Effects of soil quality on the carbon storage of seagrass in Pak Klong Beach and Ao Kham, Trang

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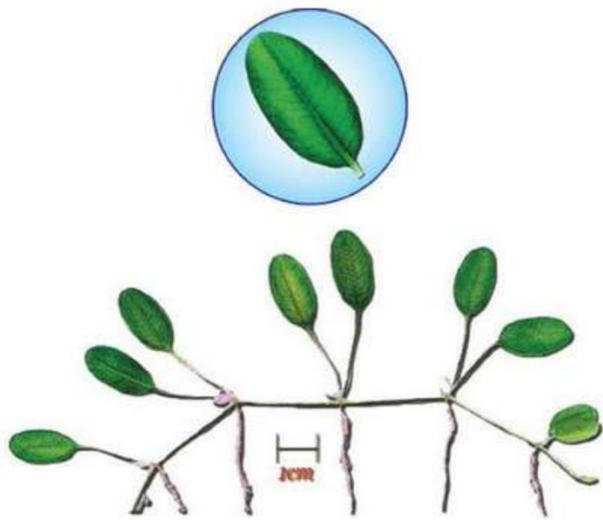Mrs. Nichapun Somkhantha
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Princess Chulabhorn Science High School Trang

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Halophila major
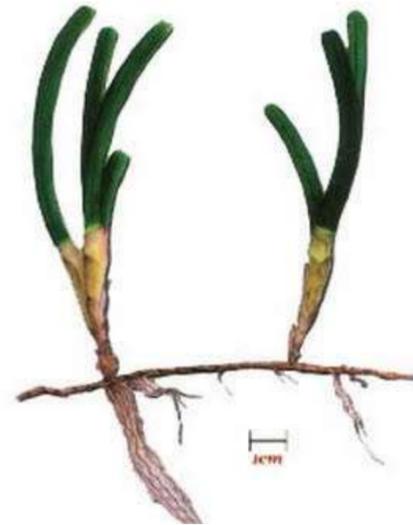
Cymodocea rotundata

Enhalus acoroides

Seagrass

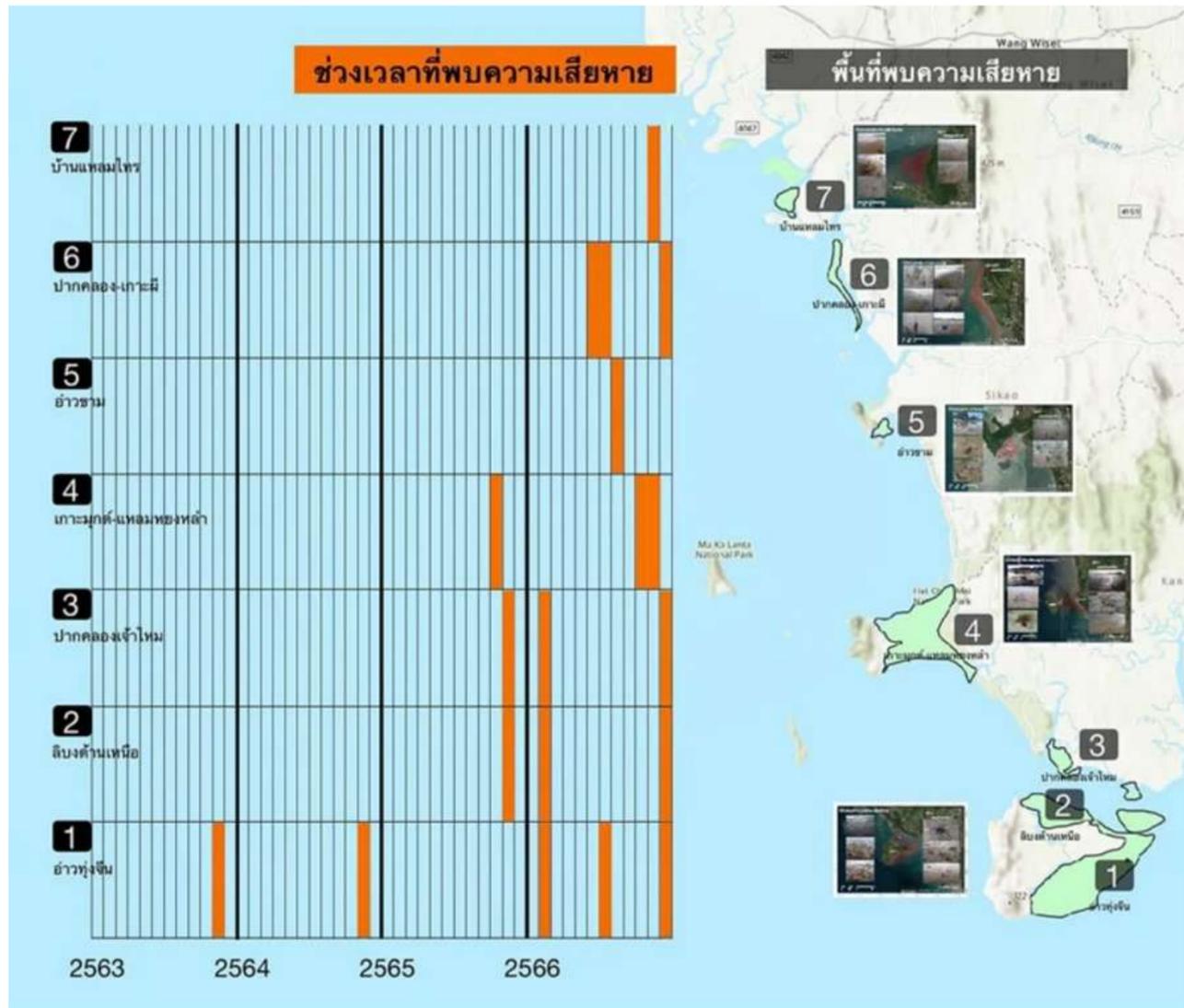
หญ้าทะเล
ดูดซับคาร์บอนเยอะกว่าป่าบกทั่วไป 2 เท่า
แต่กำลังลดฮวบทุกปี!

Seagrass carbon storage

Introduction

seegrass got damage and greatly increase

3

objective

1 To compare the carbon storage of seagrass in the Pak Khlong Beach area. and the area of Ao Kham, Pak Meng Beach

2 To study soil quality that affects carbon storage in seagrass.

3 To study the carbon storage ability of each type of seagrass including Enhalus acoroides, Halophi major, and Cymodocea rotundata

4 To compare the above-ground and underground seagrass carbon storage abilities.

5 To compare the carbon sequestration capacity of single-species and aggregated seagrass habitats.

Study site

Pak Klong

Lat7.6244
Lon99.2611
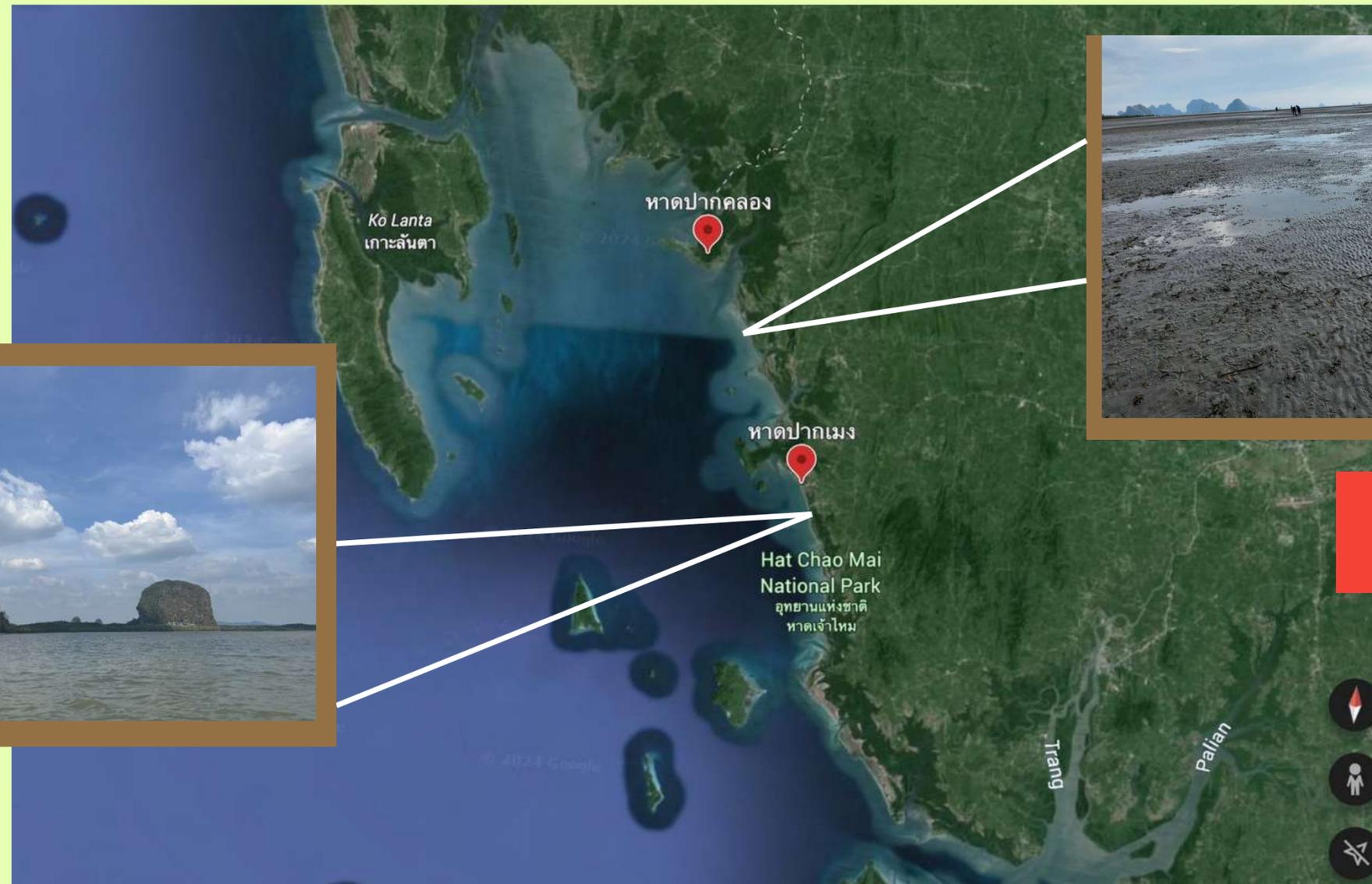
Ao Kham

Lat7.5020
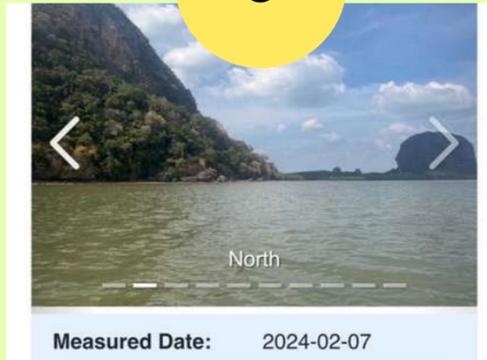Lon99.3012

Operation step

1 — Surveyed the area and collected samples of seagrass and sediment.

2 — Soil quality analysis

3 — Do Land Cover using GLOBE

4 — Analyze the quantity Store carbon in the soil

5 — Analyze the quantity Carbon storage in seagrass

6 — data analysis

Measured Date: 2024-02-07

North

6

Materials and Equipments

collecting samples

Quadrat

Tape measure

carbon storage

hot air oven

muffle fumace

digital scale

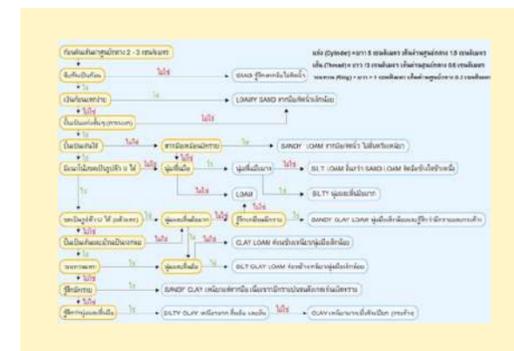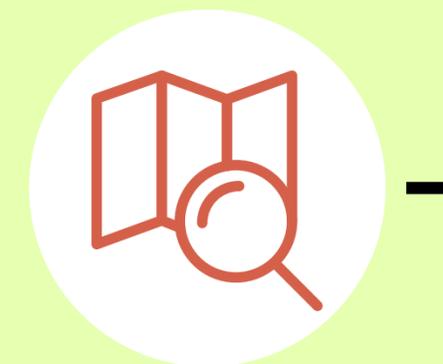## soil observation

universal indicater paper

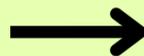soil NPK test kit

feild inspection guide for soil characteristic

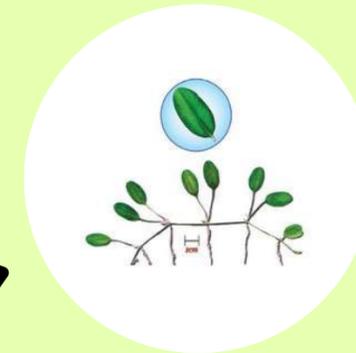# 1 Collection of seagrass and soil samples

Set a specific area

Randomly placed 5 quadrats

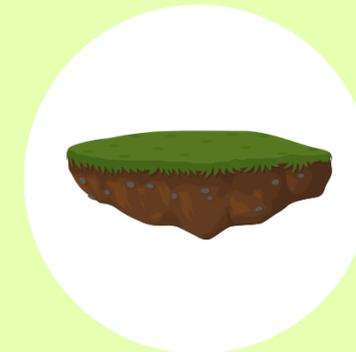Collect samples

Collect seagrass samples

Collect soil samples

Halophila major

Cymodocea rotundata

Enhalus acoroides

the area with 3 sea grass species was randomly grouped together.

1 Collection of seagrass samples

Placing a specific area
- Measure the distance from a coastline that rises 150 meters above sea level to an area with seaweed.
- The study area is set to be 100x100 meters.

9

1 Collection of seagrass samples

placing specific random quadrats in areas with 50–75% dense seagrass, divided into 4 groups, with Group 1–3 types randomly separated according to the type of sea grass, including Enhalus acoroides, Halophila major, and Cymodocea rotundata. As for the fourth group, the area with 3 sea grass species was randomly grouped together.

1 Collection of seagrass samples

All seagrass samples were collected in the quadrat for all 4 seagrass species.

Enhalus acoroides

Halophila major

Cymodocea rotundata

the area with 3 sea grass species was randomly grouped together.

11

1 Collection of soil samples

- Soil samples were collected according to the GLOBE method by digging approximately 30 cm from the soil surface in every quadrat, amounting to 400 grams.

2 Soil quality analysis

N P K test

test soil characteristics
by Field inspection guide for soil characteristic
accordinf to GLOBE method (Soil Protocol)

pH test

3 Save data to GLOBE data base

Land Cover

North

Measured Date:	2024-02-07
Organization Name:	Princess Chulabhorn Science High School Trang
Site ID:	338140
Site Name:	47NNJ332292
Latitude:	7.501501
Longitude:	99.300917
Elevation:	0m

Muddy:	true
Leaves On Trees:	true
Feature 1 Extra Data:	((compassData.headin 326, compassData.horizon: 12))
Feature 2 Extra Data:	((compassData.headin 61, compassData.horizon: 7))
Feature 3 Extra Data:	((compassData.headin 269, compassData.horizon: 7))
Feature 4 Extra Data:	((compassData.headin 31, compassData.horizon: 10))
Data Source:	GLOBE Observer App
Field Notes:	(none)
GLOBE Teams:	GLOBE PCSHSTrang

Land Cover

East

Measured Date:	2024-02-07
Organization Name:	Princess Chulabhorn Science High School Trang
Site ID:	338141
Site Name:	47NNJ304405
Latitude:	7.603733
Longitude:	99.275603
Elevation:	0m
Measured At:	2024-02-07T08:09:00
Measurement	7.604

Site ID:	338141
Site Name:	47NNJ304405
Latitude:	7.603733
Longitude:	99.275603
Elevation:	0m
Measured At:	2024-02-07T08:09:00
Measurement Latitude:	7.604
Measurement Longitude:	99.2765
Location Method:	automatic
Location Accuracy M:	6
Standing Water:	true
Muddy:	true
Leaves On Trees:	true
Data Source:	GLOBE Observer App
Field Notes:	

4 Analyze the amount of carbon storage in the soil

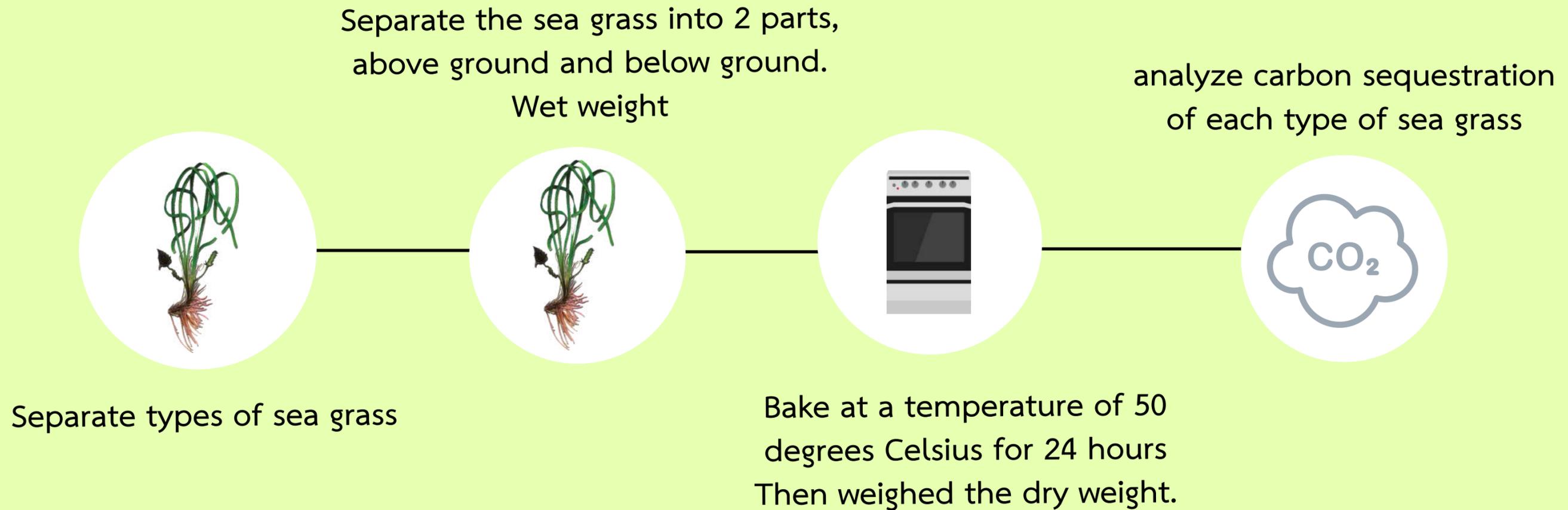Take 100 grams of baked clay,
Burned at a temperature of 450 degrees Celsius for
4 hours, left to cool and weighed after burning.
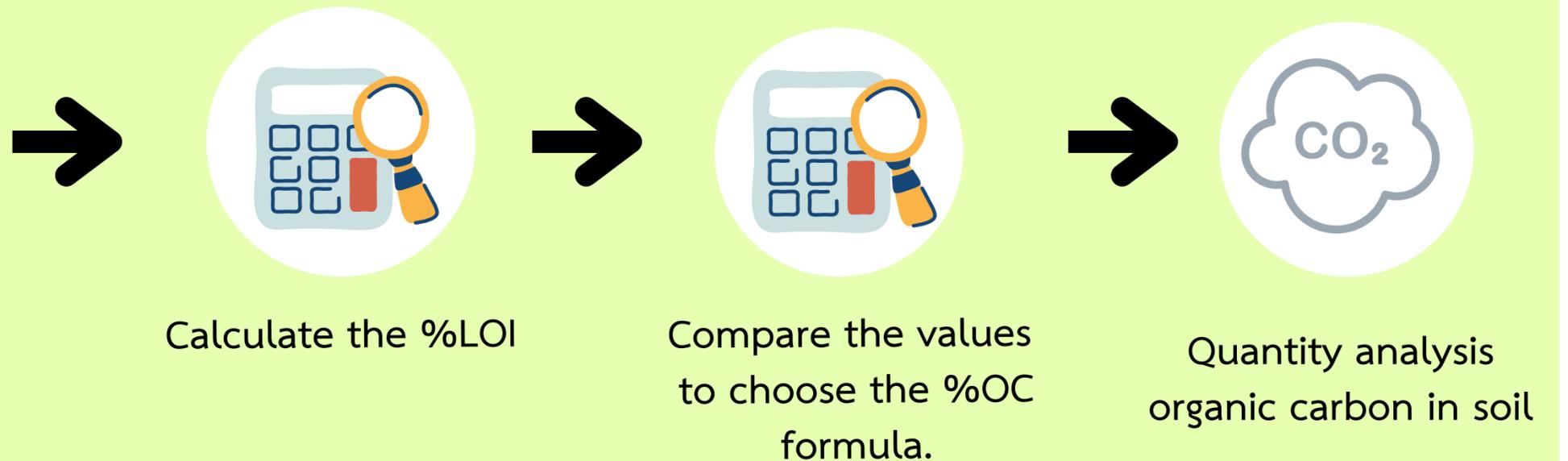
→ Calculate the %LOI

→ Compare the values to choose the %OC formula.

→ Quantity analysis organic carbon in soil

5 Analyze the amount of carbon storage in seagrass

Separate the sea grass into 2 parts,
above ground and below ground.
Wet weight

analyze carbon sequestration
of each type of sea grass

CO$_2$

Separate types of sea grass

Bake at a temperature of 50
degrees Celsius for 24 hours
Then weighed the dry weight.

5 Analyze the amount of carbon storage in seagrass

weigh weight before drying

Take seagrass to dry
at a temperature of 50
degrees Celsius for 24 hours

Weigh the seagrass after drying.
to analyze and quantify
carbon storage in seagrass

6 Formula for calculating the amount of carbon storage in soil and seagrass

1 calculated %Loss on Ignition(%LOI).

%LOI = $\dfrac{\text{(Mass before combustion – Mass after combustion)}}{\text{Mass before combustion}}$ x 100

2 Calculated Organic carbon(%OC) from analyze organic matter content(%LOI) can be done in two cases as follow:

Formular 2: %OC = -0.21 + 0.40(%LOI) If %LOI <0.20

Formular 3: %OC = -0.33 + 0.43 (%LOI)   If %LOI >0.20

3 Calculated carbon storage in seagrass

Carbon Storage in seagrass (MgC/ha) = $\dfrac{\text{%OC x Dried weigh of seagrass in area (Mg)}}{\text{Area of seagrass (ha)}}$

18

Part 1 : Soil quality

Ao Kham

Loamy sandy soil
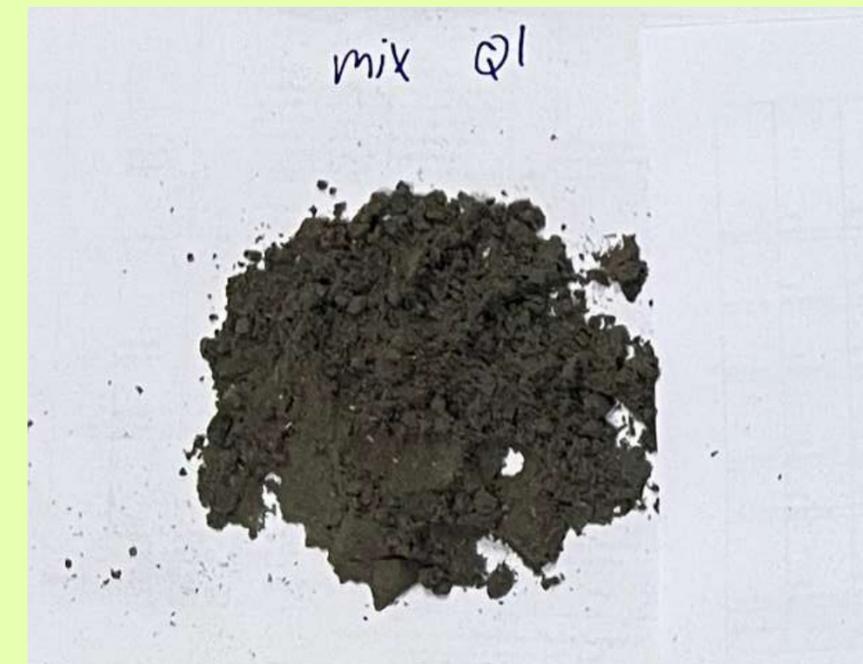
Pak Klong Beach

Loamy sandy soil

19
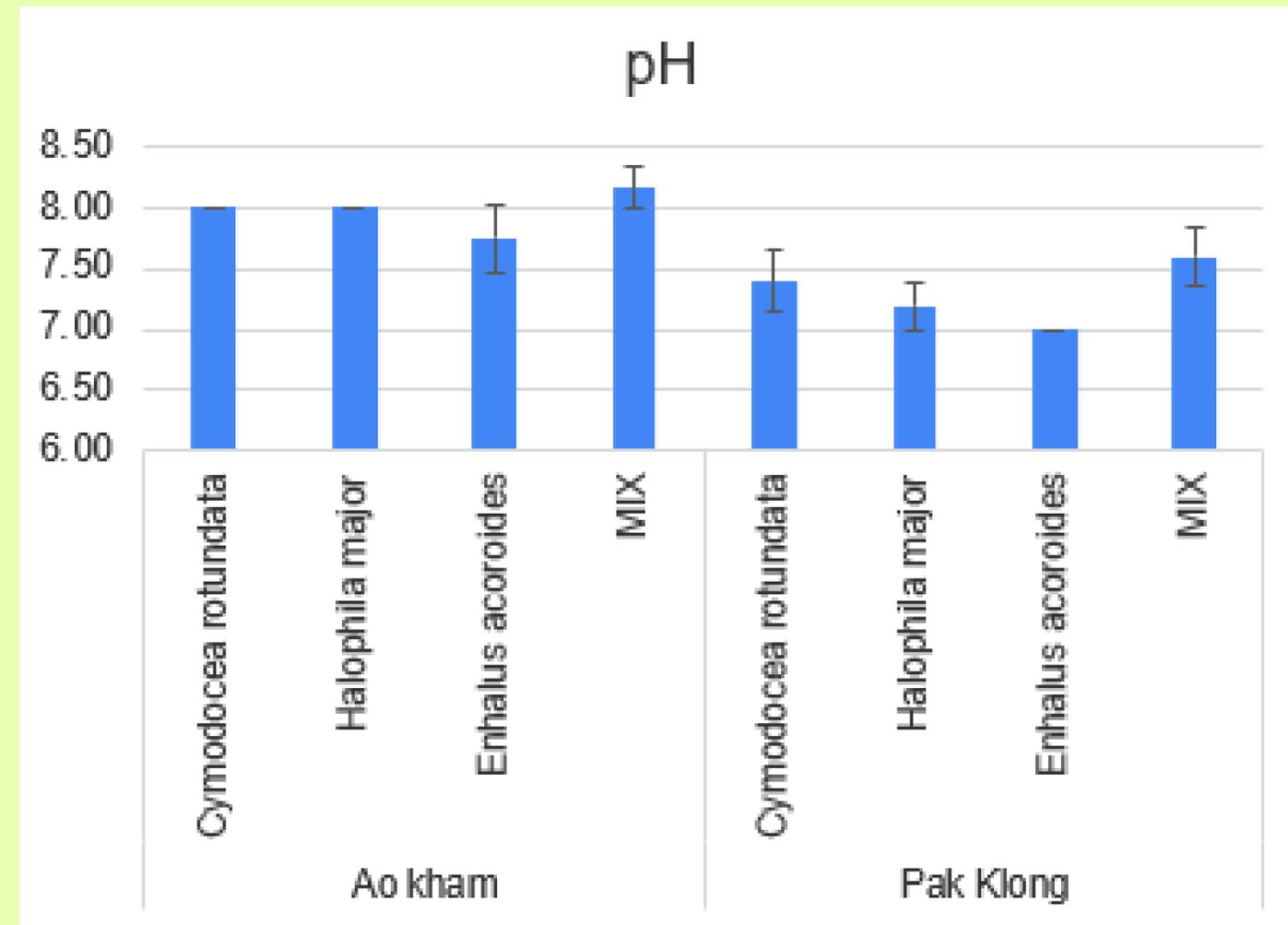
Part 1 : Soil quality

Chart 1: Shows a bar chart that showing pH comparisons.
of each type of sea grass in Pak Klong Beach and Ao Kham, Trang
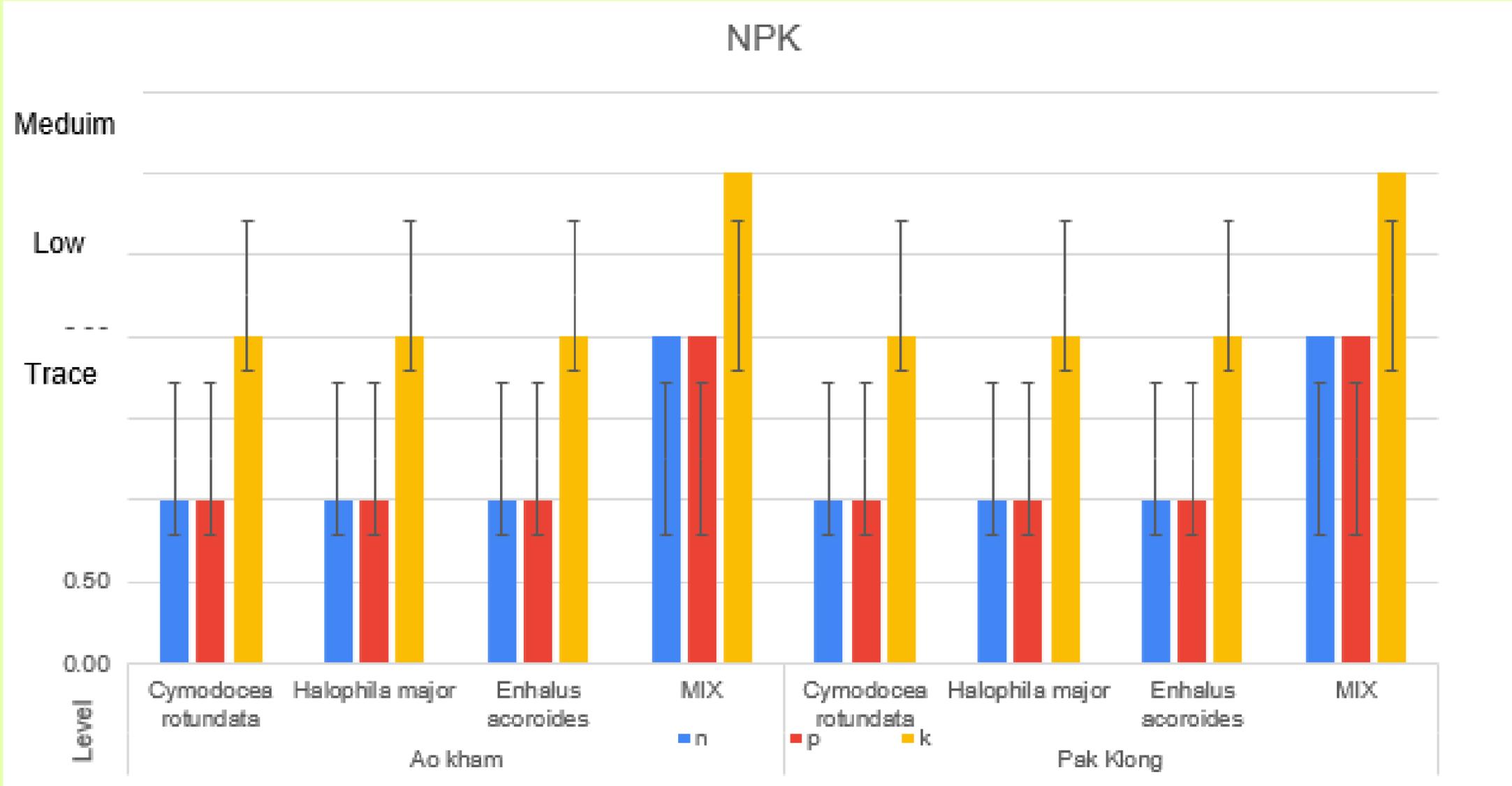
20

Part 1 : Soil quality

Chart 2: Shows a bar chart that showing N P K comparisons.
of each type of sea grass in Pak Klong Beach and Ao Kham, Trang
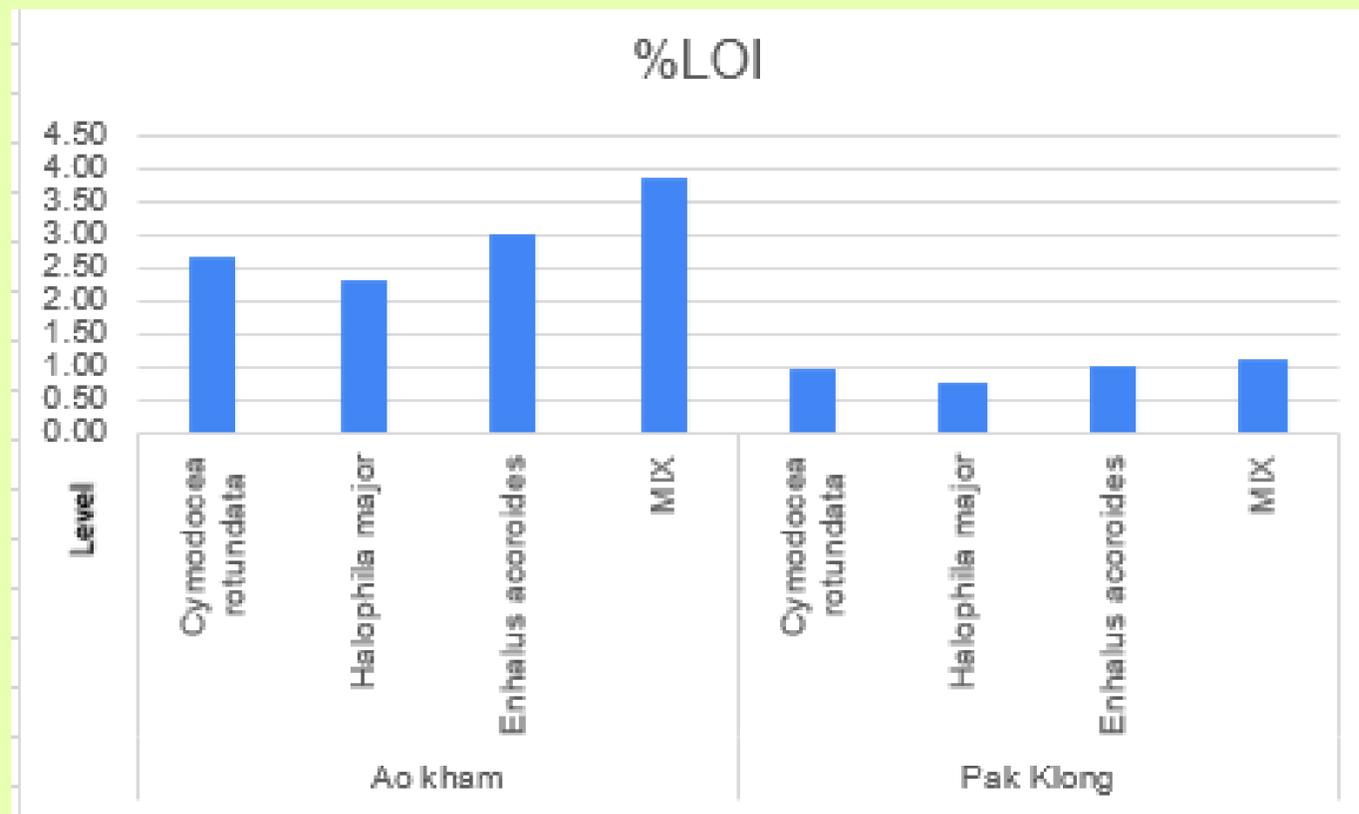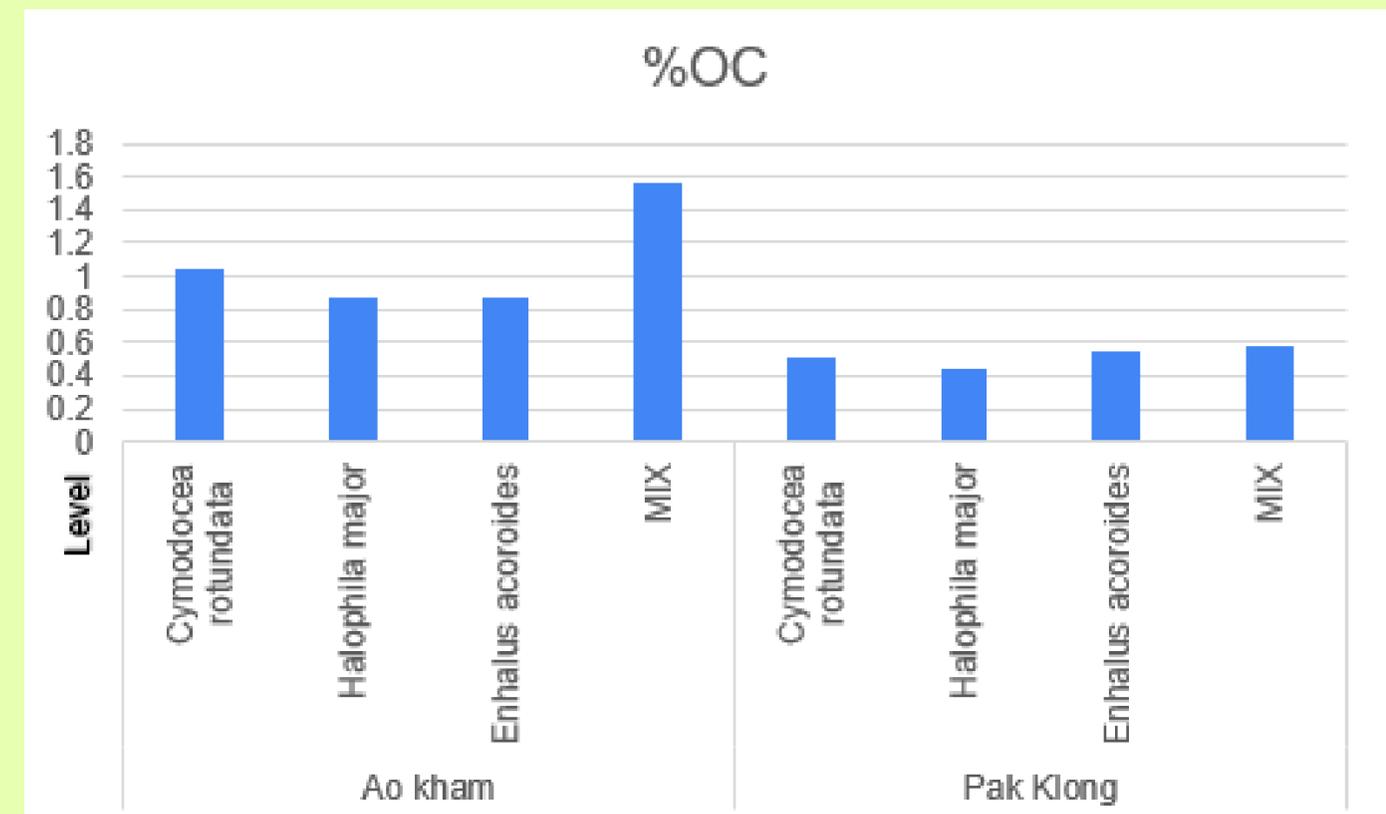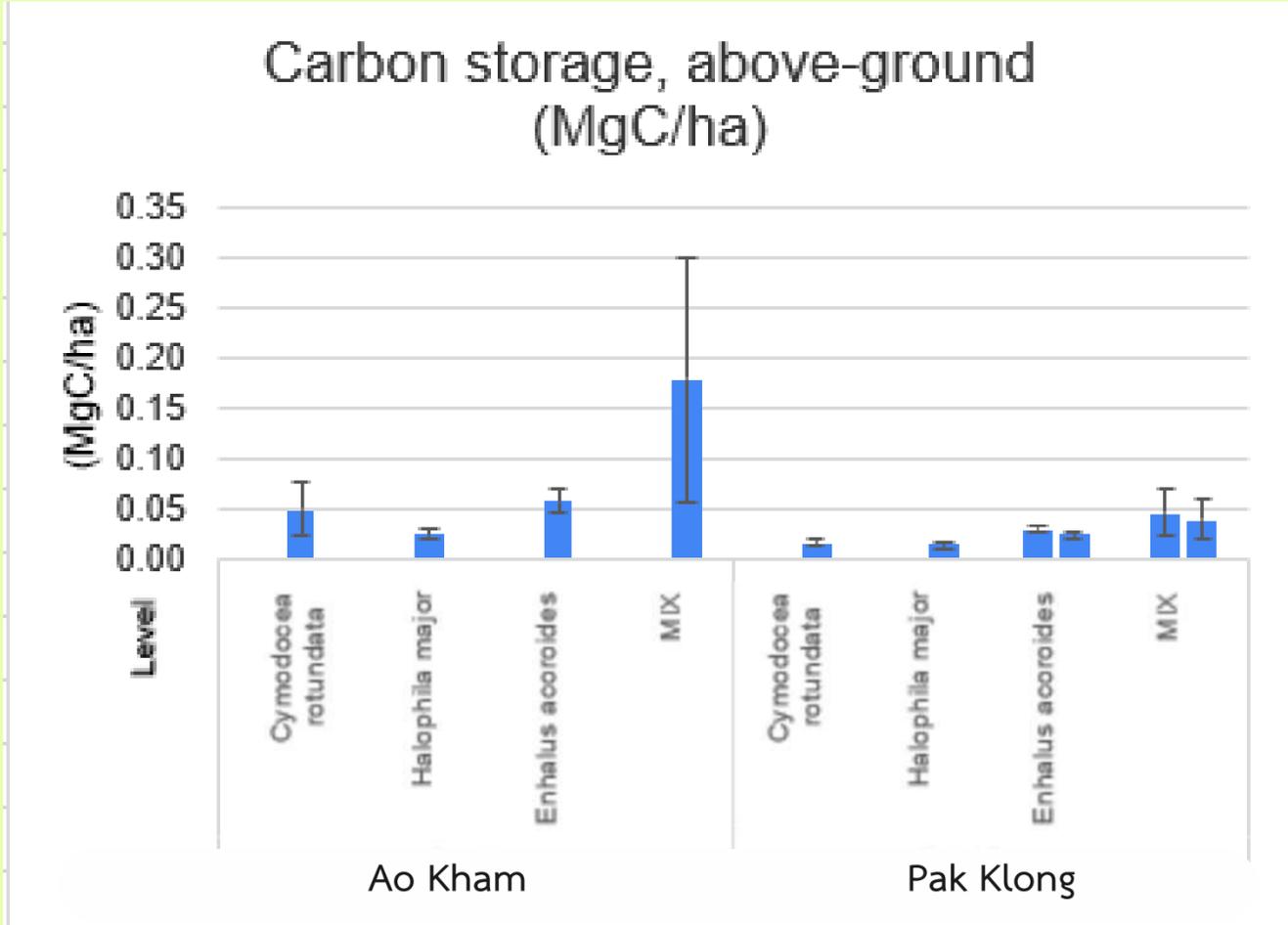
Part 1 : Soil quality

Chart 3: Shows a bar chart that showing %LOI comparisons of each type of sea grass in Pak Klong Beach and Ao Kham, Trang

Chart 4: Shows a bar chart that showing %OC comparisons of each type of sea grass in Pak Klong Beach and Ao Kham, Trang

Part 2 : Quantity of carbon storage
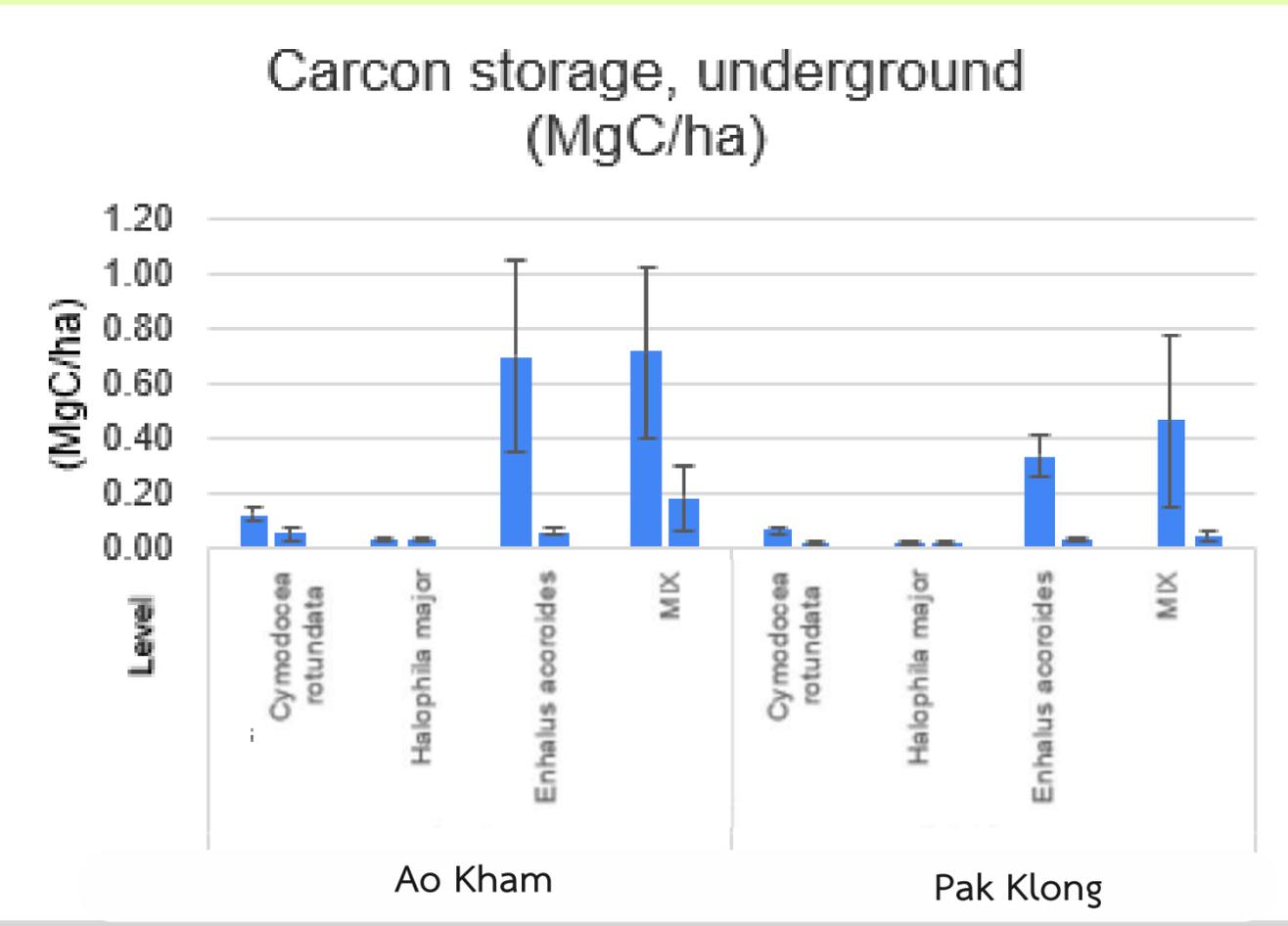

Chart 5
Carbon accumulates in aboveground seagrass

Chart 6
Carbon accumulates in underground seagrass.
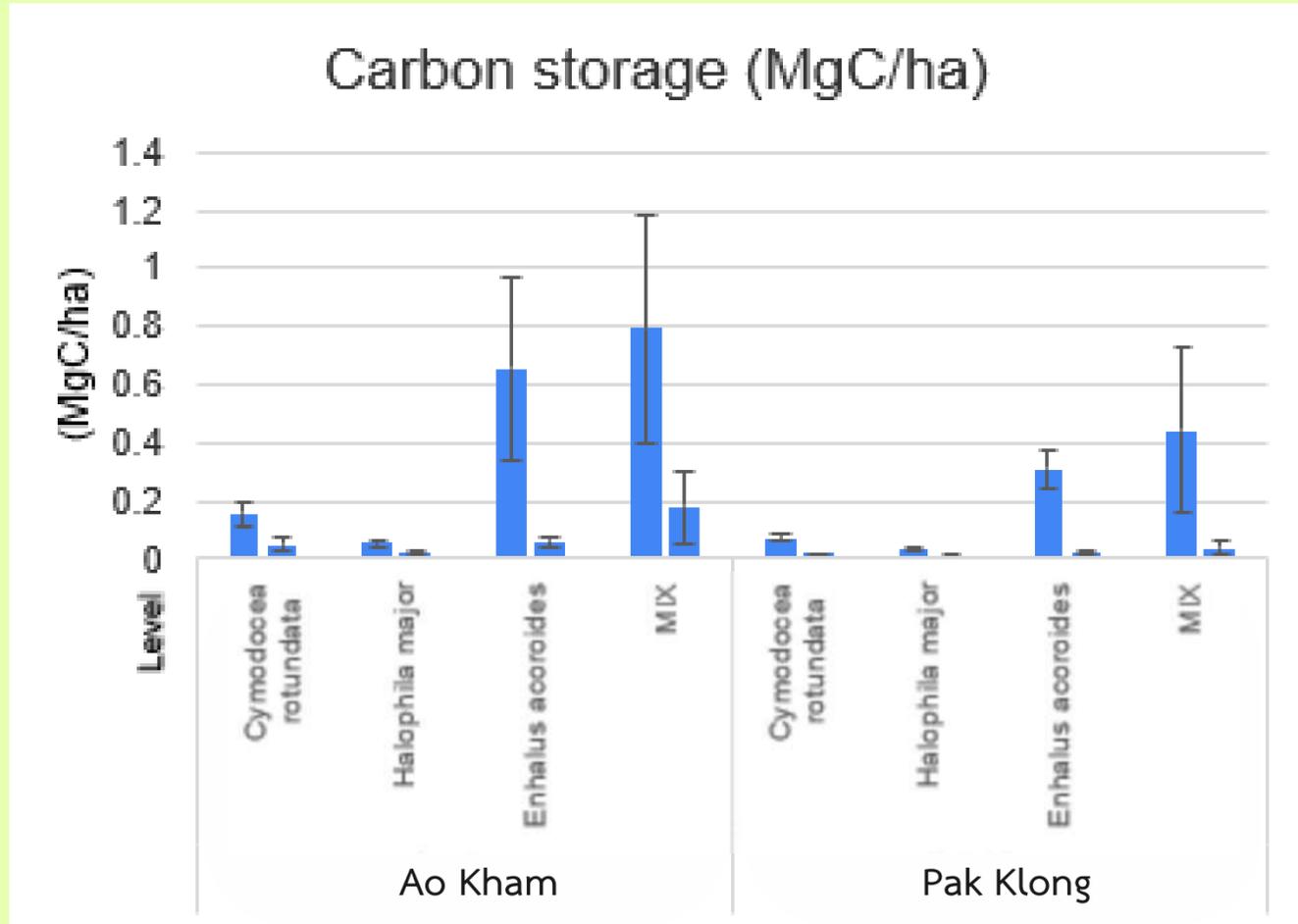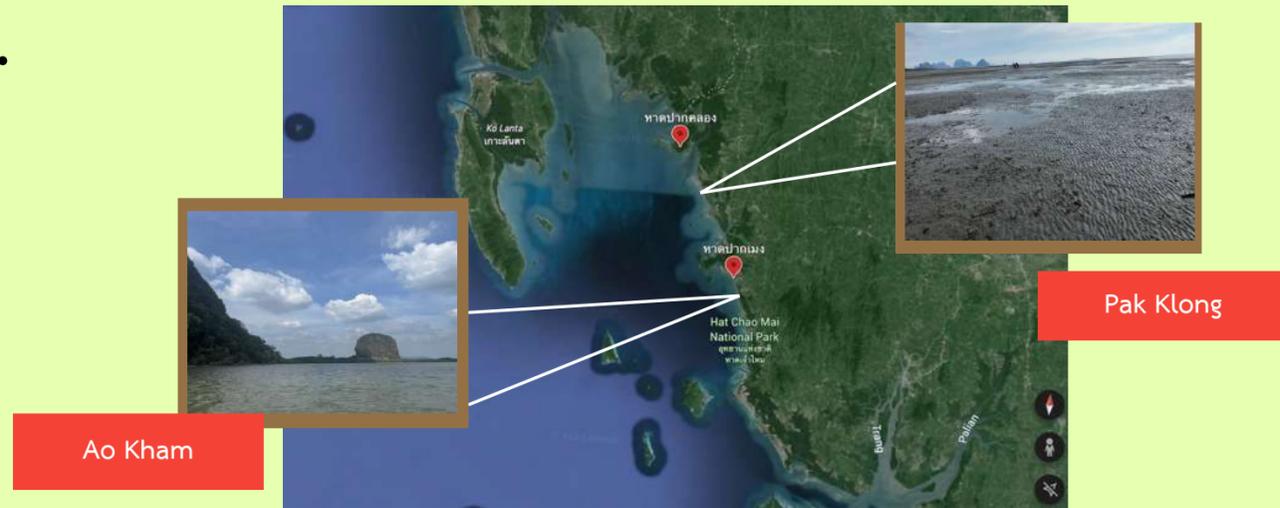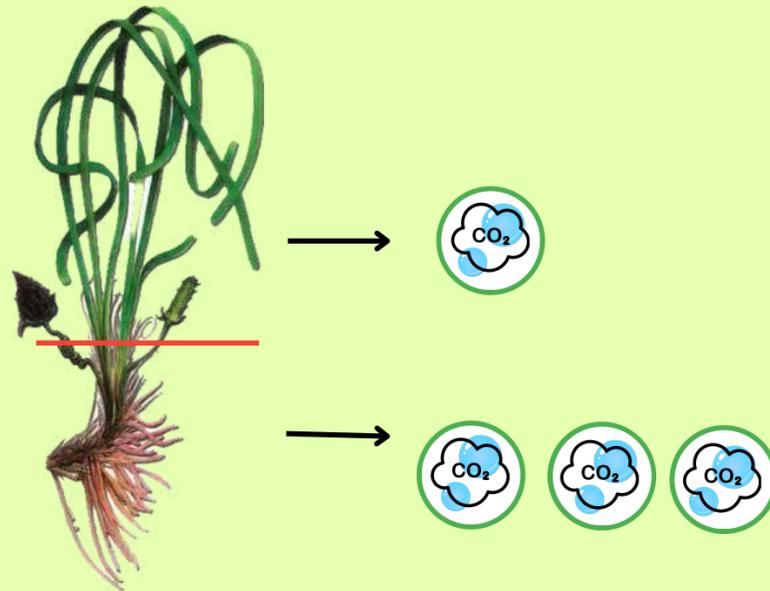
Part 2 : Quantity of carbon storage

Chart 7 Shows a bar chart that showing the amount of carbon storage that both part collected comparisons in Pak Klong Beach and Ao Kham, Trang

Conclusion and discussion
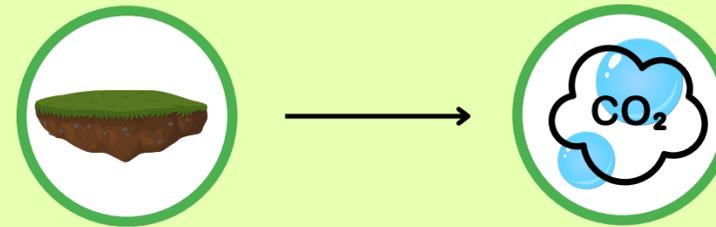
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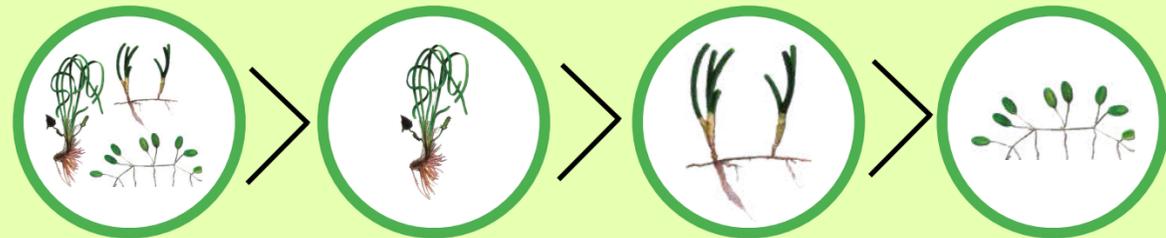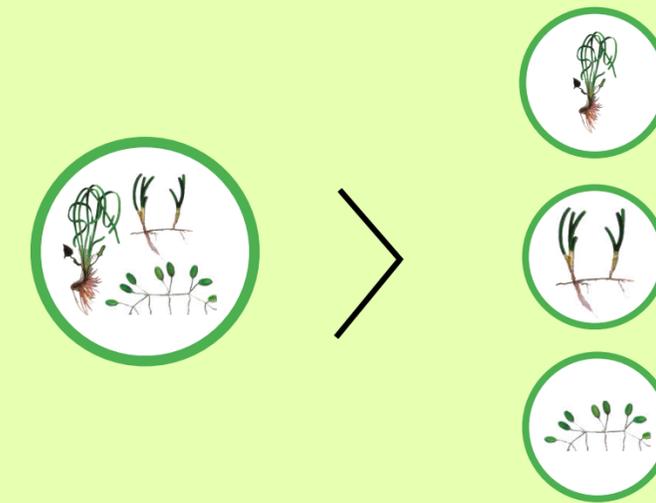Ao Kham

Pak Klong

2.

3.

4.

5.

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Sikao Trang

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Thank you