

Targeted regulation and land use: Implications for pesticide usage and nitrogen leakage.

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Arable production have unintended environmental consequences, which can be mitigated through regulation. Targeted regulation has received increasing attention as the most cost-effective way of achieving environmental goals. By targeting regulation, costs in terms of foregone food and fodder production can be minimized while producing environmental benefits.

Traditionally, political attention lies with land management changes and conversion of arable land to non-cultivated land uses such as set-a-side, forestation, wetlands or buffer zones. However, dependent on current crop type choices, these land conversions entail very diverse environmental implications.

From a welfare economic point of view it is important to target regulation to where the abatement is most cost-effective. In environmental policy, often more than one environmental objective is important, and since the optimal land use changes and abatement measures is likely to depend on the environmental objectives, the weighting of objectives will influence the choice of abatement measures and the spatial location of these.

In Denmark, nitrogen leakage as well as pesticide usage are in focus for environmental regulation. We study the interdependence between nitrogen leakage and pesticide deposits on arable land. To that aim, we set up a multi-objective optimization model, using detailed spatial information on geographical attributes as well as current land use, to find socially optimal land conversion choices in terms of the spatial location of abatement measures. Ultimately, the results indicate ways to balance environmental considerations in targeted regulation land use by assessments of potential trade-offs and conflicts.