

Supplementary Material

Table S1. Construction conventions used in the system's designs.

Item	Conventions	
Tanks	Material	Fibreglass
Plumbing	Material	PVC
	Includes	Raiwater distribution branches
		Tank overflow and cleaning exits
		Dry season potable water distribution backup
		Motor pump branch (gravity-distributed system only)
Civil works	Tank cavity	Manual excavation, 5cm gravel layer on levelled base
		Masonry walls around cavity
		Prefabricated concrete lid
	Overflow	Manual excavation
		Prefabricated concrete inspection joints
Rain collection	Gutters	PVC - according to roof size
	Filter	PVC filter according to NBR 15527 [6]
	First-flush	200L plastic barrels, according to roof area
		Includes PVC plumbing and fixtures for operation
Electrical	Level sensors	Electric floats
	Intake control	Solenoid valve (dry season - centralised water supply)
	Power supply	Includes wires and conduits
	Motor pump	½ HP - 40% efficiency
		Includes electric circuit board for automatic operation
	Pressuriser	½ HP
		Controlled by built-in pressure-switch
		Includes electric on/off board for operation
Labour	Considered in all items according to the SINAPI database of cost; compositions in the state of Paraná [33].	

Table S2. Water tariff scheme used in this research.

Water consumption	Tariff
Under 5m ³	BRL 73.36
From 6 to 10 m ³	BRL 2.26/m ³
From 11 to 15 m ³	BRL 12.63/m ³
From 16 to 20m ³	BRL 12.70/m ³
From 21 to 30 m ³	BRL 12.81/m ³
Above 30m ³	BRL 21.69/m ³

Note: On the 1st August 2022 BRL1.00 = USD 0.194 = GBP 0.159 = EUR 0.190

Source: SANEPAR [15].

Table S3. Main rainfall characterisation indexes obtained for Maringá.

Average yearly rainfall (mm)	Average number of dry days per year (days)	Seasonality index (non-dimensional)
1805	243.92	0.3157

Table S4. Characterisation indexes for dry periods obtained for Maringá.

Average duration of dry periods (days)	Standard deviation of dry periods (days)	Coefficient of variation of dry periods (%)	Maximum duration of dry periods (days)
4.50	5.44	1.21	47

Table S5. Simulation results for indirectly distributed RWH systems in Maringá.

Roof area (m ²)	Number of inhabitants (inhab.)	Rainwater demand (%)	Rainwater demand (m ³ /month)	Ideal tank size (L)	Potential for potable water savings (%)
100	2	30	2.7	5000	29.81
100	2	50	4.5	6000	47.69
100	2	70	6.3	6000	62.70
100	4	30	5.4	6000	27.69
100	4	50	9.0	8000	42.42
100	4	70	12.6	7000	50.04
100	6	30	8.1	7000	25.76
100	6	50	13.5	7000	34.40
100	6	70	18.9	6000	37.34
200	2	30	2.7	4000	29.67
200	2	50	4.5	5000	48.17
200	2	70	6.3	6000	65.91
200	4	30	5.4	6000	28.82
200	4	50	9.0	7000	45.05
200	4	70	12.6	8000	59.31
200	6	30	8.1	7000	27.56
200	6	50	13.5	8000	41.52
200	6	70	18.9	9000	53.02
300	2	30	2.7	4000	29.69
300	2	50	4.5	5000	48.48
300	2	70	6.3	6000	66.63
300	4	30	5.4	6000	29.01
300	4	50	9.0	7000	46.14
300	4	70	12.6	8000	61.65
300	6	30	8.1	7000	28.12
300	6	50	13.5	9000	44.15
300	6	70	18.9	9000	56.44

Table S6. Simulation results for directly distributed RWH systems in Maringá.

Roof area (m ²)	Number of inhabitants (inhab.)	Rainwater demand (%)	Rainwater demand (m ³ /month)	Ideal tank size (L)	Potential for potable water savings (%)
100	2	30	2.7	5000	29.81
100	2	50	4.5	6000	47.65
100	2	70	6.3	7000	63.72
100	4	30	5.4	6000	27.64
100	4	50	9.0	8000	42.29
100	4	70	12.6	7000	49.83
100	6	30	8.1	7000	25.68
100	6	50	13.5	7000	34.25
100	6	70	18.9	6000	36.95
200	2	30	2.7	4000	29.66
200	2	50	4.5	5000	48.10
200	2	70	6.3	6000	65.80
200	4	30	5.4	6000	28.77
200	4	50	9.0	7000	44.94
200	4	70	12.6	8000	59.08
200	6	30	8.1	7000	27.50
200	6	50	13.5	9000	42.18
200	6	70	18.9	9000	52.70
300	2	30	2.7	4000	29.68
300	2	50	4.5	5000	48.41
300	2	70	6.3	6000	66.53
300	4	30	5.4	6000	28.97
300	4	50	9.0	7000	46.01
300	4	70	12.6	9000	62.53
300	6	30	8.1	7000	28.06
300	6	50	13.5	9000	43.97
300	6	70	18.9	9000	56.08

Table S7. Initial outlays for RWH systems with indirect rainwater distribution.

Catchment area = 100m²						
Tank size (L)	Tanks (%)	Plumbing (%)	Civil works (%)	Rain collection (%)	Electrical (%)	Total (BRL)
3000	14.72	28.39	19.11	23.57	14.21	9696.27
4000	19.15	26.12	19.98	21.69	13.07	10,539.29
5000	23.13	24.06	20.79	19.98	12.04	11,439.27
6000	26.82	22.31	21.18	18.52	11.17	12,339.35
7000	30.18	20.71	21.54	17.20	10.37	13,289.68
8000	33.24	19.26	21.86	16.00	9.64	14,290.26
9000	36.02	17.94	22.16	14.90	8.98	15,341.09
Average	26.18	22.68	20.94	18.84	11.35	-
Catchment area = 200m²						
Tank size (L)	Tanks (%)	Plumbing (%)	Civil works (%)	Rain collection (%)	Electrical (%)	Total (BRL)
3000	13.39	25.81	17.37	30.51	12.92	10,663.95
4000	17.54	23.92	18.30	28.27	11.97	11,506.97
5000	21.32	22.18	19.17	26.22	11.10	12,406.95
6000	24.87	20.68	19.64	24.45	10.35	13,307.03
7000	28.14	19.31	20.08	22.82	9.66	14,257.36
8000	31.13	18.04	20.48	21.32	9.03	15,257.94
9000	33.88	16.88	20.84	19.95	8.45	16,308.77
Average	24.32	20.97	19.41	24.79	10.50	-
Catchment area = 300m²						
Tank size (L)	Tanks (%)	Plumbing (%)	Civil works (%)	Rain collection (%)	Electrical (%)	Total (BRL)
3000	12.51	24.12	16.23	35.07	12.07	11,412.88
4000	16.47	22.46	17.18	32.66	11.24	12,255.90
5000	20.11	20.92	18.08	30.42	10.47	13,155.88
6000	23.55	19.58	18.59	28.47	9.80	14,055.96
7000	26.73	18.34	19.07	26.67	9.18	15,006.29
8000	29.68	17.20	19.52	25.00	8.61	16,006.87
9000	32.39	16.14	19.93	23.46	8.08	17,057.71
Average	23.06	19.82	18.37	28.82	9.92	-

Note: On the 1st August 2022 BRL1.00 = USD 0.194 = GBP 0.159 = EUR 0.190

Table S8. Initial outlays for RWH systems with direct rainwater distribution.

Catchment area = 100m²						
Tank size (L)	Tanks (%)	Plumbing (%)	Civil works (%)	Rain collection (%)	Electrical (%)	Total (BRL)
3000	12.69	19.15	26.74	17.79	23.63	9674.46
4000	17.29	20.02	24.60	16.37	21.73	10,517.48
5000	21.42	20.83	22.66	15.08	20.02	11,417.46
6000	25.25	21.22	21.00	13.97	18.56	12,317.54
7000	28.73	21.57	19.50	12.97	17.23	13,267.87
8000	31.89	21.90	18.13	12.06	16.02	14,268.45
9000	34.77	22.19	16.89	11.24	14.92	15,319.28
Average	24.58	20.98	21.36	14.21	18.87	-
Catchment area = 200m²						
Tank size (L)	Tanks (%)	Plumbing (%)	Civil works (%)	Rain collection (%)	Electrical (%)	Total (BRL)
3000	11.54	17.41	24.31	16.17	30.57	10,642.14
4000	15.83	18.33	22.52	14.99	28.33	11,485.16
5000	19.75	19.20	20.89	13.90	26.27	12,385.14
6000	23.41	19.67	19.47	12.96	24.49	13,285.22
7000	26.78	20.11	18.17	12.09	22.85	14,235.55
8000	29.87	20.51	16.98	11.30	21.35	15,236.13
9000	32.70	20.87	15.88	10.57	19.98	16,286.96
Average	22.84	19.44	19.75	13.14	24.83	-
Catchment area = 300m²						
Tank size (L)	Tanks (%)	Plumbing (%)	Civil works (%)	Rain collection (%)	Electrical (%)	Total (BRL)
3000	10.78	16.26	22.71	15.11	35.14	11,391.07
4000	14.86	17.21	21.15	14.07	32.71	12,234.09
5000	18.62	18.11	19.70	13.11	30.47	13,134.07
6000	22.16	18.62	18.43	12.26	28.52	14,034.15
7000	25.44	19.10	17.26	11.49	26.71	14,984.48
8000	28.47	19.54	16.18	10.77	25.04	15,985.06
9000	31.26	19.95	15.19	10.10	23.49	17,035.90
Average	21.66	18.40	18.66	12.42	28.87	-

Note: On the 1st August 2022 BRL1.00 = USD 0.194 = GBP 0.159 = EUR 0.190

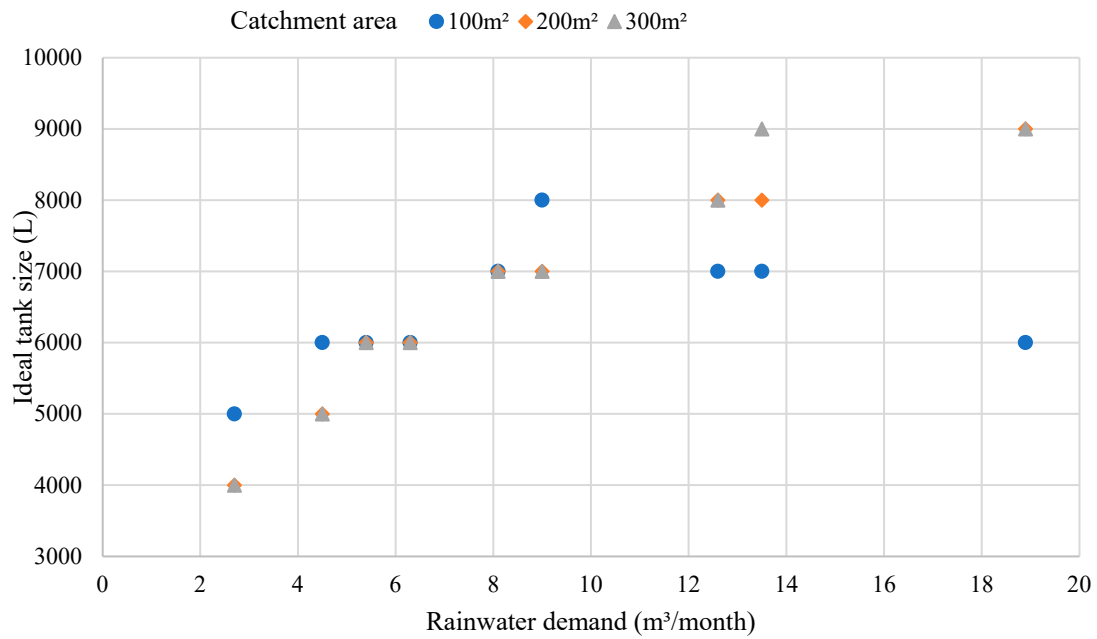


Figure S1. Ideal tank size as a function of rainwater demand for indirectly distributed RWH systems in Maringá.

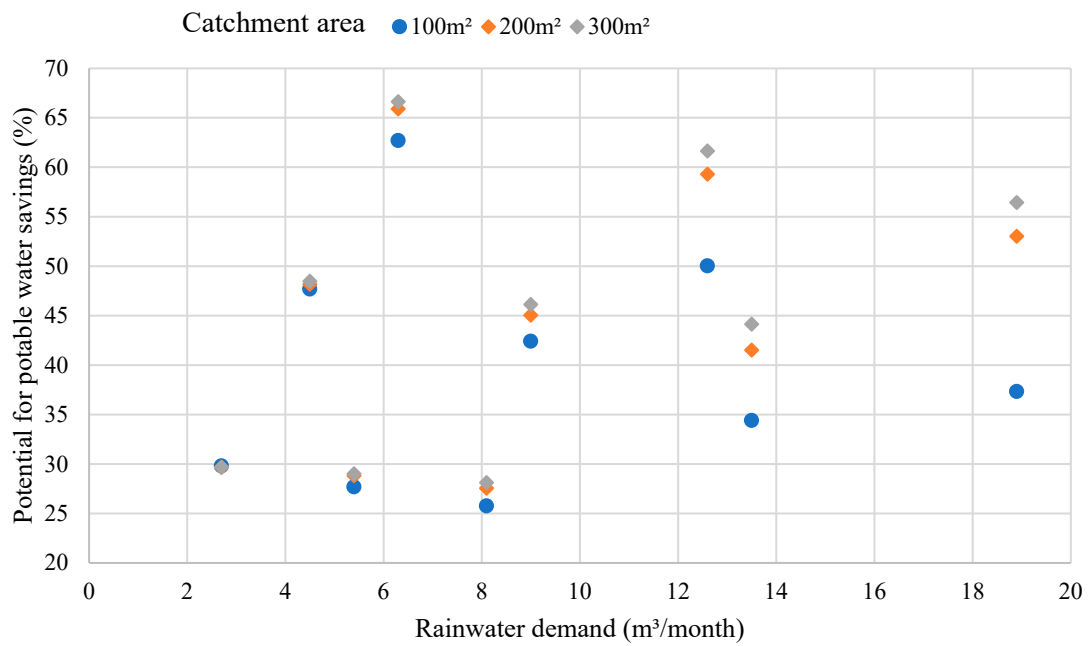


Figure S2. Potential for potable water savings as a function of rainwater demand for indirectly distributed RWH systems in Maringá.

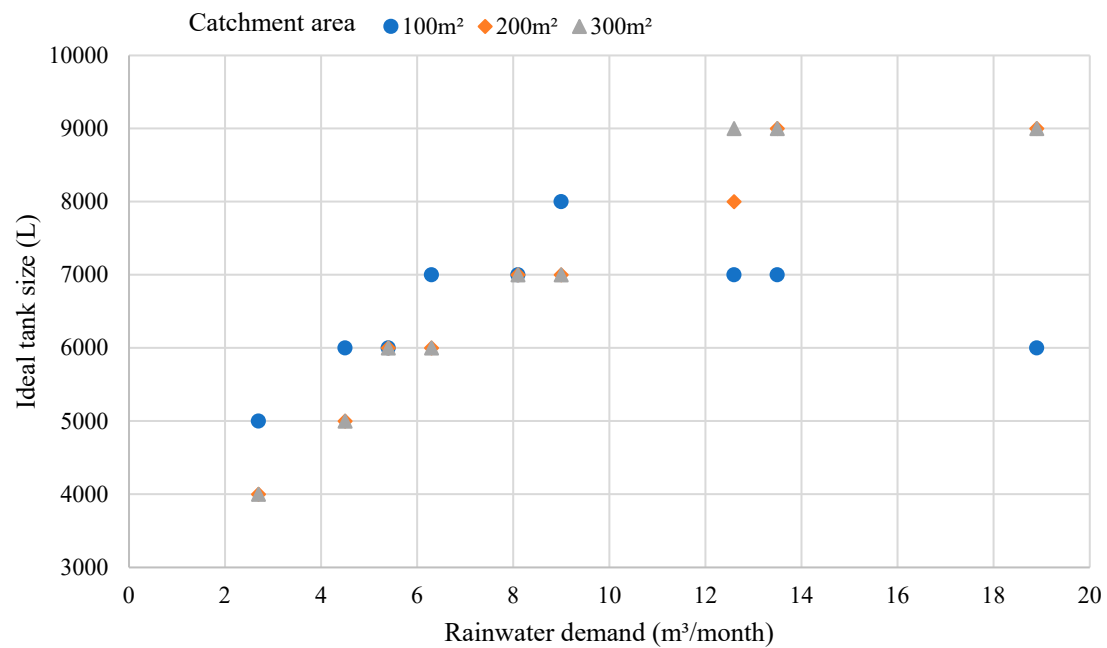


Figure S3. Ideal tank size as a function of rainwater demand for directly distributed RWH systems in Maringá.

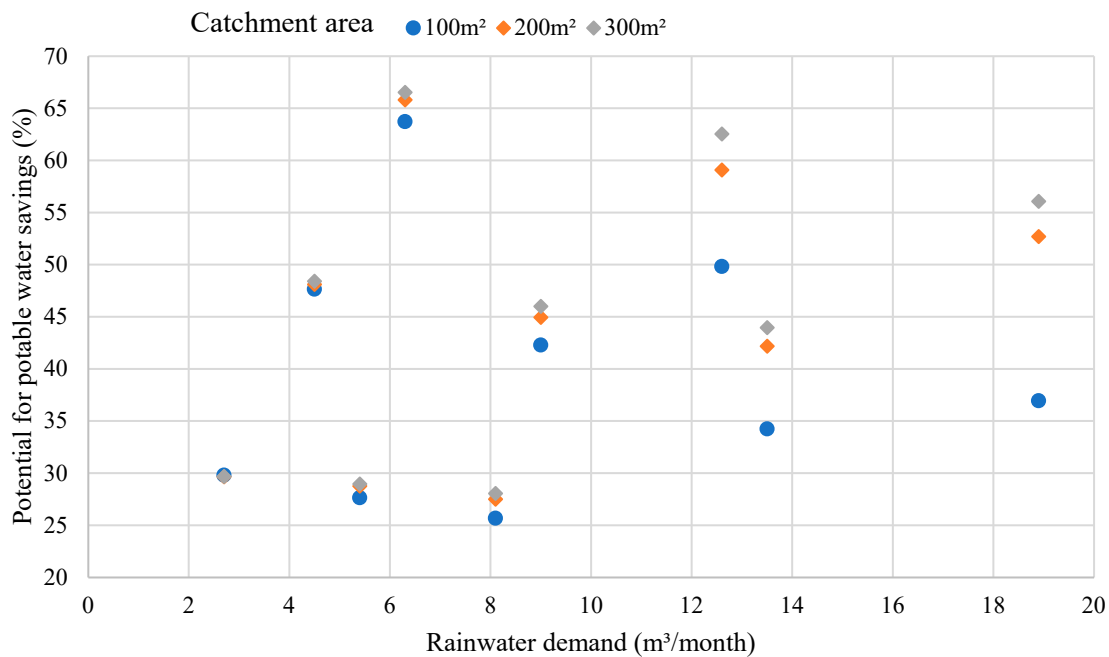


Figure S4. Potential for potable water savings as a function of rainwater demand for directly distributed RWH systems in Maringá.