

ENTERIC METHANE AND NITROUS OXIDE EMISSIONS FROM DAIRY CATTLE ESTIMATED WITH DIFFERENT METHODOLOGIES IN SOUTHERN URUGUAY

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In Uruguay the agricultural sector is the main source of nitrous oxide (N_2O) and methane (CH_4) emissions to the atmosphere. The majority of CH_4 is emitted by grazing ruminants, while most of the N_2O is produced by dung and urine. Nevertheless, there are few locally generated data about the amount and seasonality of these gas emissions, therefore the calculations are based on estimations. The objectives were to compare Tier1 and Tier2 estimation of CH_4 and N_2O emissions from dairy cattle, and to identify the major uncertainties in order to establish research priorities to improve the estimation. The department of San José was selected because is one of the most important regions for dairy production (dairy cattle represents 40% of the total). The production system includes grazing all over the year and concentrate feed (energy supplement) in early and mid lactation. Average milk production is 5000 to 5500 kg/head/year. The data source of cattle population was DICOSE statistics for San José, (2007). Average diet (50% pastures, 17 % maize silage, 33% concentrate) and digestible energy values were determined from local experimental data. The CH_4 emission factor calculated using Tier2 was 25% lower than Tier1 estimation, while the N_2O emission rate from grazing animals was 10% higher using Tier2 methodology. Increasing the accuracy and identifying causes of variation in emissions require additional research. The major uncertainties detected regarding CH_4 and N_2O emissions under grazing in Uruguay are: the effect of the diet on the amounts of CH_4 emitted and the proportion of N excreted in dung and urine; the effect of climate determining seasonal emission patterns; and the effect of soil type on N_2O evolution. Research in these areas will allow the validation of simulation models, which can be used for more accurate emission estimations.