

General information

Remover name	Bamboe Boeren B.V.		
Project code	BVUL005		
Project name	Masaka 2		
Location	Buyaga, Masaka, Uganda		
Area	7.75	ha	
Starting year	2025		year of planting
Duration	20	years	project duration
Holding pool	20%		freed up when measurements confirm projection pathways
Project emissions	6.96	tCO2-eq	LCA estimate, or specified when >20%

Per hectare

Baseline TEC	150	tCO2/ha	Soil Organic Carbon and Above Ground Carbon, following CDM AR-ACM0003
Reference capacity	1,006	tCO2/ha	Using CEDA and Soil sample data
Storage potential	856	tCO2/ha	Projection -/- baseline

Per project

Projected storage	6,634	tCO2	storage potential per ha x area
Storage in fence	4,637	tCO2	
Storage in fruit trees	11	tCO2	
LCA emissions	7	tCO2	project related emissions
Net storage potential	11,275	tCO2	project storage -/- emissions over 20 years

Potential Carbon Removal Units

Units first 12 years	6,765	units	12/20 x net storage potential
Holding Pool	1,353	units	20% of the first 12 years
Potential units issued	5,412	units	

Field Code	Field name	Size (ha)	Owner			
BVUL005-1	Buyaga	7.75	Bamboo Community Limited renting to Bamboe Boeren B.V.			

Sources			
value	source	URL	Notes
CEDA aboveground biomass carbon	https://climatee	https://dataceda	2018 data
SOC	A critical review of the conventional SOC to SOM conversion factor (Geoderma, Volume 156, Issues 3–4, 15 May 2010, Pages 75-83)		
Density	Wageningen Ur	https://edepot.wu	We've added these soil density levels to the calculation factors tab
Reference data for capacity			
SOC	495	tCO2e/ha	
SOC reference	135	tC/ha	Yuen et al. (2017), Max. based on 70 species from 184 studies [Max 200, min 70, Average 135]
AGB	511	tCO2e/ha	
	398	tCO2/ha	Yuen et al. 2017; Hermis et al. 2014; Deepika et al. 2022
	1.461		

Assumptions and used methods					
Conversion C in CO2 with 44/12 (= ratio of molecular weight)					
Carbon content in biomass 50%					
Overview of the CO2 storage potential in above- and below-ground biomass					
Bamboo species	ABC carbon total (incl. culms, branches, leaves) [C/ha]	BOB carbon total (incl. rhizomes) [C/ha]	Total stored carbon [t C/ha]	Total stored CO2 [t CO2/ha]	Source
<i>Dendrocalamus Asper</i>	74.5	17.9	92.4	368.8	Yeun et al. (2017)
	60.2164	19.9	100.2	399.2	Herrero et al. (2014)
	64.8	22.1	87.0	347.1	Depraetere et al. (2012)
Average	66.8	19.9	86.6	345.2	
<i>Bambusa bambusa</i>	108.7	6.1	114.8	458.8	Shanmughavel et al. (2001)
	81.1	12.2	93.3	372.1	Yeun et al. (2017)
	149	22.3	166.5	659.4	Neethi et al. (2006); Shanmughavel (1996)
	121	18.5	140.5	553.1	Schulz et al. (2015); Neethi et al. (2006); Kumar et al. (2003)
Average	112.9	12.2	125.1	497.6	
Tree species	ABC carbon total [C/tree]	BOB carbon total [C/tree]	Total stored carbon [t C/ha]	Total stored CO2 [t CO2/ha]	Source
Mango	0.04	0.05	0.05	0.2	Volney et al. (2012)
Guava	0.02	0.005	0.02	0.1	Schubert et al. (2011)
Coffee	0.01	0.01	0.02	0.1	Waggon, M., Stern, M. (2015)
Banana	0.003	0.05	0.01	0.05	Geenakkers et al. (2019); Oria-Lluch et al. (2020)
Cocoa	0.02	0.004	0.02	0.1	Verwilt et al. (2022); Sommariva et al. (2019); Silar et al. (2024)
Estimation of carbon stored in below-ground biomass					
	Participation per area [%]	BOC		[Mg C/ha]	
		a	b		
<i>Dendrocalamus Asper</i>	100%	0.7867	0.74	0.587	Yeun et al. (2017), p. 123 (d) <i>Dendrocalamus</i> sp. & <i>Diglossanthus</i> sp.
<i>Bambusa bambusa</i>		0.1714	0.8216	0.6328	Yeun et al. (2017), p. 123 (d) <i>Bambusa</i> sp. & <i>C. imrayutense</i>
		0.6378	0.8128		Yeun et al. (2017), p. 123 (d) all species/groups
Fence calculation					
Perimeter Masako BPA (incl. 2 entrances)	1750 m				
Amount of bamboo of fence	3718	100% <i>Bambusa bambusa</i> , 2 plants/m			
Storage potential of total fence	4022	CO2/total fence			
Allocated surface area of the 2 meters wide fence [ha]	0.30				
Fruit tree calculation					
	Amount of trees	Total stored CO2			
		[t CO2]			
Plantain/Banana - total Masako plantation (2400m x 400m x 10m)		10000			
Mango	300	1.7			
Guava	50	0.5			
Coffee	1500	17.1			
Banana	450	17.1			
Cocoa	300	7.1			
		45.6			
Allocated storage potential of fruit trees [t/ha]		152.0			

Overview of assessed categories - on plant level (1/2)		Carbon Footprint assessment (ecoinvent 3.10, EF 3.1)			Overview of assessed categories - activities of 20 years (2/2)	
Nursery - Starting material		On plant level (1/2)			Land preparation, planting, maintenance	
Description	Nursery-grown bamboo	Category	CF in kg CO2-eq.	Remarks	Process - land preparation, planting,	by hand
Average weight per starting material [gr]	0.16	Soil	0.002		Transport of workers	Employment of local farmers in
Process - propagation	by hand	Pots (Material, Transport)	0.024			
Defined as cut-off: impact of cuttings itself		Transport to field	0.152			
		Per young plant	0.03	incl. 5% loss		
		Per plant in field	0.215	incl. 20% loss		
		All plants in field	1802	625 plants/ha for total		
Nursery - Soil		Activities of 20 years (2/2)			Maintenance - soil measurement	
Description	Common Ugandan ground,	Category	CF in kg CO2-eq.	Remarks	Transport distance (Kampala - field)	190
Average weight per soil plug [kg]	0.9	All plants in field	1802	Plantation and fence	Transport vehicle	Large car, Diesel, EURO 4
Transport distance (Natabulirwa - Seeta) [km]	4	Fruit trees in field	0.42	Transport to field, allocated	Occurring amount (in 20 years)	282
Transport vehicle	Small truck, 3.5-7.5 tons,	Maintenance - fertiliser	811.5	allocated to 8.1 ha	Bamboo Village / Bamboe Boeren	Business Trips
Description	Polyethylene (PE) grow bags	Maintenance - fertiliser	510.4	allocated to 8.1 ha	Transport distance (Netherlands - Uganda)	6335
Average weight per PE pot [gr]	6.11	Maintenance - soil	46.7	Forth and back (Masaka),	Transport vehicle	Plane
Transport distance (Kampala - Seeta) [km]	19	Maintenance - travelling (BV)	1881.1	Forth and back (Masaka),	Occurring amount (in 20 years)	35
Transport vehicle	Pick-up truck, Diesel, Euro 4	Maintenance - Business trips	1911.7	allocated to 8.1HA		
		Total CF of 20 years	6963	Forth and back (Masaka),		
		Total CF of 20 years	6.96	kg CO2-eq.		
				t CO2-eq.		
Nursery - Cultivation of young plants					Maintenance - fertiliser usage	
Description	Planting of 1 cutting per pot				Amount used - CalcGrow [kg/ha]	8
Process - planting (nursery)	by hand				Amount used - 2S-5-5 [kg/ha]	8
Growth loss	5%				Amount used - Coffee Husk [kg/ha]	125
Defined as cut-off: water usoge					Transport distance (Kampala - field) [km]	190
					Transport vehicle	Small truck, 3.5-7.5 tons, EURO 4
					Occurring amount fertilizer usage (twice)	5
					Occurring amount transport (per year of	4
Transport from nursery to field						
Average weight of a young plant [kg]	145%					
Transport distance (Seeta - field (Masaka)) [km]	17800%					
Transport vehicle	Tipper truck, 3.5-7.5, EURO 4					
Field - Cultivation of plantation						
Total amount of growing plants - field and fence	8362					
Growth loss	20%					
Process - planting (field)	by hand					
Transport fruit trees to plantation						
Average weight of a young cocoa/mango plant [kg]	100%					
Average weight of a young avocado plant [kg]	2.5					
Total weight of bean seeds [kg]	2.5					
Average weight of a young coffee/pineapple plant [kg]	0.5					
Average weight of a young banana plant [kg]	2.5					
Average weight of a young orange/pomegranate/guava	1					
Average weight of a young jackfruit/strawberry crop [kg]	2.5					
Total weight of watermelon seeds stored in two tins [kg]	0.3					
Transport distance (Malembo, Masaka - field (Malembo,	3					
Transport distance (Masaka town - field (Malembo, Masaka))	20					
Transport vehicle	Small truck, 3.5-7.5 tons,					
Defined as cut-off: impact of young trees itself (grown naturally)						

from C to CO2	3 686666667	% organic	sat density
159	0.5	0.25	1.59
1583	0.6	0.3	1.583
1576	0.7	0.35	1.576
1569	0.8	0.4	1.569
1562	0.9	0.45	1.562
1555	1	0.5	1.555
1548	1.1	0.55	1.548
1541	1.2	0.6	1.541
1534	1.3	0.65	1.534
1527	1.4	0.7	1.527
152	1.5	0.75	1.52
1513	1.6	0.8	1.513
1506	1.7	0.85	1.506
1499	1.8	0.9	1.499
1492	1.9	0.95	1.492
1485	2	1	1.485
1478	2.1	1.05	1.478
1471	2.2	1.1	1.471
1464	2.3	1.15	1.464
1457	2.4	1.2	1.457
145	2.5	1.25	1.45
1444	2.6	1.3	1.444
1438	2.7	1.35	1.438
1432	2.8	1.4	1.432
1426	2.9	1.45	1.426
142	3	1.5	1.42
1414	3.1	1.55	1.414
1408	3.2	1.6	1.408
1402	3.3	1.65	1.402
1396	3.4	1.7	1.396
139	3.5	1.75	1.39
1385	3.6	1.8	1.385
138	3.7	1.85	1.38
1375	3.8	1.9	1.375
137	3.9	1.95	1.37
1365	4	2	1.365
136	4.1	2.05	1.36
1355	4.2	2.1	1.355
135	4.3	2.15	1.35
1345	4.4	2.2	1.345
134	4.5	2.25	1.34
1335	4.6	2.3	1.335
133	4.7	2.35	1.33
1325	4.8	2.4	1.325
132	4.9	2.45	1.32
1315	5	2.5	1.315
131	5.1	2.55	1.31
1305	5.2	2.6	1.305
13	5.3	2.65	1.3
1295	5.4	2.7	1.295
129	5.5	2.75	1.29
1285	5.6	2.8	1.285
128	5.7	2.85	1.28
1275	5.8	2.9	1.275
127	5.9	2.95	1.27
1265	6	3	1.265
126	6.1	3.05	1.26
1255	6.2	3.1	1.255
125	6.3	3.15	1.25
1245	6.4	3.2	1.245
124	6.5	3.25	1.24
1234	6.6	3.3	1.234
1228	6.7	3.35	1.228
1222	6.8	3.4	1.222
1216	6.9	3.45	1.216
121	7	3.5	1.21
1204	7.1	3.55	1.204
1198	7.2	3.6	1.198
1192	7.3	3.65	1.192
1186	7.4	3.7	1.186
118	7.5	3.75	1.18
1175	7.6	3.8	1.175
117	7.7	3.85	1.17
1165	7.8	3.9	1.165
116	7.9	3.95	1.16
1155	8	4	1.155
115	8.1	4.05	1.15
1145	8.2	4.1	1.145
114	8.3	4.15	1.14
1135	8.4	4.2	1.135
113	8.5	4.25	1.13
1126	8.6	4.3	1.126
1122	8.7	4.35	1.122
1118	8.8	4.4	1.118
1114	8.9	4.45	1.114
111	9	4.5	1.11
1106	9.1	4.55	1.106
1102	9.2	4.6	1.102
1098	9.3	4.65	1.098
1094	9.4	4.7	1.094
109	9.5	4.75	1.09
1086	9.6	4.8	1.086
1082	9.7	4.85	1.082
1078	9.8	4.9	1.078
1074	9.9	4.95	1.074
107	10	5	1.07
1066	10.1	5.05	1.066
1062	10.2	5.1	1.062
1058	10.3	5.15	1.058
1054	10.4	5.2	1.054
105	10.5	5.25	1.05
1046	10.6	5.3	1.046
1042	10.7	5.35	1.042
1038	10.8	5.4	1.038
1034	10.9	5.45	1.034
103	11	5.5	1.03
1026	11.1	5.55	1.026
1022	11.2	5.6	1.022
1018	11.3	5.65	1.018
1014	11.4	5.7	1.014
101	11.5	5.75	1.01
1005	11.6	5.8	1.005
1	11.7	5.85	1
0995	11.8	5.9	0.995
099	11.9	5.95	0.99
0985	12	6	0.985
098	12.1	6.05	0.98
0975	12.2	6.1	0.975
097	12.3	6.15	0.97
0965	12.4	6.2	0.965
096	12.5	6.25	0.96
0957	12.6	6.3	0.957
0954	12.7	6.35	0.954
0951	12.8	6.4	0.951
0948	12.9	6.45	0.948
0945	13	6.5	0.945
0942	13.1	6.55	0.942
0939	13.2	6.6	0.939
0936	13.3	6.65	0.936
0933	13.4	6.7	0.933
093	13.5	6.75	0.93
0927	13.6	6.8	0.927
0924	13.7	6.85	0.924
0921	13.8	6.9	0.921
0918	13.9	6.95	0.918
0915	14	7	0.915
0912	14.1	7.05	0.912
0909	14.2	7.1	0.909
0906	14.3	7.15	0.906
0903	14.4	7.2	0.903
09	14.5	7.25	0.9
0897	14.6	7.3	0.897
0894	14.7	7.35	0.894
0891	14.8	7.4	0.891
0888	14.9	7.45	0.888
0885	15	7.5	0.885
0882	15.1	7.55	0.882
0879	15.2	7.6	0.879
0876	15.3	7.65	0.876
0873	15.4	7.7	0.873
087	15.5	7.75	0.87
0867	15.6	7.8	0.867
0864	15.7	7.85	0.864
0861	15.8	7.9	0.861
0858	15.9	7.95	0.858
0855	16	8	0.855
0852	16.1	8.05	0.852
0849	16.2	8.1	0.849
0846	16.3	8.15	0.846
0843	16.4	8.2	0.843
084	16.5	8.25	0.84
0837	16.6	8.3	0.837
0834	16.7	8.35	0.834
0831	16.8	8.4	0.831
0828	16.9	8.45	0.828

0.825	17	8.5	0.825
0.822	17.1	8.55	0.822
0.819	17.2	8.6	0.819
0.816	17.3	8.65	0.816
0.813	17.4	8.7	0.813
0.81	17.5	8.75	0.81
0.808	17.6	8.8	0.808
0.806	17.7	8.85	0.806
0.804	17.8	8.9	0.804
0.802	17.9	8.95	0.802
0.8	18	9	0.8
0.798	18.1	9.05	0.798
0.796	18.2	9.1	0.796
0.794	18.3	9.15	0.794
0.792	18.4	9.2	0.792
0.79	18.5	9.25	0.79
0.788	18.6	9.3	0.788
0.786	18.7	9.35	0.786
0.784	18.8	9.4	0.784
0.782	18.9	9.45	0.782
0.78	19	9.5	0.78
0.778	19.1	9.55	0.778
0.776	19.2	9.6	0.776
0.774	19.3	9.65	0.774
0.772	19.4	9.7	0.772
0.77	19.5	9.75	0.77
0.768	19.6	9.8	0.768
0.766	19.7	9.85	0.766
0.764	19.8	9.9	0.764
0.762	19.9	9.95	0.762
0.76	20	10	0.76
0.758	20.1	10.05	0.758
0.756	20.2	10.1	0.756
0.754	20.3	10.15	0.754
0.752	20.4	10.2	0.752
0.75	20.5	10.25	0.75
0.748	20.6	10.3	0.748
0.746	20.7	10.35	0.746
0.744	20.8	10.4	0.744
0.742	20.9	10.45	0.742
0.74	21	10.5	0.74
0.738	21.1	10.55	0.738
0.736	21.2	10.6	0.736
0.734	21.3	10.65	0.734
0.732	21.4	10.7	0.732
0.73	21.5	10.75	0.73
0.728	21.6	10.8	0.728
0.726	21.7	10.85	0.726
0.724	21.8	10.9	0.724
0.722	21.9	10.95	0.722
0.72	22	11	0.72
0.718	22.1	11.05	0.718
0.716	22.2	11.1	0.716
0.714	22.3	11.15	0.714
0.712	22.4	11.2	0.712
0.71	22.5	11.25	0.71
0.709	22.6	11.3	0.709
0.708	22.7	11.35	0.708
0.707	22.8	11.4	0.707
0.706	22.9	11.45	0.706
0.705	23	11.5	0.705
0.704	23.1	11.55	0.704
0.703	23.2	11.6	0.703
0.702	23.3	11.65	0.702
0.701	23.4	11.7	0.701
0.7	23.5	11.75	0.7
0.699	23.6	11.8	0.699
0.698	23.7	11.85	0.698
0.697	23.8	11.9	0.697
0.696	23.9	11.95	0.696
0.695	24	12	0.695
0.694	24.1	12.05	0.694
0.693	24.2	12.1	0.693
0.692	24.3	12.15	0.692
0.691	24.4	12.2	0.691
0.69	24.5	12.25	0.69
0.688	24.6	12.3	0.688
0.686	24.7	12.35	0.686
0.684	24.8	12.4	0.684
0.682	24.9	12.45	0.682
0.68	25	12.5	0.68
0.678	25.1	12.55	0.678
0.676	25.2	12.6	0.676
0.674	25.3	12.65	0.674
0.672	25.4	12.7	0.672
0.67	25.5	12.75	0.67
0.668	25.6	12.8	0.668
0.666	25.7	12.85	0.666
0.664	25.8	12.9	0.664
0.662	25.9	12.95	0.662
0.66	26	13	0.66
0.658	26.1	13.05	0.658
0.656	26.2	13.1	0.656
0.654	26.3	13.15	0.654
0.652	26.4	13.2	0.652
0.65	26.5	13.25	0.65
0.648	26.6	13.3	0.648
0.646	26.7	13.35	0.646
0.644	26.8	13.4	0.644
0.642	26.9	13.45	0.642
0.64	27	13.5	0.64
0.638	27.1	13.55	0.638
0.636	27.2	13.6	0.636
0.634	27.3	13.65	0.634
0.632	27.4	13.7	0.632
0.63	27.5	13.75	0.63
0.628	27.6	13.8	0.628
0.626	27.7	13.85	0.626
0.624	27.8	13.9	0.624
0.622	27.9	13.95	0.622
0.62	28	14	0.62
0.618	28.1	14.05	0.618
0.616	28.2	14.1	0.616
0.614	28.3	14.15	0.614
0.612	28.4	14.2	0.612
0.61	28.5	14.25	0.61
0.608	28.6	14.3	0.608
0.606	28.7	14.35	0.606
0.604	28.8	14.4	0.604
0.602	28.9	14.45	0.602
0.6	29	14.5	0.6
0.598	29.1	14.55	0.598
0.596	29.2	14.6	0.596
0.594	29.3	14.65	0.594
0.592	29.4	14.7	0.592
0.59	29.5	14.75	0.59
0.588	29.6	14.8	0.588
0.586	29.7	14.85	0.586
0.584	29.8	14.9	0.584
0.582	29.9	14.95	0.582
0.58	30	15	0.58
0.578	30.1	15.05	0.578
0.576	30.2	15.1	0.576
0.574	30.3	15.15	0.574
0.572	30.4	15.2	0.572
0.57	30.5	15.25	0.57
0.568	30.6	15.3	0.568
0.566	30.7	15.35	0.566
0.564	30.8	15.4	0.564
0.562	30.9	15.45	0.562
0.56	31	15.5	0.56
0.558	31.1	15.55	0.558
0.556	31.2	15.6	0.556
0.554	31.3	15.65	0.554
0.552	31.4	15.7	0.552
0.55	31.5	15.75	0.55
0.548	31.6	15.8	0.548
0.546	31.7	15.85	0.546
0.544	31.8	15.9	0.544
0.542	31.9	15.95	0.542
0.54	32	16	0.54
0.538	32.1	16.05	0.538
0.536	32.2	16.1	0.536
0.534	32.3	16.15	0.534
0.532	32.4	16.2	0.532
0.53	32.5	16.25	0.53
0.528	32.6	16.3	0.528
0.526	32.7	16.35	0.526
0.524	32.8	16.4	0.524
0.522	32.9	16.45	0.522
0.52	33	16.5	0.52
0.518	33.1	16.55	0.518
0.516	33.2	16.6	0.516
0.514	33.3	16.65	0.514
0.512	33.4	16.7	0.512
0.51	33.5	16.75	0.51
0.508	33.6	16.8	0.508
0.506	33.7	16.85	0.506
0.504	33.8	16.9	0.504
0.502	33.9	16.95	0.502
0.5	34	17	0.5
0.499	34.1	17.05	0.499

0498	41.4	20.7	0498
0497	41.6	20.8	0497
0496	41.8	20.9	0496
0495	42	21	0495
0494	42.2	21.1	0494
0493	42.4	21.2	0493
0492	42.6	21.3	0492
0491	42.8	21.4	0491
0490	43	21.5	0490
0488	43.2	21.6	0488
0486	43.4	21.7	0486
0484	43.6	21.8	0484
0482	43.8	21.9	0482
048	44	22	048
0478	44.2	22.1	0478
0476	44.4	22.2	0476
0474	44.6	22.3	0474
0472	44.8	22.4	0472
047	45	22.5	047
0469	45.2	22.6	0469
0468	45.4	22.7	0468
0467	45.6	22.8	0467
0466	45.8	22.9	0466
0465	46	23	0465
0464	46.2	23.1	0464
0463	46.4	23.2	0463
0462	46.6	23.3	0462
0461	46.8	23.4	0461
046	47	23.5	046
0458	47.2	23.6	0458
0456	47.4	23.7	0456
0454	47.6	23.8	0454
0452	47.8	23.9	0452
045	48	24	045
0448	48.2	24.1	0448
0446	48.4	24.2	0446
0444	48.6	24.3	0444
0442	48.8	24.4	0442
044	49	24.5	044

