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

<table>
<thead>
<tr>
<th>Crop</th>
<th>Temperature Increase</th>
<th>Northern Europe</th>
<th>Southern Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>1.5 °C</td>
<td>+5%</td>
<td>-7%</td>
</tr>
<tr>
<td></td>
<td>2.0 °C</td>
<td>+5%</td>
<td>-12%</td>
</tr>
<tr>
<td>Maize</td>
<td>1.5 °C</td>
<td>-3%</td>
<td>-7%</td>
</tr>
<tr>
<td></td>
<td>2.0 °C</td>
<td>-5%</td>
<td>-11%</td>
</tr>
</tbody>
</table>

Impacts

- **Markets**: Potential price spikes & volatility; global markets may offer opportunities for European agriculture if physical and socio-economic factors are well-managed.
- **CO₂**: Some positive effects on wheat productivity but negative on nutritional aspects.

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

Mitigation

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

Adaptation mechanisms

Market adjusted effects of climate change

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.

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.

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