

Supplementary Material for:

LCA and nutritional assessment of southern Benin market vegetable gardening across the production continuum

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1 Studied sites

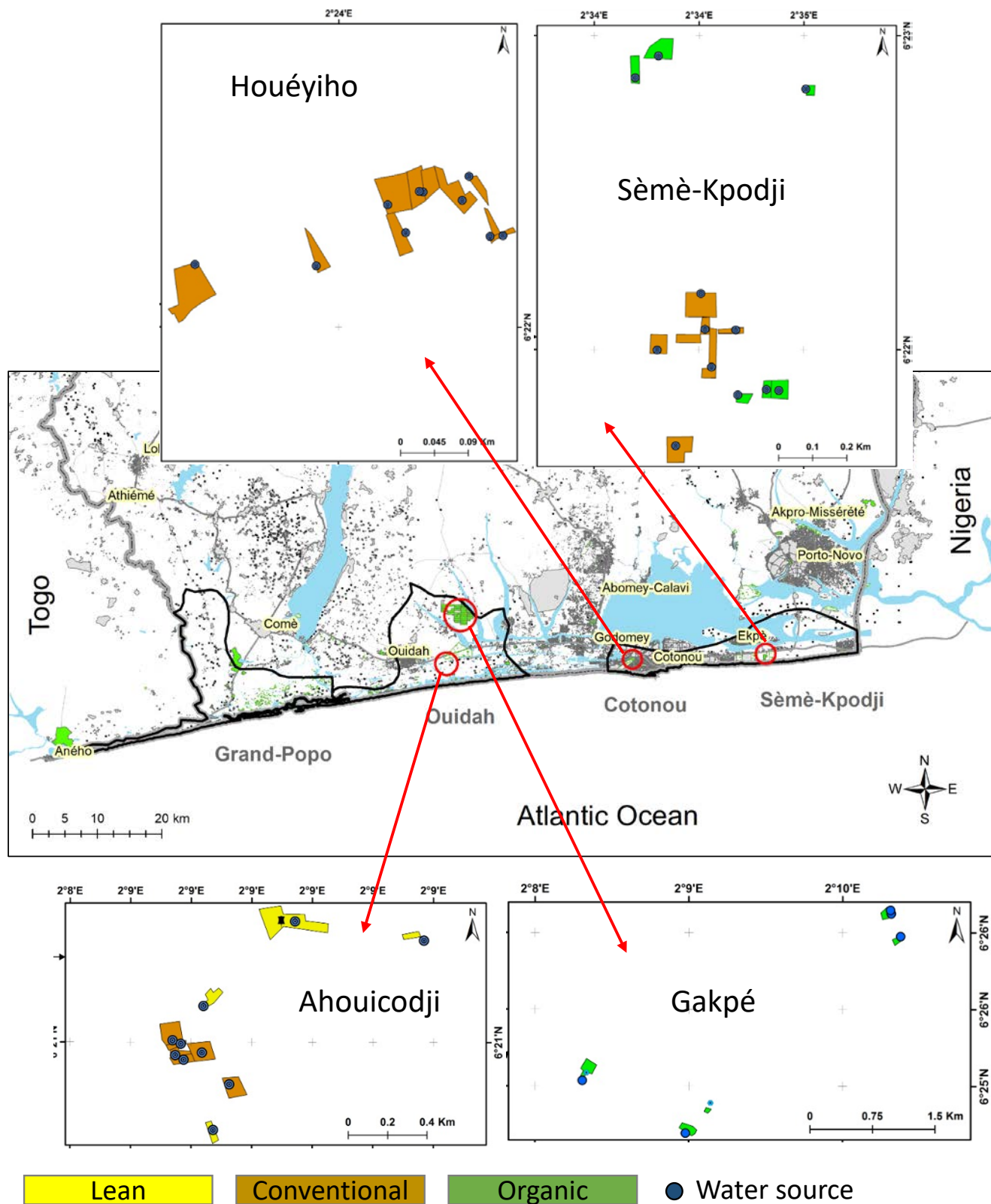


Fig. 1. Locations of studied sites and production systems

2 Laboratory analyses

Table 1. Mean contents of N, C and trace elements (mg/kg WM) in poultry droppings spread in southern Benin

		Sèmè-Kpodji	Houéyiho	Ouidah	All sites	French values ^a
Total N (%DM)	Mean	1.72	2.15	1.87	1.89	2.40
	SD	0.54	0.19	0.47	0.44	
Total C (%DM)	Mean	25.83	40.40	31.51	31.90	17.40
	SD	12.32	1.20	12.93	11.34	
Cr	Mean	35.08	11.00	23.43	24.36	2.98
	SD	15.40	4.51	7.33	14.36	
Ni	Mean	16.40	17.90	17.90	17.90	4.65
	SD	3.00				
Cu	Mean	39.98	24.13	42.93	36.11	17.85
	SD	14.38	2.25	4.65	12.04	
Zn	Mean	259.88	146.97	278.17	231.49	128.07
	SD	102.35	18.51	85.24	93.00	
Cd	Mean	0.18	0.12	0.16	0.16	0.11
	SD	0.01	0.05	0.14	0.08	
Pb	Mean	3.34	2.45	2.60	2.85	1.22
	SD	2.00	1.69	2.58	1.91	
As	Mean	0.60	0.45	0.57	0.55	
	SD	0.41	0.24	0.47	0.35	

Sources: ^a Avadí and Paillat (2020). DM: dry matter, SD: standard deviation, WM: wet mass

3 Life cycle inventories

Table 2. Surveys administered per production unit (crop)

Crops, per type of production	Varieties	Sites			
		Houéyiho	Ouidah	Sèmè-Kpodji	All sites
All Organic crops		No Organic production	11	12	23
Carrot	2			3	3
Cucumber	2		3	3	6
Lettuce	1		2	2	4
Tomato	4		5	4	9
Watermelon	1		1		1
All Conventional crops		15	8	14	37
Carrot	2	5	1	4	10
Cucumber	2	3		3	6
Lettuce	3	7	3	4	14
Tomato	3		1	2	3
Watermelon	1		2		2
All Lean crops		No Lean production	9	No Lean production	9
Carrot	1		2		2

Tomato	2	3	3	
Watermelon	1	4	4	
All crops	15	28	26	69

Table 3. Mean yields (t/ha) of studied vegetables (standard deviations in parenthesis)

Crop	Type	Houéyiho	Ouidah	Sèmè-Kpodji	All sites
Carrot	All types	45.2 (11.1)	20.8 (6.6)	29.7 (5.1)	32.3 (12.1)
	Organic			28.3 (1.7)	28.3 (1.7)
	Conventional	45.2 (11.1)	25.1 (2.1)	30.6 (6.8)	36.3 (11.9)
	Lean		16.5 (7.3)		16.5 (7.3)
Cucumber	All types	13.5 (1.2)	9.8 (5.0)	17.7 (4.3)	14.9 (5.0)
	Organic		9.8 (5.0)	14.4 (3.2)	12.1 (4.5)
	Conventional	13.5 (1.2)		20.1 (3.2)	17.3 (4.3)
Lettuce	All types	31.8 (1.4)	17.9 (4.2)	30.1 (9.1)	27.4 (8.1)
	Organic		14.6 (2.9)	26.7 (4.7)	20.6 (7.7)
	Conventional	31.8 (1.4)	20.1 (3.5)	31.8 (10.9)	29.3 (7.4)
Tomato	All types		5.8 (4.2)	9.6 (15.2)	7.3 (9.8)
	Organic		8.3 (4.3)	11.0 (19.3)	9.5 (12.3)
	Conventional		4.6 (N/A)	6.7 (2.6)	6.0 (2.2)
	Lean		2.2 (0.3)		2.2 (0.3)
Watermelon	All types		17.0 (7.1)		17.0 (7.1)
	Organic		12.8 (N/A)		12.8 (N/A)
	Conventional		21.9 (9.6)		21.9 (9.6)
	Lean		15.6 (6.6)		15.6 (6.6)
All crops	All types	32.6 (13.1)	13.3 (7.8)	21.9 (12.1)	20.8 (13.0)

Table 4. FAOSTAT 2000-2018 tomato yields in Africa (t/ha)

Year	Africa	Eastern Africa	Middle Africa	Northern Africa	Southern Africa	Western Africa
2000	18.2	10.4	13.8	30.1	33.2	6.2
2001	18.0	10.0	13.1	31.0	44.5	6.2
2002	17.8	8.5	9.9	31.7	64.5	6.2
2003	19.0	9.9	10.1	34.4	63.7	6.4
2004	19.4	9.1	8.8	35.6	62.8	7.5
2005	19.7	11.9	9.0	35.4	65.2	8.2
2006	20.7	11.2	11.4	36.1	64.7	8.4
2007	20.5	11.7	11.6	36.0	56.8	7.7
2008	20.1	10.4	11.6	37.2	58.7	7.0
2009	19.6	12.1	5.8	38.4	58.7	7.1
2010	18.5	13.0	5.7	37.7	58.8	7.2
2011	18.9	12.1	11.3	36.8	61.1	6.2
2012	16.7	12.8	10.3	38.6	61.3	5.3
2013	15.8	12.7	11.3	39.3	61.0	4.8
2014	17.5	14.0	11.3	38.4	60.7	8.2

2015	17.4	14.2	11.3	38.9	61.7	8.2
2016	13.6	13.9	11.7	39.7	62.4	5.0
2017	15.5	13.6	10.5	39.8	63.1	7.0
2018	16.1	14.4	10.4	40.7	60.8	7.2
Average	18.1	11.9	10.5	36.6	59.1	6.8

Source: <http://www.fao.org/faostat/en/#compare>

Table 5. Primary data used to build life cycle inventories

Producti on unit	Crop	Crop variety	Type	Dura- tion	Parcels	Parcel size	Area	Yield	Seed	Water	Fuel	N	P	K	Drop- pings	Com- post	Manure
Code				months		m2	ha	kg/ parcel	plants/ parcel	m3/ parcel	L/ parcel	kg N/ parcel	kg P2O5 /parcel	kg K2O/ parcel	kg/ parcel	kg/ parcel	kg/ parcel
H1-C-Ca	Carrot	All season	Conv.	2.5	45	6	0.03	21.46	438	1.8	0.72	0.082	0.028	0.028	2.00		
H1-C-Cu	Cucumber	Nadini	Conv.	1.5	12	6	0.01	7.32	14	1.08	1.25	0.097	0.075	0.075	3.75		
H1-C-Le	Lettuce	Eden	Conv.	1.2	24	6	0.01	19.01	120	1.68	0.49	0.037			1.88		
H2-C-Cu	Cucumber	Nadini	Conv.	1.4	12	6	0.01	8.19	14	2.16	1.25	0.058			3.75		
H2-C-Le	Lettuce	Eden	Conv.	1.0	50	6	0.03	18.45	120	0.72	0.20	0.055			2.00		
H3-C-Cu	Cucumber	Nadini	Conv.	1.5	17	6	0.01	8.75	14	2.16	1.88	0.025	0.032	0.032	2.65		
H3-C-Le	Lettuce	Eden	Conv.	1.4	120	6	0.07	19.98	120	1.44	0.31	0.023	0.007	0.007	1.13		
H4-C-Ca	Carrot	All season	Conv.	2.6	55	6	0.03	37.72	438	1.8	0.68	0.064	0.039	0.039	2.45		
H4-C-Le	Lettuce	Eden	Conv.	1.2	40	6	0.02	19.70	120	1.68	0.64	0.042	0.009	0.009	2.25		
H5-C-Ca	Carrot	All season	Conv.	2.6	71	6	0.04	21.77	438	3.6	0.53	0.086	0.010	0.010	1.90		
H5-C-Le	Lettuce	Eden	Conv.	1.3	21	6	0.01	18.70	125	1.776	0.88	0.074			2.14		
H6-C-Ca	Carrot	All season	Conv.	2.5	20	6	0.01	29.00	450	1.65	0.94	0.042	0.009	0.009	2.50		
H6-C-Le	Lettuce	Eden	Conv.	1.2	12	6	0.01	17.90	120	1.05	0.73	0.077			2.08		
H7-C-Le	Lettuce	Eden	Conv.	1.2	50	6	0.03	20	120	0.84	0.33	0.054	0.016	0.016	4.00		
H8-C-Ca	Carrot	All season	Conv.	2.3	44	6	0.03	25.79	438	1.8	0.67	0.061	0.025	0.025	-		
S1-B-To	Tomato	Mongal	Org.	3.1	10	6	0.006	24.00	16	4.1796	4.50				2.80		5.60
S2-B-Ca	Carrot	Infinity	Org.	3.1	34	6	0.020	18	390	1.9125	1.32				12.57	2.94	
S2-B-Cu	Cucumber	Nadini	Org.	1.6	24	4.8	0.012	8.61	22	1.125	0.94				3.76	5.21	
S2-B-To	Tomato	Cerise	Org.	1.8	20	6	0.012	0.51	16	1.97	1.31					3	3
S3-B-Ca	Carrot	Infinity	Org.	2.9	10	6	0.006	17.00	192	2.81	4.50				4.50		
S3-B-Cu	Cucumber	Nadini	Org.	1.5	22	6	0.013	7.03	22	2.025	1.02				6.15		2.05
S3-B-Le	Lettuce	Eden	Org.	1.1	17	6	0.010	18.00	136	1.2	0.88				5.29		0.88
S3-B-To	Tomato	Cerise	Org.	2.5	10	6	0.006	1.50	32	2.481	3.75				9.00		
S4-B-Ca	Carrot	All season	Org.	3.3	60	6	0.036	16.00	325	1.744	1.50				9.00	7.50	
S4-B-Cu	Cucumber	Dorade	Org.	1.5	43	6	0.026	8.04	14	1.55	0.52				3.14	1.16	
S4-B-Le	Lettuce	Eden	Org.	1.3	14	6	0.008	14.00	192	1.672	1.36				3.21	3.57	
S4-B-To	Tomato	Cerise	Org.	3.1	20	6	0.012	0.50	16	2.1375	2.25				6.75	17.10	
S5-C-Ca	Carrot	All season	Conv.	3.1	46	6	0.028	16.00	192	1.744	1.96	0.060	0.010	0.010	9.78		

S5-C-Cu	Cucumber	Nadini	Conv.	1.5	14	6	0.008	9.64	16	1.2654	1.61	0.027	0.011	0.011	3.21		
S5-C-Le	Lettuce	Eden	Conv.	1.1	35	6	0.021	14.00	175	0.75	0.43	0.066			6.43		
S6-C-Ca	Carrot	All season	Conv.	3.0	102	6	0.061	14.05	360	2.9655	1.32	0.079	0.012	0.012	4.41		
S6-C-Cu	Cucumber	Saira	Conv.	1.4	36	6	0.022	13.70	18	1.84	0.63	0.093	0.017	0.017	1.25		
S6-C-Le	Lettuce	Eden	Conv.	1.4	50	6	0.030	26.23	130	1.76	0.40	0.018	0.009	0.009	4.50		
S7-C-Ca	Carrot	All season	Conv.	2.8	320	6	0.192	20.5	390	3.645	0.84	0.069	0.042	0.042	18.00		
S7-C-Cu	Cucumber	Nadini	Conv.	1.6	146	6	0.088	11.37	0.24 g	2.295	0.31	0.059	0.019	0.019	1.85		
S7-C-Le	Lettuce	Eden	Conv.	0.9	46	6	0.028	23	165	0.99	0.33	0.039	0.012	0.012	4.89		
S7-C-To	Tomato	Mongal	Conv.	2.5	144	6	0.086	2.92	20	3.02475	0.521	0.063	0.019	0.019	8.75		
S8-C-Ca	Carrot	All season	Conv.	3.0	185	6	0.111	23	192	2.3265	0.486	0.123	0.061	0.061	9.73		
S8-C-Cu	Cucumber	Nadini	Conv.	1.6	78	6	0.047	13.6	24	1.593	0.577	0.049	0.012	0.012	8.08		
S8-C-Le	Lettuce	Eden	Conv.	1.1	58	6	0.035	13	192	1.21	0.517	0.03			7.76		
S8-C-To	Tomato	Cobra	Conv.	3.6	200	6	0.120	5.1	20	4.9	1.05	0.076	0.019	0.019	11.25		
O1-C-Ca	Carrot	Nativa	Conv.	3.1	19	27	0.051	62.75	5.26 g	13.99	4.74	0.296	0.296	0.296	36.84		
O1-C-Le	Lettuce	Eden	Conv.	1.4	11	28	0.031	67.275	585	8.4	1.82	0.273	0.036	0.036	19.00		
O1-C-Wa	Watermelon	Kaolack	Conv.	1.9	87	62	0.537	177.48	20 g	7.95	2.8	0.510	0.310	0.310	24.00		
O2-C-To	Tomato	Padma	Conv.	2.6	8	32	0.026	14.695	2.5 g	17.26	4.6875	0.150	0.045	0.045	18.75		
O2-C-Wa	Watermelon	Kaolack	Conv.	1.9	30	92	0.277	139.269	13 g	10.641	2.85	0.301	0.150	0.150	16.66		
O3-C-Le	Lettuce	Eden	Conv.	1.2	2	12	0.002	21.025	140	3.9	3.75	0.300	0.090	0.090	12.50		
O4-C-Ca	Carrot	All season	Conv.	2.6	18	27	0.049	73	100 g	13.91	4.17	0.450	0.135	0.135	32.00		
O4-C-Le	Lettuce	Eden	Conv.	1.1	6	19	0.012	36.16	350	4.338	1.25	0.177	0.030	0.030	25.00		
O5-R-To	Tomato	Bento-01	Lean	3.3	12	31	0.037	7.577	112	6.39	3.75	0.105	0.135	0.135	-		
O5-R-Wa	Watermelon	Kaolack	Lean	1.7	14	102	0.143	99.93	16 g	5.6	5.7	0.125	0.161	0.161	14.30		
O6-R-To	Tomato	Bento-05	Lean	3.5	6	45	0.027	8.64	130	16.2	7.5	-			-		
O6-R-Wa	Watermelon	Kaolack	Lean	1.9	8	110	0.088	112.78	14 g	11.5	5.25	0.280	0.213	0.213	25.00		
O7-R-Ca	Carrot	All season	Lean	3.1	7	38	0.027	43.31		23.3	6.43	0.297	0.129	0.129	9.48		
O7-R-Wa	Watermelon	Kaolack	Lean	1.8	72	63	0.454	120	12 g	9.126	1.5	0.090	0.060	0.060	6.50		
O8-R-Ca	Carrot	All season	Lean	3.2	19	12	0.023	26	5.26 g	5.04	4.74	0.024	0.024	0.024			10.53
O8-R-To	Tomato	Bento-05	Lean	2.1	10	50	0.049	10.446	210	15.12	4.5	0.08	0.11	0.11			20
O8-R-Wa	Watermelon	Kaolack	Lean	2.1	13	74	0.097	172.91	12 g	6.48	4.6	0.160	0.110	0.110			15.4

H: Houéyiho, O: Ouidah, S: Sèmè-Kpodji; C: Conventional, R: lean, B: organic

Table 6. Direct N emissions (computed with Indigo-N v2.7 over a rotation)

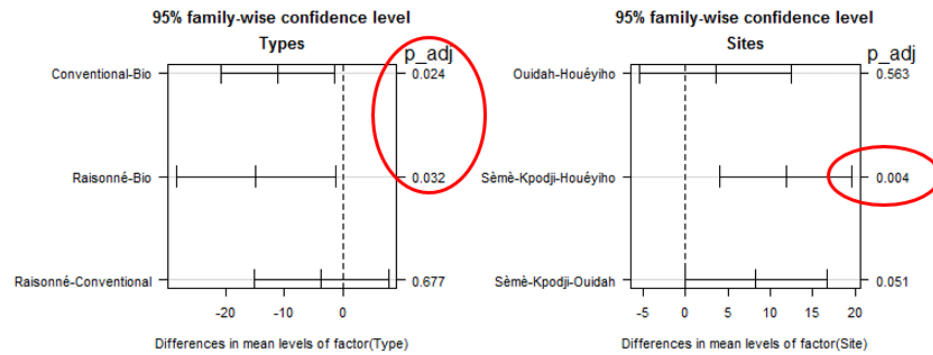
Crop	Emission (kg/ha)	Houéyiho	Ouidah				Sèmè-Kpodji		
		Conventional	All types	Organic	Conventional	Lean	All types	Organic	Conventional
Carrot	NH3	21.41	41.43		72.82	10.03	90.65	77.56	100.47
	N2O	3.64	7.09		12.00	2.17	14.71	13.11	15.91
	NOx	0.77	1.49		2.52	0.46	3.09	2.75	3.34
	NO3	4.10	3.71		-	7.42	3.79	1.69	5.36
Cucumber	NH3	35.18	59.65	59.65			38.84	41.91	36.54
	N2O	5.73	9.47	9.47			6.60	7.43	5.98
	NOx	1.20	1.99	1.99			1.39	1.56	1.26
	NO3	-	2.31	2.31			-	-	-
Lettuce	NH3	23.74	56.73	53.67	58.77		49.50	38.15	55.18
	N2O	3.97	9.24	8.27	9.89		8.05	6.55	8.81
	NOx	0.83	1.94	1.74	2.08		1.69	1.38	1.85
	NO3	-	0.74	1.85	-		-	-	-
Tomato	NH3		31.20	48.69	33.84	1.18	59.99	42.45	95.06
	N2O		5.20	8.06	5.36	0.37	10.84	8.75	15.00
	NOx		1.09	1.69	1.13	0.08	2.28	1.84	3.15
	NO3		1.30	2.33	-	-	-	-	-
Watermelon	NH3		12.61	22.55	18.16	7.36			
	N2O		2.06	3.47	2.98	1.24			
	NOx		0.43	0.73	0.63	0.26			
	NO3		2.84	3.88	8.01	-			
All crops	NH3	25.25	35.62	50.21	49.02	5.89	60.13	50.38	68.49
	N2O	4.21	5.86	8.06	8.12	1.16	10.10	9.14	10.91
	NOx	0.88	1.23	1.69	1.71	0.24	2.12	1.92	2.29
	NO3	1.37	2.04	2.38	2.00	1.65	1.02	0.42	1.53

4 Life cycle impact assessment

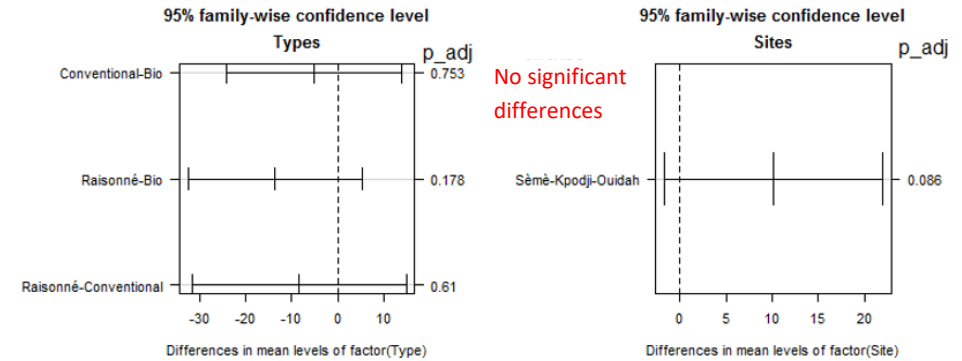
Table 7. Mean impacts of climate change (in kg CO₂-eq) of market vegetable gardening products in southern Benin, per kg of product and per hectare of cultivated land

Crop	Type	Houéyiho		Ouidah		Sèmè-Kpodji		All sites	
		/kg	/ha	/kg	/ha	/kg	/ha	/kg	/ha
Carrot	All types	0.11	4 668	0.38	7 481	0.39	11 041	0.30	8 159
	Organic					0.57	15 922	0.57	15 922
	Conventional	0.11	4 668	0.26	6 542	0.26	7 380	0.19	5 995
	Lean			0.51	8 419			0.51	8 419
Cucumber	All types	0.61	8 162	0.36	3 352	0.39	6 485	0.43	6 149
	Organic			0.36	3 352	0.57	8 582	0.46	5 967
	Conventional	0.61	8 162			0.26	4 913	0.41	6 305
Lettuce	All types	0.11	3 575	0.26	4 478	0.18	4 720	0.18	4 207
	Organic			0.16	2 194	0.33	8 305	0.25	5 250
	Conventional	0.11	3 575	0.32	6 000	0.11	2 928	0.16	3 910
Tomato	All types			1.23	4 885	9.98	15 422	4.73	9 100
	Organic			0.96	5 600	14.56	20 384	7.00	12 170
	Conventional			1.03	4 750	0.82	5 499	0.89	5 249
	Lean			1.75	3 740			1.75	3 740
Watermelon	All types			0.11	1 692			0.11	1 692
	Organic			0.14	1 838			0.14	1 838
	Conventional			0.08	1 842			0.08	1 842
	Lean			0.12	1 580			0.12	1 580
All crops	All types	0.21	4 856	0.56	4 221	2.56	9 367	1.24	6 298

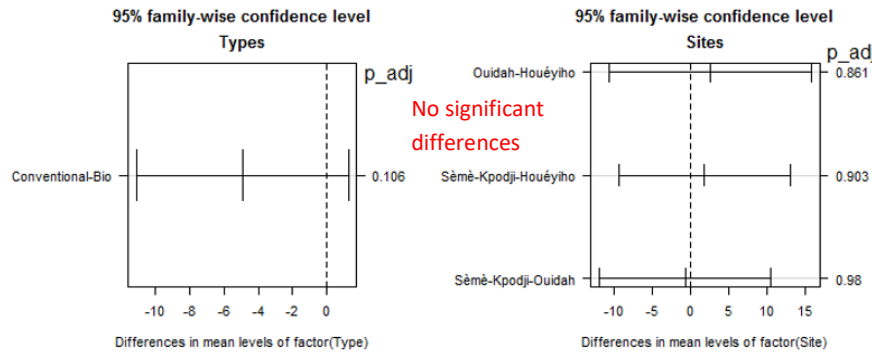
a) Carrot



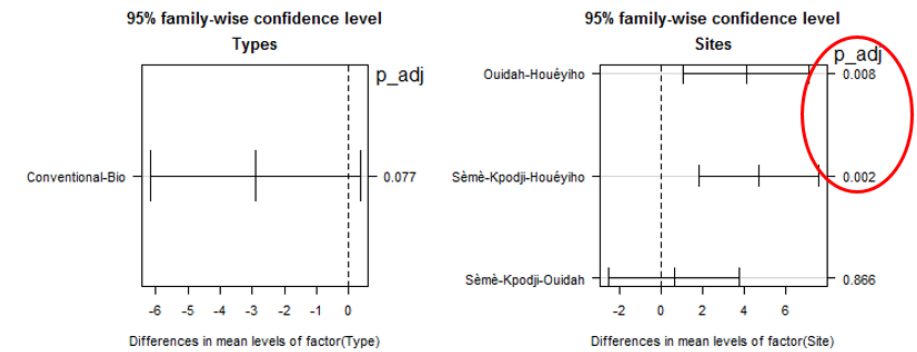
b) Tomato



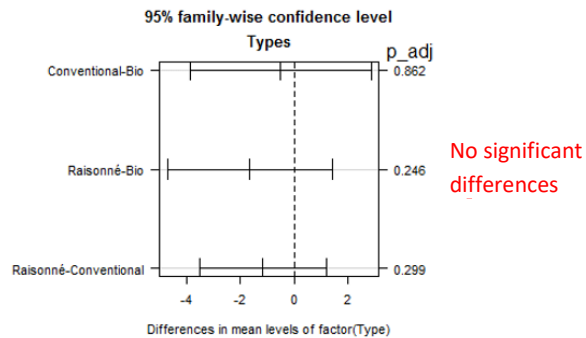
c) Cucumber



d) Lettuce



e) Watermelon



f) All crops

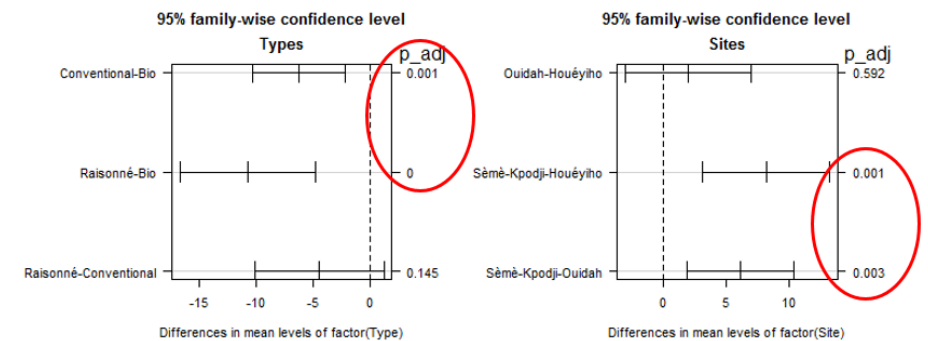


Fig. 2. Tukey's pairwise comparisons of production units impacts aggregated by crop (and for all crops), per sites and types (Raisonné = Lean; Org. = Organic)

Table 8. Midpoint impacts per kg product, per production unit, LCIA method: ILCD 2011 Midpoint+ corrected CO2 short term V1.10 / EC-JRC Global. equal weighting

Production unit		Climate change	Ozone depletion	Human toxicity. non-cancer effects	Human toxicity. cancer effects	Particulate matter	Ionizing radiation HH	Ionizing radiation E (interim)	Photochemical ozone formation	Acidification	Terrestrial eutrophication	Freshwater eutrophication	Marine eutrophication	Freshwater ecotoxicity	Land use	Water resource depletion	Mineral. fossil & ren resource depletion
Code	Yield (kg/ha)	kg CO2 eq	kg CFC- 11 eq	CTUh	CTUh	kg PM2.5 eq	kBq U235 eq	CTUe	kg NMVO C eq	molc H+ eq	molc N eq	kg P eq	kg N eq	CTUe	kg C deficit	m3 water eq	kg Sb eq
H1-C-Ca	35 770	5 049	6.9E-4	5.6E-3	8.9E-5	4.4	267.4	1.7E-3	41.5	111.6	506.9	0.96	13.1	15 016	30 571	2.5	0.20
H1-C-Cu	12 206	8 003	1.2E-3	1.1E-2	1.4E-4	7.4	452.5	2.9E-3	69.9	188.1	853.7	1.23	21.8	29 778	29 126	4.1	0.78
H1-C-Le	31 683	3 181	4.6E-4	4.9E-3	5.0E-5	3.0	173.4	1.1E-3	27.9	84.6	392.7	0.67	9.1	9 928	16 107	0.1	0.15
H2-C-Cu	13 653	7 086	1.1E-3	1.1E-2	9.0E-5	6.5	416.1	2.7E-3	66.8	173.1	790.8	0.83	20.3	28 684	27 001	2.5	0.99
H2-C-Le	30 750	2 074	2.2E-4	4.7E-3	4.5E-5	2.5	87.0	5.3E-4	15.9	86.2	406.5	0.65	6.8	9 073	11 468	0.9	0.08
H3-C-Cu	14 587	9 396	1.6E-3	9.0E-3	9.8E-5	6.9	592.3	3.9E-3	91.1	141.6	646.4	0.87	24.0	12 890	34 442	1.6	0.15
H3-C-Le	33 300	1 964	2.8E-4	3.0E-3	3.1E-5	1.9	108.2	6.9E-4	17.4	51.2	238.6	0.58	5.6	5 274	15 427	0.5	0.06
H4-C-Ca	62 860	4 642	6.5E-4	6.2E-3	8.5E-5	4.4	254.0	1.6E-3	39.6	118.3	544.9	0.94	17.5	14 222	30 819	2.0	0.21
H4-C-Le	32 833	3 885	5.8E-4	6.0E-3	5.6E-5	3.6	216.8	1.4E-3	35.3	101.0	472.5	0.69	11.2	9 578	17 865	1.0	0.09
H5-C-Ca	36 283	4 116	5.1E-4	5.0E-3	7.4E-5	3.7	199.2	1.3E-3	32.4	103.7	475.1	0.81	10.9	13 314	29 025	2.3	0.15
H5-C-Le	31 167	5 521	8.0E-4	6.3E-3	7.5E-5	4.5	298.0	1.9E-3	47.9	115.9	532.3	0.78	14.5	12 839	21 796	2.0	0.11
H6-C-Ca	48 333	5 202	8.2E-4	6.5E-3	6.3E-5	4.5	303.3	2.0E-3	49.1	116.3	543.0	0.70	14.6	9 919	32 107	1.8	0.09
H6-C-Le	29 833	5 620	8.1E-4	6.2E-3	7.9E-5	4.4	301.7	2.0E-3	48.1	109.0	499.3	0.80	14.3	13 411	21 067	1.8	0.12
H7-C-Le	33 333	2 778	3.3E-4	9.1E-3	5.9E-5	4.2	132.2	8.1E-4	25.3	150.1	719.7	0.73	11.1	12 923	14 775	1.4	0.17
H8-C-Ca	42 983	4 329	6.2E-4	1.7E-3	6.8E-5	2.7	238.6	1.5E-3	34.5	42.3	170.4	0.81	8.9	10 244	27 922	2.0	0.16
O10-B-To	6 667	4 345	2.3E-4	2.0E-2	1.2E-4	2.7	361.5	9.8E-4	21.4	123.2	832.2	0.62	10.0	16 079	30 375	6.6	0.16
O11-B-To	9 667	2 465	3.8E-4	2.1E-2	3.5E-5	7.2	137.1	9.2E-4	37.1	311.9	1 547.4	0.48	20.0	11 333	29 849	2.7	0.01
O11-B-Wa	12 778	1 838	3.1E-4	5.7E-3	1.7E-5	2.5	114.1	7.7E-4	21.3	86.1	420.6	0.47	8.5	3 544	24 734	1.5	0.01
O12-B-Cu	7 575	4 043	6.3E-4	3.1E-2	5.5E-5	11.0	228.3	1.5E-3	59.0	470.0	2 329.7	0.51	30.8	17 240	21 668	4.5	0.01
O12-B-Le	12 500	3 079	5.2E-4	1.2E-2	3.0E-5	4.7	188.7	1.3E-3	36.9	173.2	850.0	0.49	14.4	6 924	15 525	2.9	0.01
O12-B-To	2 500	5 904	8.0E-4	1.7E-2	8.7E-5	5.4	413.2	2.1E-3	53.3	181.3	983.2	0.60	18.4	12 728	36 039	3.0	0.08
O13-B-Cu	15 556	4 383	3.7E-4	1.8E-2	1.0E-4	3.5	342.4	1.2E-3	29.7	145.5	886.5	0.59	12.5	14 148	18 860	1.6	0.12
O13-B-Le	16 667	1 310	1.9E-4	1.4E-2	2.1E-5	4.7	69.5	4.7E-4	21.7	210.4	1 045.8	0.45	12.8	7 478	11 826	0.2	0.01

O13-B-To	8 333	9 105	6.9E-4	3.2E-2	2.2E-4	4.4	738.0	2.4E-3	51.6	171.9	1 233.7	0.79	18.8	26 885	36 692	2.6	0.28
O1-C-Ca	23 555	6 721	9.7E-4	1.9E-2	1.2E-4	9.0	377.6	2.4E-3	67.3	299.8	1 442.3	1.04	25.4	22 511	39 217	3.1	0.29
O1-C-Le	24 027	3 063	3.8E-4	9.3E-3	6.0E-5	4.2	146.2	9.2E-4	28.2	150.1	721.4	0.73	11.7	15 724	17 029	1.7	0.11
O1-C-Wa	28 746	2 378	2.8E-4	5.7E-3	5.6E-5	3.0	115.7	7.0E-4	19.8	97.3	457.6	0.75	7.9	10 891	19 669	1.7	0.17
O2-C-To	4 607	4 750	7.6E-4	8.8E-3	5.6E-5	4.8	281.5	1.9E-3	47.5	140.7	670.2	0.65	15.1	9 595	31 622	1.3	0.08
O2-C-Wa	15 101	1 306	1.8E-4	2.7E-3	2.5E-5	1.5	68.7	4.3E-4	11.6	45.4	213.9	0.56	4.2	4 477	17 938	0.6	0.06
O3-C-Le	17 521	11 779	1.7E-3	1.7E-2	1.8E-4	10.6	645.6	4.2E-3	104.8	283.6	1 320.5	1.31	32.8	30 751	33 917	5.3	0.36
O4-C-Ca	26 572	6 363	8.5E-4	1.6E-2	1.1E-4	7.9	327.3	2.1E-3	59.2	263.7	1 262.9	0.97	22.5	21 726	34 553	3.2	0.23
O4-C-Le	18 760	3 159	3.8E-4	1.7E-2	6.5E-5	6.5	147.4	9.3E-4	34.3	260.7	1 272.8	0.70	17.1	17 526	14 678	1.7	0.22
O5-R-To	2 460	3 841	6.3E-4	1.6E-3	4.7E-5	2.3	239.0	1.6E-3	34.6	28.8	114.6	0.68	8.2	5 873	35 551	1.3	0.11
O5-R-Wa	9 810	1 749	2.9E-4	2.4E-3	2.1E-5	1.5	108.4	7.1E-4	17.2	37.7	175.3	0.53	4.9	3 590	17 786	0.5	0.07
O6-R-To NO FERTILISER	1 929	4 596	8.3E-4	1.8E-3	3.1E-5	2.5	300.8	2.0E-3	45.2	27.4	112.2	0.53	10.2	2 447	39 559	0.8	0.01
O6-R-Wa	10 262	1 697	2.6E-4	3.4E-3	2.6E-5	1.8	97.8	6.3E-4	16.3	55.0	260.1	0.56	5.5	4 917	19 088	0.7	0.08
O7-R-Ca	11 296	5 599	8.8E-4	5.1E-3	7.0E-5	4.2	329.4	2.2E-3	50.9	90.1	407.0	0.77	17.3	10 408	37 491	2.1	0.13
O7-R-Wa	19 048	865	1.3E-4	1.6E-3	1.4E-5	0.9	49.8	3.2E-4	8.1	25.9	121.9	0.51	2.7	2 381	16 397	0.4	0.03
O8-R-Ca	21 667	11 239	2.0E-3	7.7E-3	9.0E-5	6.3	719.8	4.8E-3	109.0	79.1	348.6	0.75	25.3	9 579	52 970	2.3	0.08
O8-R-To	2 110	2 782	4.6E-4	2.8E-3	3.1E-5	1.7	172.7	1.1E-3	26.0	23.8	108.2	0.57	6.3	4 071	23 527	0.8	0.05
O8-R-Wa	23 241	2 009	3.2E-4	1.6E-3	2.5E-5	1.2	120.5	7.9E-4	18.0	17.9	78.4	0.55	4.4	3 407	21 544	0.7	0.05
O9-B-Cu	6 417	1 630	2.8E-4	3.6E-3	1.4E-5	1.8	102.7	6.9E-4	17.9	54.7	265.1	0.46	5.8	2 464	16 584	2.0	0.00
O9-B-To	14 167	6 179	1.1E-3	1.7E-2	5.5E-5	7.6	386.9	2.6E-3	69.8	249.1	1 213.1	0.56	24.1	10 532	39 952	4.3	0.02
S1-B-To	40 000	21 629	3.7E-3	1.4E-2	1.5E-4	13.1	1 352.0	9.1E-3	209.3	226.0	1 083.1	0.90	51.0	14 682	76 665	21.0	0.06
S2-B-Ca	30 000	10 273	1.3E-3	3.8E-2	1.7E-4	11.9	717.2	3.6E-3	96.5	451.5	2 415.4	0.73	37.2	26 503	44 953	1.4	0.16
S2-B-Cu	17 938	15 037	1.5E-3	4.0E-2	3.1E-4	8.3	1 092.6	4.4E-3	98.1	266.4	1 718.0	1.16	33.0	44 633	52 849	253.8	0.35
S2-B-To SELF CONSUMPT ION	845	10 200	1.3E-3	1.5E-2	1.4E-4	4.3	714.4	3.5E-3	76.1	85.0	620.1	0.73	19.2	14 899	33 508	1.3	0.15
S3-B-Ca	28 333	20 773	3.7E-3	1.6E-2	1.5E-4	13.9	1 348.9	9.1E-3	209.9	257.5	1 176.4	0.88	52.3	15 260	74 101	3.5	0.05
S3-B-Cu	11 717	6 711	9.3E-4	1.6E-2	1.0E-4	7.0	357.4	2.3E-3	60.5	226.8	1 102.0	0.87	23.2	25 351	47 639	353.0	0.06
S3-B-Le	30 000	5 680	8.0E-4	1.3E-2	8.2E-5	6.0	306.0	2.0E-3	51.8	193.0	935.2	0.79	19.7	20 679	37 849	285.5	0.05
S3-B-To SELF CONSUMPT	2 500	17 517	3.1E-3	2.5E-2	1.3E-4	14.8	1 125.1	7.6E-3	183.8	371.9	1 766.3	0.81	51.3	18 270	62 529	3.0	0.05

[illegible]