DATAMAN: A global database of methane, nitrous oxide, and ammonia emission factors for livestock housing and outdoor storage of manure

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Abstract

Livestock manure management systems can be significant sources of nitrous oxide (N_2O), methane (CH_4), and ammonia (NH_3) emissions. Many studies have been conducted to improve our understanding of the emission processes and to identify influential variables in order to develop mitigation techniques adapted to each manure management step (animal housing, outdoor storage, and manure spreading to land). The international project DATAMAN (http://www.dataman.co.nz) aims to develop a global database on greenhouse gases (N_2O, CH_4) and NH_3 emissions from the manure management chain to refine emission factors (EFs) for national greenhouse gas and NH_3 inventories. This paper describes the housing and outdoor storage components of this database. Relevant information for different animal categories, manure types, livestock buildings, outdoor storage, and climatic conditions was collated from published peer-reviewed research, conference papers, and existing databases published between 1995 and 2021. In the housing database, 2024 EFs were collated (63% for NH_3, 19.5% for CH_4, and 17.5% for N_2O). The storage database contains 654 NH_3 EFs from 16 countries, 243 CH_4 EFs from 13 countries, and 421 N_2O EFs from 17 countries. Across all gases, dairy cattle and swine production in temperate climate zones are the most represented animal and climate categories. As for the housing database, the number of EFs for the tropical climate zone is under-represented. The DATAMAN database can be used for the refinement of national inventories and better assessment of the cost-effectiveness of a range of mitigation strategies.

References/ Publications