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The reshaping of European food systems through plant-rich diets

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Summary

European food systems are under growing pressure to meet international climate, biodiversity, and public health goals. Food systems account for roughly one-third of global greenhouse gas (GHG) emissions and agriculture occupies around half of the world's habitable land. A shift towards more plant-rich diets is one of the most effective ways to reduce the environmental footprint of food consumption, especially in European regions with higher consumption of animal-sourced foods. Alongside consumer choice, this transition depends on how agricultural policy, farm economics, and regional production structures respond to changing demand. This dissertation examines how a shift towards plant-rich diets would reshape the European Union and United Kingdom (EU+UK) food system, with particular attention to subsidies, fixed assets, and regional equity.

The central conclusion is that institutional, financial, and spatial lock-ins impede the European transition towards more plant-rich diets. The current food system gives producers strong incentives to continue producing animal-sourced foods, even though broader public objectives call for more sustainable and healthier food systems. Three interrelated barriers play an important role: Common Agricultural Policy (CAP) subsidy structures that favour animal-sourced food production, long-lived capital assets tied to animal systems, and large regional differences in vulnerability and transition capacity.

First, the CAP directs most food-related agricultural support towards animal-sourced food supply chains. When animal feed is included, €39 billion, representing 77–82% of food-related CAP subsidies, supports these supply chains. These same supply chains are also responsible for 84% of the GHG emissions associated with the EU+UK food system, while providing only 35% of calories and 65% of protein. CAP subsidies also account for 58% of total farm profits, illustrating how strongly farms depend on public support. The CAP supports farm incomes while also maintaining dependence on environmentally intensive production systems. This dependence slows the reallocation of land, labour, and capital towards food systems with lower environmental impacts. €6.8 billion, or 12% of CAP support, is associated with foods exported outside the EU, which complicates food-security justifications for that share of spending.

Second, a transition towards plant-rich diets could cause a substantial share of investments in animal-sourced food supply chains to lose economic value prematurely. Farmers and other supply-chain actors make long-term investments in buildings, machinery, breeding animals, and feed infrastructure designed around current demand for animal-sourced foods. Around 78% of fixed agricultural assets in the EU+UK are linked to these supply chains. When demand declines, some assets may become stranded before the end of their technical life. Scenario analysis indicates that €61–168 billion in fixed assets could be exposed to premature stranding. Under a gradual transition, normal depreciation could absorb part of the adjustment. Under an accelerated transition, approximately €99 billion in residual asset value could become stranded. Dietary transition is therefore also a matter of timing and cost allocation.

Third, the socio-economic consequences of dietary change are highly uneven across Europe. The analyses use the Planetary Health Diet, a healthy reference diet that, for the EU, entails approximately one-third as much dairy, half as many eggs, 30% less poultry meat, and about one-seventh as much red meat as currently consumed. The transition scenarios release 58–78 million hectares of agricultural land in the EU+UK and create €28–36 billion in fiscal space for repurposing CAP support. At the same time, animal-dependent regions such as Brittany and Lower Saxony may experience substantial declines in employment and farm profits, while regions with larger plant-based sectors,

such as Andalusia, may benefit. A new regionalisation method maps such differences within countries. A typology of transition archetypes groups regions according to their sectoral composition, unsubsidised profitability, and exposure to reduced demand for animal-sourced foods. The analysis shows that livestock-loss-dominated systems can benefit from the contraction of chronically loss-making animal production, while livestock-profit-dominated systems face sharp declines in profits or employment. More diversified systems may gain as plant sectors expand and farm profits grow.

The broader policy implication is that reforming the European food system requires more than consumer-oriented measures such as dietary guidelines promoting plant-rich diets. Policy should redirect CAP support away from maintaining environmentally intensive production systems and towards public goods and transition outcomes, support farmers in managing the depreciating, phase-out, and repurposing of assets linked to animal-sourced food production, and provide spatially differentiated transition support for affected farmers and regions. A more sustainable European food system is technically possible, but its political feasibility depends on how fairly and strategically the costs and opportunities of the transition are managed.