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Specific Management and Robust Targeting of Riparian Buffer Zones

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Identifying pressures

The pollution of surface waters and groundwaters is a key environmental challenge for agri-ecosystems. Globally, water quality has declined over the last five decades. In the European Union, over half of surface waters are of less than "good ecological status", the minimum threshold required under the EU Water Framework Directive.

In order to halt declining water quality and improve aquatic and riparian habitat conditions, numerous mitigation measures have been implemented in recent decades. These measures typically aim to address the source–mobilisation–delivery process, either by undertaking mitigation to reduce the source of the pollutant or by "breaking the pathway" between source and receptor (e.g. the river). Measures targeting the riparian land–water interface have the potential to break the pathway, delivering water quality benefits along with a wide range of ecosystem services.

Although widely implemented, riparian mitigation approaches have frequently been established without due regard to the "Right Measure, Right Place" concept. The aim of the Specific Management and Robust Targeting of Riparian Buffer Zones (SMARTER_BufferZ) project was to support optimal targeting and management of riparian margins, within an agricultural context, for the effective management of Irish rivers.

Informing policy

A key tenet of Ireland's River Basin Management Plan (2022–2027) is to apply the right measure in the right place to protect and improve Irish waters.

To support stakeholders in identifying the right measures for riparian management, the SMARTER_BufferZ project identified and evaluated alternative riparian mitigation measures appropriate for Irish conditions. A riparian measures database was published containing a summary of the measures, details on their wider ecosystem benefits and an assessment of their effectiveness.

The project built on the work of the DiffuseTools project to develop tools for identifying locations where mitigation measures would have maximum impact. By coupling insights on ideal locations with target actions and knowledge on the measures that could be used, the project developed tools to identify the appropriate mitigation measures for each location. These tools used landscape context to prioritise the 16 mitigation measures identified. Using the tool ensures a consistent framework for applying rules and informing decisions on appropriate or inappropriate measures based on user inputs.

The outputs from SMARTER_BufferZ can support policymakers and catchment managers to expand beyond traditional riparian mitigation approaches.

Developing solutions

The SMARTER_BufferZ project aimed to develop a framework for the optimal targeting and management of riparian margins, within an agricultural context, for the effective management of Irish rivers. To achieve water quality objectives set out in the Water Framework Directive, mitigation measures addressing both individual delivery points within a field and collective delivery from sub-catchment areas should be considered, along with management actions to reduce the source of a pollutant.

This project has highlighted the potential of implementing new measures that are more effective than traditional grass buffers. However, there is little in the way of demonstration of such measures in an Irish context. The use of "demonstration farms" to demonstrate each of the 16 measures from the SMARTER_BufferZ database would help showcase the concepts behind these measures.

Lessons learned from the SMARTER_BufferZ project will play a key role in achieving water quality objectives. Developments in identifying and assessing riparian measures, coupled with tools to support the targeting of measures, can help to inform future projects and achieve targets under policies such as the Common Agricultural Policy and the Water Framework Directive.

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