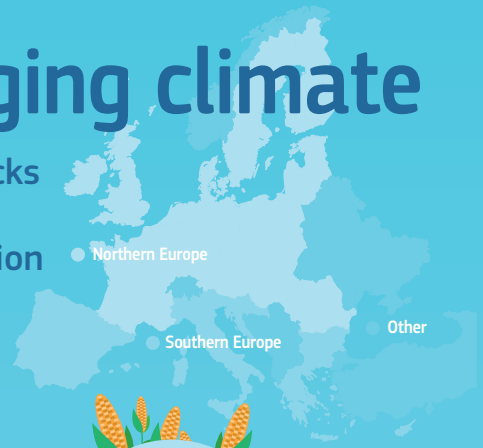
Agriculture in a changing climate

Climate change may trigger **yield losses** and **shocks** in European agriculture markets, **especially in the south**, with **trade** acting as an important **adaptation mechanism** for dealing with variability in yields.



Pure biophysical effects of climate change

Wheat yield
1.5 °C
Global temp. increase
Northern Europe +5%
Southern Europe −7%
Spread across models: High Low / High Low

Maize yield[1]
1.5 °C
Global temp. increase
Northern Europe −3%
Southern Europe −7%
Spread across models: High Low / High Low

Wheat yield
2.0 °C
Global temp. increase
Northern Europe +5%
Southern Europe −12%
Spread across models: High Low / High Low

Maize yield
2.0 °C
Global temp. increase
Northern Europe −5%
Southern Europe −11%
Spread across models: High Low / High Low

1. Maize yields are potential, i.e. assume that sufficient water is available for irrigation.

Impacts

Markets Potential price spikes & volatility; global markets may offer opportunities for European agriculture if physical and socio-economic factors are well-managed

CO_2
Some positive effects on wheat productivity but negative on nutritional aspects

Mitigation

Keeping global warming **below 2 °C** reduces the risk and facilitates adaptation

Adaptation mechanisms

Market adjusted effects of climate change[2]

For some crops improvement of agro-management practices, and introduction of new varieties may protect against climate change. A novelty of this study is that global market demand may steer adaptation in Europe with advantages for the European farming sector.

2 °C warming in year 2050

Wheat yield
Northern Europe +3%
Southern Europe +1%
Spread across models: High Low / High Low

Maize yield
Northern Europe +4%
Southern Europe +1%
Spread across models: High Low / High Low

2. The market adjusted projections used the biophysical projections as input in the modelling framework.

Farm management

Copernicus - Digital transformation of agriculture holdings using earth observations

Climate services - Climate-informed agro-management planning and anticipation of unfavourable conditions

CAP - Support climate action, increase resilience and sustainability

Without mitigation and adaptation, wheat and maize yields will decrease in southern Europe and the crops produced will have reduced nutritional value.

For more information, including assumptions of the modelling framework used, see: JRC PESETA IV project https://ec.europa.eu/jrc/en/peseta-iv

European Commission