

Session 10 – Petersen

Effects of fertiliser type and crop rotation on nitrous oxide emissions from soil

Nitrous oxide emissions from agricultural soils in Denmark are currently estimated using an emission factor of 1% proposed by the IPCC. This assumes that 1% of the total nitrogen (N) in mineral fertilisers, livestock manure or crop residues is emitted to the atmosphere as nitrous oxide (N₂O). Field studies indicate that in Denmark the actual emissions are lower, and that it would be relevant to develop national emission factors for fertiliser types and management practices. Regional differences in soil type, annual precipitation, crop and livestock production, and recommended fertiliser application rates, are all factors which should be represented in a monitoring program. The potential for N₂O emissions from manure is more difficult to predict than emissions from mineral N sources, and it may be modified by manure treatments such as anaerobic digestion, separation or amendment of a nitrification inhibitor. Also, emissions from both mineral fertilisers and manure may interact with the decomposition of (catch) crop residues, and with soil conditions at the time of application. For these reasons, it is important to determine national emission factors at the level of crop rotation, where the soil has a relevant prehistory, and to compare N₂O emissions after application of different fertilisers and manure types in different years.