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Comparative Assessment of Carbon Footprint of Four Dairy Farms in Australia using DairyGHG Model

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Abstract: DairyGHG model is a cost effective and efficient method of estimating greenhouse gas (GHG) emissions from dairy farms and analyzing how management strategies affect these emissions. Therefore, the DairyGHG model was used in this study to predict the GHG emission and assess the carbon footprints of four different dairy farms at Australia. The study was conducted in four different dairy farms distributed in different locality of Queensland, Australia. The details of the farms are: Farm 1 (220 cows; Jersey), Farm 2 (460 cows; Holstein Friesian), Farm 3 (850 cows; Holstein Friesian) and Farm 4 (434 cows; Holstein Friesian). In all the four farms the cows were fed corn silage, grain and the animals had access to grazing. The animal emission contribution to carbon footprints in Farm 1, Farm 2, Farm 3 and Farm 4 were 54.2\%, 60.0\%, 59.6\% and 38.6\% respectively. Likewise, the manure emission contribution to carbon footprints in Farm 1, Farm 2, Farm 3 and Farm 4 were 29.0\%, 29.0\% and 58.3\% respectively. On the basis of per kg of energy corrected milk the amount of GHG produced in Farm 1, Farm 2, Farm 3 and Farm 4 are 0.39 kg CO\textsubscript{2}e, 0.64 kg CO\textsubscript{2}e, 0.54 kg CO\textsubscript{2}e and 1.35 kg CO\textsubscript{2}e respectively. On comparative basis, Farm 4 contributed substantially higher quantity of GHG emission while the least contribution came from Farm 1. Thus, it can be concluded from the study that Jersey breed contributes comparatively less dairy associated GHG emission as compared to Holstein Friesian breed.

Keywords: Carbon footprint; Methane; Nitrous Oxide; GHGs; Dairy farm; DairyGHG model.