CONTRIBUTION OF THE BREEDING HERD TO METHANE EMISSIONS DURING THE PRODUCTION OF BEEF FROM PASTURE

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The inventory of greenhouse gas emissions in Australia for 1988 and 1990 was published recently by the National Greenhouse Gas Inventory Committee (NGGIC 1994a). The inventory includes estimates of methane emissions by livestock which were calculated using algorithms set out in the Workbook for Livestock (NGGIC 1994b). For beef cattle, the calculations required both population statistics and estimates of feed intake and digestibility for the nominated years. Calculated methane emissions were summed by season and class (bulls, cows etc.) for each State to obtain the value for Australia. This approach emphasises the contribution of feed quality and animal numbers to overall methane emissions but not that of other components of production, eg, the breeding herd. For beef production, the contribution to methane emissions per beef carcass of the breeding herd required to produce a slaughter beast can be assessed from estimates of its reproductive performance.

Data for each State were obtained from the Australian Bureau of Statistics and the Australian Bureau of Agricultural and Resource Economics to allow calculation for 1990 of branding rate (calves branded per breeding cow, which allows for fertility, fecundity and embryo and perinatal mortality), weaner mortality, cow and bull replacement rates (which include culling and mortality) and bull ratio (bulls per breeding cow). Then, assuming one breeding cycle per year, the number of cows/slaughter beast = {1/[(branding rate) x (1 - weaner mortality) x (1 - cow replacement)]} and of bulls/slaughter beast = {[(cows/slaughter beast) x (bulls/cow)]/(1 - bull replacement)}. Cows/beast values for NSW/ACT, VIC, QLD, SA, WA, TAS, NT and Australia were, respectively, 1.675, 1.614, 2.072, 1.611, 1.749, 1.851, 2.449 and 1.814; bulls/beast values were 0.083, 0.114, 0.118, 0.107, 0.119, 0.120, 0.143 and 0. 108.

Thus, for Australia in 1990, methane emissions from 1.81 breeding cows and 0.11 bulls must be added to the lifetime emissions of a beast slaughtered from pasture to obtain the emissions per carcass. If it is assumed that a beast was slaughtered at 2.5 years' of age, that emissions during its first year were 50% of adult steer emissions and that breeding cows and bulls emitted, respectively, 5 and 35% more than steers, then methane emitted per carcass would be the annual emissions of [(0.5 + 1.5) + (1.81 x 1.05) + (0.11 x 1.35)] = 4.05 steers, of which 51% were associated with the breeding herd. It can be seen that reductions in emissions per carcass can be achieved not only by improving feed quality, which reduces both methane produced per unit of feed and age at slaughter for a given carcass weight, but also by improvements in the components of reproductive performance.

NGGIC (1994a). 'Australia - National Greenhouse Gas Inventory 1988 and 1990', ISBN O 642 20451 9 (Department of the Environment, Sport and Territories: Canberra).

NGGIC (1994b). 'Australian Methodology tor the Estimation of Greenhouse Gas Emissions and Sinks, Workbook 6.0', ISBN O 642 20449 7 (Department of the Environment, Sport and Territories: Canberra).

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