Australian Government
Department of Industry, Science, Energy and Resources

Standard Parameters and Emissions Factors

Carbon Credits (Estimating Sequestration of Carbon in Soil Using Default Values) Methodology Determination 2015

Version 1.1

Document revision history

Version	Date	Changes
1.0		
1.1	20 July 2020	Updates to incorporate changes to the global warming potentials for methane and nitrous oxide made by the Intergovernmental Panel on Climate Change (IPCC). Formatting updated.

Disclaimer

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Table 1: Sheep (g) Emission Factors (kg CO_2-e/head/day)

State (i)	Season (k)	Class (j)					
		Rams	Wethers	Maiden Ewes (intended for breeding)	Breeding Ewes	Other Ewes	Lambs & Hoggets
NSW/ACT	Spring	1.131	0.930	0.672	0.885	0.851	0.358
	Summer	0.896	0.650	0.493	0.582	0.605	0.336
	Autumn	0.862	0.683	0.538	0.638	0.616	0.414
	Winter	0.986	0.784	0.650	0.762	0.728	0.515
Queensland	Spring	0.560	0.482	0.347	0.414	0.437	0.224
	Summer	0.650	0.582	0.426	0.470	0.526	0.280
	Autumn	0.706	0.616	0.459	0.549	0.560	0.258
	Winter	0.650	0.549	0.392	0.459	0.526	0.291
South Australia	Spring	1.131	0.974	0.728	0.795	0.773	0.571
	Summer	0.750	0.694	0.549	0.582	0.582	0.470
	Autumn	0.493	0.426	0.358	0.403	0.381	0.168
	Winter	0.874	0.750	0.650	0.762	0.683	0.414
Tasmania	Spring	1.434	0.862	0.717	0.896	0.795	0.291
	Summer	1.008	0.582	0.482	0.526	0.526	0.269
	Autumn	0.997	0.661	0.594	0.672	0.650	0.482
	Winter	0.795	0.482	0.504	0.616	0.526	0.459
Victoria	Spring	0.997	0.851	0.706	0.829	0.717	0.358
	Summer	0.694	0.582	0.482	0.538	0.526	0.314
	Autumn	0.840	0.672	0.560	0.650	0.650	0.448
	Winter	0.616	0.515	0.414	0.493	0.515	0.381
Western Australia	Spring	1.109	0.885	0.672	0.840	0.806	0.470
	Summer	0.683	0.571	0.370	0.526	0.515	0.325
	Autumn	0.414	0.302	0.470	0.426	0.291	0.134
	Winter	0.963	0.717	0.739	0.840	0.739	0.358

Table 2: Beef Cattle (g) Emission Factors (kg CO2-e/head/day)

State/Region (i)		Season (k)	Class (j)						
			Bulls <1	Bulls >1	Steers <1	Steers >1	Cows <1	Cows 1 to 2	Cows >2
Northern Territory		Spring	2.787	5.081	3.071	3.098	2.520	2.966	3.611
		Summer	2.360	6.420	3.529	3.608	2.165	3.413	5.164
		Autumn	2.750	6.171	3.736	3.771	2.386	3.587	4.678
		Winter	2.707	5.662	3.027	3.071	2.435	3.341	3.793
NSW/ACT		Spring	1.849	5.049	4.392	4.460	1.805	3.744	6.073
		Summer	3.163	5.789	4.833	4.999	2.980	4.786	5.719
		Autumn	3.595	5.759	4.889	5.034	3.312	4.537	5.229
		Winter	3.528	5.436	4.685	4.761	3.348	4.477	5.049
Queensland		Spring	2.099	6.755	4.260	4.320	1.836	3.518	6.227
		Summer	3.152	7.291	5.224	5.434	2.894	4.544	5.833
		Autumn	3.772	5.795	5.324	5.471	3.469	4.682	4.505
		Winter	4.235	5.208	4.834	4.898	3.700	4.675	4.339
South Australia		Spring	4.082	8.307	4.779	4.966	3.658	5.161	6.024
		Summer	4.300	6.326	4.347	4.413	3.816	4.639	5.008
		Autumn	2.146	4.900	3.973	4.101	1.925	3.657	5.136
		Winter	3.149	6.691	4.443	4.686	2.843	4.822	5.504
Tasmania		Spring	2.715	7.493	6.402	6.897	2.495	6.245	7.727
		Summer	6.036	7.138	5.163	5.289	2.720	4.939	6.364
		Autumn	3.914	7.352	4.518	4.672	3.185	3.916	5.050
		Winter	3.518	6.442	5.107	5.524	3.012	4.248	4.779
Victoria		Spring	4.533	9.016	6.402	6.897	4.426	6.245	7.622
		Summer	3.525	6.821	5.163	5.289	3.248	4.939	5.247
		Autumn	2.111	6.505	4.518	4.672	2.098	3.916	6.280
		Winter	2.825	7.200	5.107	5.524	2.675	4.248	6.106
Western Australia	South West	Spring	6.019	8.609	6.534	6.792	4.593	6.085	6.778
		Summer	4.610	6.140	4.703	4.768	3.874	5.093	5.062
		Autumn	2.100	5.964	3.695	3.731	1.920	3.760	5.139
		Winter	3.610	7.036	4.609	4.828	2.972	4.181	5.976
	Pilbara	Spring	1.897	3.969	3.633	3.685	1.810	3.143	4.169
		Summer	2.712	5.731	4.536	4.675	2.615	4.191	4.863
		Autumn	3.522	5.980	4.544	4.644	3.428	3.875	4.312
		Winter	3.089	4.350	3.736	3.786	3.000	3.789	3.649
	Kimberley	Spring	2.790	4.315	3.031	2.757	2.513	3.508	3.202
		Summer	2.371	6.147	4.677	2.465	2.109	3.134	5.948
		Autumn	2.797	6.334	4.866	2.830	2.426	3.652	4.604
		Winter	2.731	4.678	3.796	2.727	2.126	3.283	3.392

Table 3: Dairy Cattle (g) Emission Factors (kg CO_2-e/head/day)

State (i)	Class (j)				
	Milking Cows	Heifers >1	Heifers <1	Dairy Bulls >1	Dairy Bulls <1
NSW/ACT	12.872	4.853	2.365	6.036	2.903
Northern Territory	12.601	4.941	2.409	6.145	2.957
Queensland	12.380	4.941	2.409	6.145	2.957
South Australia	13.087	4.853	2.365	6.036	2.903
Tasmania	12.115	4.853	2.365	6.036	2.903
Victoria	12.989	4.853	2.365	6.036	2.903
Western Australia	13.494	4.853	2.365	6.036	2.903

Table 4: Other Livestock Emission Factors (kg CO_2-e/head/day)

State (i)	Species (g)							
	Goats	Horses	Deer	Buffalo	Donkeys /Mules	Emus/ Ostriches	Alpacas	Camels
NSW/ACT	0.437	1.669	1.635	4.514	0.862	0.246	0.661	3.819
Northern Territory	0.448	1.736	1.658	4.570	0.885	0.258	0.672	3.886
Queensland	0.426	1.646	1.624	4.480	0.851	0.235	0.661	3.797
South Australia	0.437	1.680	1.635	4.525	0.874	0.246	0.672	3.830
Tasmania	0.448	1.758	1.658	4.592	0.896	0.258	0.683	3.909
Victoria	0.448	1.725	1.646	4.570	0.885	0.258	0.672	3.875
Western Australia	0.448	1.714	1.646	4.558	0.885	0.246	0.672	3.864

Table 5: Synthetic Fertiliser Emission Factors (t CO_2-e/t Fertiliser N)

State (i)	Production System (j)						
	Irrigated pasture	Irrigated crop	Non-irrigated pasture	Non-irrigated crop	Sugar cane	Cotton	Horticulture /Vegetables
NSW/ACT	2.769	4.830	1.229	1.096	10.042	2.750	4.454
Northern Territory	2.769	4.830	1.676	1.644	Nil	Nil	4.697
Queensland	2.769	4.830	1.036	0.956	9.730	2.590	4.168
South Australia	2.769	4.830	1.579	1.178	Nil	Nil	4.518
Tasmania	2.769	4.830	1.844	1.839	Nil	Nil	4.827
Victoria	2.769	4.830	1.717	1.326	9.116	2.519	4.551
Western Australia	2.769	4.830	1.392	1.125	9.827	3.231	4.748

Table 6: Carbon dioxide emissions from urea applied as synthetic fertiliser

Production System (j)	Total emissions from synthetic fertiliser (t CO_2-e/t urea) $E_{SF,B}$
Urea	0.7333

Table 7: Crop Residue Parameters

Crop type (v)	N content of residues		Residue emission factor (t CO_2-e/tN)
	$NC_{v,AB}$	$NC_{v,BG}$	EF_R
Wheat	0.00792	0.00383	4.16
Barley	0.00764	0.00349	4.16
Maize	0.00344	0.00188	4.16
Oats	0.00750	0.00537	4.16
Rice	0.00734	0.00168	4.16
Sorghum	0.0096	0.00185	4.16
Triticale	0.00792	0.00554	4.16
Other Cereals	0.00771	0.00463	4.16
Pulses	0.01073	0.00608	4.16
Tuber and Roots	0.0017	0.00037	4.16
Sugar cane	0.00125	0.00085	4.16
Peanuts	0.01370	0.00240	4.16
Cotton	0.0171	0.00513	4.16
Hops	0.00792	NA	4.16
Oilseeds	0.01797	0.00659	4.16
Forage Crops	0.00708	0.00436	4.16

Table 8: Pasture Renewal Parameters

	Dry Matter Yield (t DM/ha)	Nitrogen content of Residues		Residue emission factor (t CO_2-e/tN)
	O_P	$NC_{P,AB}$	$NC_{P,BG}$	EF_R
Grasses	7.1	0.0218	0.00872	4.16