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Assessment of greenhouse GAS emissions from cattle's manure, management: the case of Mufindi District, Iringa. Tanzania

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Livestock is an important asset to many families in Iringa. It plays a crucial role in the family economy through selling and using livestock by products. However, if livestock excretions are not well managed, environmental impacts such as GHG emissions are inevitable. This study assessed the GHG emissions-Methane and Nitrous Oxide from cattle's manure management in Mufindi District, Iringa Tanzania. The objectives of the study were threefold: to examine cattle distribution, to estimate CH₄ and N₂O emissions from manure management and to assess the variations of CH₄ and N₂O emissions in the district. Data for this study such as climate, cattle population, animal live weight, milk samples and manure management methods were collected through remote sensing, questionnaire, GPS surveying, cattle live weight measurement, milk sample collection and document review such as 2006 IPCC guidelines, cattle distribution was classified using ArcGIS 10.4.1 software and mapped on the basis of indigenous and daily cattle, and cattle per square bolometer (cattle density). Estimation of GHG emissions was done in 2016 MS. Excel using improved Tier I approach. Reference was made to the 2006 IPCC guidelines for national GHG emissions inventories for calculations of CH₄ and N₂O from manure management. The estimated GHG emissions were exported to a shapefile of Mufindi district in ArcGIS 10.4.1 and the variation of CH₄ and N₂O emissions were assessed by wards. The findings show uneven distribution of cattle in Mufindi district. Ikweha ward had the highest number of cattle (134559) while M/Tazara had the lowest (43). The results also reveal a significant contribution of different animal groups to total emission. The two great emitters of CH₄ were bulls at 0.109 Gg CH₄ yr⁻¹ cows at 0.661 Gg CH₄ yr⁻¹. In N₂O emission from manure, bulls produced 0.0004 Gg N₂O yr⁻¹ followed by cows with an emission estimates of 0.0021 Gg N₂O yr⁻¹. Variation of emissions by wards; Ifwagi ward has the highest dairy cattle emissions while Ikweha ward was seen to emit highest from indigenous cattle. The study concludes that poor manure management enhances emissions of GHGs. To minimize emissions this study proposes use of manure for biogas generation, quick removal of manure from the confinement, separation of solid and liquid manure and covering; which are socially, environmentally and economically viable for the farmers to adopt during manure management.