

GREENHOUSE GAS FOOTPRINT FOR SHEEP AND BEEF FARMS

Kathryn Hutchinson¹, Anna Taylor², Ray Moss², David Scobie²
Grant Rennie³ and Robyn Dynes²

¹AgResearch, Grasslands Research Centre, Palmerston North, NZ

²AgResearch, Lincoln Research Centre, Christchurch, NZ

³AgResearch, Ruakura Research Centre, Hamilton, NZ

E-mail: kathryn.hutchinson@agresearch.co.nz

Advances in animal genetics and health along with changes in farm management practices in response to economic drivers have led to ongoing improvements in farm productivity from New Zealand sheep and beef farms over time. The national average lambing percentage has increased from 100 to 124% from 1990 to 2015-16 and lamb carcass weight 13 to 19.5 kg per ewe over the same period. Despite the decline in the area in sheep and beef, the export value of lamb, sheep meats and beef has more than doubled since 1990. Both nationally and globally, the increasing focus on environmental impacts of land use, through legislation and global consumer demands will shape farming futures. An evaluation of the impact of systems changes since 1990 on greenhouse gas (GHG) emissions is provided in this paper.

A South Canterbury farm was monitored for the NZAGRC PGgRc farms systems research programs. It is a 400 ha property, (30km inland of Timaru) comprising 80% rolling flats and 20% steep hills (150-300 m above sea level), with 600mm of annual rainfall. Using total animal production (from Farmax) and greenhouse gas emissions (from OVERSEER), the GHG emissions were calculated for current (2014-2017) and past (1990/91) systems. Over time the farm has transitioned from a traditional breeding and finishing system to a finishing system focused on resilience and performance. Total animal production (kg product/ha) was 246, 344, 241 and 337 in 1990/91, 2014/15, 2015/16 and 2016/17 respectively. GHG emissions have increased with production, however GHG emissions intensity (kg CO₂-e/kg product) was considerably lower in the current compared with the 1990 system. Destocking to manage the impact of drought resulted in almost halving the total CO₂ emissions (CO₂-e/ha) in the drought year compared with other current years, and was much greater than the impact of long term management changes. The results highlight both the extent to which sheep and beef farms have improved systems efficiency and emission intensity but also the impacts of proactive management of seasonal conditions (drought) on total emissions.

Editor's Note: An extended manuscript has not been submitted for this presentation.