

Medium-term Scenarios



“What-If” Scenarios on
Livestock Density Reduction and Climate Extremes in the EU

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JRC Mission

As the science and knowledge service of the European Commission our mission is to support EU policies with independent evidence throughout the whole policy cycle.

Scenarios on livestock density reduction: context and assumptions

Context

Assessing economic and environmental impacts of the reduction of total livestock units per ha of utilised agricultural area in the EU.

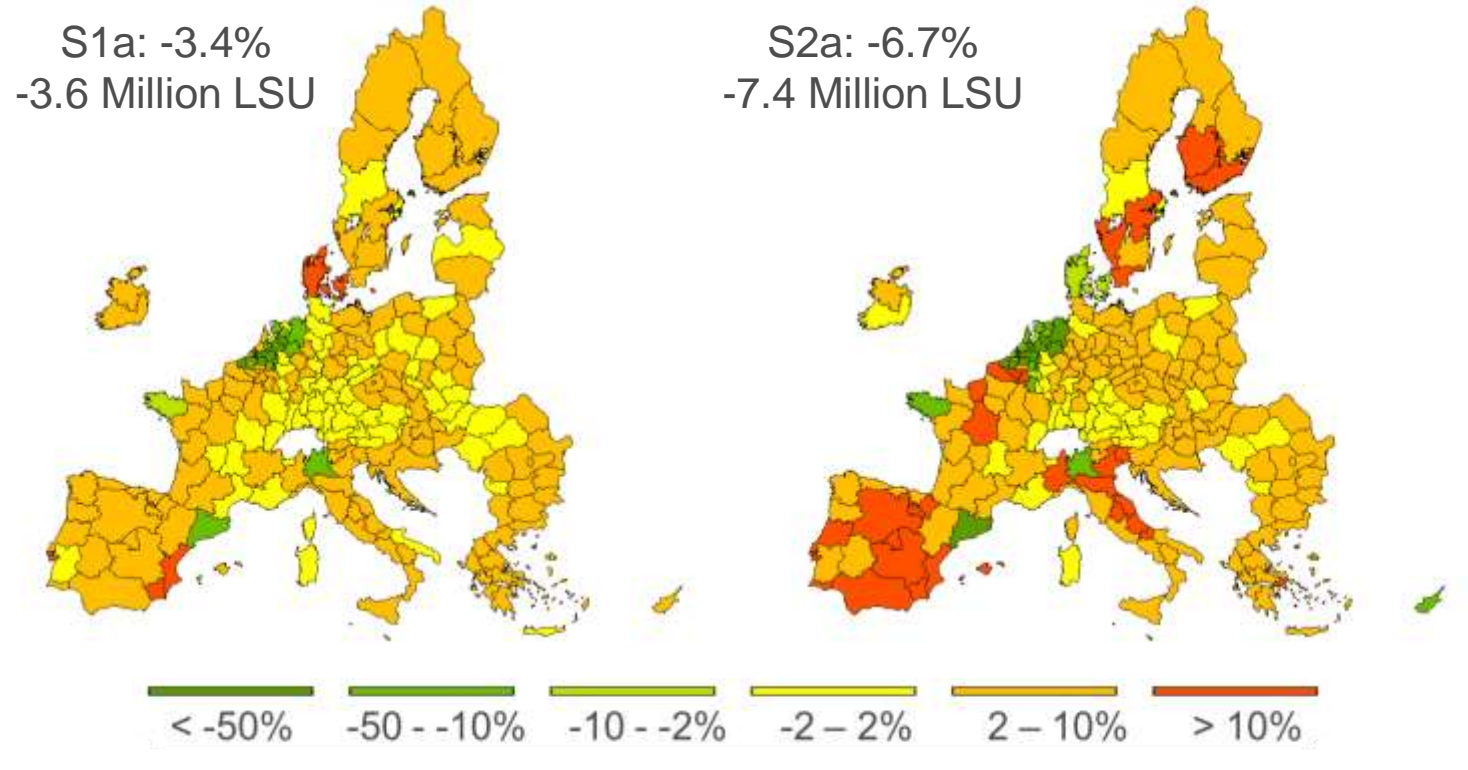
- This follows discussions on meeting requirements of Nitrates and Habitats directives.
- Reducing livestock density is one of the possible options contributing to reach the Farm to Fork goal of reducing nutrient losses by 50%.

Scenario assumptions

- **Reference:** Business-as-usual CAPRI projections for 2030
- **Scenario S1a:** max 2 livestock units per hectare at regional level
- **Scenario S2a:** max 1.4 livestock units per hectare at regional level

Scenarios on livestock density reduction: production impacts

Change in animal density

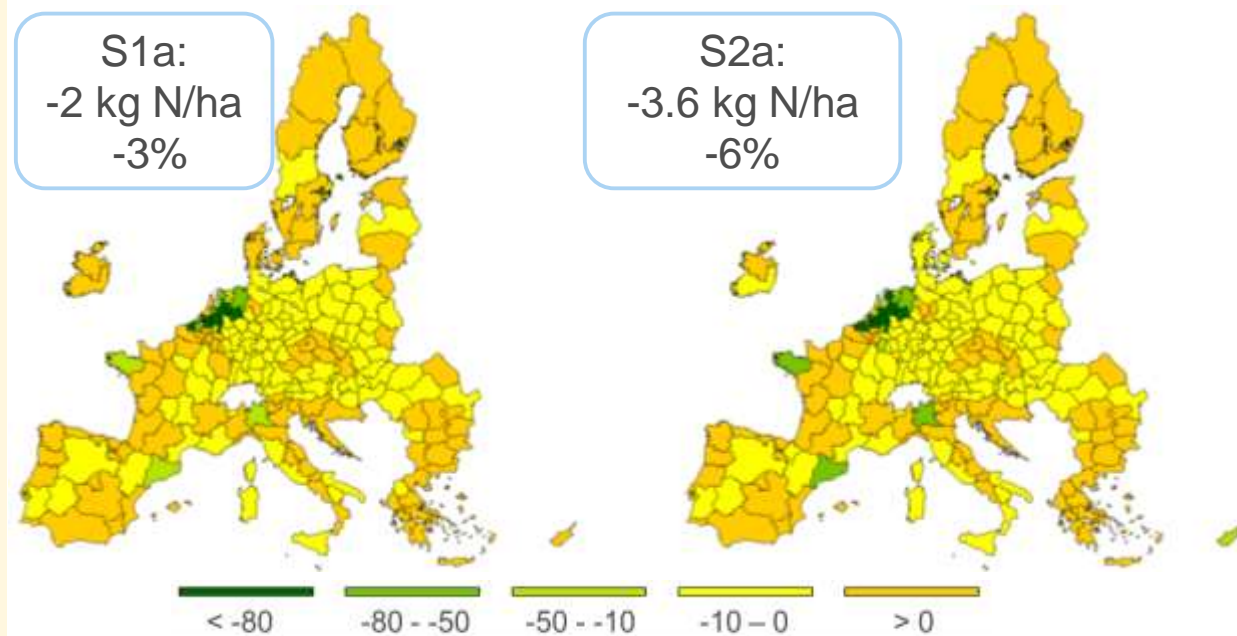


- Larger impact on pigs and poultry than on grazing livestock (i.e. cattle and sheep/goats).
- Regional hotspots in Netherlands, Belgium, Germany, Spain
- Crop production also decreases due to lower feed demand.

Impacts on animal products

- Prices increase, net exports decrease, consumption decrease.
- More pronounced for meat than dairy.

Scenario on livestock density reduction: environmental impacts



Change in nitrogen surplus

- Reduction in ammonia emissions from animals and mineral fertilisers (from -3% to -6%).
- Reduction in nitrate losses to the water (from -4% to -6%).
- High reduction of nitrate losses in some hotspot regions, e.g. Netherlands (up to -70%) and Belgium (up to -50%).

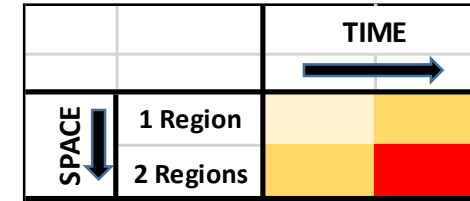
Change in GHG emissions

- GHG emissions (methane and nitrous oxide) could be reduced between 2% and 4%
- However, about 80% of the reduced EU emissions are offset by increasing emissions in other areas of the world (emission leakage).

Scenarios on climate extremes: context and assumptions

Context

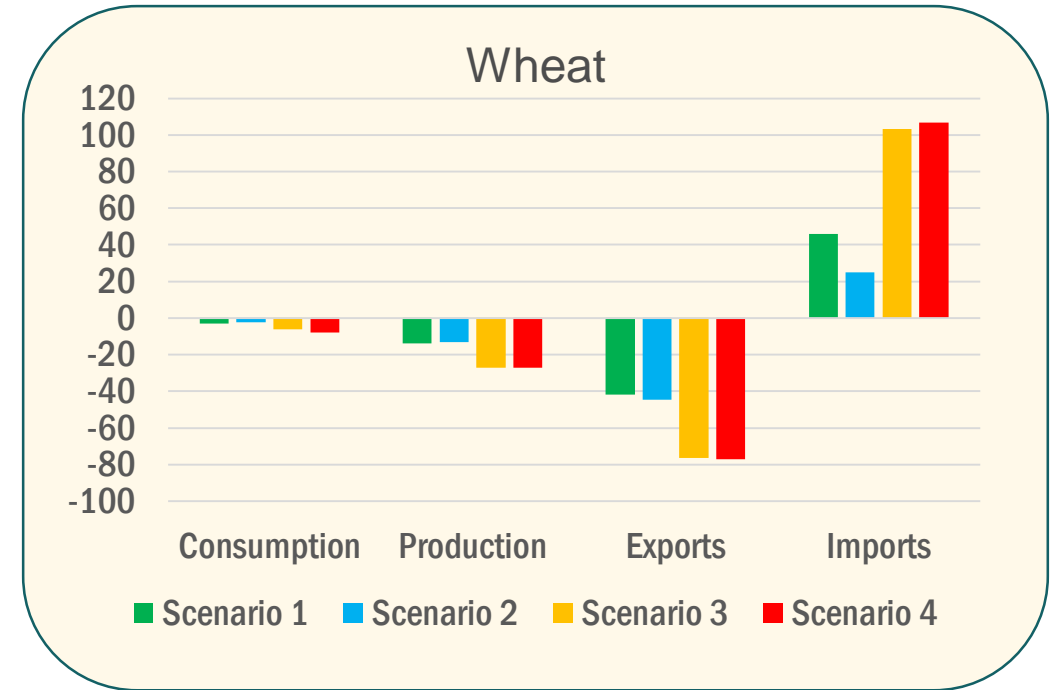
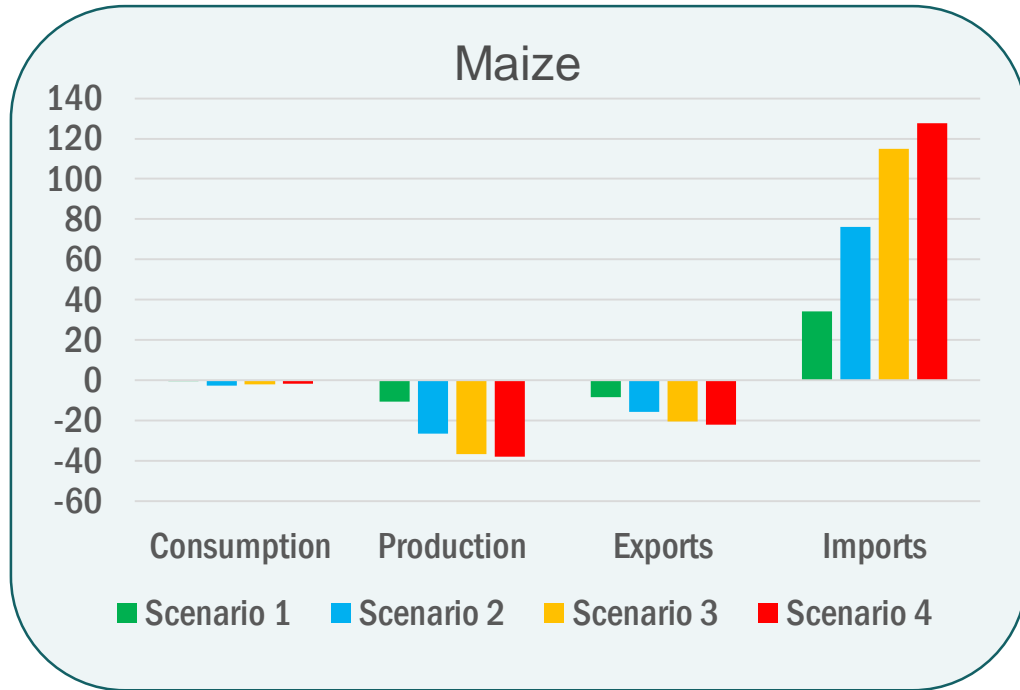
- Extreme adverse weather events are occurrences of unusually severe weather or climate conditions
- Adverse climate extremes are likely to increase in the future (IPCC 2021)
- Disruptions to EU and world ag. trade could be expected from:
 - *concurrent* climate extremes: extremes in several regions in one year
 - *recurrent* extremes: extremes in one or several regions in consecutive years
- Analysis of potential compound risks
- Crop yield extremes (proxy): average of the worst yield gaps for wheat and maize since 1993



Scenario assumptions

- **Reference:** EU Outlook 2022-2032
- **Scenario 1:** 2023 yields in EU-14 (*West*) decline for maize by -22% and wheat -21%
- **Scenario 2:** 2023 yields in EU-13 (*East*) decline for maize by -49% and wheat -37%
- **Scenario 3:** 2023 yields in EU-14 and EU-13 decline as in scenarios 1 & 2
- **Scenario 4:** 2023 and 2024 yields in EU14 and EU13 decline as in scenarios 1 & 2

Scenarios on climate extremes: agricultural markets



- ✓ Large effects on production (↓), exports (↓) and imports (↑)
- ✓ In Scenario 3 (concurrent events) imports increase more than in Scenarios 1 and 2 (single events)
- ✓ The compounding effect is stronger for wheat than for maize
- ✓ Trade helps buffering concurrent shocks (improves commodity availability domestically) but has limited capability to buffer additional recurrent events

Take-home messages

- The scenarios performed by the JRC provide some further insights to the baseline presented at this Conference
- For instance, livestock density reduction efforts could:
 - contribute to reduce nitrogen surplus (ammonia emissions and nitrates losses to the water), specially in hotspot regions.
 - have little effect on the reduction of GHG gases due to emission leakage to non-EU regions in the absence of other policies (e.g. carbon border adjustment mechanisms).
- Moreover, in the case of adverse climate extremes:
 - concurrent events could be much worse than extremes occurring in single regions
 - trade can help in buffering concurrent extremes but is less effective for recurrent events

Thank you



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