Nutrient dynamics in Scottish livestock supply chains

SRUC

The Challenge

Balancing nutrient dynamics in crop and livestock production is one of agriculture's main challenges. In livestock systems, sufficient nutrition is essential for good animal performance, but as in crop production, nutrient oversupply should be avoided to minimise harmful emissions and inefficiency. This study developed a modelling framework to analyse the spatial distribution and hotspots of agricultural nutrient dynamics in Scotland.

Policy Implication

This modelling framework helps to identify spatial hotspots of Scottish agricultural nutrient flows, including areas with highest risk of nutrient leaching and highest potential for nutrient recycling. This can be used as a tool to investigate effects of system changes (e.g. herd structure, feeding, manure management) on nutrient dynamics in Scotland. Areas where high nutrient demand (crop production) and nutrient output (from animal production) overlap indicate a high potential to re-use nutrients excreted by livestock.

Research

The nutrient dynamics within cattle, sheep, pig and chicken production in Scotland, was quantified using the Scottish Agricultural Emission Model (SAEM). Nutrient excretion and the nutrient demand of plants in Scotland were quantified. Fertilizer use was obtained from the British Survey of Fertiliser Practice, agricultural census data were used to evaluate spatial distribution of crops and grassland.

Results

High fertilizer demand is mainly located in cereal production areas. These areas partly overlap with livestock production, where lots of Nitrogen (N) is excreted. Areas where the Potassium (P) excretion exceeds the P demand in crop and grass production are mainly located in south-western Scotland. In contrast, major parts of the agricultural production areas in eastern Scotland show P surplus, i.e. the fertilizer demand exceeds the amount of P excreted by livestock.

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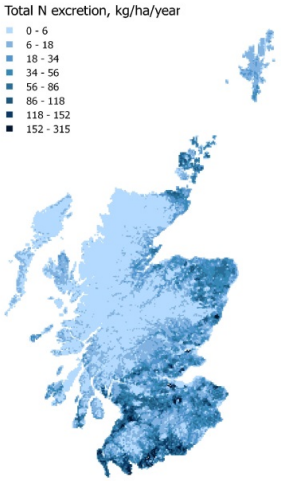

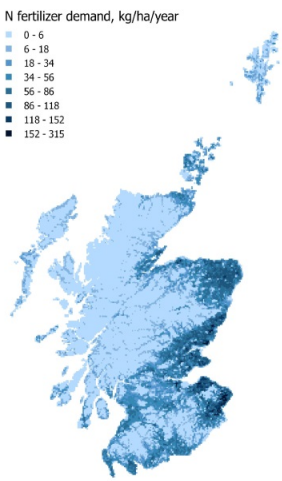

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About

The Land Economy, Environment and Society (LEES) Research Group is one of the largest groupings of economists and social scientists working in the rural, agricultural and land based sectors in the UK. Our vision is to be recognised as one of the leading centres for agricultural and wider rural economic and social research globally, benefiting the land use sector, the environment and rural communities.