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Seasol Glasshouse Trial Carbon Assessments

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EXECUTIVE SUMMARY

Seasol initiated greenhouse gas carbon assessments for two glasshouse trials on lettuce to identify emission sources and to compare the effect of Seasol on carbon emission under various irrigation and fertiliser regimes.

The Cool Farm Tool (CFT), a web-based calculator developed with academic and industry collaboration, was employed to estimate GHG emissions from farming operations. It calculates emissions in carbon dioxide equivalents (CO_2-e) for carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), factoring in crop type, soil management, irrigation, and fertilization.

At 60% irrigation rate, Seasol-treated lettuce showed an 18% lower emissions intensity, with an overall reduction in emissions intensity by 5% and 17% at 80% and 60% irrigation rates respectively.

Seasol-treated lettuce at 75% fertiliser rate showed a 13% lower emissions intensity.

Seasol, in conjunction with reduced nitrogen fertiliser and irrigation rates, can significantly lower greenhouse gas emissions in lettuce production. While reduced fertiliser rates alone do not always decrease emissions intensity due to lower yields, combining lower irrigation rates with Seasol use has been demonstrated to be effective. The data suggests potential for broader application in horticulture, warranting further research on combining lowered fertiliser and irrigation rates.

INTRODUCTION

Greenhouse gas carbon assessments are critical for agriculture to identify the specific sources of emissions within the farming process. These assessments offer a roadmap for adaptation of agricultural practices.

Climate change is already affecting agriculture through altered weather patterns and increased extreme events. By understanding our current emissions, we can model the future impact and plan accordingly. There's a growing consumer demand for responsibly produced food.

Seasol commissioned greenhouse gas carbon assessments of two glasshouse trials on lettuce.

METHODOLOGY

Cool Farm Tool

The Cool Farm Tool (CFT) was used for the quantification of greenhouse gas (GHG) emissions associated with agricultural activities. Developed in collaboration with academic institutions and industry leaders, the CFT is a robust, web-based calculator designed to estimate GHG emissions specifically from farming operations. Companies such as Unilever, Nutrien Ag Solutions, McCains and PepsiCo are active members of the CFT.

The CFT requires a variety of data inputs that correspond to different aspects of agricultural practices such as:

1. Crop type
2. Soil management techniques
3. Irrigation volumes and methods
4. Fertiliser application rates and types

The CFT calculates the GHG emissions in terms of carbon dioxide equivalents (CO_2-e) for three main GHGs: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The tool also breaks down emissions by source, such as from soil, fertilisers or livestock.

The CFT algorithms were calibrated against localised emission factors and validated through comparison with direct field measurements whenever possible.

Lettuce crop data

There were two glasshouse trials comparing the effect of Seasol on water use efficiency and nutrient use efficiency on lettuce production. Robust data was produced by these trials and was used for the carbon assessments in this study.

A report on the WUE trial can be accessed here

A report on the NUE trial can be accessed here

Seasol emission estimations

There has not been a life cycle analysis on the emissions generated by the production of Seasol. Seasol production emissions intensity was estimated at 119 kg CO_2-e per 1000L of Seasol® based on a study of seaweed based biostimulant production to factory[1], which included assessment of seaweed cultivation, transportation, sap processing and waste disposal.

Definitions

The following definitions produced by the Australian Clean Energy Regulator[2], the government body responsible for accelerating carbon abatement for Australia:

Scope 1 greenhouse gas emissions are the emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level. Scope 1 emissions are sometimes referred to as direct emissions. Examples of this are nitrous oxide emissions from nitrogen fertiliser applications or carbon dioxide emissions from diesel combustion.

Scope 2 greenhouse gas emissions are the emissions released to the atmosphere from the indirect consumption of an energy commodity. An example of is the use of grid-based electricity used to run irrigations pumps.

Scope 3 emissions are indirect greenhouse gas emissions other than scope 2 emissions that are generated in the wider economy. They occur as a consequence of the activities of a facility, but from sources not owned or controlled by that facility's business. Examples of this include transportation emissions outside of the farm gate or emissions resulting from the production of fertiliser.

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[1] Ghosh, A., Anand, K.V. and Seth, A., 2015. Life cycle impact assessment of seaweed based biostimulant production from onshore cultivated Kappaphycus alvarezii (Doty) Doty ex Silva—is it environmentally sustainable?. Algal Research, 12, pp.513-521.

[2] https://www.cleanenergyregulator.gov.au/NGER/About-the-National-Greenhouse-and-Energy-Reporting-scheme/Greenhouse-gases-and-energy

GREENHOUSE GAS EMISSIONS

Nutrient Use Efficiency Trial

The effect of Seasol on lettuce yield and quality at various fertiliser rates was trialled in glasshouse conditions in Sydney, Australia. The data produced by this trial was used to test the carbon emissions of each treatment over two metrics:

1. Direct emissions from the glasshouse trial (Scope I)
2. Fertiliser and Seasol emissions (Scope I, II and III). This narrowed assessment is relevant because all other variables were controlled.

Direct Greenhouse Gas Emissions

In this assessment, direct emissions are calculated solely from soil emissions after fertiliser applications.

Little difference in emissions were calculated between treatment groups (grouped by fertiliser rate), **except the 75% fertiliser rate, where Seasol treated lettuce showed 13% less CO_2-e emissions intensity compared to untreated lettuce** (Figure 1). The difference in emissions intensity at the 75% fertiliser rate is primarily due to the statistically significant (P<0.05, n=18) difference in lettuce yield.

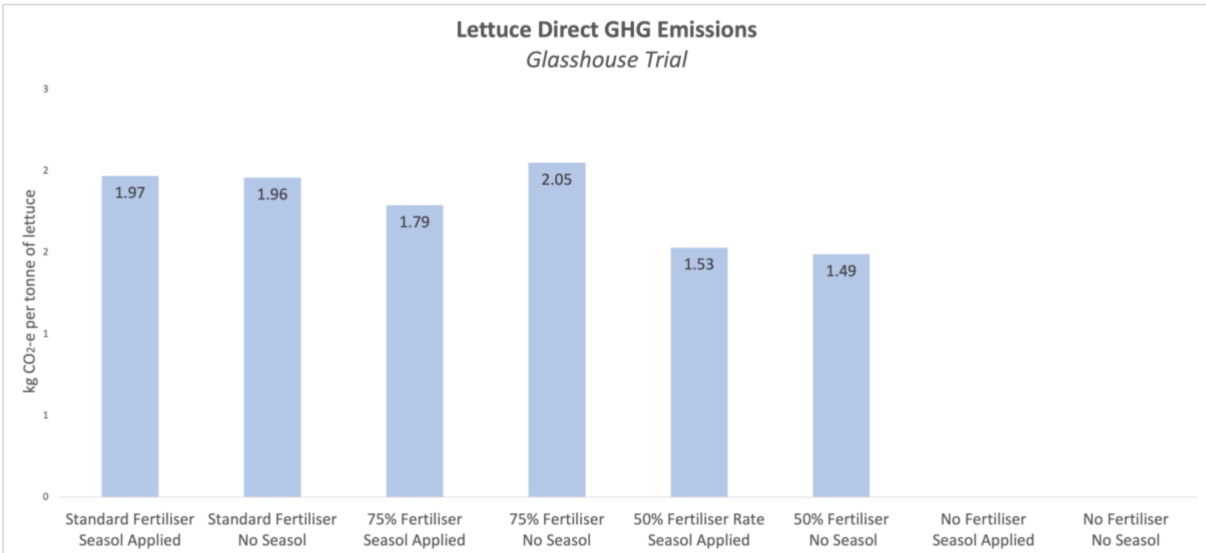

Figure 1 Direct emissions from a lettuce fertiliser rate trial in glasshouse conditions.

Fertiliser and Seasol emissions

In this assessment, fertiliser emissions are calculated from soil emissions after fertiliser applications, production emissions of fertiliser and estimated production emissions from Seasol.

Little difference in emissions were calculated between treatment groups (grouped by fertiliser rate), **except the 75% fertiliser rate, where Seasol treated lettuce showed 13% less CO_2-e emissions intensity compared to untreated lettuce** (Figure 2, Table 1). The difference in emissions intensity at the 75% fertiliser rate are primarily due to the statistically significant ($P<0.05$, $n=18$) difference in lettuce yield.

Estimated Seasol production emissions are negligible because the culminative application rate was low at 0.92 L/ha.

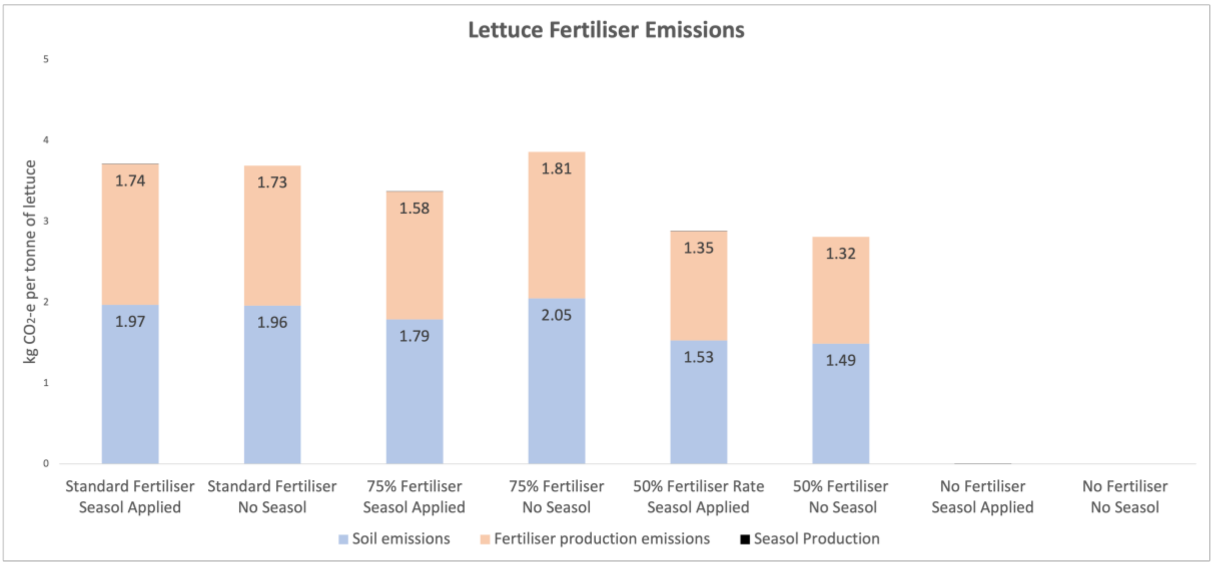

Figure 2 Fertiliser and Seasol production emissions, and soil emissions of lettuce fertiliser rate trial in glasshouse conditions.

Table 1 Breakdown of fertiliser and Seasol production emissions, and soil emissions of lettuce fertiliser rate trial in glasshouse conditions.

(kg CO_2-e/t lettuce)	Std Fert Seasol	Std Fert No Seasol	75% Fert Seasol	75% Fert No Seasol	50% Fert Seasol	50% Fert No Seasol
Soil emissions	1.97	1.96	1.79	2.05	1.53	1.49
Fertiliser production	1.74	1.73	1.58	1.81	1.35	1.32
Seasol production	0.002	0.000	0.002	0.000	0.003	0.000
Total	3.71	3.69	3.37	3.86	2.88	2.81

Water Use Efficiency

The effect of Seasol on lettuce yield and quality at various irrigation rates was trialled in glasshouse conditions in Sydney, Australia. [Report available here](). The data produced by this trial was used to test the carbon emissions of each treatment over four metrics:

1. Direct emissions from the glasshouse trial (Scope I)
2. Fertiliser and Seasol emissions (Scope I, II and III). This narrowed assessment is relevant because all other variables were controlled
3. Fertiliser, Seasol and irrigation pumping emissions (Scope I, II and III). This narrowed assessment is also relevant because all other variables were controlled
4. Simulated field crop emissions (Scope I and II) using actual trial data and realistic estimates on diesel fuel use and electricity for irrigation pumping

Direct Greenhouse Gas Emissions

In this assessment, direct emissions are calculated solely from soil emissions after fertiliser applications.

Little difference in emissions were calculated between treatment groups (grouped by irrigation rate), **except the 60% irrigation rate, where Seasol treated lettuce showed 18% less CO_2-e emissions intensity compared to untreated lettuce** (Figure 3). The difference in emissions intensity at the 60% irrigation rate is due to the statistically significant ($P<0.05$, $n=18$) difference in lettuce yield.

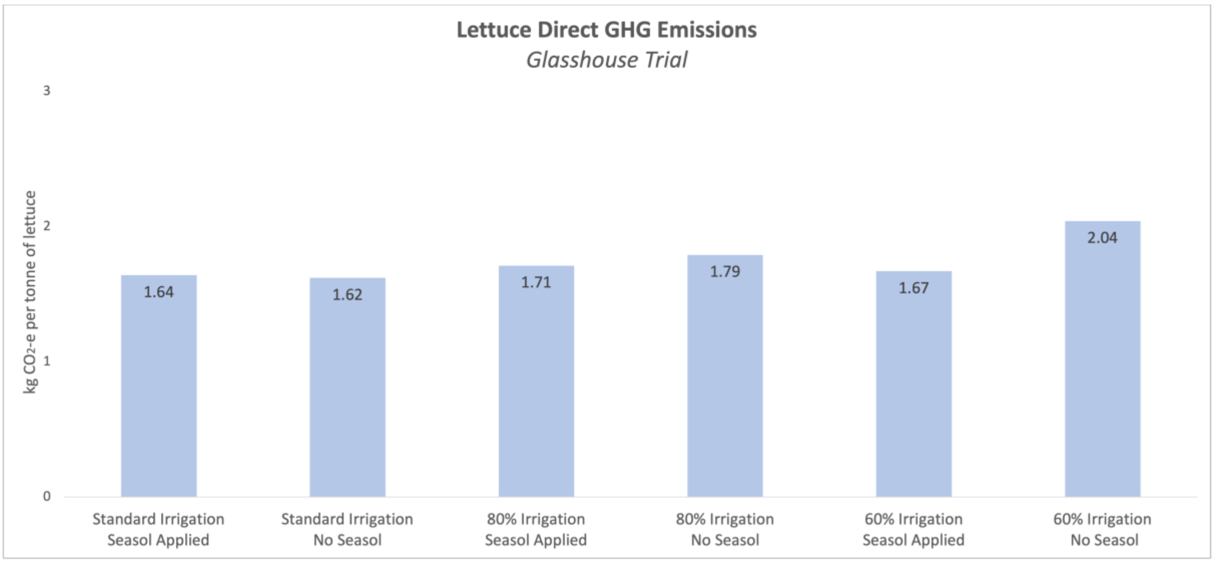

Figure 3 Direct emissions from a lettuce irrigation rate trial in glasshouse conditions.

Fertiliser and Seasol emissions

In this assessment, emissions are calculated from soil emissions after fertiliser applications, production emissions of fertiliser and estimated production emissions from Seasol.

Emissions intensities increase with lower irrigation rates due to a declining a yield, however this effect is less pronounced when lettuce was treated with Seasol (Figure 4, Table 2). This effect is most prominent at the 60% irrigation rate due to the statistically significant ($P<0.05$, $n=18$) difference in lettuce yield. It is important to note that this assessment does not consider the theoretical irrigation pumping electricity emissions, which are shown in the next assessment (Figure 5).

Estimated Seasol production emissions are negligible because the culminative application rate was low at 1.22 L/ha.

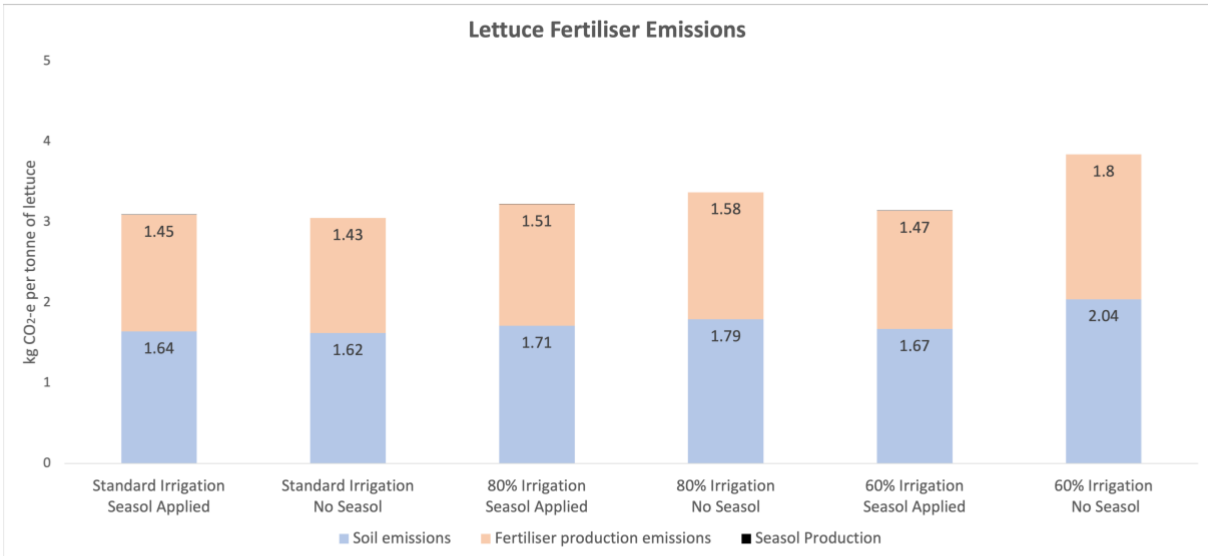

Figure 4 Fertiliser and Seasol production emissions, and soil emissions of lettuce irrigation rate trial in glasshouse conditions.

Table 2 Breakdown of fertiliser and Seasol production emissions, and soil emissions of lettuce irrigation rate trial in glasshouse conditions.

(kg CO2-e/ tonne lettuce)	Std Irrigation Seasol	Std Irrigation No Seasol	80% Irrigation Seasol	80% Irrigation No Seasol	60% Irrigation Seasol	60% Irrigation No Seasol
Soil emissions	1.64	1.62	1.71	1.79	1.67	2.04
Fertiliser production	1.45	1.43	1.51	1.58	1.47	1.8
Seasol production	0.002	0.000	0.002	0.000	0.002	0.000
Total	3.09	3.05	3.22	3.37	3.14	3.84

Fertiliser, irrigation pumping and Seasol emissions

In this assessment, emissions are calculated from soil emissions after fertiliser applications, production emissions of fertiliser, estimated production emissions from Seasol, and estimated irrigation pumping energy requirements based on actual irrigation volumes.

Emissions intensities increase with lower irrigation rates due to a declining a yield, however this effect is reversed when lettuce was treated with Seasol (Figure 5, Table 3). This effect is most prominent at the 60% irrigation rate where emissions intensity is 18% lower when Seasol is applied, primarily due to the statistically significant ($P<0.05$, $n=18$) difference in lettuce yield.

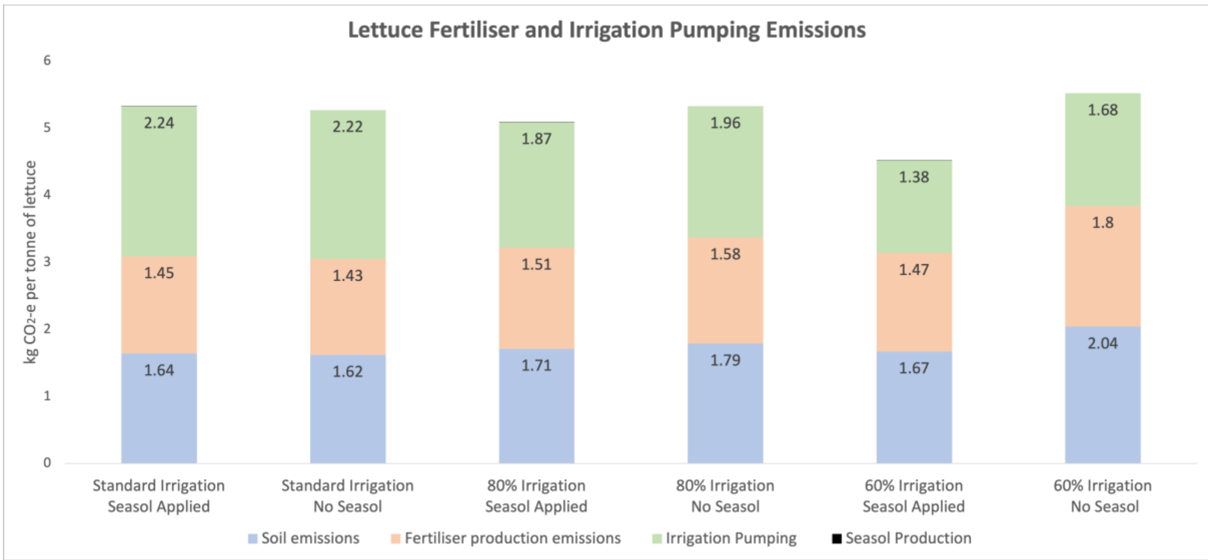

Figure 5 Fertiliser, irrigation pumping and Seasol production emissions, and soil emissions of lettuce irrigation rate trial in glasshouse conditions.

Table 3 Breakdown of fertiliser, irrigation pumping and Seasol production emissions, and soil emissions of lettuce irrigation rate trial in glasshouse conditions.

(kg CO_2-e/ tonne lettuce)	Std Irrigation Seasol	Std Irrigation No Seasol	80% Irrigation Seasol	80% Irrigation No Seasol	60% Irrigation Seasol	60% Irrigation No Seasol
Soil emissions	1.64	1.62	1.71	1.79	1.67	2.04
Fertiliser production	1.45	1.43	1.51	1.58	1.47	1.8
Irrigation pumping	2.24	2.22	1.87	1.96	1.38	1.68
Seasol production	0.002	0.000	0.002	0.000	0.002	0.000
Total	5.33	5.27	5.09	5.33	4.52	5.52

Simulated field crop emissions

In this assessment, fertiliser emissions are calculated from soil emissions after fertiliser applications, production emissions of fertiliser and estimated production emissions from Seasol. Crop residues are estimated at fixed 5% of yield and diesel consumption is fixed at 100L/ha. Irrigation pumping requirements are based on the actual irrigation volumes applied to the treatments. A detailed breakdown is included as Appendix 2.

Simulated field crop emissions (Scope I and II) show increased emissions intensity at lower irrigation rates when Seasol is not used. However, when lettuce was treated with Seasol, the effect of increased water use efficiency (increased yield and lower irrigation requirement) show reduced emissions intensity by 5% at a 80% irrigation rate and 17% at a 60% irrigation rate (Figure 6, Table 4). The reductions in emissions intensity are primarily driven by increases yield when Seasol is applied, and the reduced pumping energy requirements at lower irrigation rates.

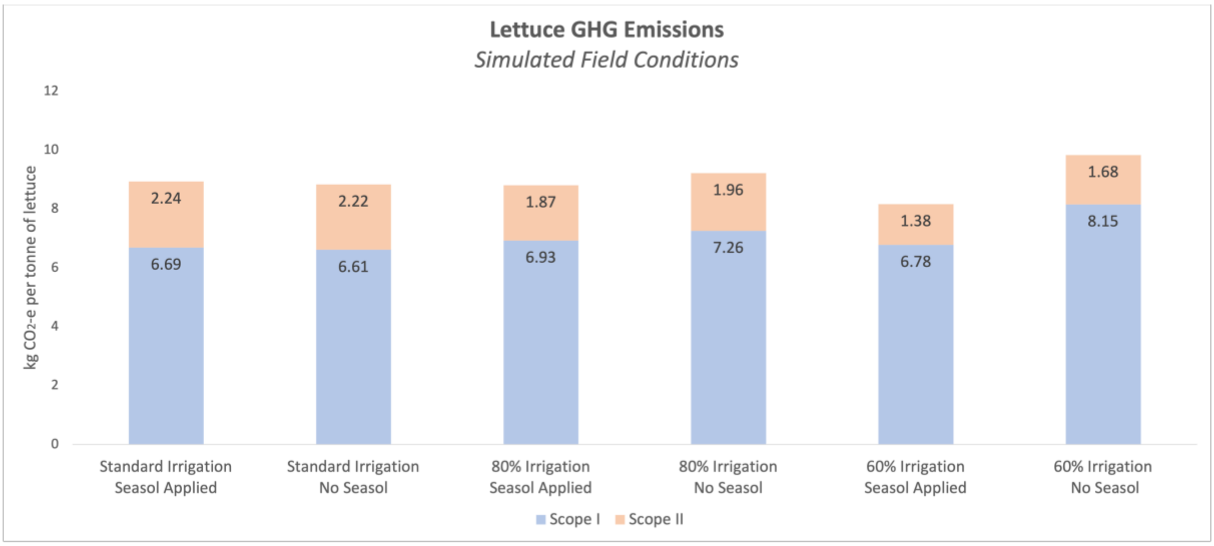

Figure 6 Simulated field crop emissions using actual trial data and realistic estimates on diesel fuel use and electricity for irrigation pumping.

Table 4 Breakdown of fertiliser, irrigation pumping and Seasol production emissions, and soil emissions of lettuce irrigation rate trial in glasshouse conditions.

(kg CO2-e/ tonne lettuce)	Std Irrigation Seasol	Std Irrigation No Seasol	80% Irrigation Seasol	80% Irrigation No Seasol	60% Irrigation Seasol	60% Irrigation No Seasol
Scope I						
Crop Residue	0.65	0.64	0.64	0.65	0.64	0.63
Fertiliser Emissions	1.64	1.62	1.71	1.79	1.67	2.04
Diesel Use	4.4	4.35	4.58	4.82	4.47	5.48
Scope II						
Irrigation Pumping	2.24	2.22	1.87	1.96	1.38	1.68
Total	8.93	8.83	8.8	9.22	8.16	9.83

CONCLUSION

Seasol can reduce greenhouse gas emissions when it used in conjunction with lowered nitrogen fertiliser and irrigation rates, particularly if pumping of irrigation water is required.

This desktop study of glasshouse trial data shows that Seasol can mitigate some greenhouse emissions from lettuce production, and potentially other types of horticulture. Reducing fertiliser rates does reduce total GHG emissions, however this does not always reduce emissions intensity because lettuce yields are lower at these reduced fertiliser rates.

The most useful conclusion is that lower irrigation rates can be realistically used in conjunction with Seasol to reduce emissions intensity.

Further research could demonstrate greater potential improvements in the nutrient and water use efficiency benefits of Seasol, particularly by testing lowered fertiliser rates with correspondingly lowered irrigation rates.

APPENDICIES

Appendix 1 Water Use Efficiency Data
Appendix 2 Nutrient Use Efficiency Data
Appendix 3 Cool Farm Tool Outputs

Lettuce NUE Cool Farm Tool Data Inputs and Outputs

	Standard Fertiliser Seasol Applied	Standard Fertiliser No Seasol	75% Fertiliser Seasol Applied	75% Fertiliser No Seasol	50% Fertiliser Rate Seasol Applied	50% Fertiliser No Seasol	No Fertiliser Seasol Applied	No Fertiliser No Seasol
Yield								
FW (g)	123	124	102	89	80	82	29	29
Area (cm2)	196	196	196	196	196	196	196	196
Yeild (g/cm2)	0.630	0.635	0.520	0.454	0.406	0.416	0.150	0.149
Yield (t/ha)	**63.0**	**63.5**	**52.0**	**45.4**	**40.6**	**41.6**	**15.0**	**14.9**
Crop Residude DW (10%)	**0.31**	**0.32**	**0.26**	**0.23**	**0.20**	**0.21**	**0.07**	**0.07**
Soil								
Textture	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
Organic Matter (%)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
pH	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Seasol								
Emssions (kg CO2-e/ha)	0.109	0	0.109	0	0.109	0	0.109	0
Emssions (kg CO2-e/t lettuce)	0.00173	0.00000	0.00210	0.00000	0.00269	0.00000	0.00728	0.00000
Fertiliser								
Nitrophoska NPK	12:5.2:14.1	12:5.2:14.1	12:5.2:14.1	12:5.2:14.1	12:5.2:14.1	12:5.2:14.1		
Total (mg)	800	800	600	600	400	400	0	0
Total (g/cm2)	0.00408	0.00408	0.00306	0.00306	0.00204	0.00204	0.00000	0.00000
Total (t/ha)	0.408	0.408	0.306	0.306	0.204	0.204	0.000	0.000
Total N (t/ha)	0.049	0.049	0.037	0.037	0.024	0.024	0.000	0.000
Total N (kg/ha)	**49.0**	**49.0**	**36.7**	**36.7**	**24.5**	**24.5**	**0.0**	**0.0**
Calcium Nitrate	15.5:0:0	15.5:0:0	15.5:0:0	15.5:0:0	15.5:0:0	15.5:0:0		
Total (mg)	920	920	690	690	460	460	0	0
Total (g/cm2)	0.00469	0.00469	0.00352	0.00352	0.00235	0.00235	0.00000	0.00000
Total (t/ha)	0.469	0.469	0.352	0.352	0.235	0.235	0.000	0.000
Total N (t/ha)	0.059	0.059	0.044	0.044	0.029	0.029	0.000	0.000
Total N (kg/ha)	**58.7**	**58.7**	**44.0**	**44.0**	**29.3**	**29.3**	**0.0**	**0.0**
Pesticides	None	None	None	None	None	None	None	None
Energy Use								
Diesel (L/ha)	100	100	100	100	100	100	100	100
Irrigation (L/ha/week)								
Week 1	33929	33929	33929	33929	33929	33929	33929	33929
Week 2	47500	47500	47500	47500	47500	47500	47500	47500
Week 3	40714	40714	40714	40714	40714	40714	40714	40714
Week 4	13571	13571	13571	13571	13571	13571	13571	13571
Week 5	27143	27143	27143	27143	27143	27143	27143	27143
Week 6	20357	20357	20357	20357	20357	20357	20357	20357
Week 7	27143	27143	27143	27143	27143	27143	27143	27143
Week 8	20357	20357	20357	20357	20357	20357	20357	20357
Week 9	27143	27143	27143	27143	27143	27143	27143	27143
Week 10	33929	33929	33929	33929	33929	33929	33929	33929
Week 11	88520	88520	88520	88520	88520	88520	88520	88520
Week 12	81735	81735	81735	81735	81735	81735	81735	81735
Emissions (kg per tonne lettuce (CO2-e)) - Cool Farm Tool Outputs								
Crop Residue	0.63	0.63	0.64	0.65	0.63	0.65	0.6	0.61
Fertiliser Production	1.74	1.73	1.58	1.81	1.35	1.32	0	0
Fertiliser Emissions	1.97	1.96	1.79	2.05	1.53	1.49	0	0
Diesel Use	5.29	5.25	6.41	7.35	8.21	8.01	22.2	22.38
Irrigation Pumping	2.79	2.77	3.38	3.87	4.33	4.23	11.7	11.8
Seasol producton	0.002	0.000	0.002	0.000	0.003	0.000	0.007	0.000

	Standard Fertiliser Seasol Applied	Standard Fertiliser No Seasol	75% Fertiliser Seasol Applied	75% Fertiliser No Seasol	50% Fertiliser Rate Seasol Applied	50% Fertiliser No Seasol	No Fertiliser Seasol Applied	No Fertiliser No Seasol
Scope I Emmissions								
Glasshouse trial								
kg CO2 per tonne	1.97	1.96	1.79	2.05	1.53	1.49	0.00	0.00
Scope II Emmissions								
Glasshouse trial								
kg CO2 per tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scope I Emmissions								
Simulated Field Conditions								
kg CO2 per tonne	6.55	6.51	7.69	8.65	9.47	9.31	23.43	23.60
Scope II Emmissions								
Simulated Field Conditions								
kg CO2 per tonne	2.79	2.77	3.38	3.87	4.33	4.23	11.72	11.80

Lettuce WUE Cool Farm Tool Data Inputs and Outputs

	Standard Irrigation Seasol Applied	Standard Irrigation No Seasol	80% Irrigation Seasol Applied	80% Irrigation No Seasol	60% Irrigation Seasol Applied	60% Irrigation No Seasol
Yield						
FW (g)	148.6	150.1	142.7	135.9	145.9	119.3
Area (cm2)	196	196	196	196	196	196
Yield (g/cm2)	0.758	0.766	0.728	0.693	0.745	0.609
Yield (t/ha)	**75.8**	**76.6**	**72.8**	**69.3**	**74.5**	**60.9**
Crop Residude DW (10%)	**0.38**	**0.38**	**0.36**	**0.35**	**0.37**	**0.30**
Soil						
Textture	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
Organic Matter (%)	1.4	1.4	1.4	1.4	1.4	1.4
pH	6.1	6.1	6.1	6.1	6.1	6.1
Seasol						
Emssions (kg CO2-e/ha)	0.145	0.0	0.145	0.0	0.145	0.0
Emssions (kg CO2-e/t lettuce)	0.0019	0.0000	0.0020	0.0000	0.0019	0.0000
Fertiliser						
Nitrophoska NPK	12:5.2:14.1	12:5.2:14.1	12:5.2:14.1	12:5.2:14.1	12:5.2:14.1	12:5.2:14.1
Total (mg)	800	800	800	800	800	800
Total (g/cm2)	0.00408	0.00408	0.00408	0.00408	0.00408	0.00408
Total (t/ha)	0.408	0.408	0.408	0.408	0.408	0.408
Total N (t/ha)	0.049	0.049	0.049	0.049	0.049	0.049
Total N (kg/ha)	**49.0**	**49.0**	**49.0**	**49.0**	**49.0**	**49.0**
Calcium Nitrate	15.5:0:0	15.5:0:0	15.5:0:0	15.5:0:0	15.5:0:0	15.5:0:0
Total (mg)	920	920	920	920	920	920
Total (g/cm2)	0.00469	0.00469	0.00469	0.00469	0.00469	0.00469
Total (t/ha)	0.469	0.469	0.469	0.469	0.469	0.469
Total N (t/ha)	0.059	0.059	0.059	0.059	0.059	0.059
Total N (kg/ha)	**58.7**	**58.7**	**58.7**	**58.7**	**58.7**	**58.7**
Pesticides	None	None	None	None	None	None
Energy Use						
Diesel (L/ha)	100	100	100	100	100	100
Irrigation (L/ha/week)						
Week 1	14286	14286	12449	12449	10612	10612
Week 2	31122	31122	24898	24898	18673	18673
Week 3	28061	28061	22449	22449	16837	16837
Week 4	45918	45918	36735	36735	27551	27551
Week 5	45918	45918	36735	36735	27551	27551
Week 6	86735	86735	69388	69388	52041	52041
Week 7	76531	76531	61224	61224	45918	45918
Week 8	96939	96939	77551	77551	58163	58163
Week 9	20408	20408	16327	16327	12245	12245
Emissions (kg per tonne lettuce (CO2-e))						
Crop Residue	0.65	0.64	0.64	0.65	0.64	0.63
Fertiliser Production	1.45	1.43	1.51	1.58	1.47	1.8
Fertiliser Emissions	1.64	1.62	1.71	1.79	1.67	2.04
Diesel Use	4.4	4.35	4.58	4.82	4.47	5.48
Irrigation Pumping	2.24	2.22	1.87	1.96	1.38	1.68
Seaweed extract production	0.0019	0.0000	0.0020	0.0000	0.0019	0.0000

	Standard Irrigation Seasol Applied	Standard Irrigation No Seasol	80% Irrigation Seasol Applied	80% Irrigation No Seasol	60% Irrigation Seasol Applied	60% Irrigation No Seasol
Scope I Emmissions						
Glasshouse trial						
kg CO2 per tonne	1.64	1.62	1.71	1.79	1.67	2.04
Scope II Emmissions						
Glasshouse trial						
kg CO2 per tonne	0.00	0.00	0.00	0.00	0.00	0.00
Scope I Emmissions						
Simulated Field Conditions						
kg CO2 per tonne	6.69	6.61	6.93	7.26	6.78	8.15
Scope II Emmissions						
Simulated Field Conditions						
kg CO2 per tonne	2.24	2.22	1.87	1.96	1.38	1.68

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Lettuce NUE 100% Fert w Seasol

Other Crops • Vegetable - Above Ground • Finished product: 63 tonnes • Dataset: Default • Yield: 63 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | Results | 10 Com

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions

783.01 ()
kg CO2e

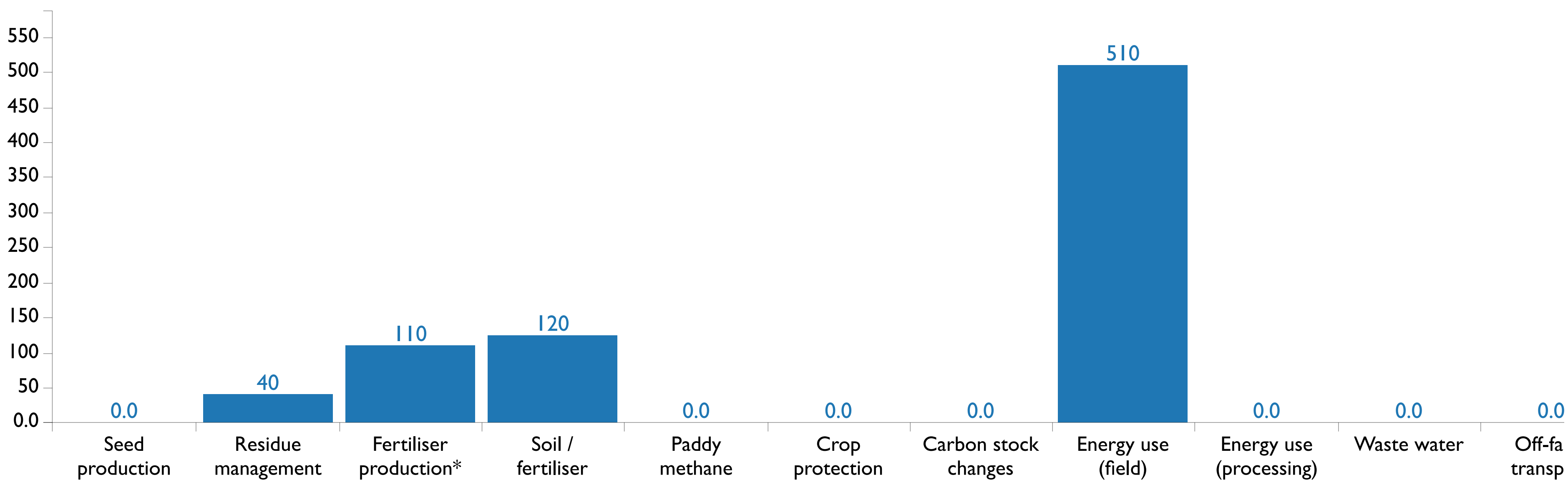
Emissions per hectare

783.01 ()
kg CO2e

Emissions per tonne

12.43 ()
kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.15 ()	0 ()	39.94 ()	39.94 ()	0.63 ()
Fertiliser production*	109.59 ()	0 ()	0 ()	109.59 ()	109.59 ()	1.74 ()
Soil / fertiliser	0 ()	0.45 ()	0 ()	124.21 ()	124.21 ()	1.97 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	509.28 ()	0 ()	0 ()	509.28 ()	509.28 ()	8.08 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce NUE 100% Fert w/o Seasol

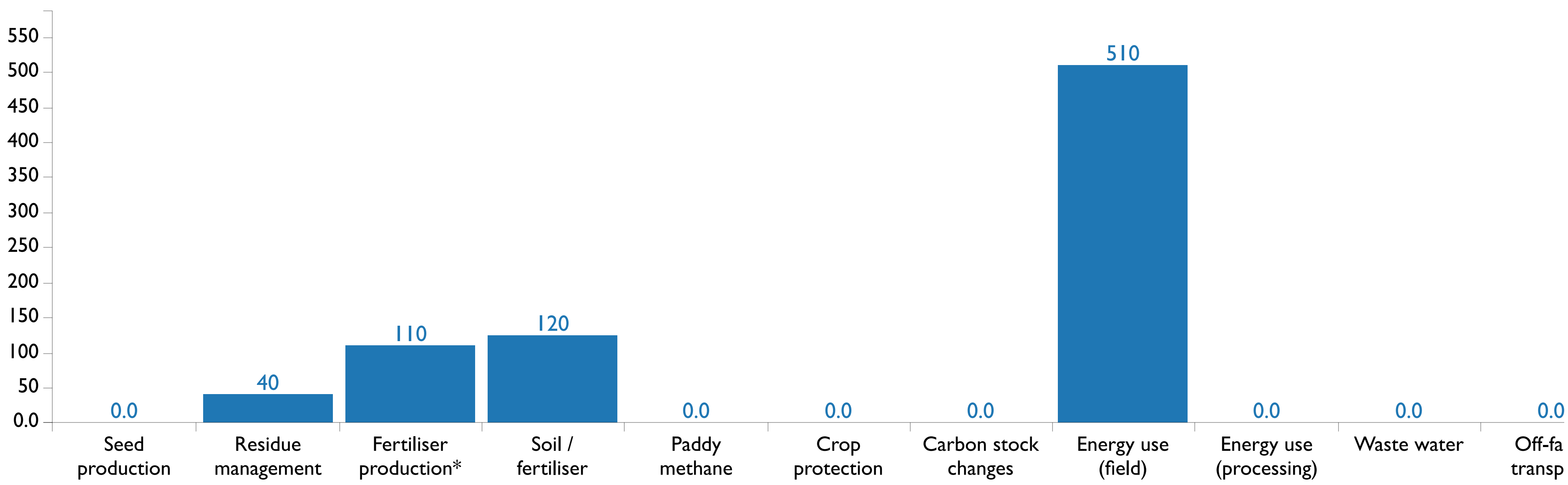
Other Crops • Vegetable - Above Ground • Finished product: 63.50 tonnes • Dataset: Default • Yield: 63.50 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | **Results** | 10 Com

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
783.01 () kg CO2e	**783.01 ()** kg CO2e	**12.33 ()** kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.15 ()	0 ()	39.94 ()	39.94 ()	0.63 ()
Fertiliser production*	109.59 ()	0 ()	0 ()	109.59 ()	109.59 ()	1.73 ()
Soil / fertiliser	0 ()	0.45 ()	0 ()	124.21 ()	124.21 ()	1.96 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	509.28 ()	0 ()	0 ()	509.28 ()	509.28 ()	8.02 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce NUE 75% Fert w Seasol

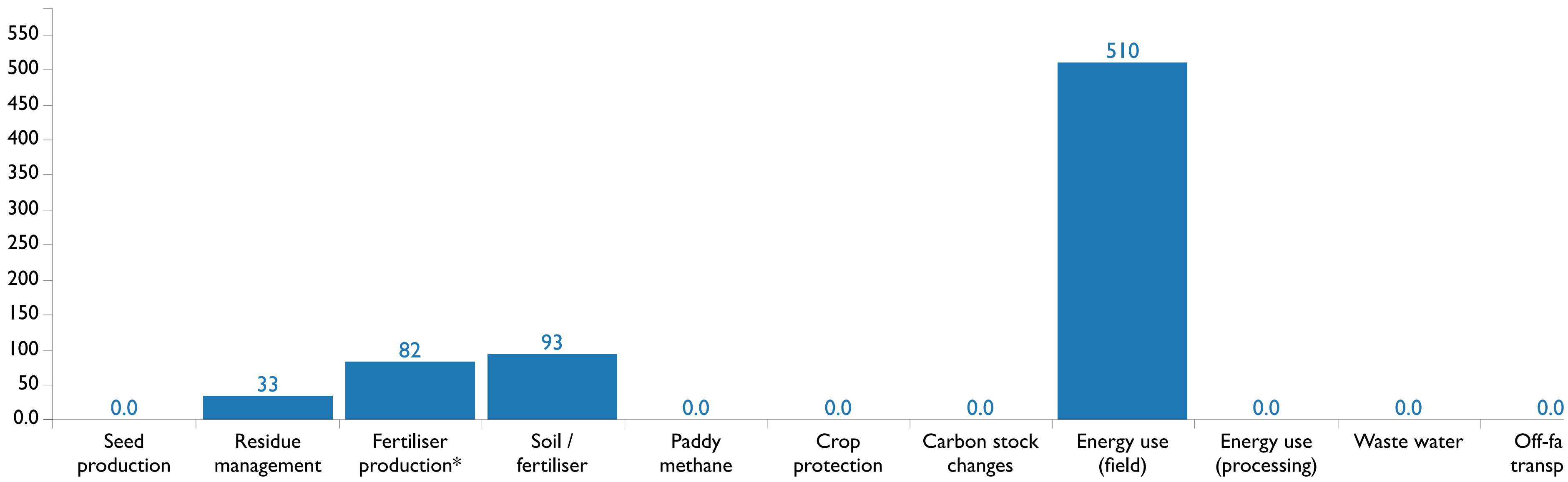
Other Crops • Vegetable - Above Ground • Finished product: 52 tonnes • Dataset: Default • Yield: 52 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | **Results** | 10 Com

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
717.98 () kg CO2e	**717.98 ()** kg CO2e	**13.81 ()** kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.12 ()	0 ()	33.50 ()	33.50 ()	0.64 ()
Fertiliser production*	82.13 ()	0 ()	0 ()	82.13 ()	82.13 ()	1.58 ()
Soil / fertiliser	0 ()	0.34 ()	0 ()	93.07 ()	93.07 ()	1.79 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	509.28 ()	0 ()	0 ()	509.28 ()	509.28 ()	9.79 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce NUE 75% Fert w/o Seasol

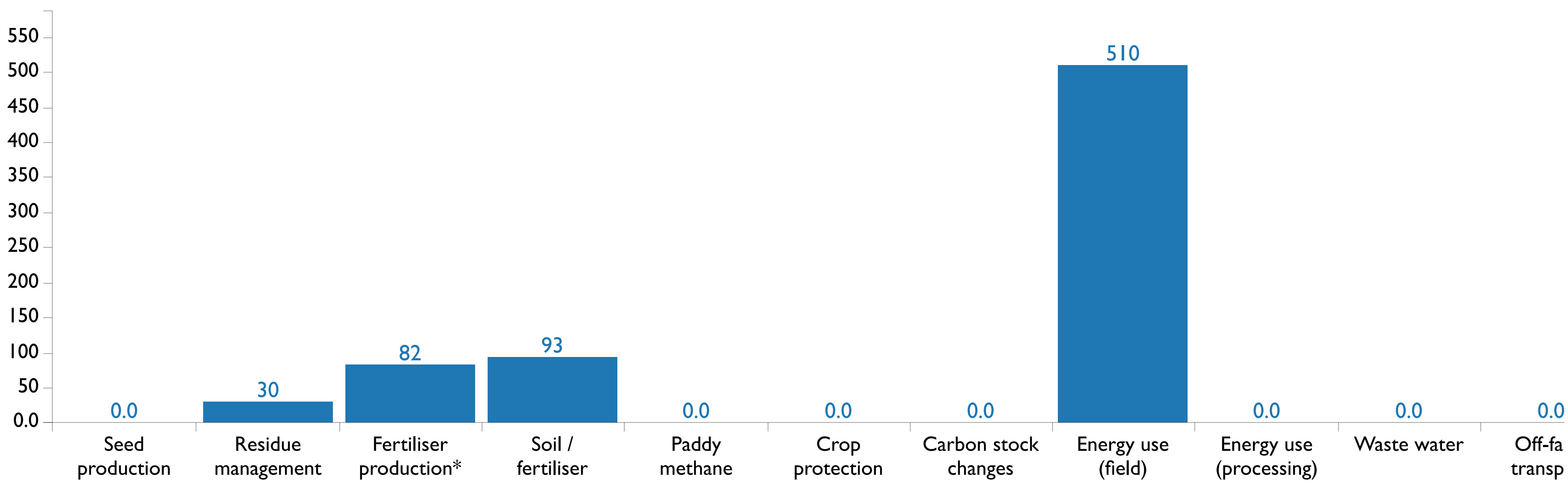
Other Crops • Vegetable - Above Ground • Finished product: 45.40 tonnes • Dataset: Default • Yield: 45.40 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | **Results** | 10 Com

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
714.11 () kg CO2e	**714.11 ()** kg CO2e	**15.73 ()** kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.11 ()	0 ()	29.63 ()	29.63 ()	0.65 ()
Fertiliser production*	82.13 ()	0 ()	0 ()	82.13 ()	82.13 ()	1.81 ()
Soil / fertiliser	0 ()	0.34 ()	0 ()	93.07 ()	93.07 ()	2.05 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	509.28 ()	0 ()	0 ()	509.28 ()	509.28 ()	11.22 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce NUE 50% Fert w Seasol

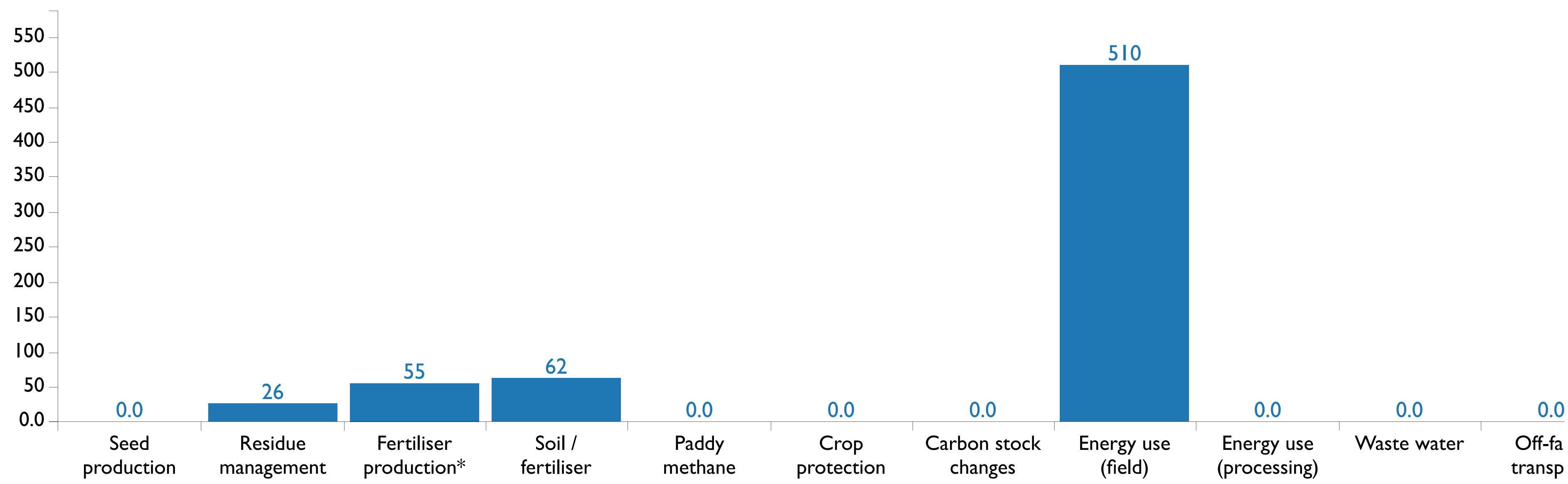
Other Crops • Vegetable - Above Ground • Finished product: 40.60 tonnes • Dataset: Default • Yield: 40.60 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | **Results** | 10 Com

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
651.81 () kg CO2e	**651.81 ()** kg CO2e	**16.05 ()** kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.09 ()	0 ()	25.77 ()	25.77 ()	0.63 ()
Fertiliser production*	54.72 ()	0 ()	0 ()	54.72 ()	54.72 ()	1.35 ()
Soil / fertiliser	0 ()	0.23 ()	0 ()	62.04 ()	62.04 ()	1.53 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	509.28 ()	0 ()	0 ()	509.28 ()	509.28 ()	12.54 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce NUE 50% Fert w/o Seasol

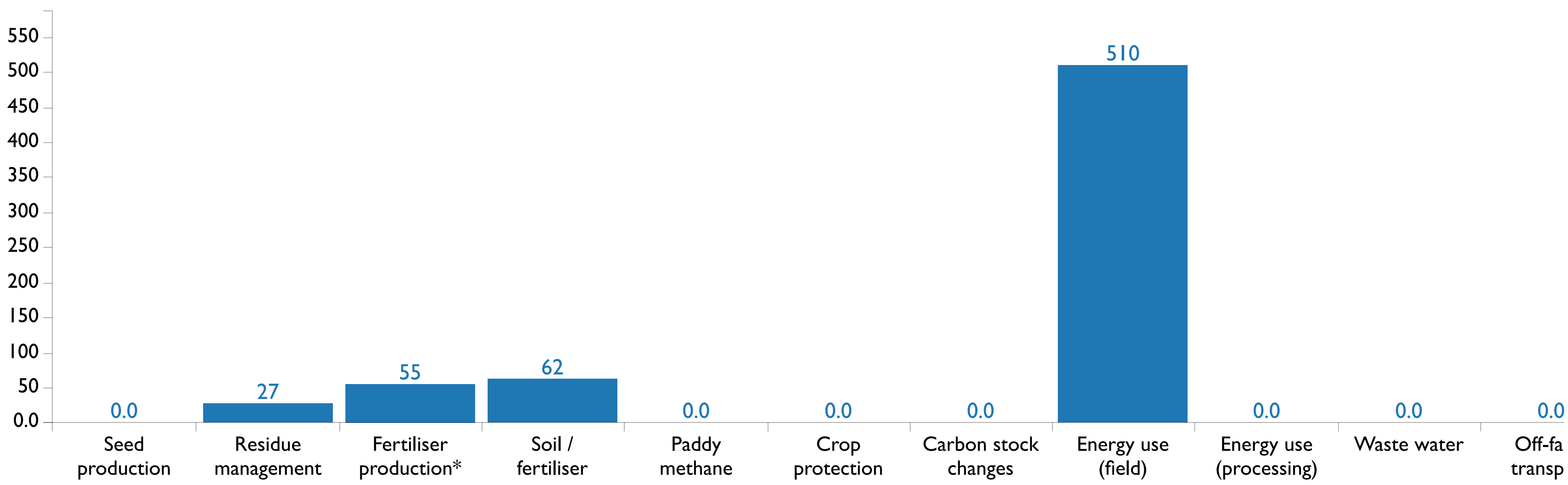
Other Crops • Vegetable - Above Ground • Finished product: 41.60 tonnes • Dataset: Default • Yield: 41.60 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | Results

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
653.09 () kg CO2e	653.09 () kg CO2e	15.70 () kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.10 ()	0 ()	27.05 ()	27.05 ()	0.65 ()
Fertiliser production*	54.72 ()	0 ()	0 ()	54.72 ()	54.72 ()	1.32 ()
Soil / fertiliser	0 ()	0.23 ()	0 ()	62.04 ()	62.04 ()	1.49 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	509.28 ()	0 ()	0 ()	509.28 ()	509.28 ()	12.24 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

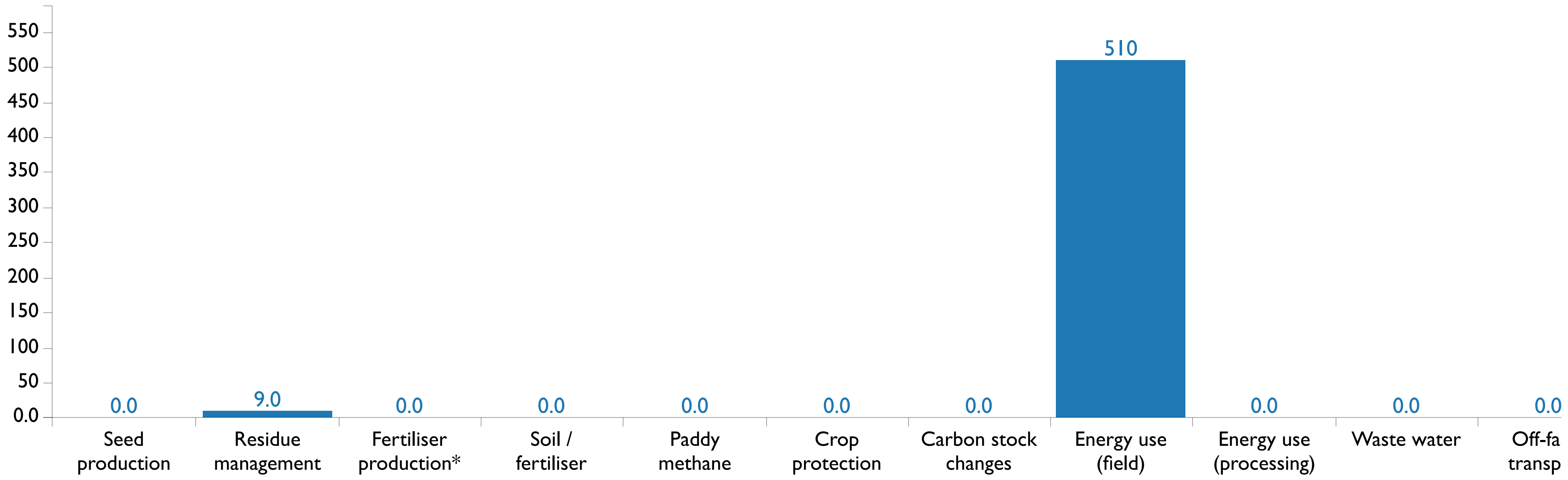
** Calculated with validated default values for fertiliser production.*

Lettuce NUE 0% Fert w Seasol

Other Crops • Vegetable - Above Ground • Finished product: 15 tonnes • Dataset: Default • Yield: 15 tonne / ha

Total emissions	Emissions per hectare	Emissions per tonne
518.30 () kg CO2e	518.30 () kg CO2e	34.55 () kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.03 ()	0 ()	9.02 ()	9.02 ()	0.60 ()
Fertiliser production*	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Soil / fertiliser	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	509.28 ()	0 ()	0 ()	509.28 ()	509.28 ()	33.95 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce NUE 0% Fert w/o Seasol

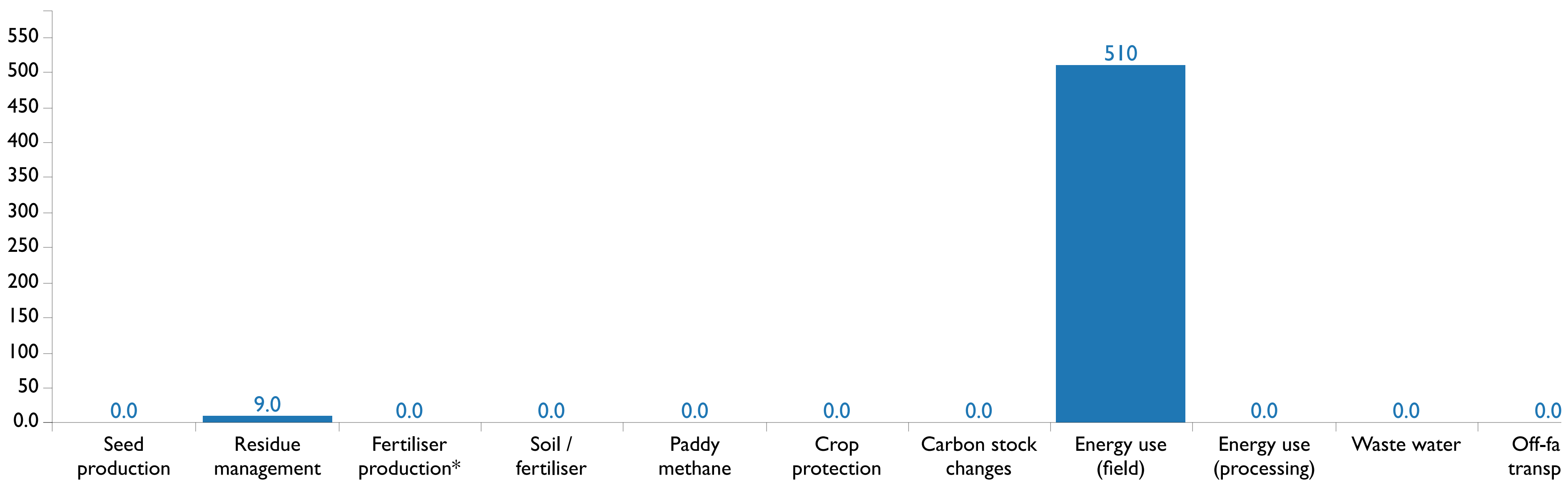
Other Crops • Vegetable - Above Ground • Finished product: 14.90 tonnes • Dataset: Default • Yield: 14.90 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | Results | 10 Com

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
518.30 () kg CO2e	518.30 () kg CO2e	34.79 () kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.03 ()	0 ()	9.02 ()	9.02 ()	0.61 ()
Fertiliser production*	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Soil / fertiliser	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	509.28 ()	0 ()	0 ()	509.28 ()	509.28 ()	34.18 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce WUE 100% Irrigation w Seasol

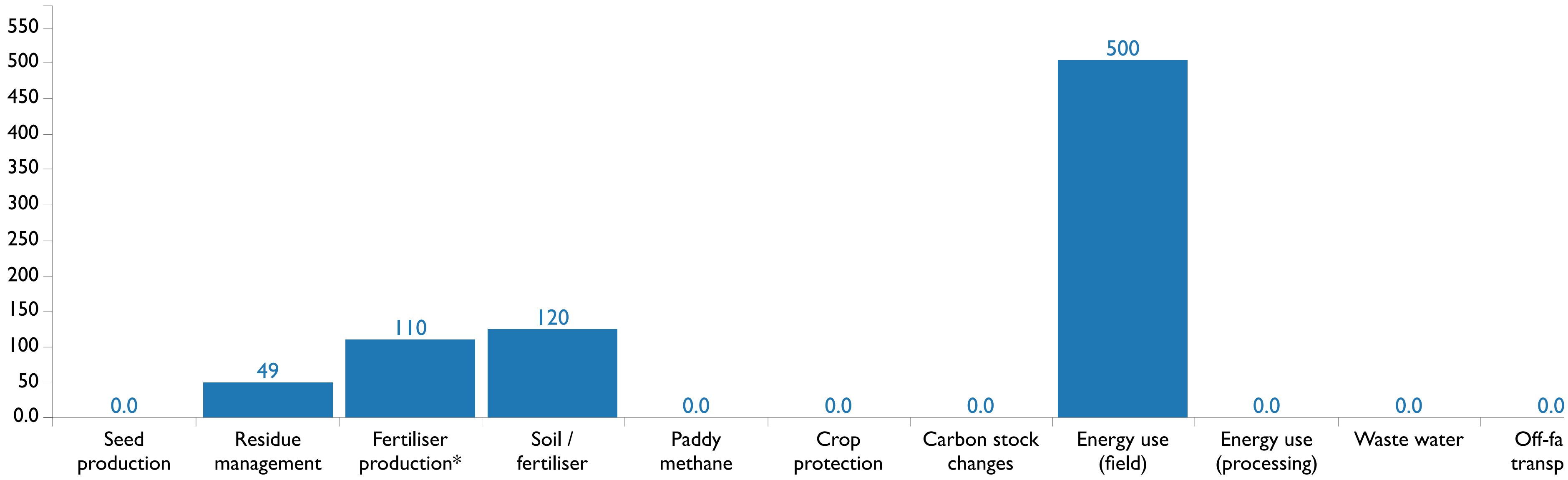
Other Crops • Vegetable - Above Ground • Finished product: 75.80 tonnes • Dataset: Default • Yield: 75.80 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | Results | 10 Com

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
785.87 () kg CO2e	785.87 () kg CO2e	10.37 () kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.18 ()	0 ()	48.95 ()	48.95 ()	0.65 ()
Fertiliser production*	109.59 ()	0 ()	0 ()	109.59 ()	109.59 ()	1.45 ()
Soil / fertiliser	0 ()	0.45 ()	0 ()	124.21 ()	124.21 ()	1.64 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	503.12 ()	0 ()	0 ()	503.12 ()	503.12 ()	6.64 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce WUE 100% Irrigation w/o Seasol

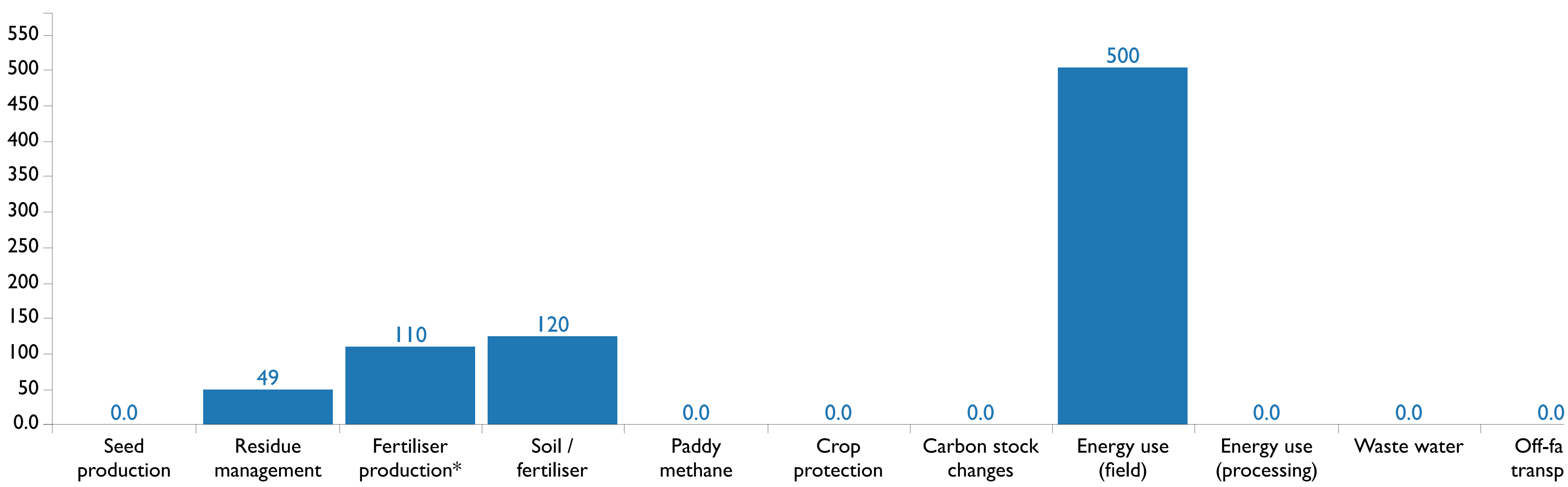
Other Crops • Vegetable - Above Ground • Finished product: 76.60 tonnes • Dataset: Default • Yield: 76.60 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | **Results** | 10 Com

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
785.87 () kg CO2e	785.87 () kg CO2e	10.26 () kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.18 ()	0 ()	48.95 ()	48.95 ()	0.64 ()
Fertiliser production*	109.59 ()	0 ()	0 ()	109.59 ()	109.59 ()	1.43 ()
Soil / fertiliser	0 ()	0.45 ()	0 ()	124.21 ()	124.21 ()	1.62 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	503.12 ()	0 ()	0 ()	503.12 ()	503.12 ()	6.57 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce WUE 80% Irrigation w Seasol

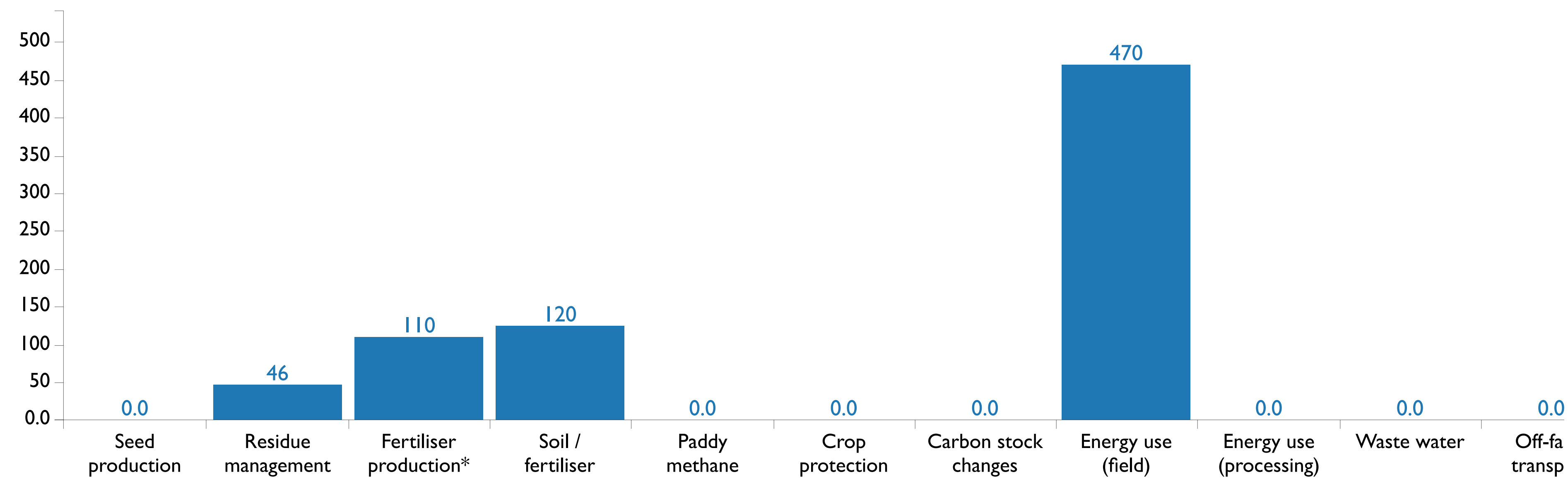
Other Crops • Vegetable - Above Ground • Finished product: 72.80 tonnes • Dataset: Default • Yield: 72.80 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport   **Results** 10 Com

GHGs (Green House Gasses) Water Compare Performance Costs Data

Total emissions	Emissions per hectare	Emissions per tonne
749.76 () kg CO_2e	**749.76 ()** kg CO_2e	**10.30 ()** kg CO_2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.17 ()	0 ()	46.38 ()	46.38 ()	0.64 ()
Fertiliser production*	109.59 ()	0 ()	0 ()	109.59 ()	109.59 ()	1.51 ()
Soil / fertiliser	0 ()	0.45 ()	0 ()	124.21 ()	124.21 ()	1.71 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	469.59 ()	0 ()	0 ()	469.59 ()	469.59 ()	6.45 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce WUE 80% Irrigation w/o Seasol

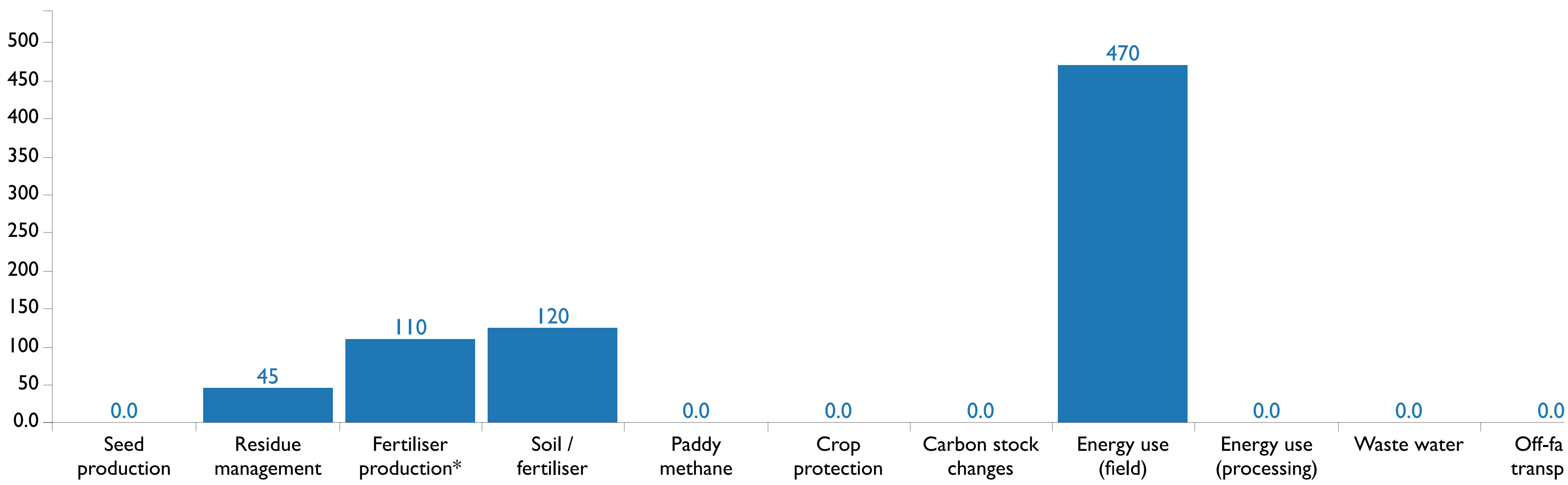
Other Crops • Vegetable - Above Ground • Finished product: 69.30 tonnes • Dataset: Default • Yield: 69.30 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | **Results**

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
748.47 () kg CO2e	748.47 () kg CO2e	10.80 () kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.17 ()	0 ()	45.09 ()	45.09 ()	0.65 ()
Fertiliser production*	109.59 ()	0 ()	0 ()	109.59 ()	109.59 ()	1.58 ()
Soil / fertiliser	0 ()	0.45 ()	0 ()	124.21 ()	124.21 ()	1.79 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	469.59 ()	0 ()	0 ()	469.59 ()	469.59 ()	6.78 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*

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Lettuce WUE 60% Irrigation w Seasol

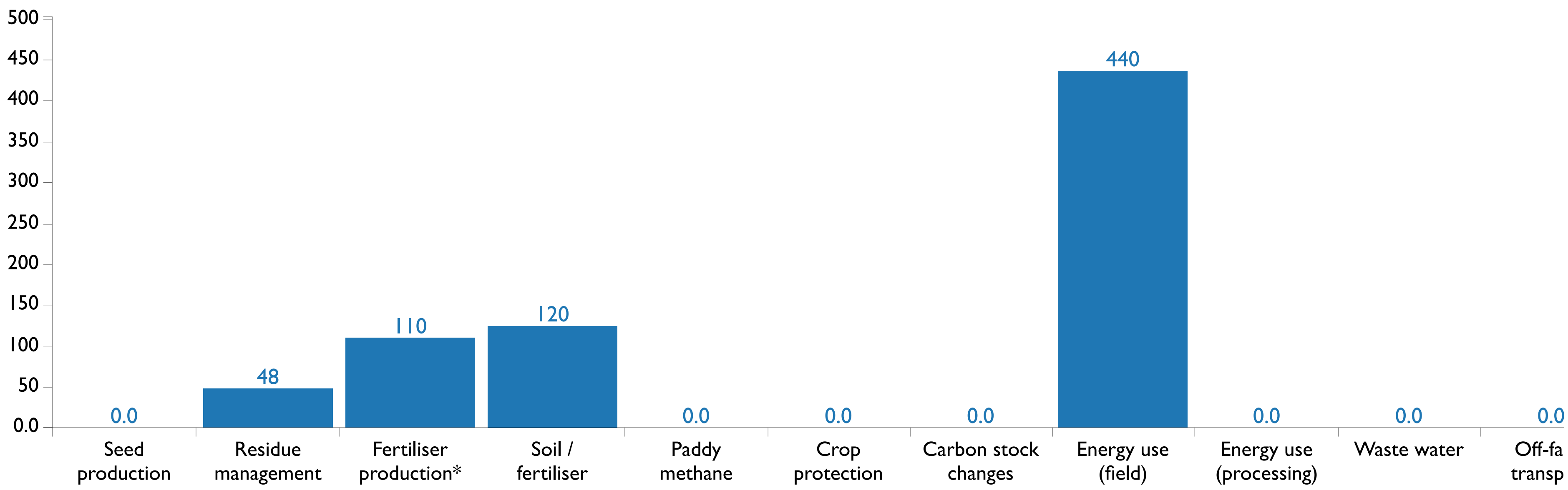
Other Crops • Vegetable - Above Ground • Finished product: 74.50 tonnes • Dataset: Default • Yield: 74.50 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | Results

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
717.49 () kg CO2e	717.49 () kg CO2e	9.63 () kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.17 ()	0 ()	47.67 ()	47.67 ()	0.64 ()
Fertiliser production*	109.59 ()	0 ()	0 ()	109.59 ()	109.59 ()	1.47 ()
Soil / fertiliser	0 ()	0.45 ()	0 ()	124.21 ()	124.21 ()	1.67 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	436.03 ()	0 ()	0 ()	436.03 ()	436.03 ()	5.85 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

* *Calculated with validated default values for fertiliser production.*

Cool Farm

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Lettuce WUE 60% Irrigation w/o Seasol

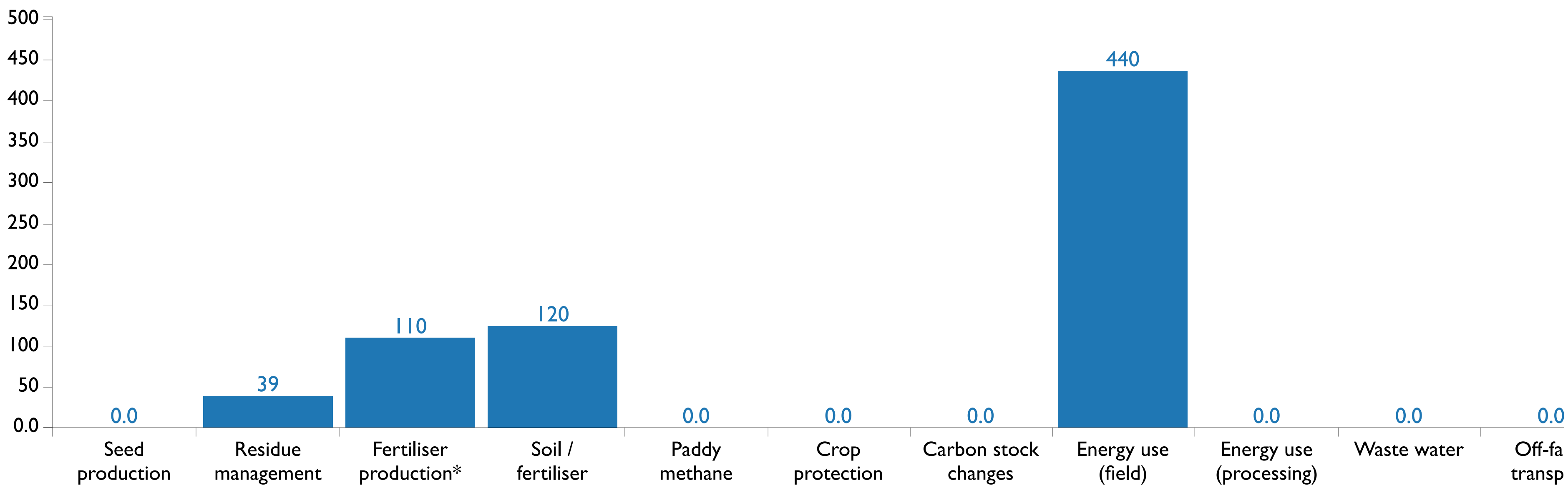
Other Crops • Vegetable - Above Ground • Finished product: 60.90 tonnes • Dataset: Default • Yield: 60.90 tonne / ha

Crop | Soil | Inputs | Fuel & Energy | Irrigation | Carbon | Transport | Results | 10 Com

GHGs (Green House Gasses) | Water | Compare | Performance | Costs | Data

Total emissions	Emissions per hectare	Emissions per tonne
708.48 () kg CO2e	708.48 () kg CO2e	11.63 () kg CO2e

Total Emissions (kg CO2e)



Detailed data (all values in kg)

Hide data

Sources	CO_2	N_2O	CH_4	Total CO_2 eq (equivalent)	Per ha	Per tonne
Seed production	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Residue management	0 ()	0.14 ()	0 ()	38.65 ()	38.65 ()	0.63 ()
Fertiliser production*	109.59 ()	0 ()	0 ()	109.59 ()	109.59 ()	1.80 ()
Soil / fertiliser	0 ()	0.45 ()	0 ()	124.21 ()	124.21 ()	2.04 ()
Paddy methane	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Crop protection	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Carbon stock changes	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Energy use (field)	436.03 ()	0 ()	0 ()	436.03 ()	436.03 ()	7.16 ()
Energy use (processing)	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Waste water	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()
Off-farm transport	0 ()	0 ()	0 ()	0 ()	0 ()	0 ()

** Calculated with validated default values for fertiliser production.*