

Farmer preferences for measures to reduce nitrogen losses to the water environment in Denmark

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Abstract

Restructuring of nitrogen (N) regulation in agriculture from general to a targeted regulation is currently debated.

In 2013 the Commission on Nature and Agriculture proposed that targeted regulation, optimising production in environmentally robust areas and extensifying production on more vulnerable areas, would generate overall societal benefits. A non-tradable N-quota was suggested calculated for all farms differentiated by N retention, chosen crop types and the vulnerability of the nearby water ecosystem. Each farmer would comply with the N-quota by reducing inputs or by choosing documented N-measures to reduce N-losses (The Commission on Nature and Agriculture 2013).

A number of regulatory approaches have since been suggested. In February 2015, the Danish Economic Council proposed a new Danish targeted policy instrument combining an N-tax and a tradable N-quota. Other regulatory approaches suggested in the last years are the N-measure model (c.f. in Danish: "Virkemiddelmodellen") from the Environmental Protection Agency and the Nature Agency and the Leaching-model (cf. in Danish: "Udledningsmodellen") from the Danish Agriculture and Food Council (Miljøstyrelsen 2014).

Farmers preferences for N-reduction measures will have a large impact on the land use and environmental outcomes as N-measures such as catch crops, wetland areas and burning of manure have very different impacts on the landscapes visual appearance, recreational possibilities, and on biodiversity. This is important as society's expectation of what farming should deliver has been changing rapidly the last few decades. There is now a strong public desire to see farming moving away from a single objective production focus towards a multi-functional role delivering non-marketed goods as well as traditional produce (Macgregor & Warren, 2006).

In this study we analyse farmer preferences for different N-reduction measures by asking farmers to rank a variety of defined N reduction measures. The measures chosen are from the Danish Catalogue for Nitrogen Reduction Measures selected for use in the implementation process of the Water Framework Directive (Eriksen et al. 2014). The measures cover e.g. energy crops, catch crops, and buffer zones, early sowing of winter wheat and constructed wetlands

One hypothesis is, that farmers generally prefer measures which changes their existing land use structure less and in general deselect measures where area are taken out of production. The last mentioned are measures such as wetlands and buffer zones and the first mentioned are measures such as catch crops and early sowing. However, a lot of attributes might influence on farmers choices (see e.g. Barnes et al. 2009, Buckley 2012, Yazdanpanah et al. 2014). Therefore, besides ranking of N-reduction measures we ask farmers to respond to a range of statements about attitudes towards N-leaching and the water environment, towards N-reduction measures in general and N-application quotas. Furthermore, they are asked about their goals for the future and a variety of background questions about their agricultural area and husbandry production.

From farmers' choices and background information it is possible to cluster farmers into farm typologies. This is also done by e.g. Barnes et al. (2011) as .."the benefit of providing a typology also

allows an understanding of the general approach to water quality management of producers..”.. “..and, thus, can identify appropriate information strategies for various types who may effectively block efficient delivery of policy targets [p. 478]”. Relating farmers to typologies and ranking results gives the possibility to scale up the results for a whole catchment and thereby give an estimate of the resulting landscape preferred by different farm typologies.

This kind of bottom-up analysis is important at a stage where Denmark and other countries in the European Union are designing N policies to comply with the WFD directive in a more flexible way.

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