



Stakeholder co-development of farm level nutrient management software

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Over the last number of decades intensification in the use nitrogen (N) and phosphorus (P) in agricultural production has led to excessive accumulations of these nutrients in soils, groundwaters and surface water bodies (Sutton et al., 2011). According to the European Environment Agency (2012) despite some progress diffuse pollution from agriculture is still significant in more than 40% of Europe's water bodies in rivers and coastal waters, and in one third of the water bodies in lakes and transitional waters. Recently it was estimated that approximately 29% of monitored river channel length is polluted to some degree across the Republic of Ireland. Agricultural sources were suspected in 47 per cent of cases (EPA, 2012).

Farm level management practices to reduce nutrient transfers from agricultural land to watercourses can be divided into source reduction and source interception approaches (Ribaudo et al., 2001). Source interception approaches involve capturing nutrients post mobilisation through policy instruments such as riparian buffer zones or wetlands. Conversely, the source reduction approach is preventative in nature and promotes strict management of nutrient at farm and field level to reduce risk of mobilisation in the first instance. This has the potential to deliver a double dividend of reduced nutrient loss to the wider ecosystem while maximising economic return to agricultural production at the field and farm levels.

Adoption and use of nutrient management plans among farmers is far from the norm. This research engages key farmer and extension stakeholders to explore how current nutrient management planning software and outputs should be developed to make it more user friendly and usable in a practical way. An open innovation technology co-development approach was adopted to investigate what is demanded by the end users - farm advisors and farmers. Open innovation is a knowledge management strategy that uses the input of stakeholders to improve internal innovation processes. Open innovation incorporates processes such as 'user-led' (farmer and advisor) innovation and the 'co-development' (by technologists and users) of a technology. This strategy is increasingly used by a variety of organisations across sectors to try to ensure that the use of their outputs (products/services/technologies) is optimised by their target customers/clients, by incorporating user insights into the development of outputs. This research use the open innovation co-development framework through farmer and farm advisor focus group sessions to inform the development of a desirable software package for nutrient management planners (farm advisors) and desirable output formats for the end user (farmers).

References

- Sutton, M., Oenema, O., Erisman, J. W., Leip, A., Grinsven, H. & Winiwarter, W. 2011. Too much of a good thing. *Nature*, 472, 159-161.
- European Environment Agency, 2012. European waters — assessment of status and pressures.
- Environmental Protection Agency, 2012. Ireland's Environment: An assessment 2012.
- Ribaudo, M.O., Heimlich, R., Claassen, R., Peters, M., 2001. Least-cost management of nonpoint source pollution: source reduction versus interception strategies for controlling nitrogen loss in the Mississippi Basin. *Ecological Economics*, 37, 183-197.