The Danish nitrogen footprint - Applying nitrogen footprints and using policy scenarios to change consumption behavior

Summary

The first, preliminary Danish nitrogen footprint tool is calculated as part of the DNMARK project. The tool is used to demonstrate how footprint tools can help assessing different strategies to reduce the Danish nitrogen footprint, from both the policy and regulatory arena perspective and from the general consumer side.

Conclusion

- Individual and institutional food choices and behavior are a major driver of nitrogen pollution.
- Changing consumption patterns could reduce N pollution, and one way to change consumption patterns is by raising awareness of human pollution and resource consumption through the use of the Nitrogen footprint.
- The Danish nitrogen footprint is under development.

Background and methods

The nitrogen footprint is a calculation of the nitrogen embedded in our everyday consumption of food, energy, transportation and services & goods. The nitrogen footprint methodology was developed by the nitrogen footprint team: http://www.n-print.org/, where the definition of an nitrogen footprint was first outlined: "*the total amount of reactive nitrogen released to the environment as a result of an entity's resource consumption, expressed in total units of reactive nitrogen*". The nitrogen footprint is calculated based on food intake (i.e., FAO estimates of protein, food supply and food waste) and the amount of nitrogen lost during the production of that food, presented as virtual nitrogen factors. Virtual nitrogen factors includes losses such as fertilizer not incorporated into the plant, crop residues, processing waste, etc. The energy component of the nitrogen footprint (i.e., the nitrogen released from fossil fuel combustion) is calculated using average rates of energy consumption and country-specific emission factors for Denmark.

Results

The Danish nitrogen footprint is still under development, however preliminary results (using Virtual Nitrogen Factors from Netherlands with Danish data) show many similarities with comparable European countries. The average Danish nitrogen footprint from this preliminary analysis is comparable with the German and Netherlands footprint around 25 kg nitrogen capita^{-1} yr^{-1} and is above the recommended nitrogen footprint. Virtual nitrogen factors for Denmark will be developed for a comprehensive average footprint calculation.

Recommendations and perspectives

The development of the first Danish nitrogen footprint is part of the www.dNmark.org research alliance and the N-print project, where the goal is to include the Danish nitrogen footprint onto the N-Print web platform, so that Danish citizens can calculate their nitrogen footprint and compare it to the average Danish per capita nitrogen footprint, and thereby help describing human impacts on the environment.

One of the objectives of this research is to explore how we can reduce our nitrogen footprint and the ambition is to try to build awareness of the consumer's role in this sustainability challenge. Assessing how to reduce the nitrogen footprint will be investigated through examination of how different agro-environmental regulations and policy scenarios affect the nitrogen footprint. The policy scenarios will be used to show how different agro-environmental regulations and policies effect the N-print, by for example supporting more organic production; how waste water treatment (policies on recirculation of sludge/biosolids) can reduce the footprint, how different energy and transportation policy scenarios effect the footprint, and how policies towards more recirculation of food waste can reduce the footprint etc.

Eating less meat, flying less, usage of public transport and reduction of energy usage are important actions at the individual level. These everyday actions must be combined with political interventions and the political actions, instruments and regulations must be based on the fact that we, as citizens demand that the good choice also is the easy choice. Here different policy scenarios are evaluated on their potential to support a more sustainable agri-food system and reduce the nitrogen footprint.

More information

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