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Mitigating Agricultural Impacts on Water Quality through Research and Knowledge Exchange

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Identifying pressures

The WaterMARKE project investigated ways in which the complementary use of research and knowledge exchange can achieve greater uptake of farm-level water quality mitigation measures to improve water quality as required by the Water Framework Directive.

Agricultural activities can impact water quality when nutrients, sediments and pesticides leave the soil and enter our waterways. Nutrients such as nitrogen (nitrates) can leach downwards through light soils into groundwater, while phosphorus and sediment can be lost through overland flow over heavy/peat soils. In terms of mitigation, the biological mechanisms of nutrient and sediment loss to water are complex and site specific, making them difficult to overcome. Farm mitigation measures to "break the pathway" may be less technologically complex, but may involve the implementation of new practices, facilitated by advisory supports.

Given this context, uncovering the scientific, economic and behavioural barriers that prevent farmers from adopting practices that can improve water quality is critical so that policymakers can shape future strategies more effectively.

Informing policy

WaterMARKE addressed water quality improvement using a multidisciplinary approach incorporating (1) systems analysis of the actors and incentives that influence farm practices impacting water quality, (2) spatial analysis of the effects of rural activity on water quality, (c) economic analyses of the factors impacting adoption of measures by farmers, and (d) socio-economic and behavioural psychology studies to identify pro-environmental behavioural drivers of water quality improvement.

In particular, the research findings emphasised the importance of innovative and collaborative "system-wide" efforts to foster meaningful change at farm level across government departments, researchers, co-operatives, advisers and farming organisations.

A case study of the impact of increased collaboration and innovation across the system of actors (stakeholders) was documented in a short video by WaterMARKE and CAP Network Ireland, which shows the "systemic" collaboration between the Local Authority Waters Programme, the Agricultural Sustainability Support and Advisory Programme and farmers to improve bathing water quality at Lough Ennell, County Westmeath.

To continue developing such innovations across the water quality improvement system, actors need to allocate time for reflexive thinking to allow for wider participation and the development of trust.

Developing solutions

WaterMARKE demonstrated the importance of behavioural drivers in improving farm-level adoption of mitigation measures.

As expected, financial and transaction (hassle, training) costs were barriers to adoption. Loss of productive area (opportunity costs) varied according to farm system and location.

Know-how and farmer norms were particularly important drivers of behaviour. It was found that farmers required adviser support to identify farm-level water quality risks and to understand the technicalities and time/financial resources required to implement measures. Farmers were also more likely to adopt familiar measures that they felt they had the capacity to undertake and would be approved of by other farmers. Leveraging these positive behavioural drivers could be achieved though group events facilitated by advisers and run jointly with influential farmers who have successfully implemented measures in areas where other farmers are also undertaking measures.

The research highlighted the crucial role of trust between advisers and farmers. However, advisers stated they need support both in upskilling, due to the complexity of water quality mitigation, and in allocating time to addressing water quality awareness and improvement with their farmer clients.

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