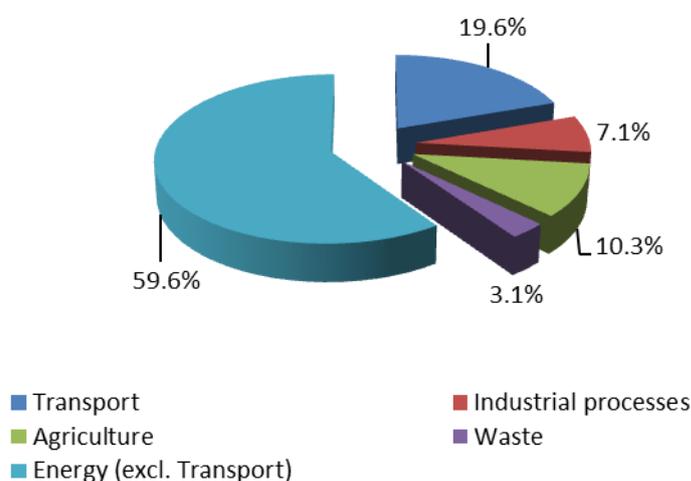




EU agriculture and climate change

Agriculture is highly exposed to climate change, as farming activities directly depend on climatic conditions. But agriculture also contributes to the release of greenhouse gases to the atmosphere. However, agriculture can also help to provide solutions to the overall climate change problem by reducing emissions and by sequestering carbon while not threatening viable food production.

According to Green House Gases (GHG) inventories of the EU-28 Member States, GHG emission in the source category agriculture accounted for a total 471 million tons of CO₂ equivalents in 2012. This represented **10.3 % of total EU-28 GHG** emissions in 2012.



Source: European Environment Agency database (2015)

Depending on the relative size and importance of the agricultural sector, the share of agriculture emissions in total national GHG emissions varies considerably within the Member States. The share is the highest in Ireland (31 %), Lithuania (23 %) and Latvia (22 %) and the lowest in Malta (2.5 %), Luxembourg and the Czech Republic (about 6 % each).

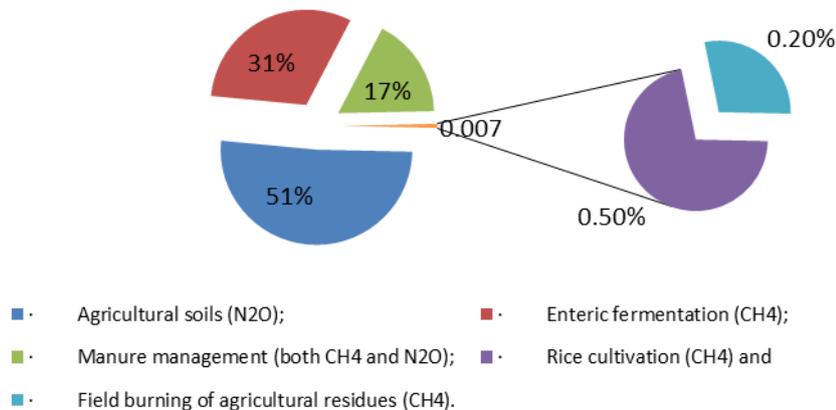
The historical developments of agriculture GHG emissions in the EU show a rather steady downward trend on the aggregated EU-28 level of -24 %, from 618 million tons CO₂ equivalents in 1990 to about 471 million tons CO₂ equivalents in 2012. While EU-15 emissions decreased by 15 % (-68.4 million CO₂ equivalents), in the new Member States emission decreased by 45 % (-78.8 tons CO₂ equivalents) over the period 1990 to 2012.

How does farming influence climate change?

Mainly by producing two powerful **greenhouse gases**:

- **Methane (CH₄)** - from livestock digestion processes and stored animal manure,
- **nitrous oxide (N₂O)** - from organic and mineral nitrogen fertilisers.

The main sources and shares of GHG emissions in the agriculture sector of the EU-28 in 2012, divided by categories:



Source: European Environment Agency database, 2015

In the future, farming emissions are **likely to fall even further**, as a result of increasing social pressure and the EU's high emissions reduction targets.

For more information on greenhouse gas emissions go to the [website of the European Environment Agency](#).

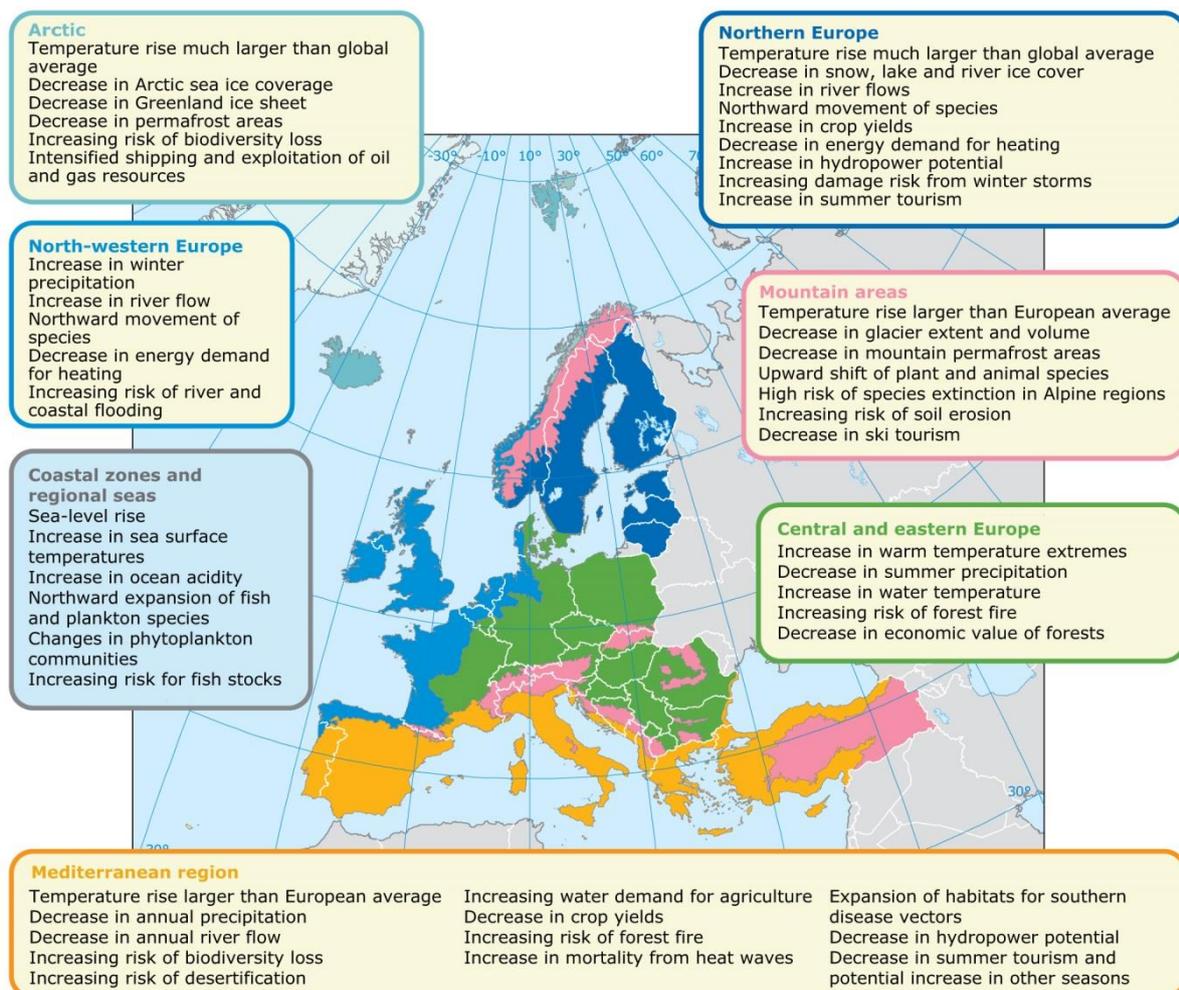
How will farming in the EU be affected by climate change?

Evidence on climate change is solid and real - it will affect the EU, with European farming first in line:

- **changing in rainfall** will be a serious problem in many regions,
- **rising temperatures;**
- variability and seasonality as well as
- extreme events, **heatwaves, droughts, storms and floods** across the EU.

Human systems and ecosystems in Europe are vulnerable to major climate change impacts such as river floods, droughts or coastal flooding. Even if some climatic changes may be positive for some northern European regions, most will be negative, affecting regions already suffering from environmental or other changes. In various regions, a combination of different types of these impacts can exacerbate vulnerabilities. Farming will be most affected in the southern and south-eastern regions of the EU (see the map below).

Key observed and projected climate change and impacts for the main regions in Europe



How can farms reduce emissions now?

As regards the future of agriculture under the changing climate, a range of adjustment measures can be undertaken relating to farming practices, for example planting, harvesting and watering/fertilising existing crops, using different varieties, diversifying crops, implementing management practices.

Mitigation has the potential to reduce climate change impacts, and **adaptation** can reduce the damage of those impacts. Together, both approaches can contribute to the development of societies that are more resilient to the threat of climate change.

The Common Agricultural Policy (CAP) offers a number of instruments to find adequate answers to the challenges of climate change, a more sustainable EU agriculture. Given the pressure on natural resources, agriculture has to improve its environmental performance through more sustainable production methods. Farmers also have to adapt to challenges stemming from climate change, and have to pursue mitigation and adaptation actions (e.g. by developing greater resilience to disasters, such as flooding, drought and fire). Sustainable management of natural resources and climate action represent one of the three main objectives of the CAP.

Improved sustainability will be achieved by **combined complementary effects of various instruments**:

Firstly, there is a simplified and more targeted **cross-compliance mechanism**, representing the basic layer of environmental requirements and obligations to be met in order to receive full CAP funding.

Secondly, from 2015 onwards, the CAP introduced a new policy instrument, the Green Direct Payment. This '**green payment**' is granted for implementing three compulsory practices, namely crop diversification, ecological focus areas and permanent grassland, whose environmental benefits on biodiversity, water and soil quality, carbon sequestration and landscapes have been proven. It represents 30 % of the direct payment budget. As the green direct payment is compulsory it has the advantage of introducing practices that are beneficial for the environment and climate change on large part of the utilised agricultural area.

Thirdly, building on these compulsory elements, **rural development** continues to play a pivotal role in achieving the environmental objectives of the CAP and combating climate change. The rural development policy objectives are translated into priorities at EU level. Two of these objectives directly concern environment and climate change:

- "Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry"
- "Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in the agriculture, food and forestry sectors"

On top of this, innovation as well as climate change and environment are cross-cutting objectives within the EU's rural development policy, meaning that these three objectives should be integrated/reflected in Member States' strategies and instrument choice.

The focus of the rural development policy on sustainability is clearly visible by the fact that at least 30 % of the budget of each [rural development programme](#) must be reserved for voluntary, targeted measures that are beneficial for the environment and climate change.

The whole set of complementary policy instruments is accompanied by related training measures and other support from the Farm Advisory System, insights gained from the [Innovation Partnership](#) and applied research, which would help farmers to implement appropriate solutions for their specific situations.

How can farming adapt to the changed climate?

Adaptive measures (both at farm and at sectorial level) in agriculture range from technological solutions to adjustments in farm management or structures, and to political changes, such as adaptation plans.

Concerning **farm-level adaptation**, possible short to medium term adaptive solutions may include:

- Adjusting the timing of farm operations, such as planting or sowing dates and treatments;
- Technical solutions, such as protecting orchards from frost damage or improving ventilation and cooling systems in animal shelters;
- Choosing crops and varieties better adapted to the expected length of the growing season and water availability, and more resistant to new conditions of temperature and humidity;
- Adapting crops with the help of existing genetic diversity and new possibilities offered by biotechnology;
- Improving the effectiveness of pest and disease control through for instance better monitoring, diversified crop rotations, or integrated pest management methods;
- Using water more efficiently by reducing water losses, improving irrigation practices, and recycling or storing water;
- Improving soil management by increasing water retention to conserve soil moisture, and landscape management, such as maintaining landscape features providing shelter to livestock;
- Introducing more heat-tolerant livestock breeds and adapting diet patterns of animals under heat stress conditions.

Sectorial-level adaptation may include:

- Identification of vulnerable areas and sectors and assessment of needs and opportunities for changing crops and varieties in response to climate trends;
- Support to agricultural research and to experimental production aiming at crop selection and development of varieties best suited to new conditions;
- Building adaptive capacity by awareness raising and provision of salient information and advice on farm management.

You can find more details in the ["Agriculture & Forestry" chapter of the European Climate Adaptation Platform](#).

Latest update: September 2015