

A Comparison of Carbon Sequestration in Tree Species at Wichienmatu School, City District, Trang Province

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Abstract

This study examines the carbon sequestration capacity of nine tree species at Wichienmatu School, Trang Province. Tree height and circumference were measured, with five samples per species, and biomass calculation methods were used to estimate carbon storage. Dipterocarp (*Dipterocarpus alatus*) had the highest sequestration (>760.962 kgC), followed by Cajeput (*Melaleuca cajuputi*, ~574.446 kgC) and Eucalyptus (*Eucalyptus spp.*, ~444.788 kgC). In contrast, Rough-leaved Fig (*Ficus hispida*) had the lowest carbon sequestration.

Research Question & Hypothesis

Research Question: How does the carbon sequestration capacity differ among the nine tree species at Wichienmatu School?

Hypothesis: The nine tree species—Coconut Palm (*Cocos nucifera*), Rough-leaved Fig (*Ficus hispida*), Eucalyptus (*Eucalyptus spp.*), Cajeput (*Melaleuca cajuputi*), Jacaranda (*Jacaranda obtusifolia*), Dipterocarp (*Dipterocarpus alatus*), Teak (*Tectona grandis*), Betel Nut Palm (*Areca catechu*), and Perfume Flower Tree (*Fagraea fragrans*)—have varying carbon sequestration capacities.

Methodology

- Study Site: Wichienmatu School, Trang Province (7.5553°N, 99.6146°E)
- Measuring tree circumference at 130 cm from the ground (DBH method)
- Measuring tree height using a clinometer and tangent table
- Carbon sequestration calculated using the Faculty of Engineering, Kasetsart University website
- Data analysis through comparison of average carbon sequestration per tree species

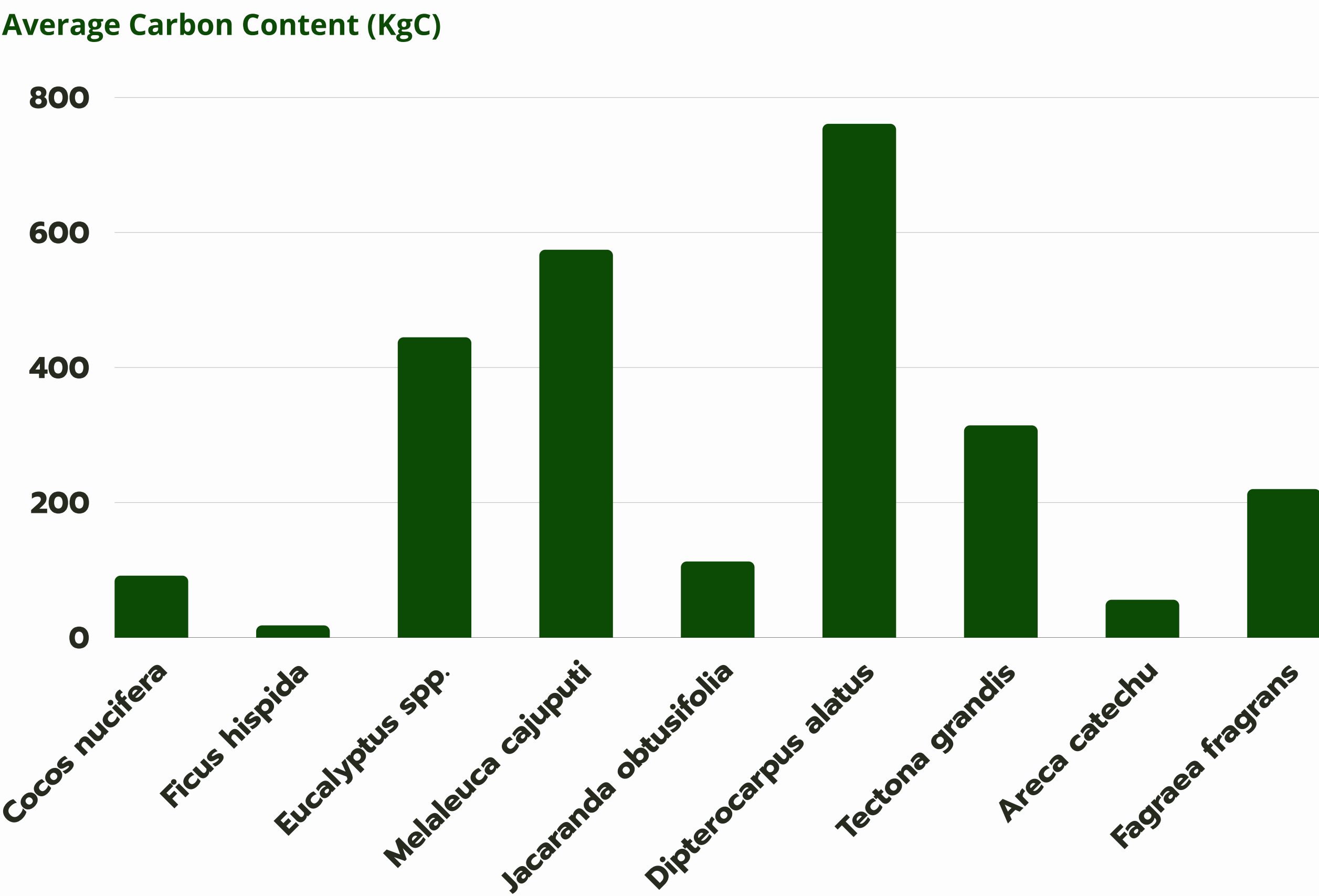
Results & Discussion

- Highest Carbon Sequestration: Dipterocarp (*Dipterocarpus alatus*) (>760.962 kgC)
- Moderate Carbon Sequestration: Cajeput (*Melaleuca cajuputi*) (~574.446 kgC), Eucalyptus (*Eucalyptus spp.*) (~444.788 kgC)
- Lowest Carbon Sequestration: Rough-leaved Fig (*Ficus hispida*)
- Key Findings: Larger trees with higher biomass store more carbon; fast-growing hardwoods tend to sequester more carbon than small trees.

Figure 1: Data on tree species, including height, circumference, and carbon content in biomass.

	Tree Specie	Tree Height (m)	Circumference (cm)	Carbon Content in Biomass (KgC)
1	Cocos nucifera 1	13.559	83.3	75.58
	Cocos nucifera 2	16.166	92	87.45
	Cocos nucifera 3	22.615	85	114.65
	Cocos nucifera 4	16.741	90.9	90
	Cocos nucifera 5	16.934	107.8	90.84
2	Ficus hispida 1	8.054	29.3	12.88
	Ficus hispida 2	7.606	30.7	13.33
	Ficus hispida 3	6.537	33.8	13.85
	Ficus hispida 4	8.251	29.4	13.26
	Ficus hispida 5	8.792	49	37.04
3	Eucalyptus spp. 1	20.345	128	502.92
	Eucalyptus spp. 2	19.87	99.4	305.14
	Eucalyptus spp. 3	38.181	83.6	407.68
	Eucalyptus spp. 4	39.622	122	861.82
	Eucalyptus spp. 5	17.306	72.2	146.38
4	Melaleuca cajuputi 1	21.242	113	414.01
	Melaleuca cajuputi 2	23.25	142	693.93
	Melaleuca cajuputi 3	18.285	190	958.64
	Melaleuca cajuputi 4	22.84	106	392.93
	Melaleuca cajuputi 5	15.056	134	412.72
5	Jacaranda obtusifolia 1	14.11	56	74.63
	Jacaranda obtusifolia 2	14.862	77.9	146.34
	Jacaranda obtusifolia 3	17.23	61.8	108.63
	Jacaranda obtusifolia 4	13.282	31	23.01
	Jacaranda obtusifolia 5	20.25	81	211.04
6	Dipterocarpus alatus 1	22.7035	86.7	267.34
	Dipterocarpus alatus 2	15.76	90.4	204.93
	Dipterocarpus alatus 3	36.933	137.9	1016.51
	Dipterocarpus alatus 4	35.598	167.9	1424.5
	Dipterocarpus alatus 5	26.25	152.6	891.53
7	Tectona grandis 1	14.974	161	580.63
	Tectona grandis 2	14.306	78.9	144.61
	Tectona grandis 3	23.73	77.1	223.32
	Tectona grandis 4	17.398	123.9	408.01
	Tectona grandis 5	16.586	90.4	215.06
8	Areca catechu 1	5.782	55	35.4
	Areca catechu 2	10.79	49.3	62.24
	Areca catechu 3	10.0076	49.4	58.31
	Areca catechu 4	9.082	52.3	53.54
	Areca catechu 5	12.5	102	70.58
9	Fagraea fragrans 1	17.779	86.6	211.75
	Fagraea fragrans 2	25.016	114.4	494.46
	Fagraea fragrans 3	17.44	59.5	102.27
	Fagraea fragrans 4	15.63	102.1	255.89
	Fagraea fragrans 5	7.878	50.6	35.48

Figure 2: Average carbon content in biomass for each tree species.



Conclusion

This study demonstrates that different tree species have varying capacities for carbon sequestration. Large, tall trees such as Dipterocarp (*Dipterocarpus alatus*) and Teak (*Tectona grandis*) store more carbon than smaller species like Rough-leaved Fig (*Ficus hispida*) and Betel Nut Palm (*Areca catechu*). The results highlight the importance of selecting high carbon-sequestering species for afforestation and climate change mitigation strategies.

References

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