Agriculture adaptation to climate change

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Adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause, or taking advantage of opportunities that may arise.
Adaptation – Why?

Sweden's wine industry is maturing nicely – thanks to climate change

Nilder winters mean Europe's most northerly winegrowers can challenge rival producers, but the Swedish alcohol laws are just one of many obstacles they face.

German Potato Processing Industry Association expects crop shortage due to drought

Italy sees 57% drop in olive harvest as result of climate change, scientist says

Extreme weather blamed for plunge in country's olive harvest – the worst in 23 years – that could leave the country dependent on imports by April

€ 436 billion economic losses between 1980-2016 (EEA)
“Either we delay and pay, or we plan and prosper.”

Christiana Figueres, former chair UNFCCC
EU adaptation strategy

1. **Promote action by all member states**
   - Encourage all MS to adopt adaptation strategies
   - Provide funding to help them build resilience
   - Promoting adaptation action by local authorities via the Covenant of Mayors initiative

2. **Make EU-level action 'climate-proof'**
   - Further integrate climate adaptation needs into key vulnerable sectors eg agriculture, fisheries, energy, regional development
   - Make infrastructure more resilient
   - Promote insurance against disasters

3. **Better inform decision-making**
   - Address knowledge gaps through research
   - Develop European climate adaptation platform as 'one-stop shop' for adaptation information in Europe: Climate-ADAPT
1. National adaptation strategies & plans

Climate-vulnerable sectors identified in the EU

- Agriculture and forestry
- Environment, ecosystems and biodiversity
- Health
- Water resources and management
- Tourism and recreation
- Infrastructure (buildings, transport)
- Energy
- DRR
- Urban environment
- Coastal areas
- Fisheries
- Land use and planning
- Insurance

Source: EEA (2018)
2. Bridge the knowledge gap

- EEA Climate change impact and vulnerability assessment
- JRC Modelling
- Climate Adapt
- LIFE, H2020


https://climate-adapt.eea.europa.eu/
Adapting LIFE in farming and forestry
Getting ready for climate change

LIFE is the EU's programme for environment, nature and climate action. Between 1992 – 2017, LIFE has funded 204 projects to help European farmers and foresters adapt to climate change.

86 PROJECTS
€141.3m TOTAL BUDGET
€74.4m LIFE CONTRIBUTION

118 PROJECTS
€232.8m TOTAL BUDGET
€116.3m LIFE CONTRIBUTION

The Green Link
90% tree survival rate

LIFE AgroClimaWater
15% water saved on olive and citrus farms

LIFE VinEcoS
22% less pesticides used on vineyards

LIFE BIODELEAR
0% insecticide used on fruit orchards

SigAGROasesor
400 farmers given real-time recommendations

PTD LIFE
120 livestock breeders tested adaptive grazing plans

LIFE+ DEMORGEST
60% extra CO² savings alongside new anti-forest fire practices

LIFE+ ForBioSensing PL
22 million trees mapped to track climate change effects

ec.europa.eu/easme/en/life
@LIFEprogramme
LIFE programme
LIFE programme
3. Mainstreaming adaptation across policies

🌟 Agriculture
- Common Agriculture Policy (CAP)
- Measures to support climate adaptation – Choice of (water efficient) crops/varieties; natural water retention; insurance schemes that encourage prevention,…

🌟 Forests
- EU Forest Strategy
- EU Biodiversity strategy

🌟 Water policies
- Water Framework Directive
- Floods directive
- Proposal for Water Reuse
<table>
<thead>
<tr>
<th>Article in EAFRD</th>
<th>Rural Development Measures</th>
<th>Examples for climate change mitigation and adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art. 17</td>
<td>Investments in physical assets</td>
<td>Actions which reduce input intensity, energy demand and emissions, such as energy efficiency installations in buildings, use of renewable energy sources, manure storage facilities and biogas digesters. Actions which reduce the exposure of holdings to climate change impacts, such as on-farm water storage installations for drought periods, highly efficient irrigation systems, investments in farm buildings and installations to cope with heat and water stress.</td>
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<tr>
<td>Art. 18</td>
<td>Restoring agricultural production potential damaged by natural disasters and catastrophic events and introduction of appropriate prevention actions</td>
<td>Actions preventing soil degradation, low tillage, and winter green cover. Establishing agro-forestry systems can also provide synergies to improve soil management, including on soil carbon stock depletion. Investments in hard and soft infrastructure to manage climate hazards (e.g. flood risk and volatility in water supply). Introduction of climate-resilient crops and species potentially including local crop varieties and livestock breeds.</td>
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<td>Art. 19</td>
<td>Farm and business development</td>
<td>Support to young farmers to introduce efficiency-oriented measures to optimize production processes. These may relate to on-farm or off-farm non-agricultural activities (e.g. land cultivation, energy consumption, and use of fertiliser and forage) Business plans including climate adaptation considerations and cost estimations. This is also relevant to Articles 38, 39, 40 (see below).</td>
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<tr>
<td>Art. 22</td>
<td>Afforestation and creation of woodland</td>
<td>In general, all afforestation measures are beneficial to mitigation. Where possible, attention should be given to measures with an optimal input/output ratio (i.e. investments in relation to carbon capture) taking in account location, soil quality, rapidness of tree growth etc. Forest management actions to preserve and improve the ecosystem services provided by forests which help with climate resilience (e.g. reduction of flood risk, erosion protection and soil buffering/ filtering functions).</td>
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<td>Art. 23</td>
<td>Establishment of agroforestry systems</td>
<td>Actions which reduce input intensity, energy demand and GHG emissions, because of improved efficiency of resource use through tree cover. Mixture of agriculture and forestry to improve soil protection, prevent erosion, improve water and soil quality, lessen water demand, and create shelter and shaded areas for livestock and crops.</td>
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<td>Art. 24</td>
<td>Prevention and restoration of damage to forests from forest fires and natural disasters and catastrophic events</td>
<td>Actions that prevent forest fires and mitigate impacts from fires and natural disasters. Protective infrastructure such as observation posts, forest roads, water reservoirs, fire resistant plants, forest maintenance and fire ecology infrastructure, remote sensing, post-fire protection installations (fascines) and forest protection belts.</td>
</tr>
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</table>
Agriculture adaptation... What?

- **Farming practices** that enhance resilience (choice of crops, varieties, farming systems)
- Support farmers’ transition through **advisory services**, technical assistance at sector and farm level to develop farm-level adaptation plan
- **Early warning systems**
- **Insurance schemes** (incentivising preventive action)
- Move away from compensation to prevention
- **Monitor economic losses**
Agriculture adaptation... How?

CAP Strategic plans

Green Architecture:
- Eco-schemes
- Sector support: e.g. Fruits and vegetables, Wine, ...
- Rural development (e.g. AECM, Investments)
- Risk management tools that support adaptation
- Advisory services

SWOT analysis and needs assessment to identify key vulnerabilities, risks and adaptation needs

Coherence & Consistency
Evaluation - Main findings

- relevant
- effective
- efficient
- coherent
- EU added value

Also, new developments since 2013:

- More extreme events (e.g. heatwaves, droughts, storms, wildfires 2x, floods 4x compared to 1980) – likelihood increased by climate change
- Higher future damage estimates (e.g. 10-fold increase for critical infrastructure by the end of the century)
- International context: Paris Agreement’s provisions on adaptation
Where to now...?

Knowledge generation and dissemination (including climate projections, shifts in crop suitability maps, varieties, technologies, ...)

Capacity building

Financial support for transformation (CAP, lending terms, Horizon 2020/Europe, LIFE, InvestEU, ...)

Insurance against disasters

Systematic adaptation planning and risk management

Monitoring developments to inform policy-making
# Adaptation and agriculture... Where to now?

<table>
<thead>
<tr>
<th><strong>Robustness</strong></th>
<th>marginal adjustments in response to perturbations and disturbances; with aim to maintain the same functions and desired level of outputs despite the occurrence of perturbations (ST recovery)</th>
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<tr>
<td><strong>Adaptability</strong></td>
<td>ability to adapt processes, structures and systems to constantly changing external drivers; with aim to increase the capacity to adjust responses to changing external drivers and internal processes and thereby allow for development along the current trajectory while continuing important functionalities - so the system becomes stronger (middle, long-term)</td>
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<td><strong>Transformability</strong></td>
<td>ability to develop fundamentally new values, rules and identities in response to uncertainties and disturbances that render the existing system untenable or dysfunctional; with aim at developing new systems (focus on long term)</td>
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</table>
Directorate-General for Climate Action ("DG CLIMA"): ec.europa.eu/clima

EU Strategy on Adaptation to Climate Change: ec.europa.eu/clima/policies/adaptation/index_en.htm

European Climate Adaptation Platform: climate-adapt.eea.europa.eu

Covenant of Mayors for Climate & Energy: www.eumayors.eu
Useful literature

Adaptation reports and guidance documents

- EEA (2019) - *Climate change adaptation in the agriculture sector in Europe*
- EU (2014) - *Mainstreaming climate change into rural development policy post 2013 Final Report*
- LIFE brochure (2019) *Ready, Steady, Green – LIFE helps farming and forestry adapt*
IPCC Climate Change and Land Report (2019)

<table>
<thead>
<tr>
<th>Response options based on land management</th>
<th>Mitigation</th>
<th>Adaptation</th>
<th>Desertification</th>
<th>Land Degradation</th>
<th>Food Security</th>
<th>Cost</th>
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<td>Improved cropland management</td>
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<td>Improved livestock management</td>
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<td>Agricultural diversification</td>
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<td>Improved grazing land management</td>
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Figure SPM.3 Potential global contribution of response options to mitigation, adaptation, combating desertification and land degradation, and enhancing food security.