2024 GLOBE International Virtual Science Symposium

THE STUDY OF CARBON STORAGE OF SOME TREES IN THUNG KHAI BOTANIC GARDEN, TRANG.

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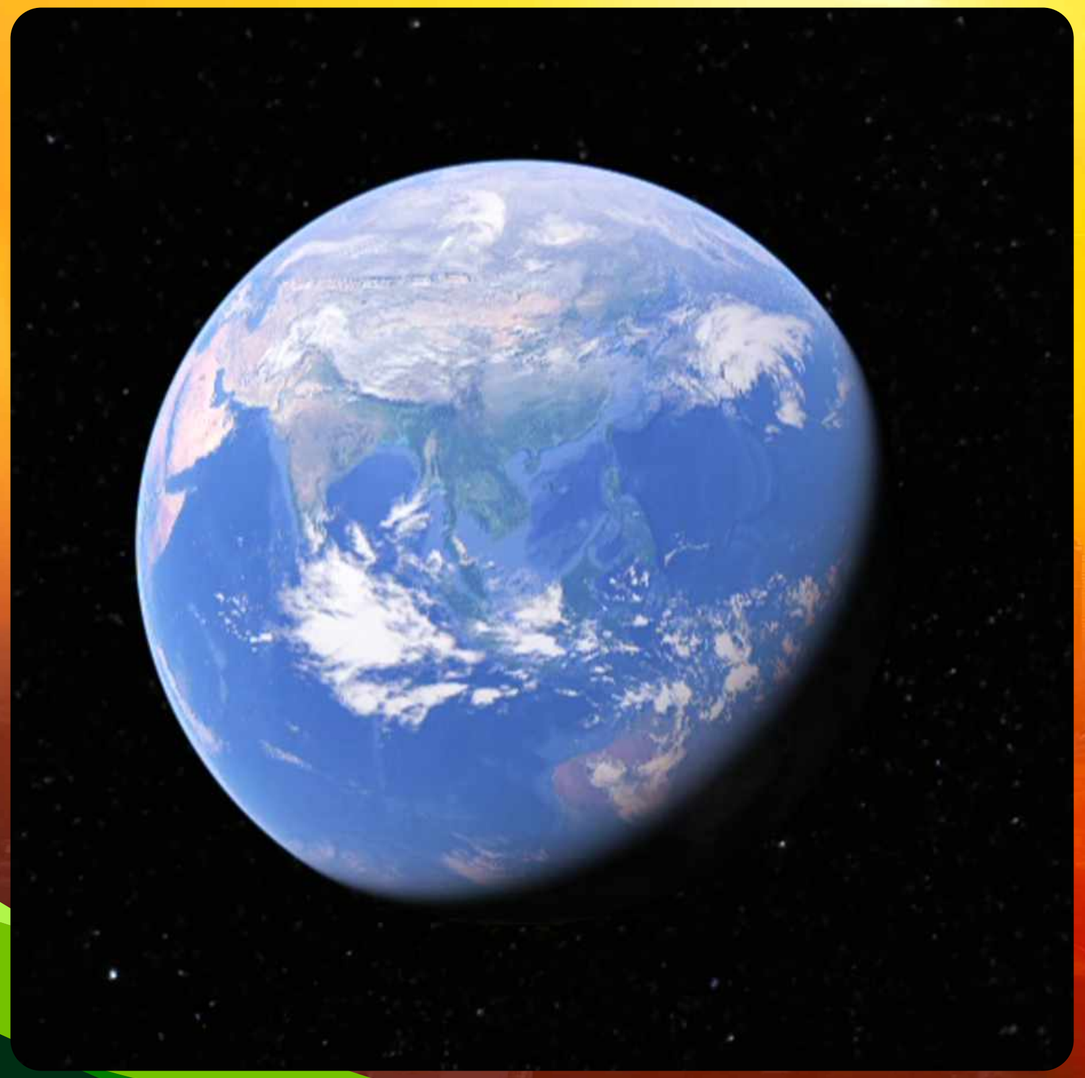
Introduction



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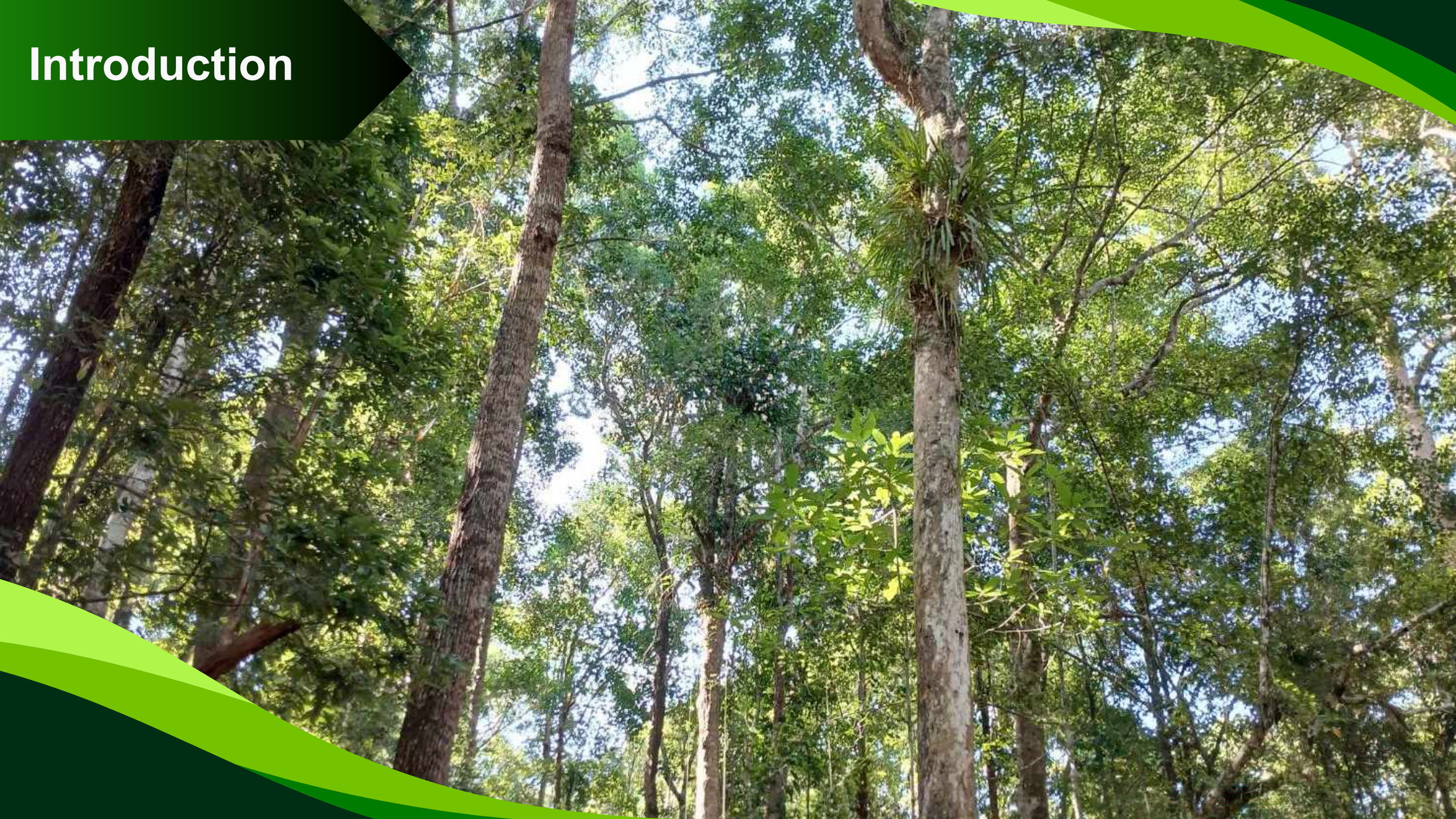

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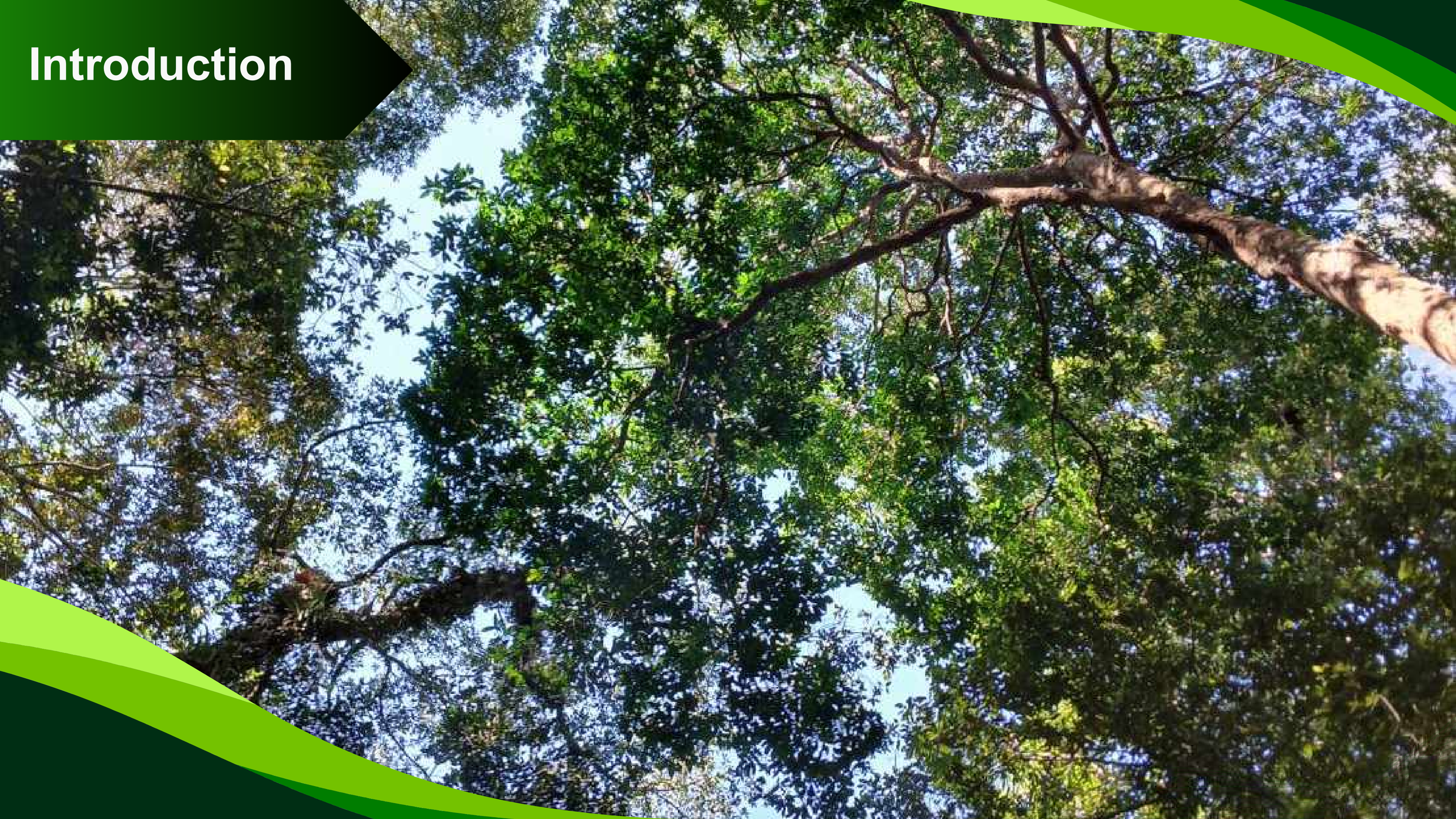


Research Question and Hypothesis

RESEARCH QUESTIONS

1. The quality of the soil affects the amount of carbon storage of the 10 outstanding trees, including Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta. Is it grown in Thung Khai Botanic Garden, Trang Province?

2. The quality of the air affects the amount of carbon storage of the 10 outstanding trees, including Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta. Is it grown in Thung Khai Botanic Garden, Trang Province?

3. Growth affects the amount of carbon storage of all 10 outstanding trees including Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta. Is it grown in Thung Khai Botanic Garden, Trang Province?

Research Question and Hypothesis

HYPOTHESIS

1. The quality of the soil affects the amount of carbon storage of the 10 outstanding trees, including Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta. Grown in Thung Khai Botanic Garden, Trang Province.

2. The quality of the air affects the amount of carbon storage of the 10 outstanding trees, including Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta. Grown in Thung Khai Botanic Garden, Trang Province.

3. Growth affects the amount of carbon storage of all 10 outstanding trees, including Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta. Grown in Thung Khai Botanic Garden, Trang Province.

Objective

1. To study soil quality that affects the amount of carbon storage of each type of trees in the Thung Khai Botanical Garden, Trang Province, includes Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta.

2. To study the air quality that affects the amount of carbon storage of each type of trees in Thung Khai Botanical Garden, Trang Province, including Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta

3. To study the amount of carbon storage of each type of trees in Thung Khai Botanical Garden, Trang Province, including Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta

Research Methods and Materials

MATERIALS

Measuring tape

Clinometer

Beaker and Stirring rod

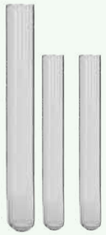
Soil quality testing kit

Universal indicator paper

Erlenmeyer Flask

Filter paper

Distilled water



Test tube

Google Map

Air quality meter

Website to assess tree carbon storage

DETERMINE STUDY POINTS

This research was conducted in Thung Khai Botanic Garden, Thung Khai Subdistrict, Yantakhao District, Trang Province. It is located at the coordinates of latitude 7.4681940 and longitude 99.6383065 and selects the outstanding trees grown in Thung Khai Botanic Garden, Trang Province. Quantity 10 types.

Research Methods and Materials

Part 1 To study the quality of soil that affects the carbon storage of tree species.

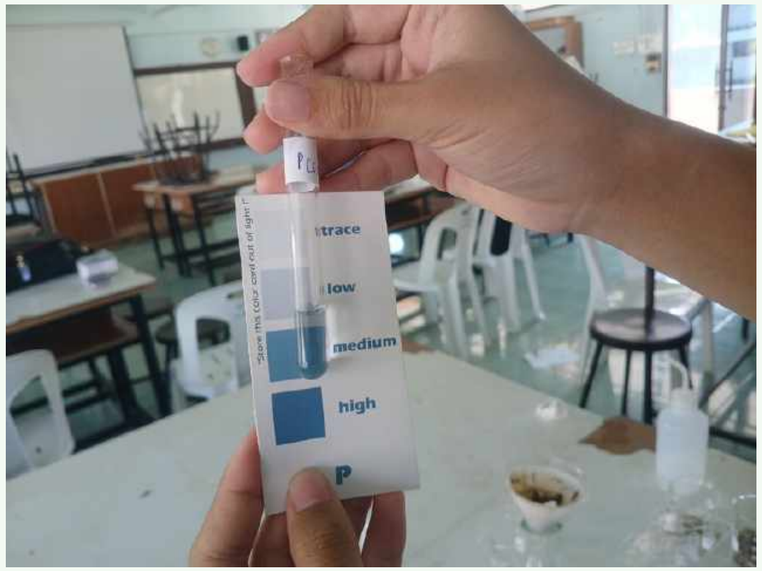
METHODS

Determine a soil sample collection point by collected from the area where 10 outstanding tree species were to be studied.

METHODS

Measure soil temperature using a thermometer and soil humidity using a multimeter.

METHODS



Measures pH and soil fertility. And collect data

Research Methods and Materials

Part 2 To study the quality of air that affects the carbon storage of trees.

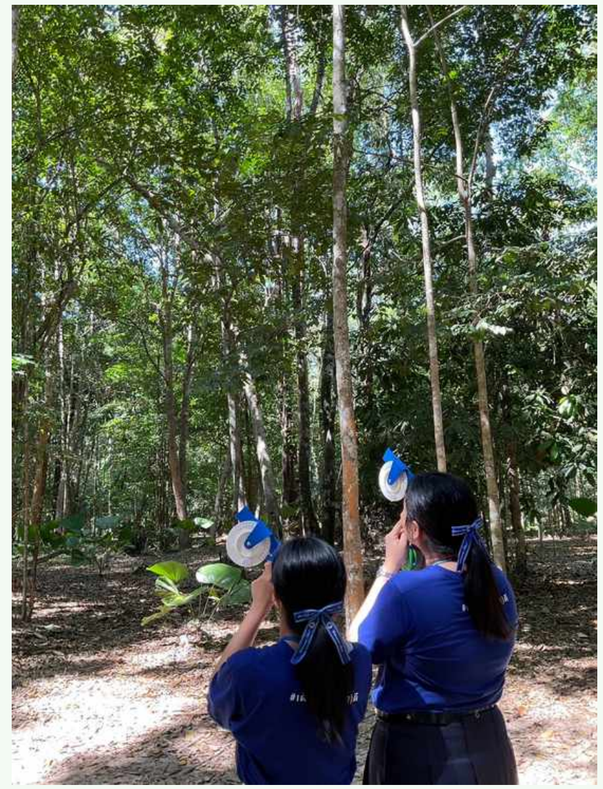
METHODS

Measures temperature, humidity and light intensity in the air.

Research Methods and Materials

Part 3 To study the growth of tree species that affect carbon storage.

METHODS



Measure the height of all 10 dominant trees using a clinometer and stand 20 meters from the tree.

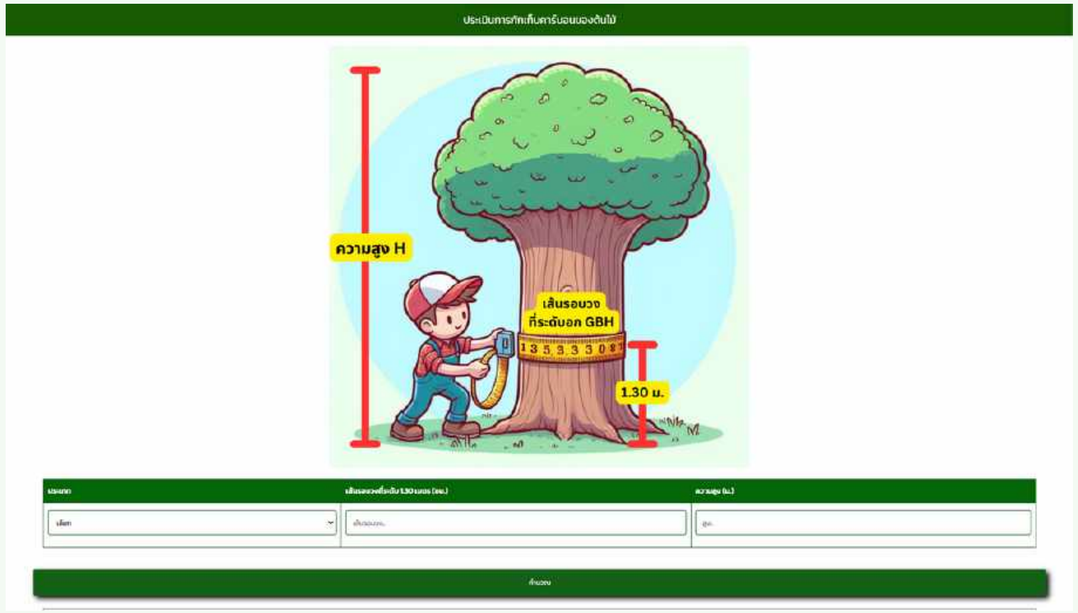
METHODS

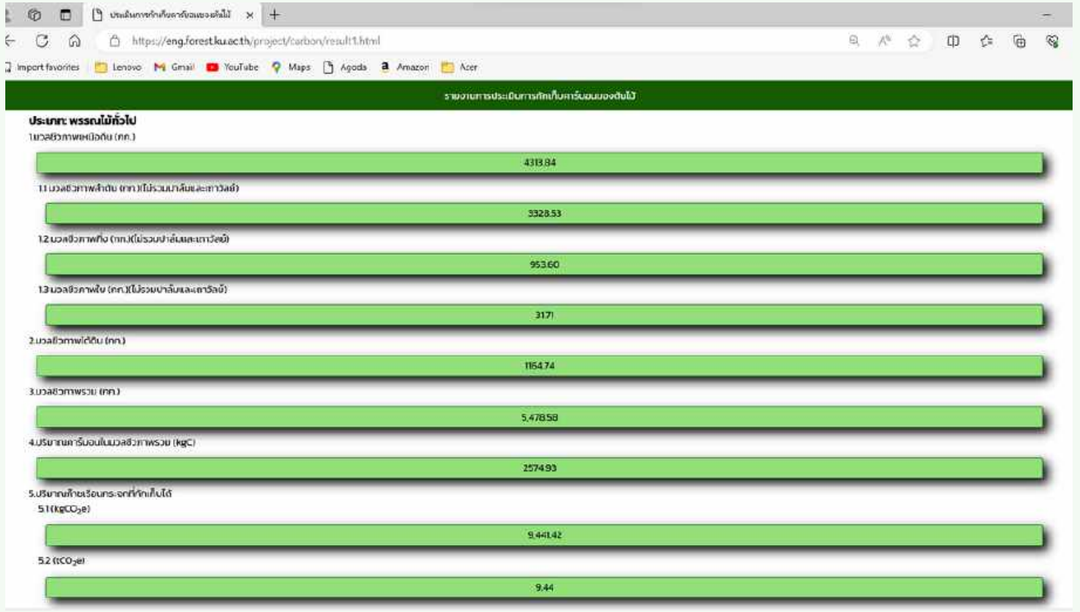
Then aim the Clinometer at the top of the tree, press and hold the button. When you see it, release the button and record the angle.

METHODS

The trunk circumference of each tree species was measured using a tape measure at chest height, approximately 130 centimeters from the ground.

METHODS





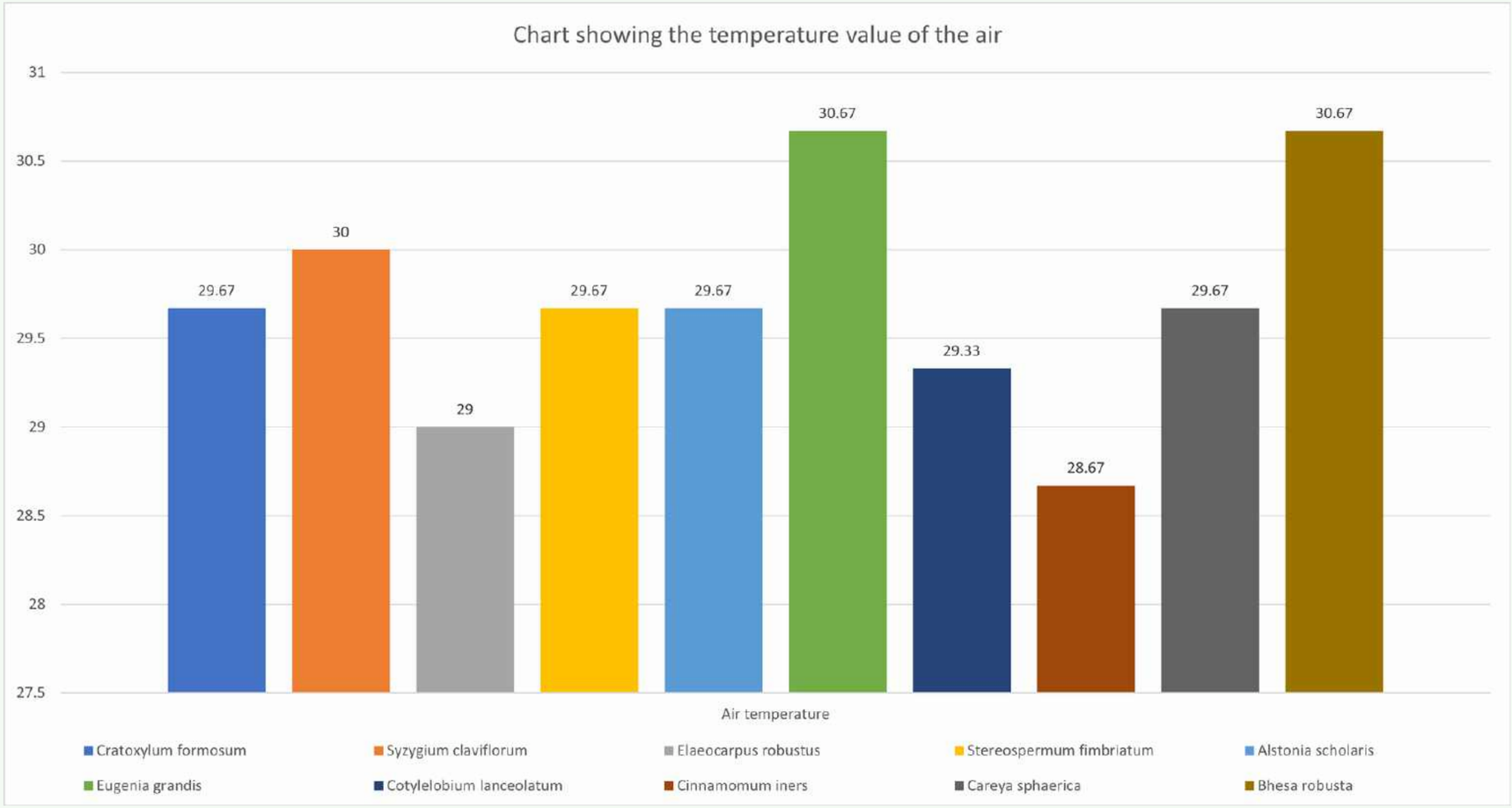
Calculate your carbon storage with the Tree Carbon Storage Estimator website

Results:

Results : Part 1

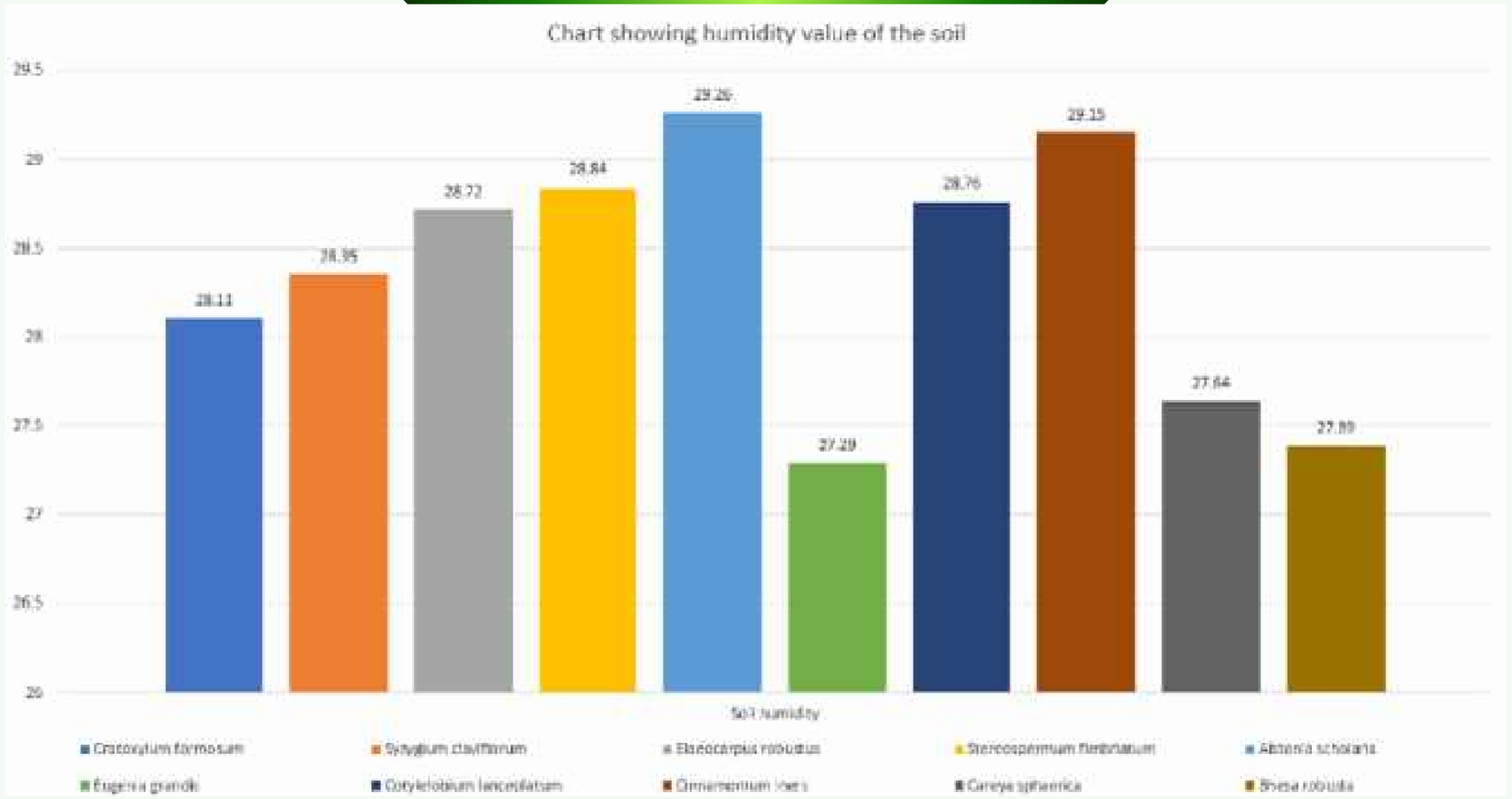
To study the quality of soil that affects the carbon storage of tree species

RESULTS



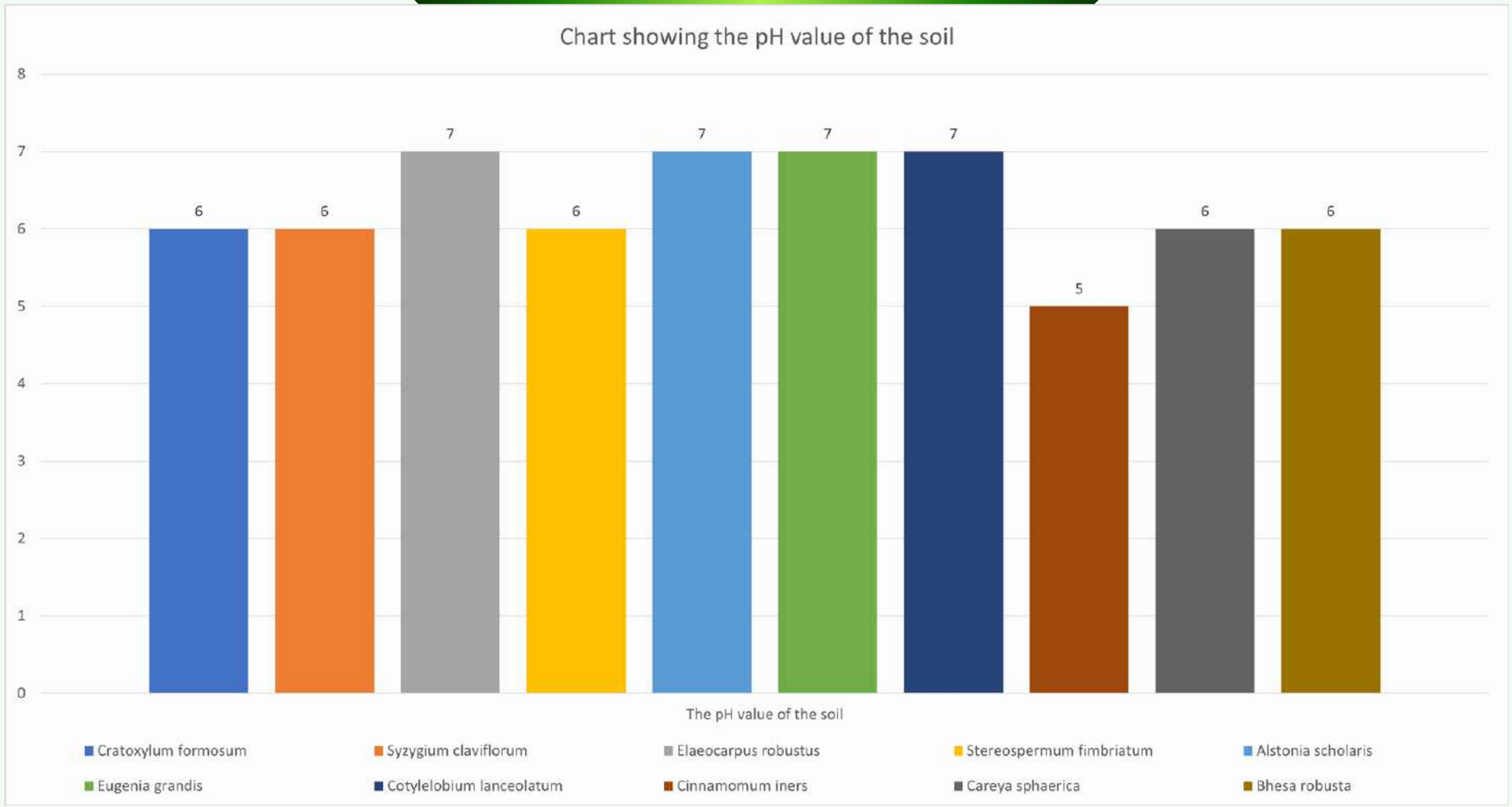
Picture 1: Chart showing soil temperature values around each some tree.

RESULTS



Picture 2: Chart showing soil humidity values for each tree.

RESULTS



Picture 3 : Chart showing the pH in the soil of each tree

RESULTS

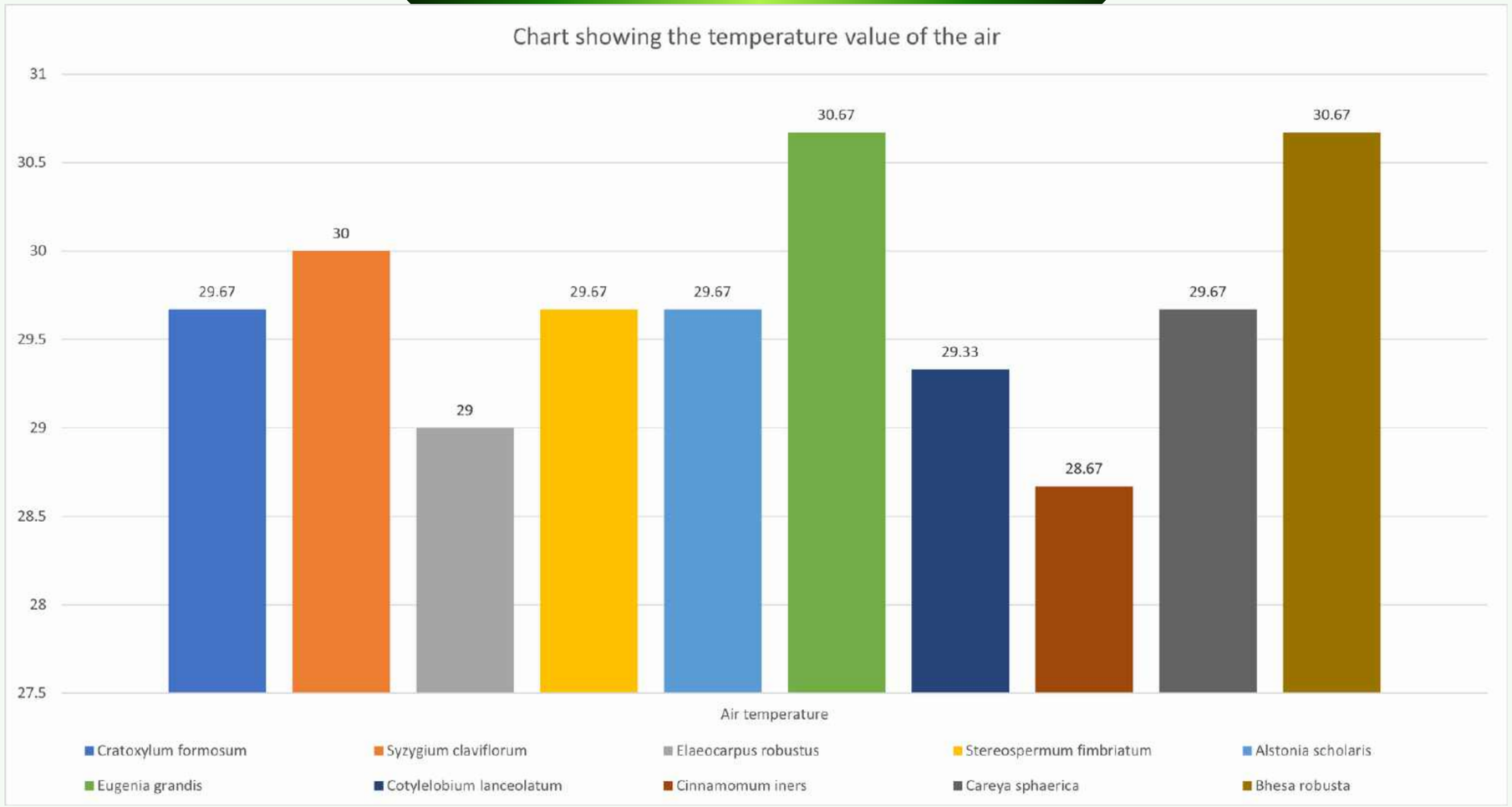
Tree name	Elements in the soil		
	Nitrogen	Phosphorus	Potassium
Cratoxylum formosum	High	Medium	High
Syzygium claviflorum	High	High	High
Elaeocarpus robustus	Medium	Medium	High
Stereospermum fimbriatum	High	High	High
Alstonia scholaris	Very high	Very high	Very high
Eugenia grandis	Medium	Medium	Medium
Cotylelobium lanceolatum	High	Medium	High
Cinnamomum iners	High	Medium	Medium
Careya sphaerica	Medium	Medium	Medium
Bhesa robusta	High	High	High

Table 1 shows the soil fertility of each tree.

Results : Part 2

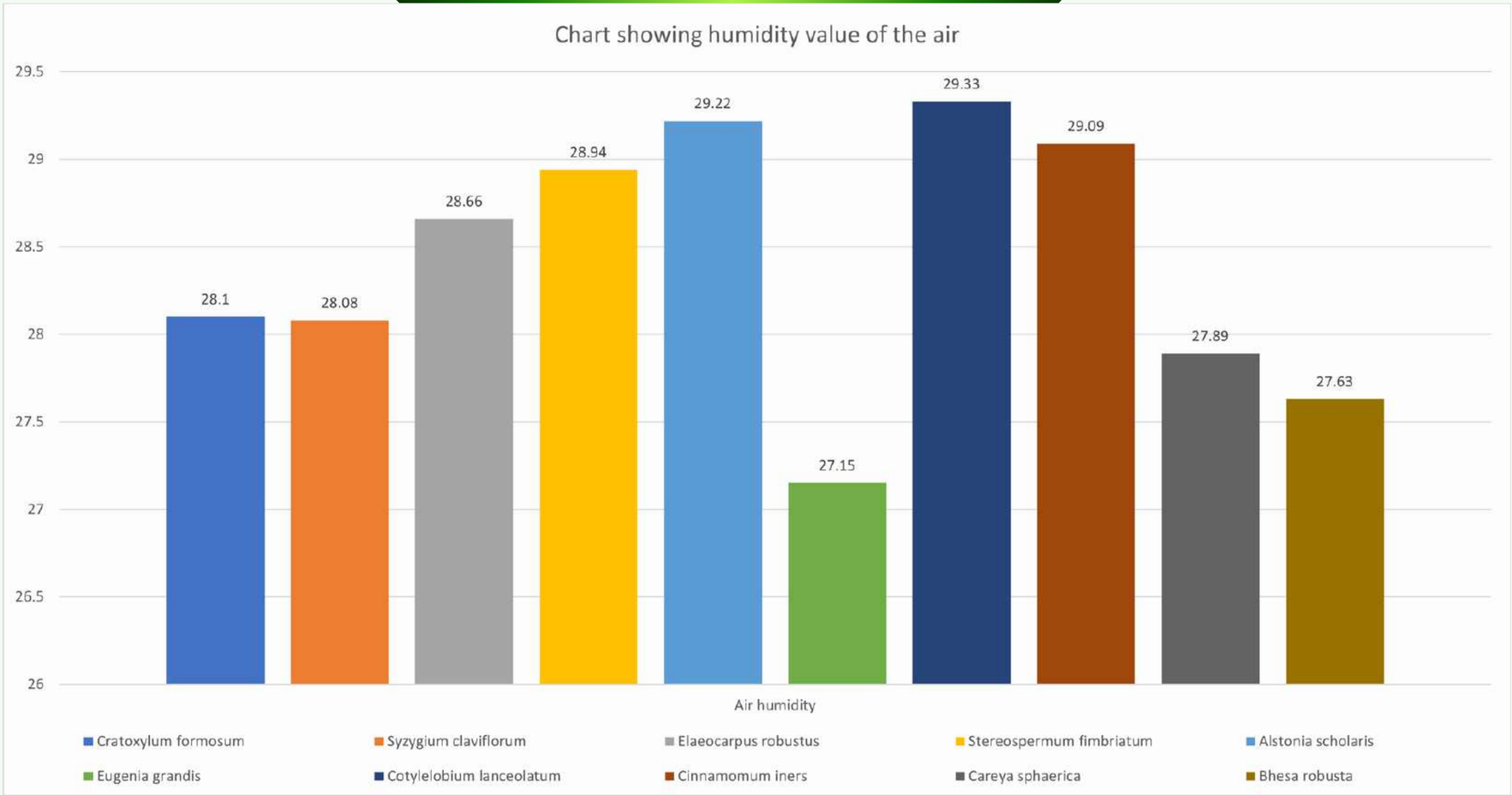
To study the quality of air that affects the carbon storage of trees.

RESULTS



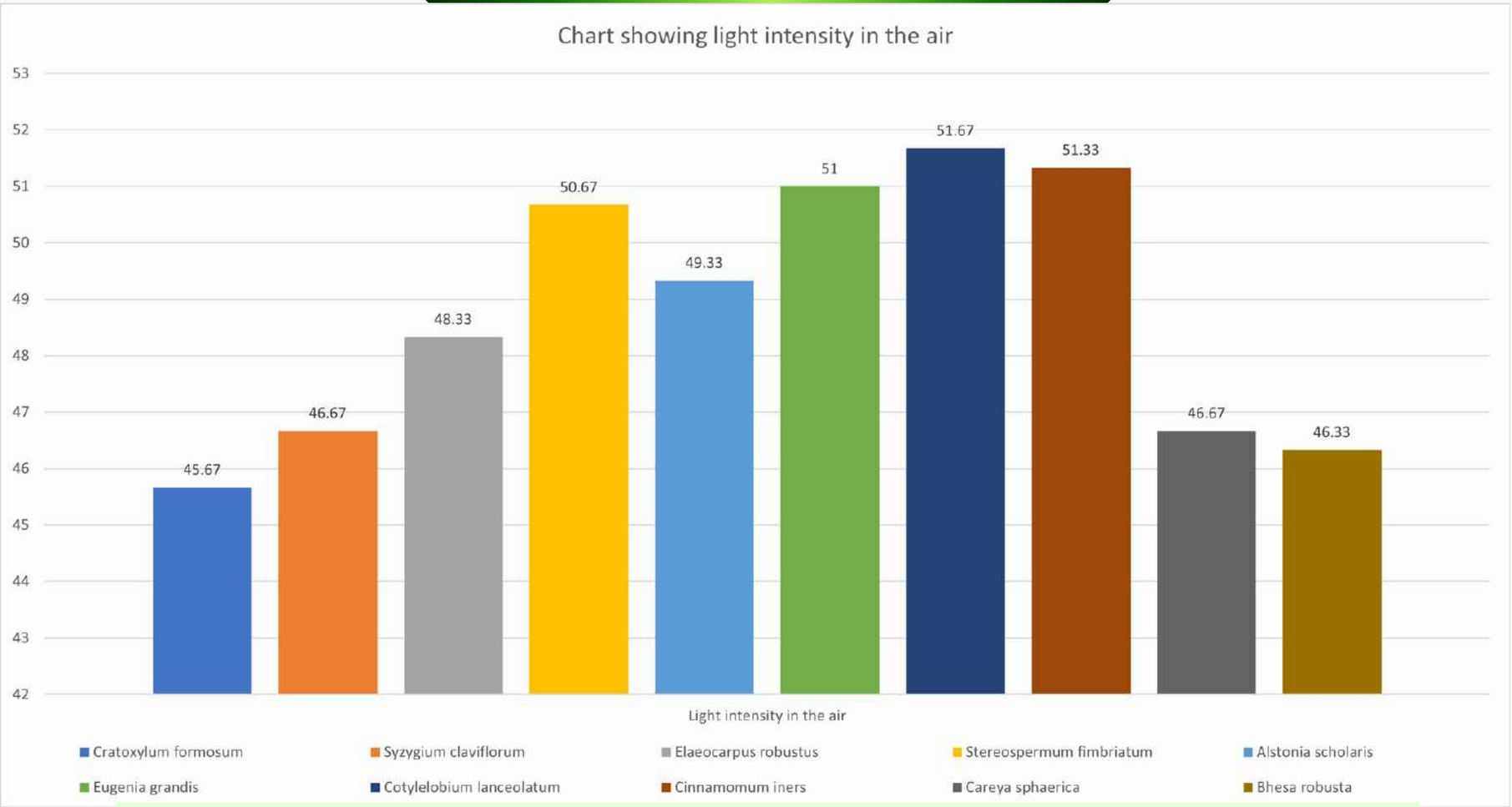
Picture 4: Bar chart showing the temperature in the air around each tree

RESULTS



Picture 5: Chart showing the air humidity value of each tree

RESULTS



Picture 6: Bar chart showing the light intensity of each tree.

Results : Part 3

To study the growth of tree species that affect carbon storage.

RESULTS

Tree name	Height (m)	Circumference (cm)	Distance to tree (m)	Angle
Cratoxylum formosum	22.2	113	20	48
Syzygium claviflorum	32	216	20	58
Elaeocarpus robustus	18.6	72	20	43
Stereospermum fimbriatum	19.4	159	20	44
Alstonia scholaris	29.6	256	20	56
Eugenia grandis	14.6	56	20	36
Cotylelobium lanceolatum	17.4	158	20	41
Cinnamomum iners	18	79	20	42
Careya sphaerica	14	75	20	35
Bhesa robusta	28.6	256	20	55

Table 2 shows the height and circumference of each tree.

RESULTS

Tree name	Aboveground biomass (kg.)	Underground biomass (kg.)	Total biomass (kg.)
Cratoxylum formosum	723.08	195.23	918.32
Syzygium claviflorum	3476.66	938.70	4415.36
Elaeocarpus robustus	261.16	70.51	331.68
Stereospermum fimbriatum	1213.14	327.55	1540.69
Alstonia scholaris	4456.88	1203.36	5660.23
Eugenia grandis	129.13	34.96	163.99
Cotylelobium lanceolatum	1081.76	292.07	1373.83
Cinnamomum iners	301.73	81.47	383.19
Careya sphaerica	215.6	58.23	273.90
Bhesa robusta	4313.84	1164.74	5478.58

Table 3 shows soil biomass both aboveground and underground and an overview of each tree .

RESULTS

Tree name	Carbon content in total biomass (kgC)	Amount of greenhouse gases sequestered ($kgCO_2e$)
Cratoxylum formosum	431.61	1582.56
Syzygium claviflorum	2075.22	7609.14
Elaeocarpus robustus	155.89	571.59
Stereospermum fimbriatum	724.13	2655.13
Alstonia scholaris	2660.31	9754.47
Eugenia grandis	77.08	282.61
Cotylelobium lanceolatum	645.70	2367.57
Cinnamomum iners	180.10	660.37
Careya sphaerica	128.73	472.02
Bhesa robusta	2574.93	9441.42

Table 4 shows the carbon content in the total biomass and the amount of greenhouse gases sequestered by each tree species.

Discussion and Conclusion

Discussion and Conclusion

From the study of soil quality, air quality, and growth affect carbon storage of 10 prominent tree species grown in Thung Khai Botanic Garden, Trang Province that is based on the hypothesis that soil quality, air quality, and growth to affect the carbon storage of 10 prominent tree species, including Cratoxylum formosum, Syzygium claviflorum, Elaeocarpus robustus, Stereospermum fimbriatum, Alstonia scholaris, Eugenia grandis, Cotylelobium lanceolatum, Cinnamomum iners, Careya sphaerica and Bhesa robusta grown in Thung Khai Botanical Garden, Trang Province. It was found that the Alstonia scholaris area had higher temperature and elements in the soil than other tree areas. It has a lower light intensity in the air, results in more growth to a higher height and circumference than Alstonia scholaris, so it can store the most carbon storage in the total biomass and the amount of greenhouse gases.

THANKYOU

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