Supplementary File S1

Exploring the branch wood supply potential of an agroforestry system with strategically designed harvesting interventions based on terrestrial LiDAR data

Rafael Bohn Reckziegel*[1], Werner Mbongo[2], Anton Kunneke[2], Christopher Morhart[1], Jonathan P. Sheppard[1], Paxie Chirwa[3], Ben du Toit[2] and Hans-Peter Kahle[1]

[1] Chair of Forest Growth and Dendroecology, University of Freiburg, Tennenbacher Str. 4, 79106 Freiburg, Germany
[2] Department of Forest and Wood Science, Stellenbosch University, Private Bag X1, 7602 Matieland, South Africa
[3] Department of Plant and Soil Sciences, University of Pretoria, Private Bag X20, 0028 Hatfield, South Africa
* Correspondence: rafael.bohn.reckziegel@iww.uni-freiburg.de (R.B.R.);

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Note: 'Supplementary File 2' contains the assessment of assortments on a tree basis for each harvesting simulation.

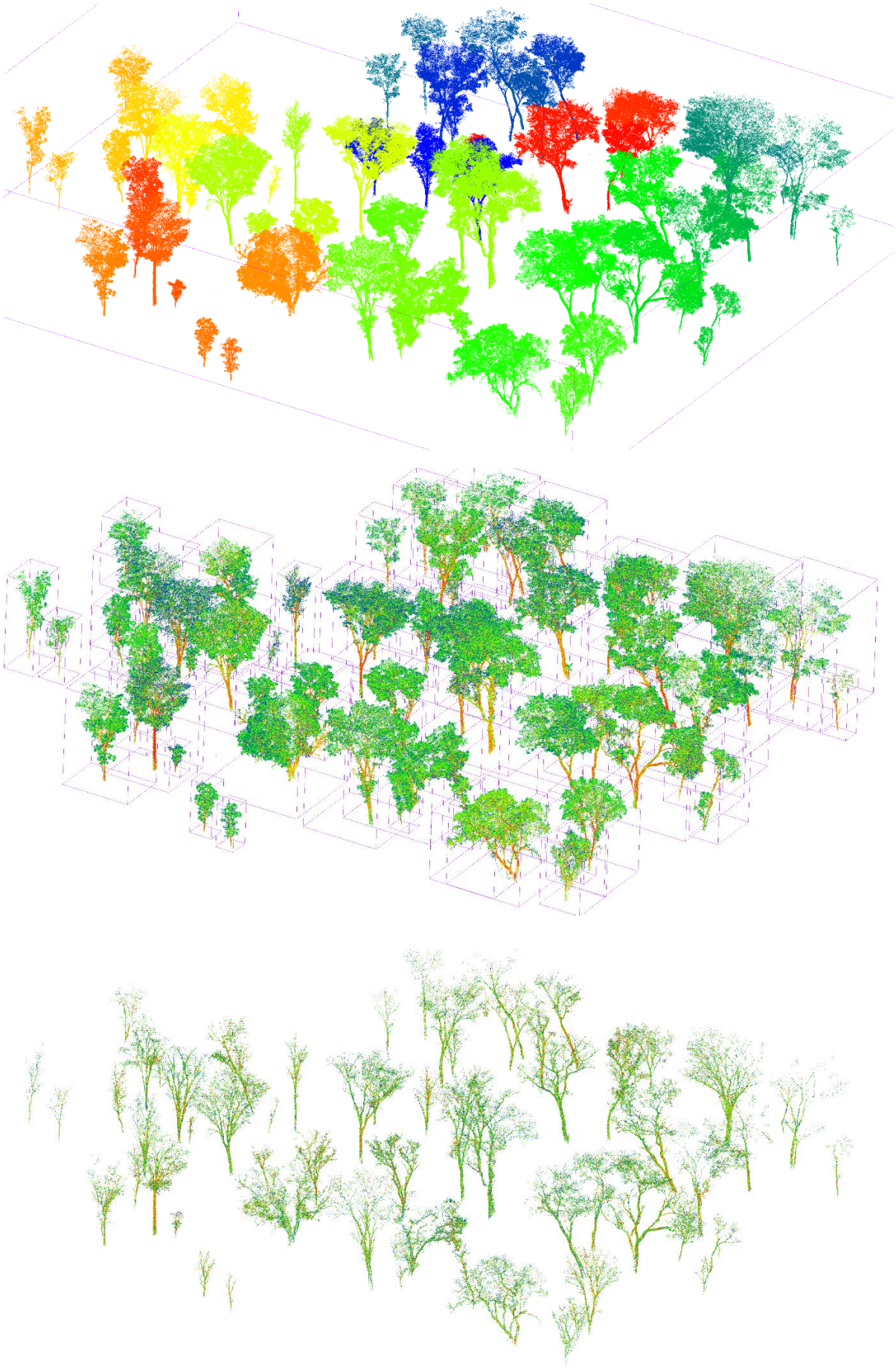

Figure S1. Individual tree point clouds (up) identified by colours, leaf-on mode evidenced by intensity values (middle), and the leaf-off point clouds (bottom).

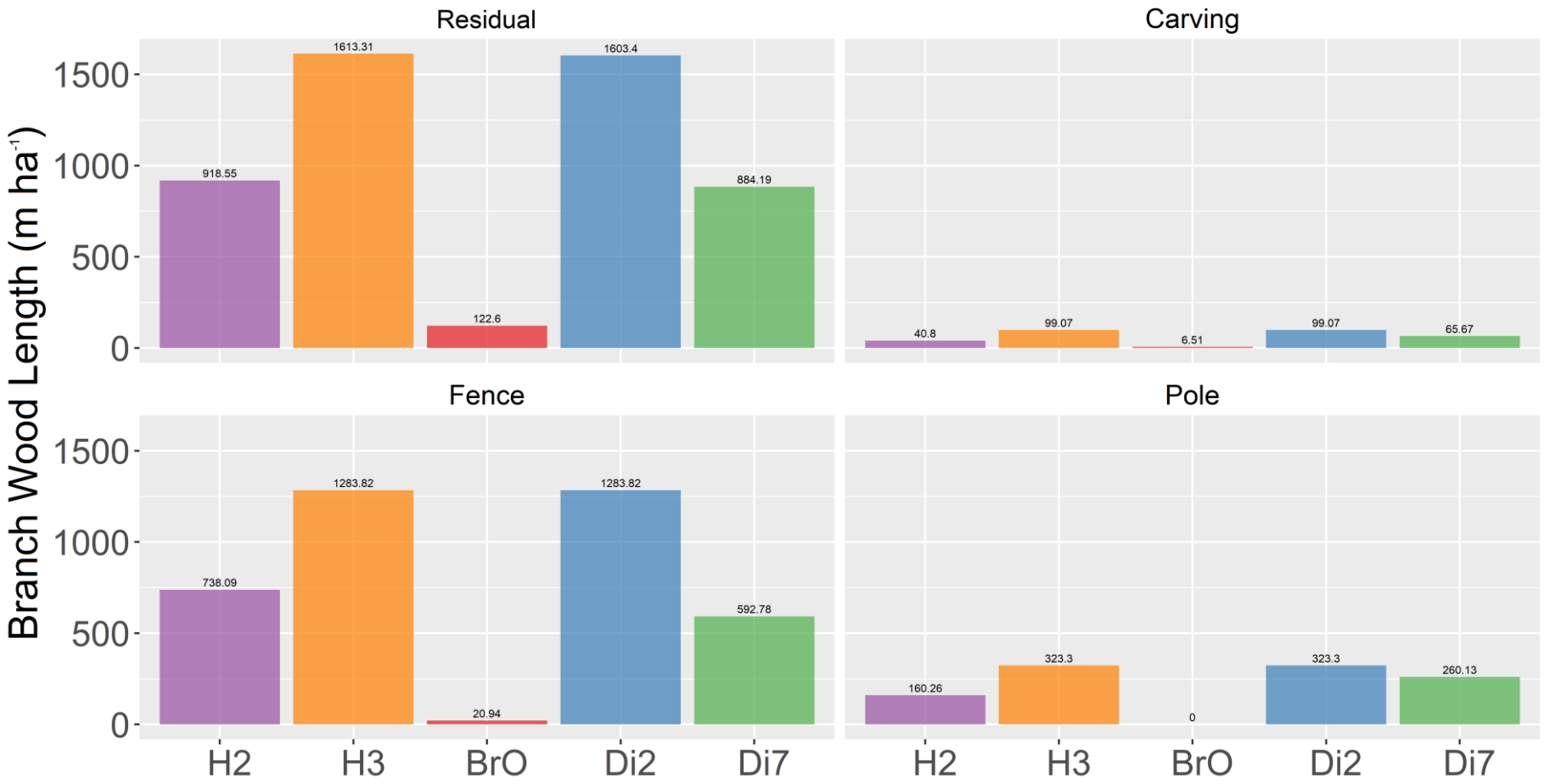

Figure S2. Stand level wood assortments available in linear meters for each simulated harvesting treatment.

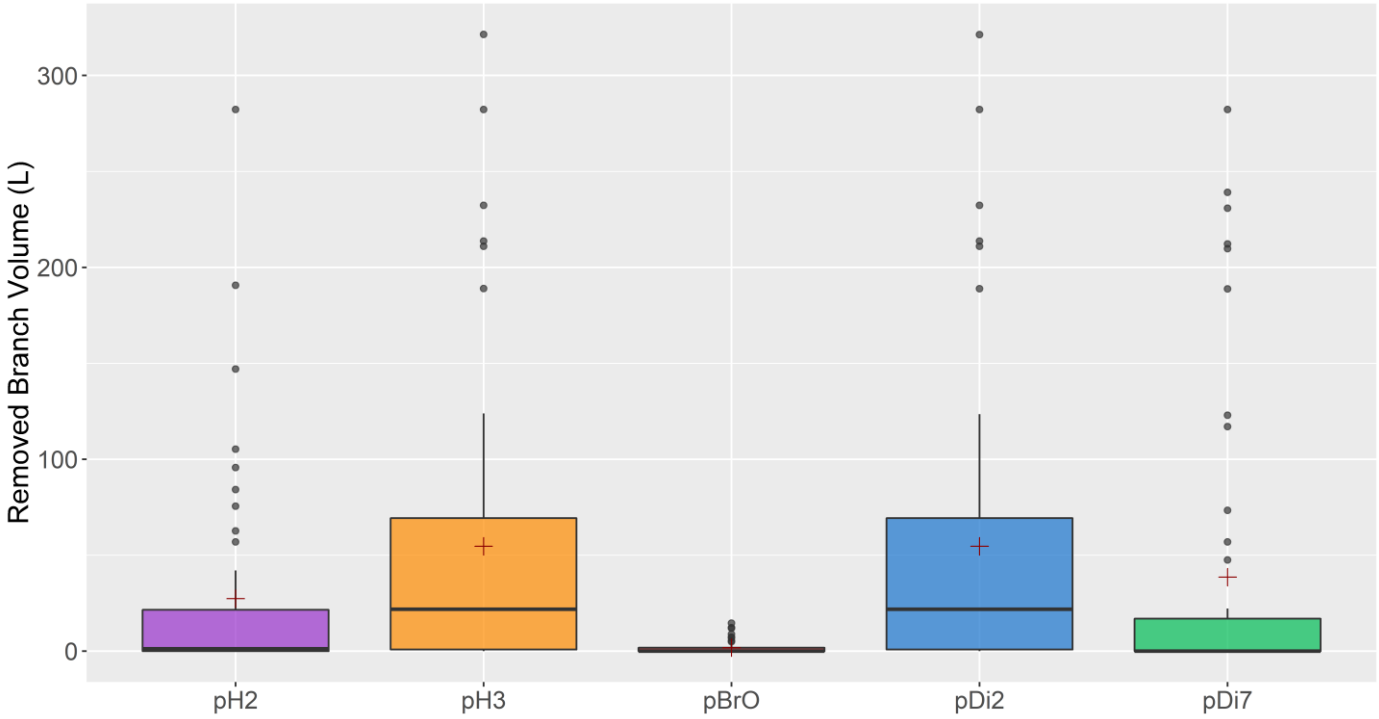

Figure S3. Boxplots of the absolute branch volume removal in each harvesting simulation with the red crosses representing treatment means.

Table S1. QSM-derived tree parameters for trees in the stand (n=66)

Tree ID	DBH cm	Tree Height m	Tree Volume L	Trunk Volume L	Branch Volume L	Trunk Length m	Branch Length m	Number Branches -	Max Branch Order -	Avg. Crown Diam m	Crown Base Height m	Crown Length m	Trunk Area m^2	Branch Area m^2
t01	20.7	9.8	470.5	186.9	283.6	7.5	92.6	95	4	4.0	2.4	7.4	4.10	16.15
t02	18.9	8.2	180.3	84.6	95.6	6.9	52.1	63	3	1.7	1.4	6.8	2.47	7.14
t03	17.6	7.5	123.9	48.9	75.1	5.0	47.0	30	3	2.5	1.4	6.1	1.59	5.99
t04	6.8	6.3	29.9	12.5	17.4	6.4	19.1	14	3	1.3	0.5	5.8	0.97	1.97
t05	27.0	13.7	634.9	330.8	304.2	14.3	97.7	61	6	4.6	3.3	10.4	6.79	16.58
t06	21.2	10.3	229.8	174.2	55.6	9.6	61.6	73	7	3.1	5.3	5.0	4.18	5.78
t07	19.7	10.2	220.6	119.3	101.3	8.9	60.9	50	5	3.2	1.8	8.4	3.37	7.90
t08	24.0	10.4	327.6	192.9	134.7	7.9	61.8	60	4	3.0	2.9	7.4	3.98	9.01
t09	23.0	12.9	379.8	282.5	97.4	12.1	16.7	8	1	1.8	3.5	9.4	6.12	4.03
t10	17.1	9.5	129.3	109.8	19.5	10.3	12.7	6	1	1.1	2.3	7.2	3.42	1.64
t11	14.4	7.5	107.1	55.4	51.8	5.4	22.0	16	2	1.2	3.0	4.5	1.90	3.53
t12	8.5	5.9	49.3	30.7	18.7	3.7	12.5	6	2	1.1	3.1	2.8	1.14	1.68
t13	6.7	11.5	327.3	63.0	264.3	8.8	203.7	125	5	7.6	0.5	10.9	2.44	24.07
t14	22.6	11.4	233.4	177.3	56.0	14.1	21.5	15	2	2.6	3.0	8.4	5.08	3.47
t15	12.1	6.6	54.7	39.8	14.9	6.3	11.2	7	2	1.4	3.0	3.7	1.70	1.35
t16	17.7	6.6	92.6	72.1	20.4	5.7	12.7	11	2	0.9	2.5	4.1	2.05	1.46
t17	24.8	11.0	259.5	170.3	89.2	11.2	79.1	90	5	4.8	3.2	7.7	4.11	8.10
t18	7.8	9.9	116.8	44.4	72.4	6.3	56.6	52	4	3.1	0.5	9.4	1.82	6.66
t19	6.7	6.7	53.3	27.7	25.6	5.6	21.8	14	3	1.7	1.6	5.1	1.34	2.50
t20	9.1	4.8	41.5	14.1	27.4	3.2	37.5	42	5	1.9	1.6	3.2	0.71	3.24
t21	9.9	10.1	525.0	93.6	431.4	8.9	324.9	358	8	9.2	0.5	9.6	3.12	35.74
t22	29.8	11.4	858.0	356.3	501.7	11.7	147.2	144	5	6.6	1.7	9.7	6.55	24.72
t23	21.9	7.6	313.4	142.9	170.5	3.8	82.6	75	6	4.0	2.3	5.3	2.57	12.16
t24	31.4	11.6	690.0	456.8	233.1	11.6	140.1	142	8	5.7	4.0	7.6	7.35	15.51
t25	8.1	6.2	86.6	11.1	75.5	2.7	72.5	53	4	6.1	0.3	5.8	0.61	7.73
t26	4.4	8.0	66.6	15.7	50.9	6.8	60.5	48	5	3.9	1.2	6.9	1.14	5.73
t27	6.2	8.9	126.8	32.7	94.1	8.6	74.1	45	5	2.8	1.3	7.6	1.76	8.70
t28	6.1	5.9	52.7	15.6	37.1	4.2	25.1	15	3	1.6	1.1	4.8	0.87	3.19
t29	8.1	4.2	27.0	7.3	19.7	2.5	14.3	12	3	1.0	0.8	3.4	0.47	1.76
t30	5.7	6.7	27.6	16.3	11.3	5.6	24.4	58	3	1.1	2.4	4.3	1.01	1.67
t31	19.8	8.6	358.0	106.3	251.8	7.8	200.7	344	8	4.2	1.8	6.8	2.96	20.25
t32	10.0	11.5	318.7	125.3	193.4	13.6	116.4	96	5	4.2	0.3	11.3	4.25	14.98
t33	8.6	8.0	156.6	24.7	131.9	6.9	175.1	266	7	6.0	0.3	7.7	1.40	15.12
t34	6.1	2.9	11.8	5.1	6.7	1.6	9.6	13	4	0.6	0.7	2.2	0.32	0.83
t35	26.6	12.4	571.0	328.0	243.0	12.1	80.2	57	4	4.7	3.7	8.7	6.21	13.20
t36	22.4	12.1	541.4	285.4	256.0	12.5	246.4	284	6	6.2	0.4	11.7	5.73	24.91
t37	11.1	11.2	131.2	65.8	65.3	10.2	66.1	81	5	2.0	2.9	8.3	2.73	6.95
t38	25.7	11.2	626.3	245.0	381.3	9.7	161.6	107	5	5.5	2.7	8.4	4.91	24.38

t39	9.2	5.7	57.0	23.8	33.2	4.6	23.7	29	4	1.4	2.8	2.9	1.14	2.93
t40	16.5	8.3	215.5	73.2	142.4	5.7	85.6	113	6	3.2	2.2	6.1	2.10	10.64
t41	25.9	10.9	608.7	275.4	333.3	9.3	147.2	153	7	5.1	3.6	7.4	5.23	20.41
t42	17.0	11.0	204.2	122.6	81.6	10.0	48.7	43	4	2.0	4.2	6.9	3.65	6.39
t43	5.0	3.8	9.3	6.2	3.2	3.2	2.9	4	2	0.3	1.4	2.4	0.48	0.31
t44	21.8	10.5	434.9	155.3	279.6	8.0	141.0	145	6	4.2	1.7	8.7	3.71	18.73
t45	4.3	3.3	7.0	3.8	3.3	2.5	8.4	19	3	0.5	1.2	2.1	0.33	0.52
t46	26.7	11.7	576.6	379.0	197.6	12.7	128.0	188	5	3.6	1.1	10.5	7.06	15.58
t47	4.2	4.2	11.1	7.5	3.6	4.1	11.0	18	3	0.8	1.3	2.9	0.58	0.60
t48	23.1	9.1	255.9	161.3	94.6	7.2	95.7	117	6	4.1	1.8	7.3	3.49	9.25
t49	12.2	7.0	61.3	29.8	31.5	6.3	29.5	37	3	1.4	2.2	4.8	1.47	3.08
t50	6.3	5.7	27.3	17.2	10.2	5.7	6.3	5	1	0.5	2.1	3.6	1.09	0.84
t51	9.2	6.5	41.5	18.0	23.4	4.3	11.1	8	2	0.9	2.9	3.6	0.96	1.66
t52	12.3	9.0	83.3	51.0	32.3	8.3	13.1	7	1	0.9	2.6	6.4	2.21	2.20
t53	3.5	1.5	2.0	1.6	0.4	1.2	0.7	1	1	0.0	1.0	0.5	0.15	0.06
t54	4.4	8.8	110.0	14.8	95.2	5.8	135.6	147	6	5.3	0.8	8.0	1.01	11.84
t55	19.9	9.9	213.1	125.0	88.1	10.3	60.3	55	4	2.7	1.1	8.7	3.57	7.51
t56	5.0	5.0	20.4	9.6	10.8	3.7	23.9	31	4	0.8	0.8	4.2	0.63	1.67
t57	7.2	4.1	13.3	9.3	4.1	4.0	5.6	5	1	0.4	1.7	2.4	0.66	0.52
t58	29.3	10.7	576.5	376.7	199.8	10.5	143.0	188	6	4.1	4.8	5.9	6.38	16.10
t59	5.9	2.9	16.1	3.7	12.4	2.7	20.1	53	3	0.8	0.8	2.1	0.33	1.52
t60	5.6	6.7	39.8	19.2	20.6	5.7	24.0	22	2	1.3	1.3	5.3	1.13	2.30
t61	7.9	9.2	130.7	46.6	84.1	8.7	50.3	46	4	2.0	0.4	8.9	2.08	6.72
t62	15.8	8.9	192.3	86.7	105.5	7.1	114.3	196	6	3.2	2.8	6.1	2.64	10.26
t63	13.3	7.3	94.9	49.6	45.2	7.7	69.7	64	4	3.1	1.6	5.8	1.96	5.72
t64	32.2	10.6	882.9	409.6	473.3	8.3	138.1	113	6	6.6	2.8	7.8	6.09	23.17
t65	19.3	9.9	228.6	156.8	71.8	9.7	66.0	68	5	3.5	5.4	4.4	4.05	7.00
t66	10.5	6.9	60.0	35.4	24.6	4.4	17.8	21	4	1.0	3.8	3.1	1.39	2.17

Table S2. Optimised QSM input parameters for each tree

Tree ID	Patch Diam1	Patch Diam2 Min	Patch Diam2 Max	Ball Rad1	Ball Rad2	Tree ID	Patch Diam1	Patch Diam2 Min	Patch Diam2 Max	Ball Rad1	Ball Rad2
t01	0.08	0.025	0.06	0.092	0.068	t34	0.08	0.02	0.045	0.092	0.053
t02	0.08	0.01	0.045	0.092	0.053	t35	0.04	0.02	0.06	0.052	0.068
t03	0.04	0.01	0.06	0.052	0.068	t36	0.12	0.01	0.03	0.132	0.038
t04	0.04	0.01	0.03	0.052	0.038	t37	0.08	0.01	0.03	0.092	0.038
t05	0.04	0.025	0.03	0.052	0.038	t38	0.04	0.015	0.06	0.052	0.068
t06	0.04	0.01	0.045	0.052	0.053	t39	0.08	0.02	0.06	0.092	0.068
t07	0.04	0.015	0.03	0.052	0.038	t40	0.04	0.01	0.06	0.052	0.068
t08	0.08	0.02	0.06	0.092	0.068	t41	0.12	0.02	0.06	0.132	0.068
t09	0.08	0.02	0.045	0.092	0.053	t42	0.04	0.02	0.06	0.052	0.068
t10	0.08	0.02	0.045	0.092	0.053	t43	0.08	0.02	0.045	0.092	0.053
t11	0.08	0.02	0.045	0.092	0.053	t44	0.04	0.015	0.045	0.052	0.053
t12	0.08	0.02	0.045	0.092	0.053	t45	0.04	0.015	0.03	0.052	0.038
t13	0.04	0.01	0.03	0.052	0.038	t46	0.08	0.02	0.03	0.092	0.038
t14	0.04	0.015	0.03	0.052	0.038	t47	0.04	0.01	0.06	0.052	0.068
t15	0.08	0.02	0.045	0.092	0.053	t48	0.04	0.01	0.06	0.052	0.068
t16	0.08	0.02	0.045	0.092	0.053	t49	0.04	0.01	0.045	0.052	0.053
t17	0.08	0.01	0.03	0.092	0.038	t50	0.08	0.02	0.045	0.092	0.053
t18	0.04	0.01	0.03	0.052	0.038	t51	0.08	0.02	0.045	0.092	0.053
t19	0.04	0.01	0.03	0.052	0.038	t52	0.08	0.02	0.045	0.092	0.053
t20	0.04	0.01	0.03	0.052	0.038	t53	0.08	0.02	0.045	0.092	0.053
t21	0.12	0.01	0.03	0.132	0.038	t54	0.04	0.01	0.03	0.052	0.038
t22	0.04	0.025	0.06	0.052	0.068	t55	0.04	0.015	0.03	0.052	0.038
t23	0.04	0.02	0.03	0.052	0.038	t56	0.04	0.01	0.06	0.052	0.068
t24	0.04	0.015	0.045	0.052	0.053	t57	0.08	0.02	0.045	0.092	0.053
t25	0.04	0.01	0.03	0.052	0.038	t58	0.04	0.02	0.03	0.052	0.038
t26	0.08	0.01	0.03	0.092	0.038	t59	0.12	0.01	0.03	0.132	0.038
t27	0.04	0.01	0.03	0.052	0.038	t60	0.04	0.01	0.03	0.052	0.038
t28	0.04	0.01	0.045	0.052	0.053	t61	0.04	0.01	0.03	0.052	0.038
t29	0.08	0.02	0.045	0.092	0.053	t62	0.04	0.01	0.06	0.052	0.068
t30	0.04	0.01	0.03	0.052	0.038	t63	0.04	0.01	0.06	0.052	0.068
t31	0.12	0.01	0.06	0.132	0.068	t64	0.04	0.02	0.06	0.052	0.068
t32	0.08	0.01	0.03	0.092	0.038	t65	0.04	0.01	0.06	0.052	0.068
t33	0.04	0.01	0.03	0.052	0.038	t66	0.04	0.02	0.06	0.052	0.068

Table S3. Summary of available assortments and yields per harvesting treatment.

Assortments	Harvesting Yields – Volume (m^3 ha^{-1})						Harvesting Yields – Linear Meters (m ha^{-1})					
	N	*H2*	*H3*	*BrO*	*Di2*	*Di7*	*N*	*H2*	*H3*	*BrO*	*Di2*	*Di7*
Pole	20.67	1.15	2.54	0.00	2.54	2.33	1500.6	160.3	323.3	0.0	323.3	260.1
Carving	1.42	0.22	0.46	0.05	0.46	0.34	298.3	40.8	99.1	6.5	99.1	65.7
Fence	5.44	1.00	1.80	0.04	1.80	0.89	3750.3	738.1	1283.8	20.9	1283.8	592.8
Residual	2.77	0.56	1.09	0.11	1.08	0.59	4060.8	918.6	1613.3	122.6	1603.4	884.2

N : control trees (not harvested; evaluation of whole tree structure as assortment)