GRAZ PROPHET CONSULTING
Optimising Performance in Livestock Enterprises
phone: +61 2 64533187 mobile: 0411139594
MFS
MONARO FARMING SYSTEMS

Key Soil Carbon messages for the Monaro – economic comparisons & emissions

- ✓ Modelling of a range of the project sites demonstrates remarkable consistency in the enterprise emissions produced when considered on a DSE basis.
- ✓ For low fertility native pasture systems running the self -replacing merino enterprise typical of the Monaro we might expect emissions of around 195 kg CO_2-e/DSE.
- ✓ Introduced pastures at moderate fertility levels achieved a DSE emissions intensity of around 180 kg CO_2-e/DSE while when optimally fertilised this can be reduced by a further 5 kg CO_2-e/DSE.
- ✓ To claim reduced net emissions (carbon sequestration), management that improves pasture production and increases carrying capacity of a native pasture by 2 DSE/ha will first need to offset an increase in methane emissions of around 400 kg CO_2-e/ha or 110 kg of carbon.
- ✓ In rough terms if only 20% of any extra biomass produced is retained in the soil then the first 6-700kg of extra above ground biomass production would be needed to offset the extra livestock emissions even before accounting for any changes in other emissions sources such as N_2O which might also be expected.
- ✓ In economic terms the returns to increasing soil fertility are clear but only when the extra pasture produced is utilized (This means increasing stocking rates and with that livestock emissions).
- ✓ The modeling of potential fertility changes at Site 8 (“Quinburra”, improved pasture) show over $2000/ha extra profit accumulated over a 10 year period resulting from applications of higher rates of fertiliser.
- ✓ If the fertiliser was applied solely for the purposes of sequestering soil carbon, at $14/tonne CO_2-e, 40 tonnes of extra soil carbon would be needed to net the same extra returns.
- ✓ To achieve this, additional above ground pasture growth of more than 20 tonnes/ha/year would be required ie. more than trebling pasture production.
- ✓ Calculations such as these make it clear that on farm decisions to increase pasture productivity will be made principally to increase livestock production and any value coming from carbon sequestration will be relatively minor within the current quantum of its market value.

Sites modelled

- **"Maffra", Rolfe -** new crop and old native pasture ①
- **"Sth Bukalong", Garnock -** Old improved pasture vs New Improved Pasture ②
- **"Delegate Station", Jeffreys -** Old improved Pasture ③
- **"Quinburra", Horton -** North and East aspect (improved pasture) ④

Table 1 Average annual enteric methane emissions and emissions intensity (EI) of wool and meat production. Emissions are allocated according to relative economic value of each product to the enterprise.

		Low Fert Native (basalt) ①	Fertilised Native (basalt) ①	Fertilised Phalaris (basalt) ①	New Crop (basalt) ①
Enteric CH_4	kg/ha	35.4	45	64.4	47.1
CO_2 –eq	kg/ha	885	1125	1610	1117
Wool EI	kg CO2-e/kg	37.8	37.3	36.1	36.7
Meat EI	kg CO2-e/kg	13.0	13.0	11.6	12.3
DSE EI	kg CO2-e/DSE	197	194	179	186

		Old Imp Pasture②	New Imp Pasture②	Old Improved Pasture③	Nth Aspect④	East Aspect④
Enteric CH4	kg/ha	70.1	74.5	96.9	111.4	137.1
CO2 –eq	kg/ha	1752	1863	2421	2785	3428
Wool EI	kg CO2-e/kg	34.4	34.4	35.4	33.8	34.7
Meat EI	kg CO2-e/kg	11.4	11.4	11.3	11	11.2
DSE EI	kg CO2-e/DSE	181	181	178	171	176

Enteric CH_4 = annual methane released via digestion per grazing sheep

CO_2 – eq = equivalent economic contribution to the enterprise

Wool EI = Emissions intensity of clean wool production

Meat EI = Emissions intensity of meat production on a carcass weight basis

DSE EI = annual emissions per livestock unit