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3S1 Modeling the circular economy with sectoral and macro-economic models

The future of Dutch and EU agriculture in a global context

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This study focuses on assessing, by applying the MAGNET model, the consequences of a set of core issues that will likely determine the future of Dutch and EU agricultural economy, in the context of the Green deal and a world moving towards achieving ambitious reductions of greenhouse gas emissions, reducing food loss and waste, diet changes, and changes in preferences to local products (partly due to COVID-19). A core component of the study is to assess the consequences of the EU tackling these ambitious challenges unilaterally, or, in contrast, in lock-step with a global greening movement. If the EU goes green unilaterally the impact of CO₂ compensating import tariffs is considered to reduce leakage effects and maintain competitiveness of EU agriculture. The impact of the scenario's was calculated on a wide range of indicators (GDP, value added, employment, production, bilateral trade flows, land use, GHG emissions, agricultural prices, production factor income, etc.). This study was done at request of the Dutch Ministry of Agriculture, Nature and Food Quality, and involved multiple feedback rounds to ensure policy relevance of the results. Within this process a decomposition analysis was developed to identify the impact of each assumption on the overall result and this enabled a better science-policy dialogue.

The MAGNET model was run with four scenarios along two core axis: Trade and sustainability, with measures implemented either worldwide or for the EU in case of scenarios where only unilateral action from the EU was envisioned. The key indicators produced by the MAGNET scenarios show that primary animal production decreases for EU in all scenarios due to assumptions in diet change and CO₂-taxes, with light compensation in the plant sectors. Further observations are that the EU remains self-sufficient in all scenarios, especially because of strong position of the food processing industry. Additionally, for unilateral action from the EU, the agricultural industry can be supported by protective tariffs and export subsidies which help compensate the negative effects of unilateral implementation of the CO₂-tax.

From the 'subtotals' analysis it becomes immediately clear that, for the primary animal production, the diet change implementation actually has the largest effect at about -20% in any scenario. The second largest effect is the CO₂-tax implementation, which has, however a smaller effect when the whole world implements the same sustainability measures. This occurs due to the fact that, in our base data, the EU animal sector is

already more efficient in terms of greenhouse gas emissions and thus has a competitive advantage. A similar observation can be made for food waste reduction, which at its core reduces the need for production, but implemented unilaterally can also indicate a competitive advantage.

Keywords: Trade, Green Deal, Carbon tax, Food waste, Diet change