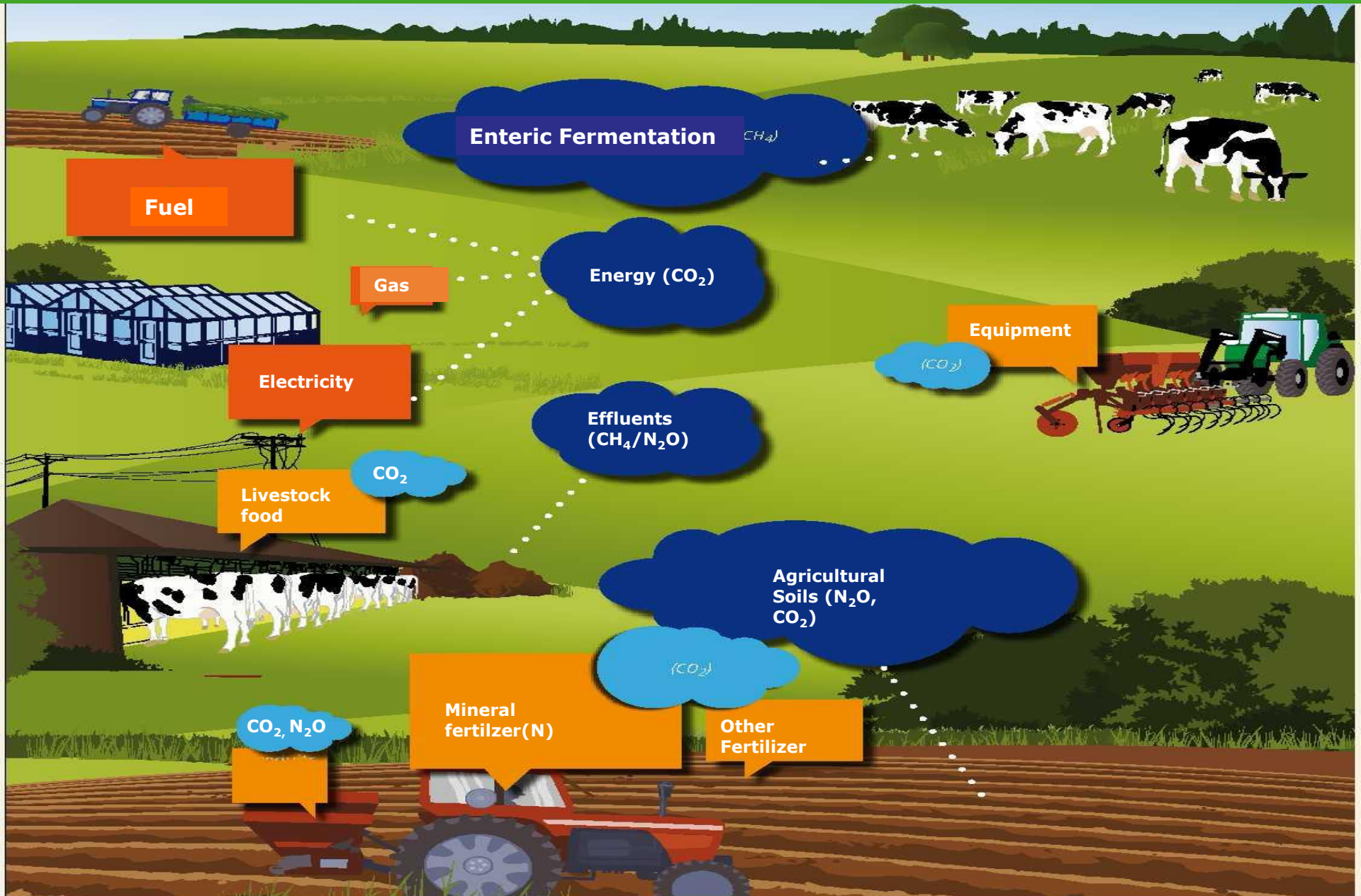
- 1. Background information:**
  - **agriculture's GHG emissions**
  - **EU climate policy framework**
- 2. What is mitigation ?**
- 3. What is adaptation ?**



## **1. Background information on:**


- agriculture's GHG emissions and carbon sequestration**
- EU climate policy framework**






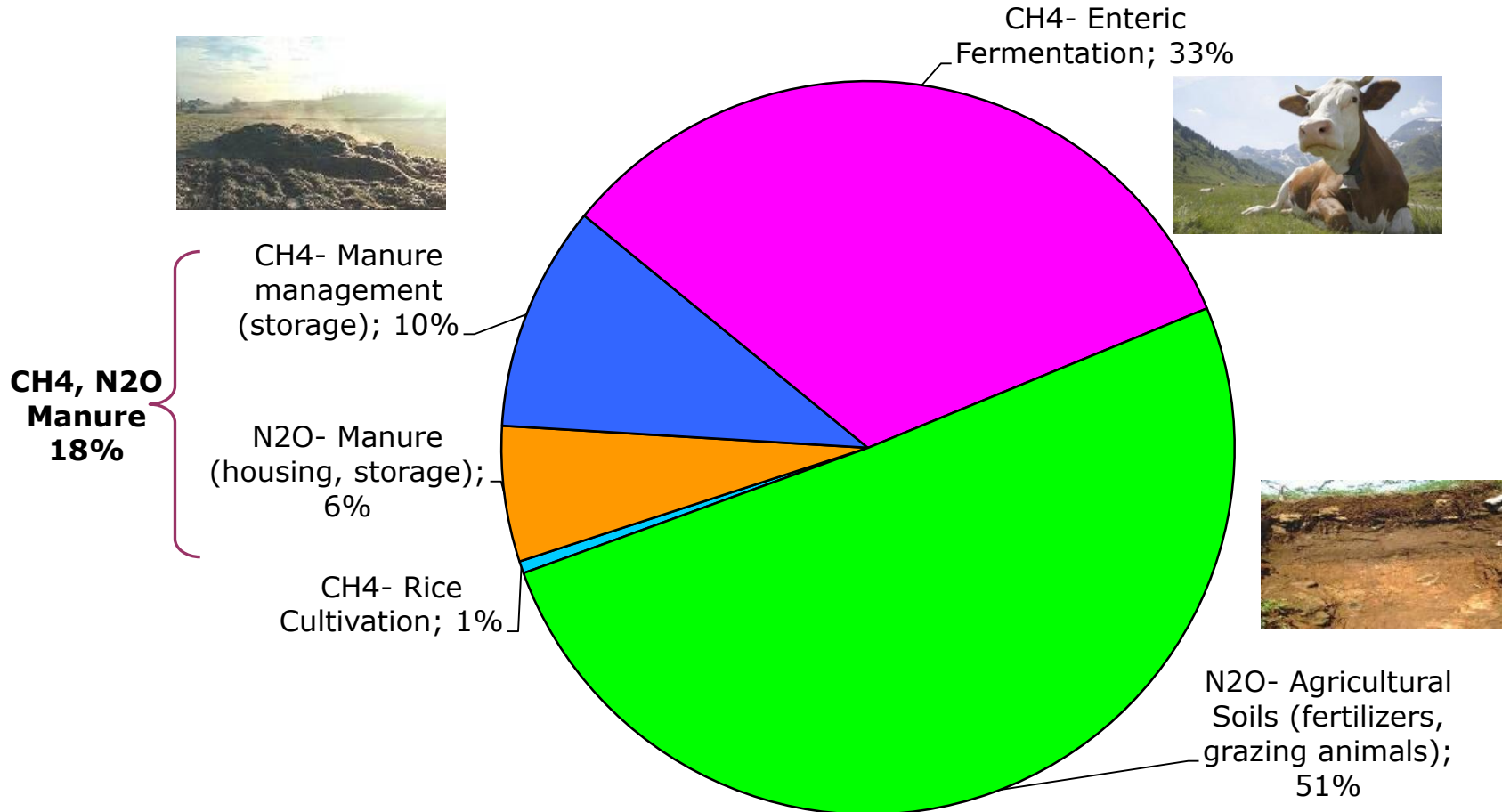
 **Direct Energy**

 **Indirect Energy**

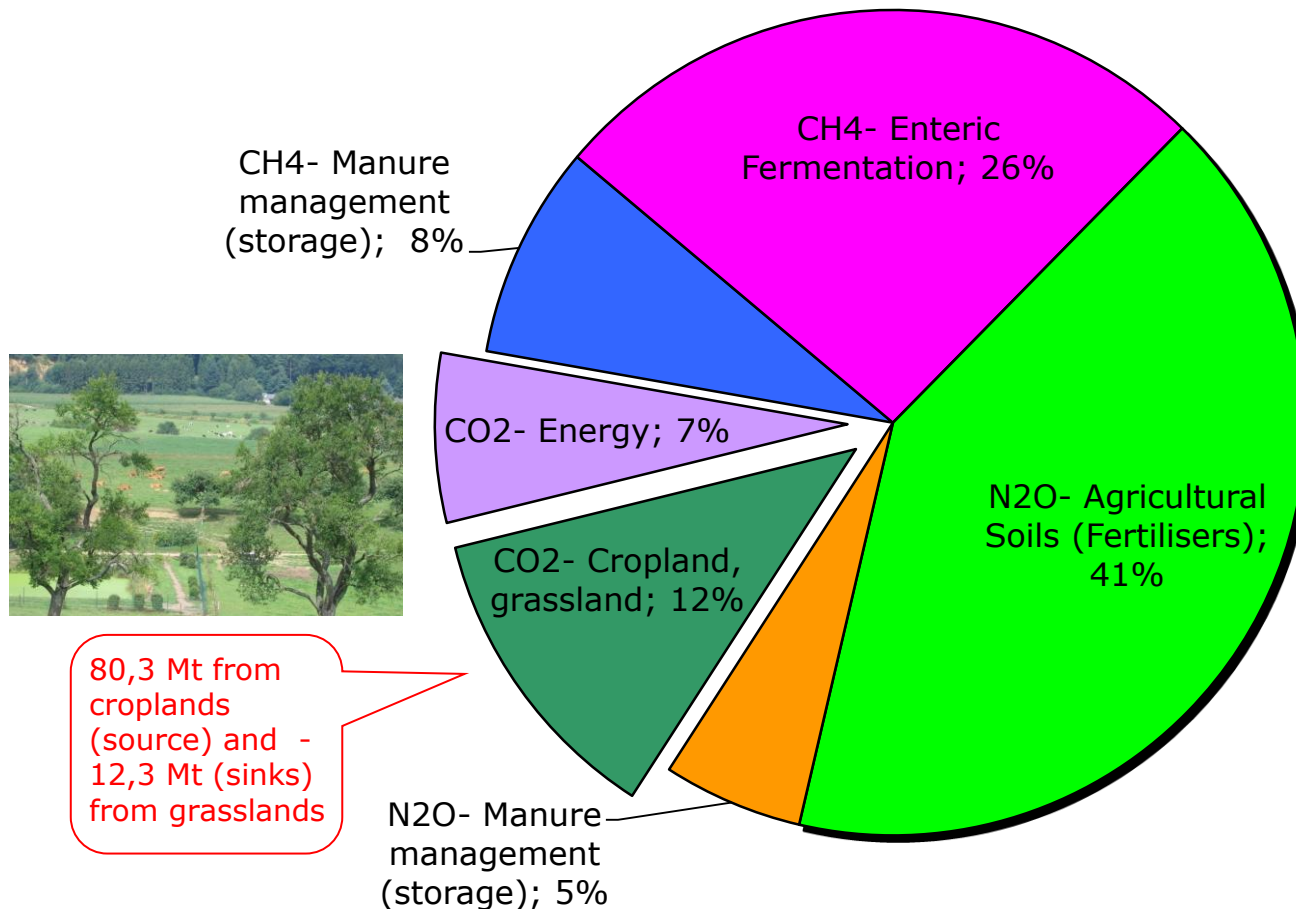
 **Direct emissions**

 **Indirect Emissions**

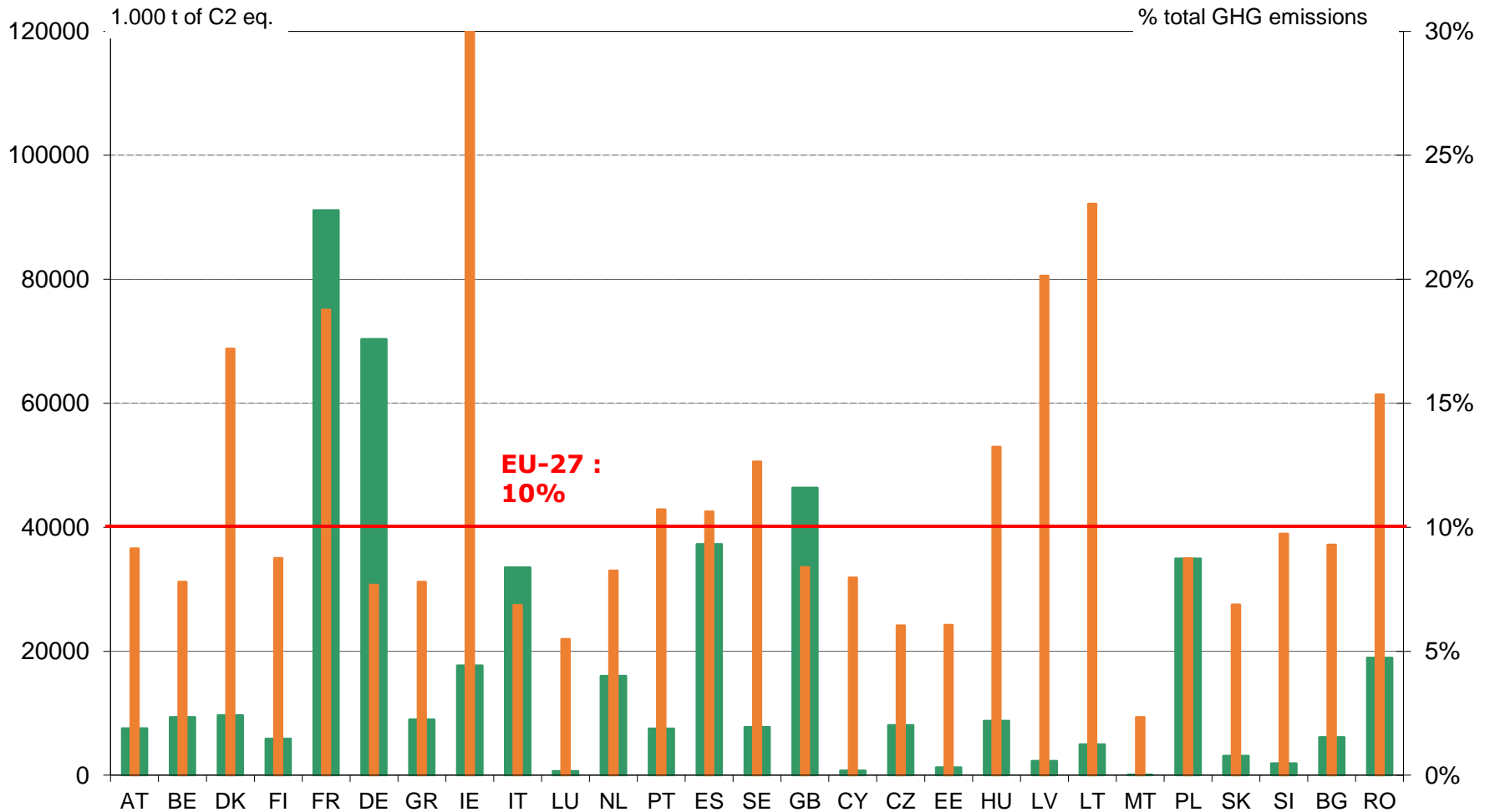
## Emissions inventory for sector "Agriculture", EU-27, 2010



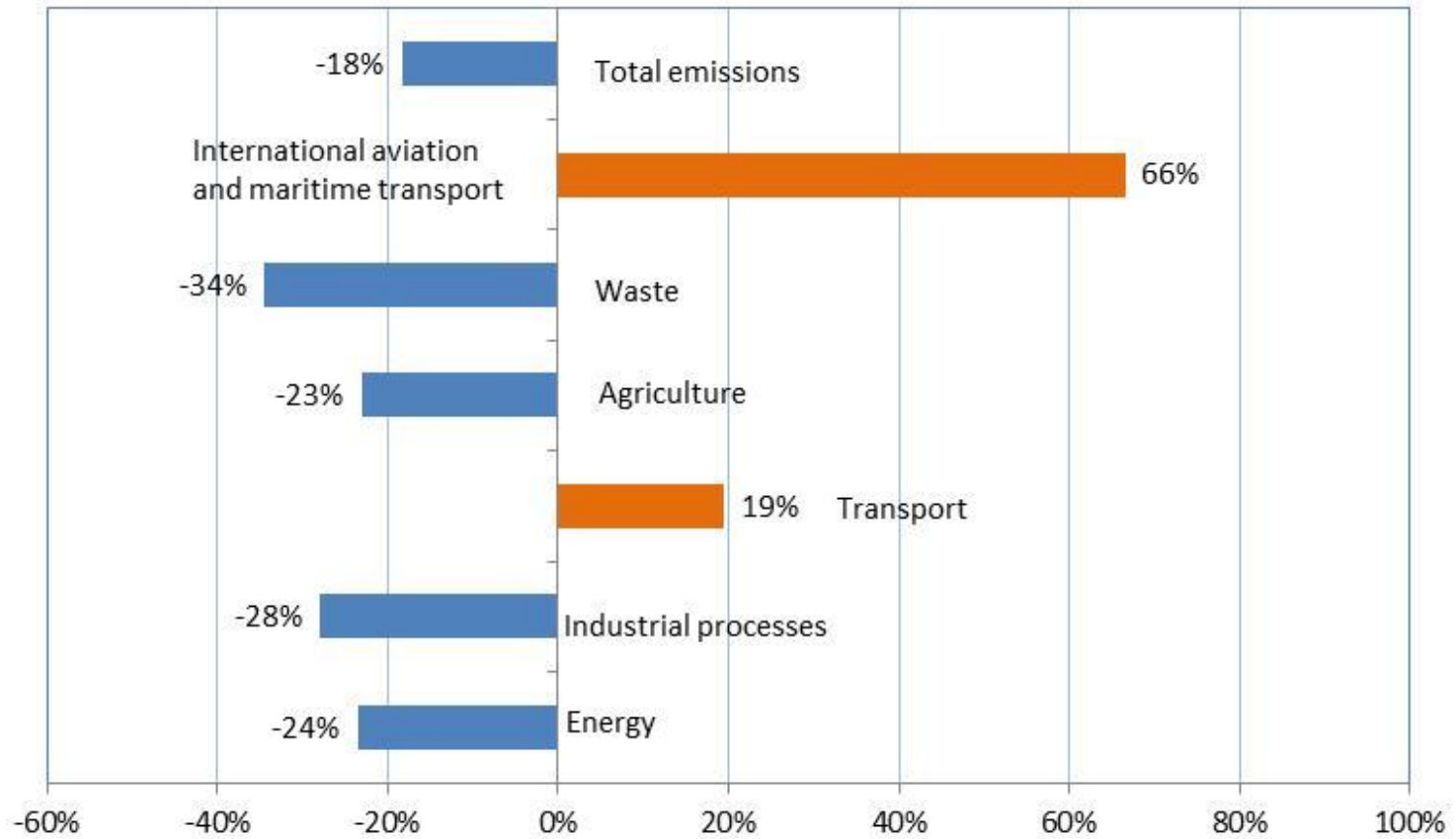
## Share of GHG from sectors "Agriculture", "Energy" and "LULUCF", EU-27, 2011

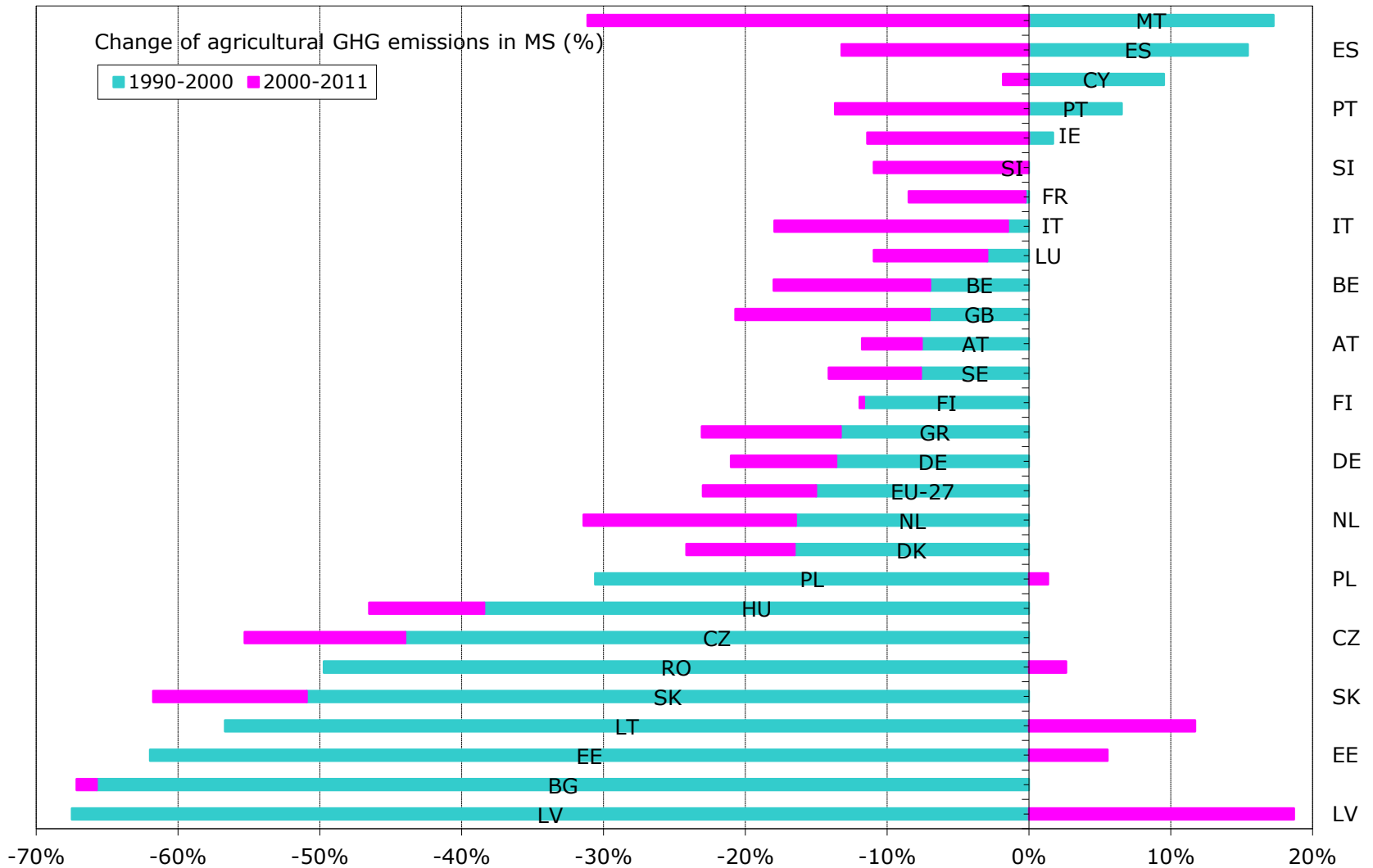


### Agricultural GHG emissions in MS (without LULUCF), 2011

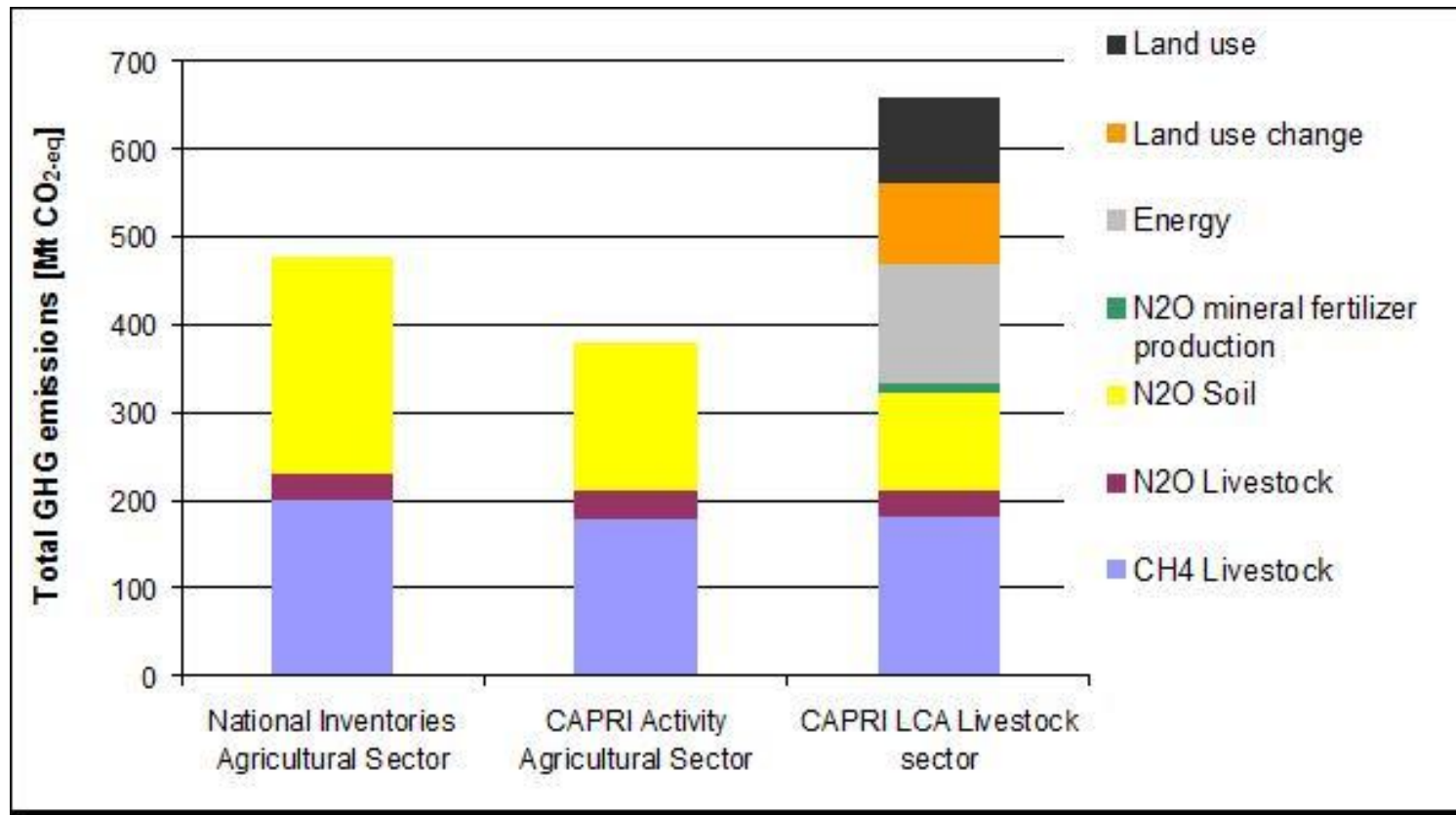


### Changes in EU-27 GHG emissions by sector, 1990–2011



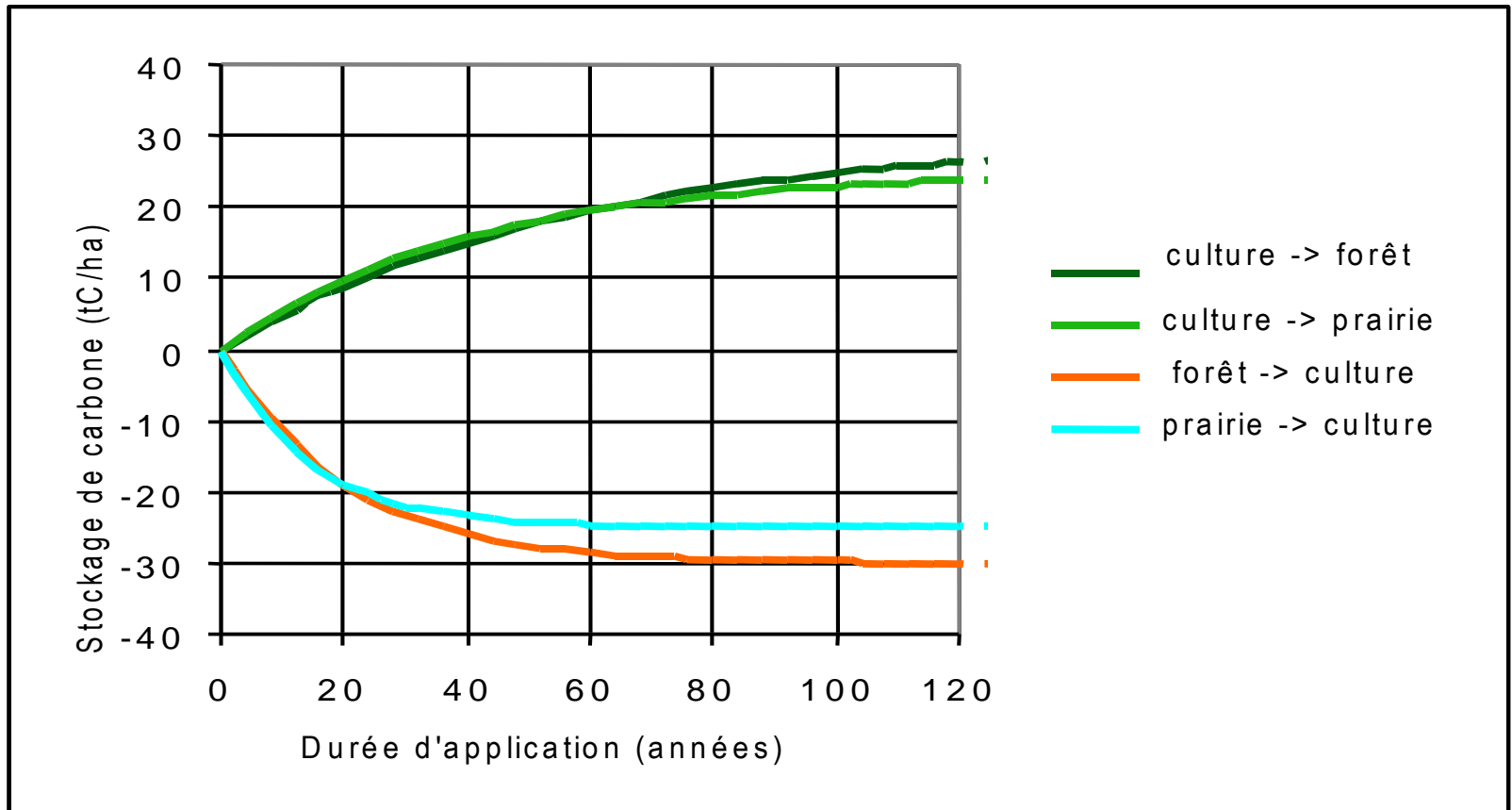


## Livestock emissions – a "hotspot"



Source: JRC, "Evaluation of the livestock sector's contribution to the EU greenhouse gas emissions" GGELS, 2010.

## Land use change and carbon sequestration



Source: INRA (France)



**Carbon release is faster than sequestration**



## EU climate policy - key policy instruments

GHG Target in 2020: -20% compared to 1990

-14% compared to 2005

EU Emissions Trading  
System (ETS)  
-21% compared to 2005

Effort sharing Decision  
Non ETS sectors (transport, buildings,  
waste, **agriculture**)  
-10% compared to 2005

CH<sub>4</sub> and N<sub>2</sub>O  
from agriculture  
included

CO<sub>2</sub> from  
LULUCF  
NOT included

27 Member State targets  
stretching from -20% to +20%

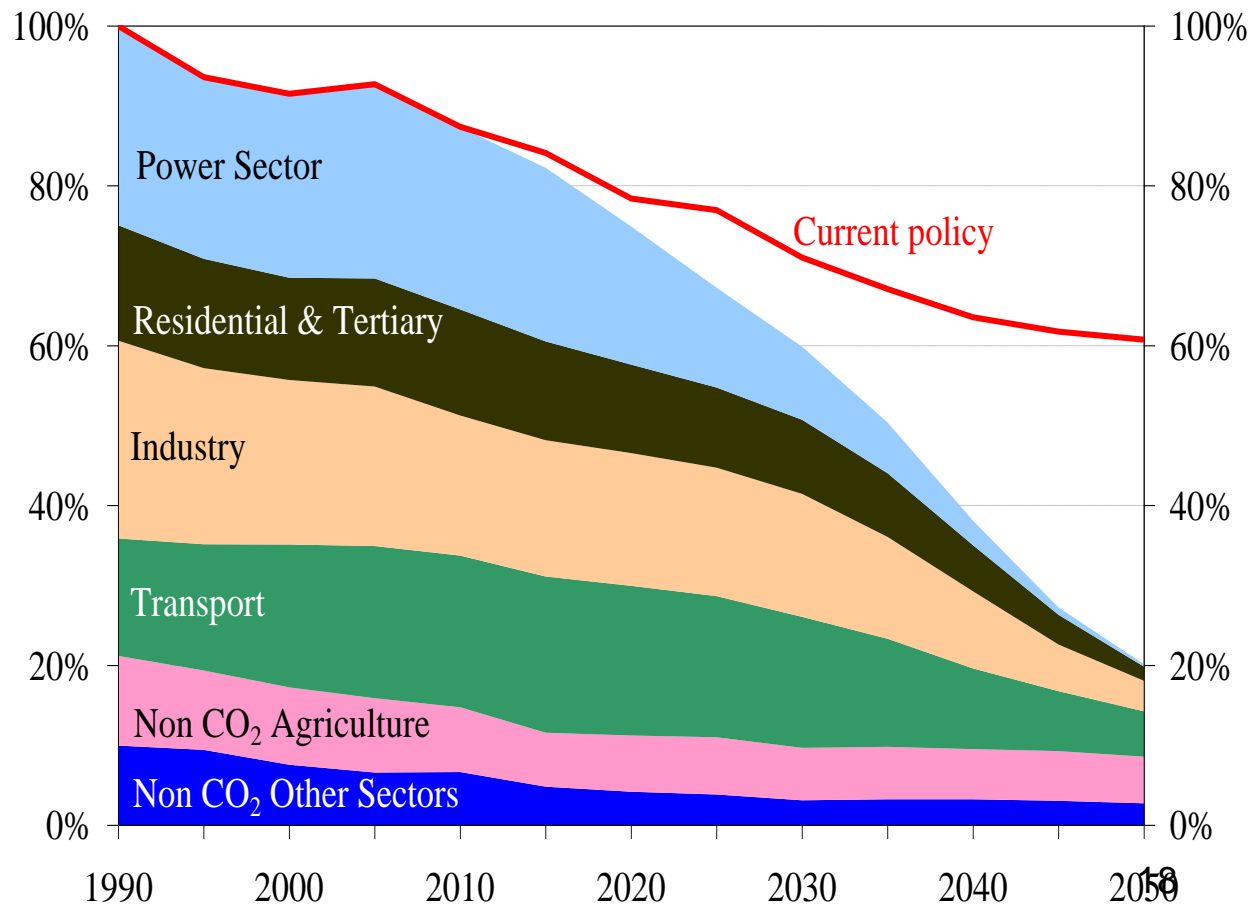
## Looking beyond 2020: roadmap 2050

### 80% domestic reduction in 2050 is feasible:

- With currently available technologies,
- With behavioural change induced by prices
- If all economic sectors contribute to a varying degree & pace

### Milestones for agriculture:

- 25% in 2020
- 36% to -37% in 2030
- 40 to -50% in 2050





## MFF 2014-20: financing climate action

- **Integration approach** – using all EU funds
- **Objective** - At least **20 %** of EU budget 2014-20 to be spent on action over climate change – core element of "greening" the EU budget
- Specific **earmarked** contributions only for some EU funds, for other funds, relevant contribution
- **Climate tracking** - giving an indicative estimate of spending related to climate change (mainstreaming)
- Art. 8 of Common Provisions Regulation: method will be set in the implementing act

## 2. What is mitigation ?





## Mitigation – concept

- Broadly, agriculture can contribute to **mitigation** by:
  - ▼ direct emissions from farm operations (CH<sub>4</sub> and N<sub>2</sub>O)
  - ▼ CO<sub>2</sub> emissions by improving farm "energy profile" (efficiency, on-farm use of renewable energies)
  - Improve CO<sub>2</sub> balance of farmland soils by protecting or expanding carbon sinks
  - ▼ CO<sub>2</sub> from fossil fuel use in other sectors by supplying feedstock for bioenergy and industrial applications
- Measures with **highest mitigation potential**:
  - *Increase production efficiency (fertilizer, resource use)*
  - *Improving manure and slurry management (storage, application)*
  - *'Waste to worth' (anaerobic digestion for animal waste – biogas)*
  - *Grassland management (improving livestock "carbon footprint" and carbon sink)*
- Actions which improve **resource efficiency** are positive for climate (reduce direct and indirect emissions)
- **Synergies** with soil protection (erosion), water quality (nitrates), air quality (ammonia)
- High mitigation potential **variability** in systems and management practices: potential depends on baseline climates, soil types, farm production systems
- Large **uncertainties**

### Coûts de la tonne de CO<sub>2</sub>e évité pour l'agriculteur et potentiels d'atténuation (année 2030, France métropolitaine)



Source: Quelle contribution de l'agriculture française à la réduction des émissions de GES?, INRA (France), July 2013

# Tackling climate change through livestock

## Emissions

**Methane (CH<sub>4</sub>)**



**Renewal Effluent management**

**Nutrition Biogas**

**Nitrogen monoxide(N<sub>2</sub>O)**



**Fertilization management**

**Global nitrogen management**

**CO<sub>2</sub> (energy)**



**Legumes**

**Livestock food**

**Autocons.**

**Fuel**

**Mecanisation**

**Tractor tuning**

**Electricity**

## Sinks

**CO<sub>2</sub>**



**Grassland**

**Ecological infrastr.**





Portugal, 2005

GETTY IMAGES



France, 2003



Greece, 2007



England, 2007



### 3. What is adaptation to climate change ?





## EC policy framework on adaptation

- ▶ **White Paper on 'Adapting to climate change: towards a European framework for action'** (April 2009)
- ▶ **EU Adaptation Strategy** (April 2013)
  - **General aim:** enhancing Europe's resilience to the impacts of climate change
  - **Specific objectives:**
    - *Enhancing the knowledge base and widening access to information*
    - *Mainstreaming adaptation into EU policies, strategies and programmes*
    - *Capturing the potential of the market, market-based instruments and the private sector*
    - *Support to and facilitation of collaboration, exchange of knowledge and good practice examples, etc. between MS, regions, cities...*
  - **Agriculture** is a vulnerable sector – the strategy draws on CAP for providing adaptation support
    - *Climatic changes will lead to a **variety of risks** which call for adaptation responses*
    - *make the key measures within RDPs more **climate resilient** and*
    - *dedicate funds **directly** for adaptation*

### Arctic

Temperature rise much larger than global average  
Decrease in Arctic sea ice coverage  
Decrease in Greenland ice sheet  
Decrease in permafrost areas  
Increasing risk of biodiversity loss  
Intensified shipping and exploitation of oil and gas resources

### Northern Europe

Temperature rise much larger than global average  
Decrease in snow, lake and river ice cover  
Increase in river flows  
Northward movement of species  
Increase in crop yields  
Decrease in energy demand for heating  
Increase in hydropower potential  
Increasing damage risk from winter storms  
Increase in summer tourism

### North-western Europe

Increase in winter precipitation  
Increase in river flow  
Northward movement of species  
Decrease in energy demand for heating  
Increasing risk of river and coastal flooding

### Mountain areas

Temperature rise larger than European average  
Increase in glacier extent and volume  
Decrease in mountain permafrost areas  
Upward shift of plant and animal species  
High risk of species extinction in Alpine regions  
Increasing risk of soil erosion  
Decrease in ski tourism

### Coastal zones and regional seas

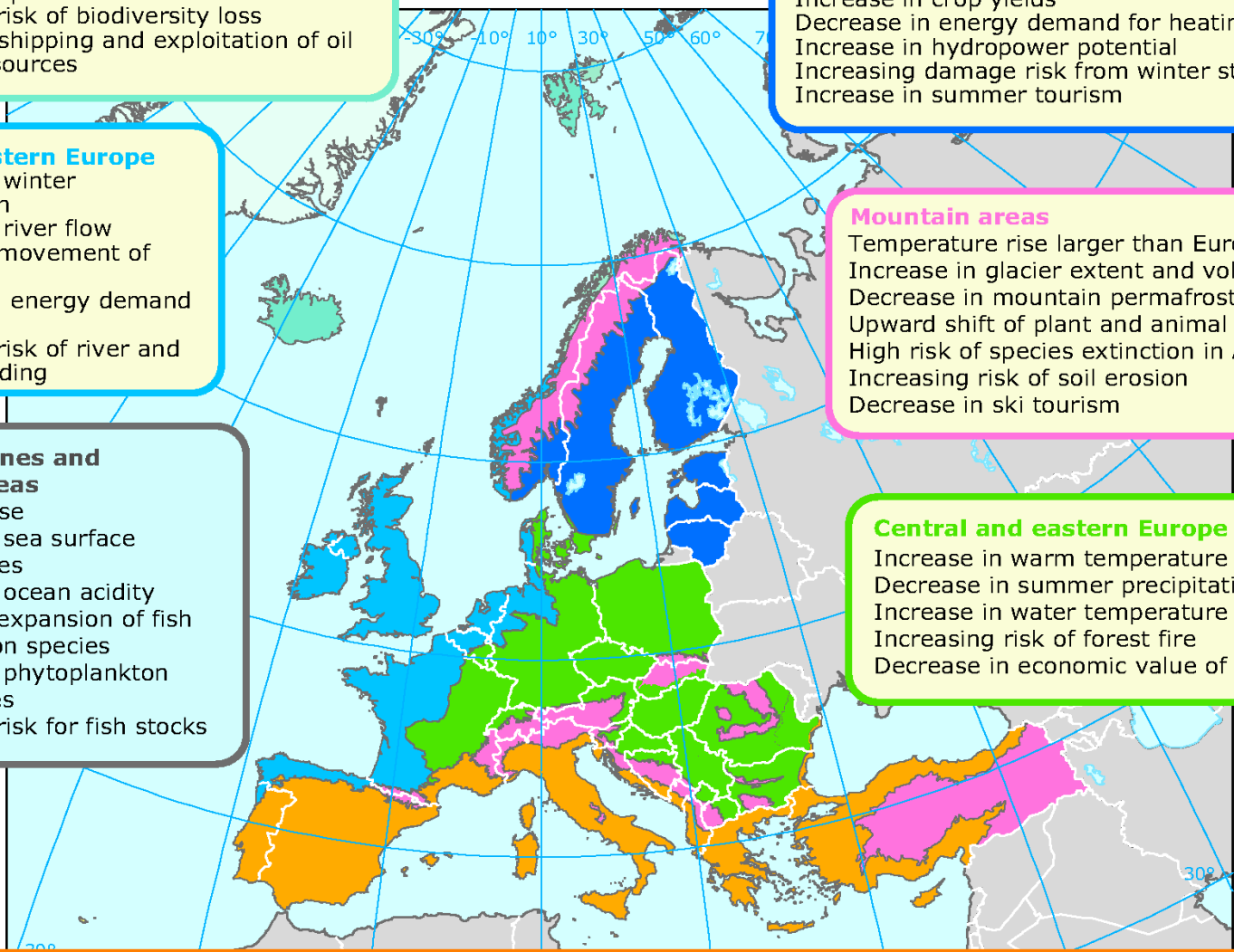
Sea-level rise  
Increase in sea surface temperatures  
Increase in ocean acidity  
Northward expansion of fish and plankton species  
Changes in phytoplankton communities  
Increasing risk for fish stocks

### Central and eastern Europe

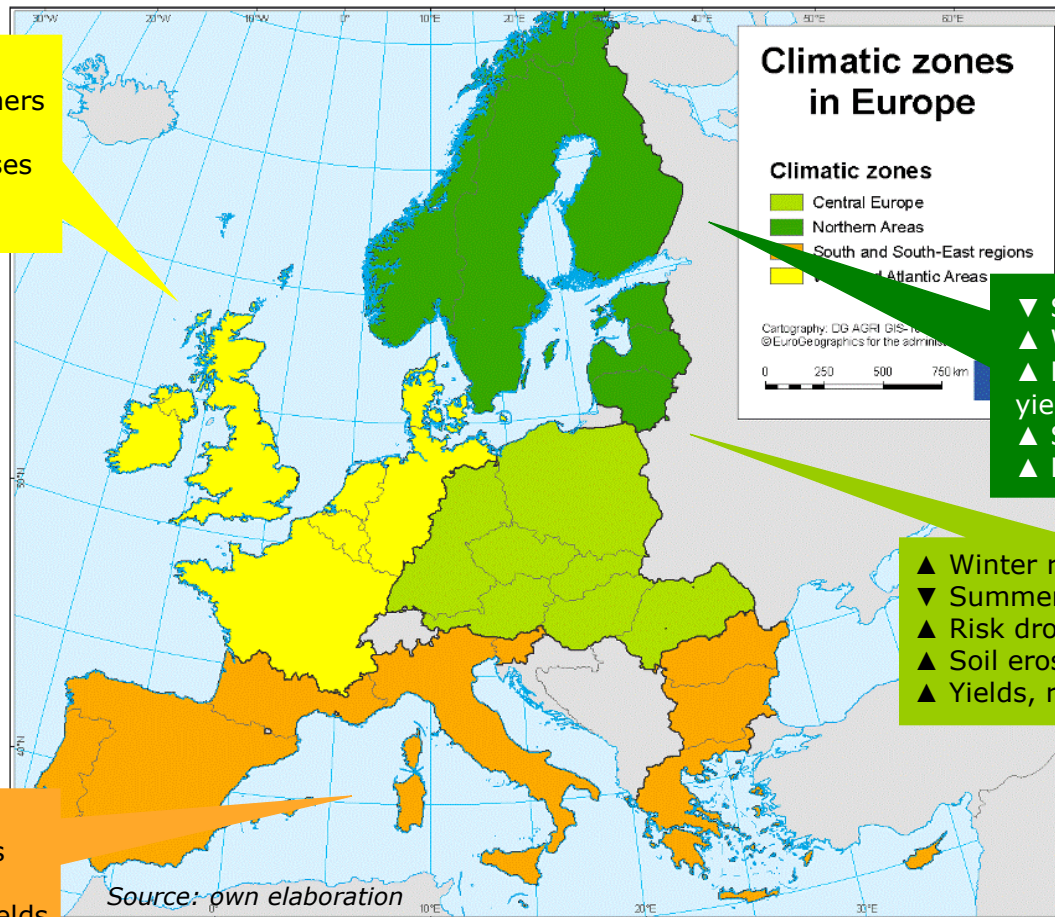
Increase in warm temperature extremes  
Decrease in summer precipitation  
Increase in water temperature  
Increasing risk of forest fire  
Decrease in economic value of forests

### Mediterranean region

Temperature rise larger than European average	Increasing water demand for agriculture	Expansion of habitats for southern disease vectors
Decrease in annual precipitation	Decrease in crop yields	Decrease in hydropower potential
Decrease in annual river flow	Increasing risk of forest fire	Decrease in summer tourism and potential increase in other seasons
Increasing risk of biodiversity loss	Increase in mortality from heat waves	
Increasing risk of desertification		



# Climate change – Possible impacts on EU agriculture



- ▲ Floods risk
- ▲ Hotter and drier summers
- ▲ Sea levels
- ▲ Risk crop pests, diseases
- ▲ Crop, forage yields
- ▼ Animal health, welfare

- ▼ Summer rainfall
- ▲ Winter storms, floods
- ▲ Length growing season, yields
- ▲ Suitable farmland
- ▲ Pests, diseases risks

- ▲ Winter rainfall, floods
- ▼ Summer rainfall
- ▲ Risk drought, water stress
- ▲ Soil erosion risk
- ▲ Yields, range of crops

- ▼ Water availability
- ▲ Risk drought, heat spells
- ▲ Risk soil erosion
- ▼ Growing season, crop yields
- ▼ Optimal crop areas



## Adaptation & risk prevention

- ▶ Adaptation to CC is **broader than 'risk prevention/risk management'** –
  - aims to **enhance resilience** of: economic sectors and systems (infrastructures, agriculture, forestry) and environmental resources (biodiversity, soil, water)
  - has a **long-term perspective** vs short/medium-term for 'risk prevention'
- ▶ Over the coming years, it may require **changes** in: production patterns and methods, farm structures and strategies, with investments and costs
- ▶ Possible **adaptive solutions** – examples
  - Adapting timing farm operations (planting, sowing)
  - Technical measures (frost protection, ventilation systems, livestock housing)
  - Soil management (rise water holding capacity, organic matter)
  - Better adapted and more resilient crop varieties (less water intensive)
  - More effective pest and disease controls
  - Improving efficiency of water use and irrigation equipment
  - Protect and build "green infrastructure" (hedgerows, floodplains, wetlands)
- ▶ "Best" **approach** to cope with uncertainties – build **resilience**
  - Prioritise **no-regret** actions
  - Protecting **natural environment base** on which agriculture takes place
  - **"Synergetic"** actions
  - Improve **adaptive capacity**



## Looking into the future

- Farmers need to face the **climate challenge** - reduce farm-level GHG emissions, and adapt and manage risks
  - In a context of rising of global food demand, increasing input prices
  - Environmental constraints (water, soils, biodiversity) intensified by climatic change
- Agriculture's carbon footprint is reducing but the sector needs to **strengthen efforts** towards mitigation – EU climate policy framework 2030
- The **CAP 2020** offers a range of tools for incentivising the adoption of mitigation and adaptation action within the wider context of sustainable food production (but has also its limits)
- "Voluntary" approach needs to **address barriers** to action:
  - **Technology** solutions - improve farming methods and develop solutions
  - Encourage **behavioural** changes
  - Improve **measuring tools** at different levels – GHG inventories, LCA, farm-level GHG assessment tools
- Identifying **climate policy instruments** for farming sector is a key task
- **Global context** – international climate agreement (2015)





European  
Commission



*«Making European agriculture more climate friendly and climate resilient is not a choice, but a serious need and obligation. The proposal for the new CAP will help farmers to better deal with climate change challenges »*

*Jerzy Plewa, DG of DG AGRI,  
April 2013*

Agriculture  
and Rural  
Development