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Manuscript on the role of behavioural drivers for the design of economic policy interventions to reduce greenhouse gas (GHG) emissions from agriculture

Work Package № 3 (Agri-Environmental policy experimentation)

Executive summary

This manuscript, prepared under Work Package 3 (WP3) of the VISIONARY project, contributes to the overarching aim of identifying policy levers that can support transitions towards sustainable farming and food systems in Europe. WP3 investigates how behavioural approaches and experimental methods can help design effective agri-environmental policy interventions to address three key transition challenges: climate neutrality, halting biodiversity loss, and improving water quality. In this context, the manuscript focuses on the role of behavioural drivers — cognitive, social, and dispositional factors that shape human decision-making — in determining farmers' responses to economic policy instruments designed to reduce greenhouse gas (GHG) emissions from agriculture.

The manuscript presents findings from two complementary experimental studies. The first study investigates Italian dairy farmers' preferences for alternative payment schemes aimed at incentivising the adoption of essential oil feed supplements to reduce enteric methane emissions. Using a lab-in-the-field experiment with 120 farmers in the Autonomous Province of Trento, it elicits willingness to accept Action-Based Payments (ABPs), Results-Based Payments (RBPs) framed either as an Agri-Environmental Climate Scheme or a voluntary carbon market, and Hybrid Payment (HP) designs combining both components. The second study examines Danish farmers' beliefs about the economic impacts of a CO_2e tax on agriculture and tests whether providing expert information can reduce misperceptions and increase policy support. It draws on a randomised survey experiment with 981 farmers, conducted in the context of Denmark's actual CO_2e tax proposals at both high (750 DKK/tonne) and low (125 DKK/tonne) stringency levels.

The results demonstrate that behavioural drivers are central mediators of farmers' acceptance of climate policy instruments. Italian dairy farmers show a general preference for ABPs over RBPs, driven by familiarity, certainty preference, and reduced complexity, though acceptance of innovative payment mechanisms improves substantially when pro-environmental attitudes are present, risk aversion is lower, and farmers have higher perceived behavioural control over the implementation of new practices, and when RBPs are introduced in hybrid formats alongside conventional subsidies. Notably, farmers' responses to hybrid schemes are more coherent when paired with an AECS framing than with a voluntary carbon market framing, suggesting that pure market mechanisms create additional psychological barriers. Danish farmers systematically and substantially overestimate the negative economic impacts of the CO_2e tax — by a factor of up to three relative to expert estimates — and this perception gap represents a key driver of policy opposition. Expert information partially reduces these misperceptions and increases tax support, but the effect is heterogeneous: smaller farms and crop producers respond more readily, while larger farms and livestock producers exhibit limited belief revision, consistent with motivated reasoning. The study also finds that opposition to the carbon tax can paradoxically increase openness to an agricultural ETS scheme, pointing to a policy substitution effect with important implications for policy sequencing. Together, these findings highlight that achieving agricultural GHG reductions requires policy designs that account for behavioural realities, including uncertainty aversion, belief biases, and farmer heterogeneity, thereby contributing to VISIONARY's broader objective of identifying how policy design can facilitate sustainability transitions in diverse socio-ecological contexts.