Geophysical Research Abstracts
Vol. 19, EGU2017-11200, 2017
EGU General Assembly 2017

Developing methodologies for estimation of manure across livestock systems using agricultural census data

Mohammad I. Khalil (1), John Muldowney (2), and Bruce Osborne (1)

(1) UCD School of Biology & Environmental Science and UCD Earth Institute,University College Dublin, Dublin 4, Ireland (ibrahim.khalil@ucd.ie), (2) Department of Agriculture, Food and the Marine (DAFM), Port Laoise, Ireland.

Livestock production and management-induced emissions of greenhouse gases (GHGs), comprising 18% of total global anthropogenic emissions together with air pollutants, have major atmospheric and ecosystem-related impacts. Identification of categorical/sub-categorical hotspots associated with these emissions and the estimation of emissions factors (EFs), including the use of the Intergovernmental Panel on Climate Change defaults (Tier 1), are key objectives in the preparation of reasonable, and transparent national reporting inventories (Tier 2). They also provide a basis for assessment of technological/management approaches for emissions reduction. For this, data on manure (solid/FYM and slurry/liquid) production across livestock categories, housing types and periods, storage types and application methodologies are required. However, relevant agricultural activity data are not sufficient to quantify the proportion and timing of the amounts of manure applied to major land use types and for different seasons. We have used the recent Census of Agriculture survey data 2010, collected by the Central Statistics Office, Ireland. Based on the compiled datasheets, several steps have been taken to generate missing information (e.g., number of individual livestock categories/subcategories) and to develop methodologies for calculating the proportion of slurry and manure production and application across farm categories. Among livestock categories, the proportion (%) of slurry over solids was higher for pigs (99:1) than the proportion derived from cattle (61:39). Solid manure production from other livestock systems derived mostly from loose-bedded houses. There were large differences between the proportions estimated using the number of farms and the livestock population. A major proportion of the slurry was applied to grassland (97 vs. 73) and the amounts applied in spring and summer were similar (40-42 vs. 36-39), but significantly higher than the autumn application (18 vs. 24). Similarly, most solid manure was applied to grassland (90 vs.77) with more applied during autumn (49 vs. 26), and the spring application was larger (31 vs. 61) than the summer application (21 vs. 13). Among the application methods used for slurry and solid manure, farmers mostly used splash plate and side discharge (90 and 60%, respectively) methods. Nationally, the total estimated (no. of places vs. population) amount of slurry from cattle and pigs for 2010 was 30.9 vs. 32.1 Mm3 and for solid manure was 319.8 vs. 320.3 Mm3 included sheep, poultry, goats and horses. The analysis indicates significant deficiencies in the available information, including discrepancies in the number of available places in relation to the total population during the housing period (key categories vs. poultry), and the methods of slurry, and solid manure application. Expert advice and the collection of information from other verifiable sources will be required before the information can be made acceptable to users.