# EU agriculture and climate change

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PURPOSE: to evaluate the main impacts of climate change on EU agriculture.

CONTENT: the White Paper 'Adapting to climate change' lays out a European framework for action to improve Europe's resilience to climate change, emphasising the need to integrate adaptation into all key European policies and enhance co-operation at all levels of governance.

Complementing the White Paper, **this working document** summarises the main impacts of climate change on EU agriculture, examines adaptation needs, describes the implications for the CAP and explores possible orientations for future action. It aims at further engaging Member States and the farming community into a debate and action on adaptation needs that result from climate pressures.

The document stresses that climate change will require farmers to adapt while they are also called to reduce farm-level greenhouse emissions, and to improve agriculture's environmental performance.

Developing a progressively evolving and comprehensive response to climate change is needed to maintain the resilience and competitiveness of EU agriculture so that it can continue to play its role as supplier of high quality food and environmental and landscape services, as well as contribute to the sustainable development of EU rural areas. Climate change also brings an additional perspective to the challenge of food security.

According to the Commission, **possible orientations** for future action are as follows:

**1) Prioritising "no regret" measures**: in face of the inherent uncertainties, prioritising "no regret" options for adaptive action will ensure the most cost-effective approach. These are choices which help cope with a broad range of plausible changes and induce socio-economic or environmental co-benefits. In the agricultural sector this means enhancing resilience of the agricultural ecosystems by **more sustainable use of natural resources, in particular water and soils**.

By protecting the natural resource base on which agriculture depends the sector can better build resilience to climatic changes. Such responses will ensure that management decisions implemented over the next decades do not undermine the ability to cope with potential larger impacts later in the century.

As indicated in the White Paper, it is also necessary to **assess which requirements regarding water management should be further integrated into relevant CAP instruments**. Adaptation measures concerning agriculture can also be integrated in the national implementation of the Water Framework Directive and the Floods Directive.

**2) Strengthening the role of agriculture as a provider of ecosystem services**: taking into account the projected impacts of climate change on European hydrological systems, habitats and biodiversity, the maintenance of ecosystems through the management of agricultural land has a central role to play in contributing to overall resilience to climate change.

Agriculture can, for example, **assist in watershed management, protection of habitats and biodiversity as well as in the maintenance and restoration of multifunctional landscapes**. Among other, migration of species can be facilitated by establishing networks of wildlife corridors on agricultural land, and the water holding capacity of grazing land can be used to reduce the risk of flooding. The potential role of agriculture in providing such "green infrastructure" could be recognized and further enhanced.

Current agri-environmental measures contribute to this objective, but may not always sufficiently enhance connectivity between areas protecting biodiversity. In this context, the **applicability of rural development measures on a territorial scale beyond the level or individual farms could be considered** to help successful adaptation.

**3) Enhancing resilience of agricultural infrastructure**:agriculture as a production system is dependent on fixed assets (e.g., equipment, buildings, machinery) and infrastructure, which can be impacted by extreme events. The potential economic losses triggered by such events can become a serious concern to the sector, in particular because in agriculture the value of fixed assets tends to be significant compared to the average annual output and farm income.

Therefore **further developing preventive action** and developing instruments tailored to regional characteristics to cope with potential damage is necessary.

**4) Developing synergies between adaptation and mitigation**: agricultural activities are an important source of nitrous oxide and methane emissions, which contribute to global warming. In the EU, agriculture can contribute to climate change mitigation by reducing its emissions, by the production of renewable energies and bioproducts, and by storing carbon in farmland soils. To address the double challenge of reducing GHG emissions while at the same time coping with the changing climate, it will be necessary to ensure synergies between adaptation and mitigation as much as possible. Measures that provide co-benefits in terms of reducing emissions and increasing resilience of farming need to be identified and promoted. These include, among other, **soil and tillage practices** that help maintain and increase organic carbon in soils, and protection and management of pastures. **Organic farming** has potential for mitigation through its efficient nutrient cycles and soil management, and as it usually implies higher diversity and high level of knowledge of the functioning of the farm ecosystem, it is also likely to be more resilient to climate change.

Possible conflicts between objectives should be considered when deciding about appropriate measures, and trade-offs may in some cases be necessary. Member States may use rural development funds to implement these measures.

**5) Improving the adaptive capacity of farmers**: strengthening information and advisory support on climate-related matters to farmers and agricultural workers is key for motivation and preparedness to adapt. Various means are available such as dedicated courses, specialised press, use of communication technologies. It is also important to include climate change into educational systems for young farmers, farm workers and apprentices. **Farm advisory services** could be developed so that they can become an instrument for disseminating regionally-specific information and practical adaptive solutions enhancing farmers' skills to respond to future changes. The measures adopted in the framework of the CAP "Health Check" provide additional possibilities, within the rural development policy, for funding dissemination and training programmes, and for using farm advisory services.

**6) Facilitating co-operation between Member States**: development of national and sub-national programmes and policy thinking on climate change adaptation needs to be encouraged. **Exchanging approaches, experience and best practices** in adaptation options in the agricultural sector between the Member States can advance farming practices and production systems best adapted to expected climatic developments. A **technical working group** on agriculture, supporting the Steering Group on Impacts and Adaptation, proposed by the White Paper, will be set up by the end of 2009.The Commission initiative to establish a Clearing House Mechanism to serve as a platform for information exchange on climate change impacts and vulnerabilities, will need to include a part specifically dedicated for sharing national developments, projects results and best practices in the agricultural sector.

**7) Enhancing research on climate and agriculture**: improving and refining the spatial and time scales of the assessments of expected climatic impacts and vulnerability, and a better understanding of the interactions between agriculture and climate is essential. A recent Commission Communication on European agricultural research elaborates on the needs and directions for EU climate change research and innovation, including those for the agriculture sector (COM(2008)0862).

In addition, as rural areas are exposed to wider climatic risks and as significant parts of rural Europe are characterised by economic multifunctionality, it is essential:

- to reach an integrated understanding of the impacts of climate change on rural economies and societies is important. **Socio-economic research** on the climate challenge and its impact on rural sustainability could thus be enhanced;
- to emphasise the need for continuous agricultural research, at EU and national levels, for example on development of crops, varieties and herds better adapted to future conditions;
- to **support mitigation by research efforts** to further develop suitable and affordable technology and innovation;
- to integrate findings from the physical and agronomic sciences with local knowledge from farmers, so as to **develop robust adaptation strategies**, which, over a range of climate and socio-economic scenarios, can minimize the negative impacts of climate change. The Farm Advisory System can be an important tool also in this regard;
- **to strengthen the capacity of regional institutions** to use appropriate tools to address climatic changes (partnerships between national and regional research institutions, advisory services and social partners in agriculture as well as setting up of regional networks providing information to farm communities will help to design adequate site-specific strategies).

**8) Developing vulnerability indicators**: developing specific indicators for agriculture such as an index for adaptive capacity and vulnerability could be explored. The identification of vulnerability would need to be carried out at low spatial scale, on the basis of current sensibility to climate variability and natural hazards as well as scenarios of changes in weather patterns. Building a vulnerability indicator, including the aspect of adaptive capacity, will require a multi-dimensional approach combining climatic, environmental and socio-economic factor.

**In conclusion**: adaptation is a long-term process which needs to evolve over the coming decades according to the climatic trends and by building on a growing body of knowledge and practical experience. In this process, it is important to further **engage the farming community in the discussion** on adaptation needs and in sharing good practices.

In the context of the review of the Common Agricultural Policy after 2013 the need to ensure favourable conditions for the adaptation of agriculture and rural areas will need to be examined. Effective adaptation and adoption of new technologies, which contribute both to mitigation and the long term viability of farming, will require investments and planning efforts beyond the capacity of individual farms. **Public authorities will have a role to play** in supporting and facilitating climate change adaptation policies.