# Understanding Economic Values of Seagrass Ecosystem and Implications for Decision Making: A Case Study of Trang Province, Southern Thailand

Orapan Nabangchang;

Economy and Environment Institute of the Lower Mekong Sub Region (EEI-LMS)

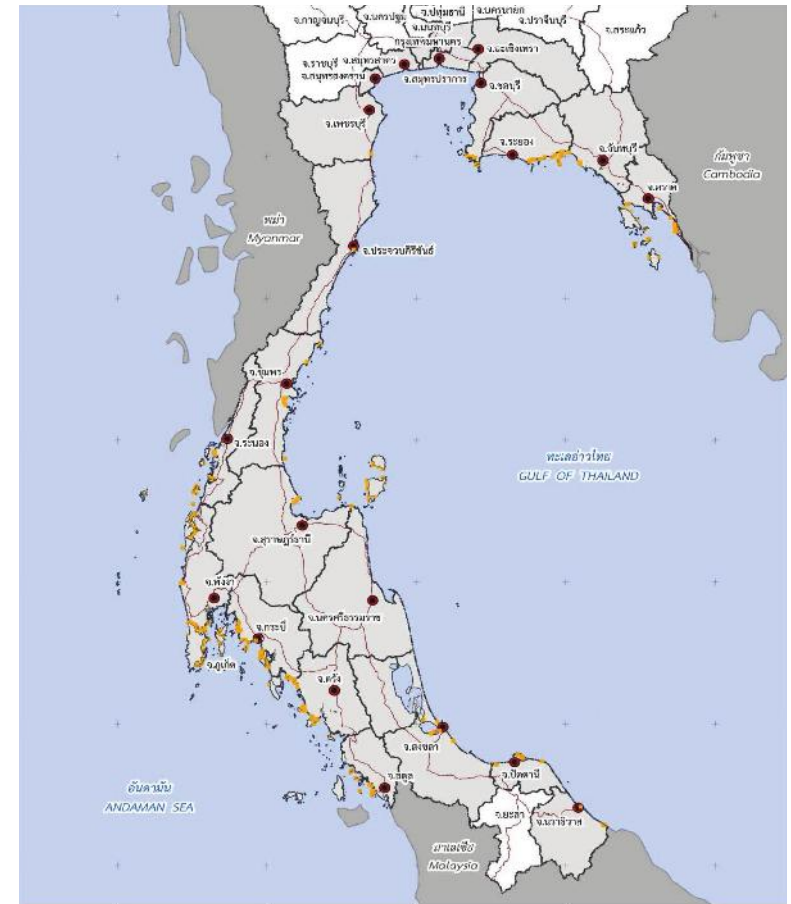orapann@gmail.com

THE EAST ASIAN SEAS CONGRESS 2015

**Global Targets**
**Local Benefits**
Setting the Sustainable Development Agenda for the Seas of East Asia beyond 2015

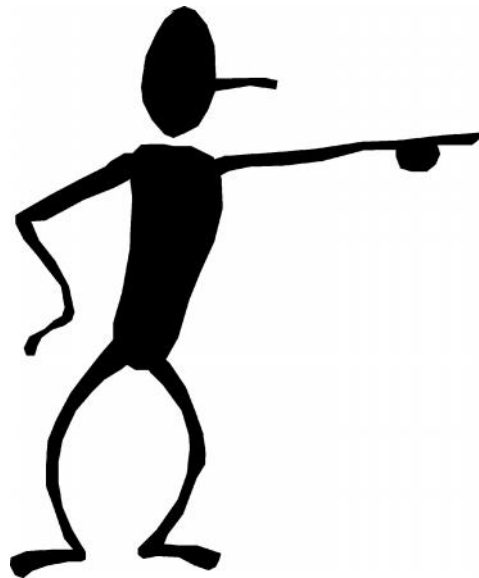16-21 November 2015 • Danang, Vietnam

bluecarbonblog.blogspot.com

HOSLO JIWA

Worldwide, there are 60 species. This map shows where they are distributed

Seagrass

Thailand has 13 sea grass species. The total area is118,665 rai which is distributed both on the Gulf side and the Andaman coasts.

11 of the 13 seagrass species can be found on the coasts of Trang, making this the province with the highest concentration of sea grass
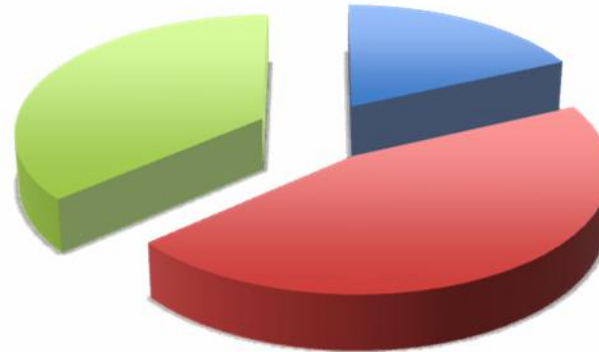
Total Economic Value

# Use value from fisheries



**Interviewing the fishermen**



**Collecting records from local fish traders**

# Capturing non-use values by using Choice Experiment

- Examine tradeoffs by asking respondents to choose between options defined by *attributes*.
- Provide value of overall changes as well as individual attribute levels

| Advantages | Disadvantages |
|---|---|
| • Obtains more information from each subject<br><br>• Makes subjects think about trade-offs and thoroughly examine preferences<br><br>• Allows for the valuation of both the product and its attributes<br><br>• Has been used extensively in market research and product development<br><br>• Can test some properties of utility theory / decision making | • Cognitively challenging for subjects<br><br>• Requires at least as much information to be provided as other techniques<br><br>• Cross-section/time-series, discrete nature of data pose econometric challenges |

# Why sea grass beds are important



Without sea grass, there will be no dugongs because they feed only seagrass



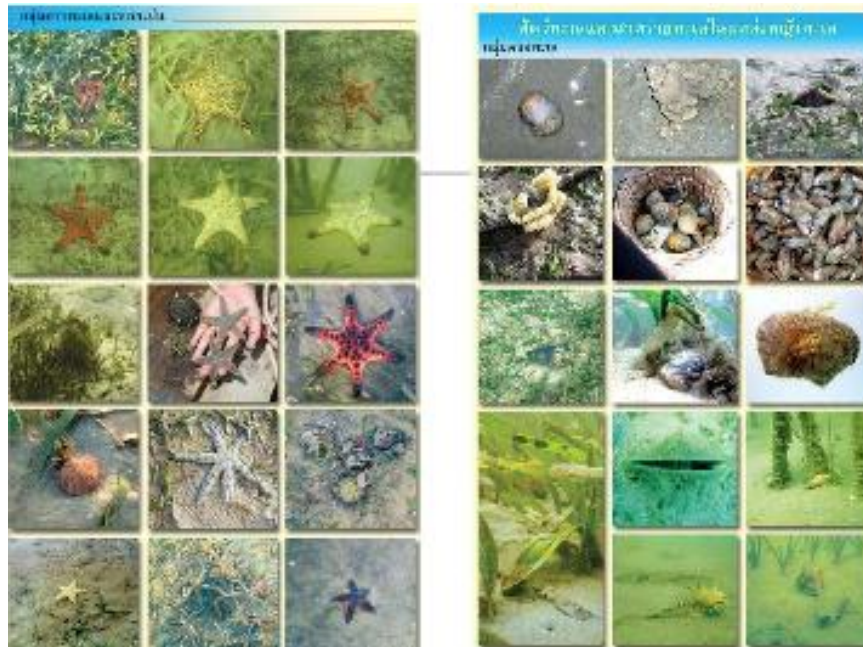A dugong can eat up to 40 kgs of seagrass per day

Marine turtles also feed on sea grass especially green turtles



A green turtle can eat up to 2 kgs of seagrass per day

Seagrass ecosystem provides habitat, shelter, nursery grounds and food for aquatic species

Apart from various fish species, a diversity of marine life can be found such as sea urchins, shrimps, muscles, etc.
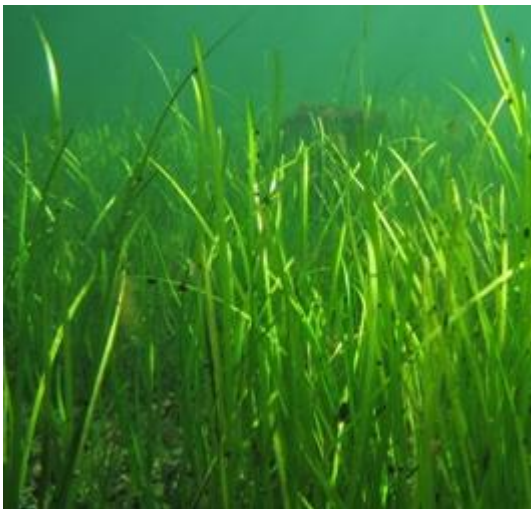


Seagrass beds therefore guarantee sustainability of income for coastal fisheries in Trang province.  It is also a gurantee for food security for coastal communities.
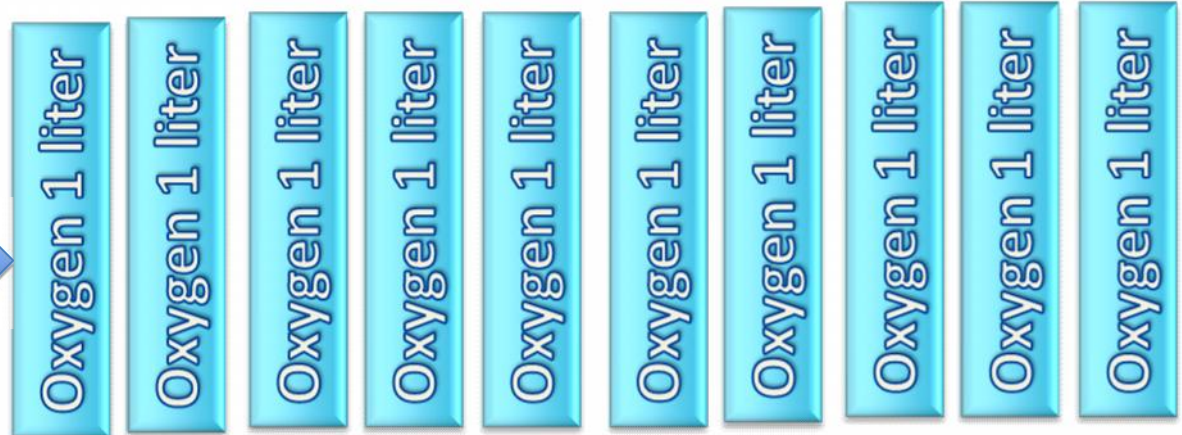
Recently, scientists have tried to create awareness about the importance of sea grass in producing oxygen, sequestering and storing carbon

One square meter of seagrass

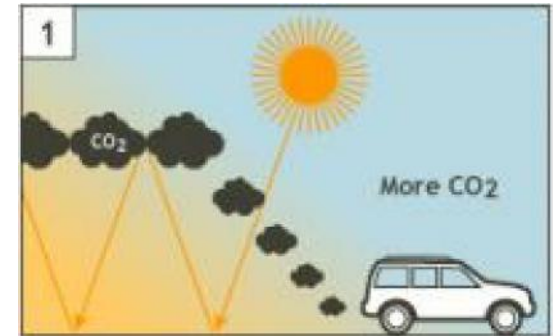Produces 10 liters of oxygen each day

ผลิต

Oxygen 1 liter
Oxygen 1 liter
Oxygen 1 liter
Oxygen 1 liter
Oxygen 1 liter
Oxygen 1 liter
Oxygen 1 liter
Oxygen 1 liter
Oxygen 1 liter
Oxygen 1 liter

1 rai of sea grass can sequester 48 tons of carbon/year

This is equivalent to the green house gas emitted if you drive a car for a distance of 3,350 kilometers



Sea grass's carbon sequestering and storage function is of direct relevance to what mant are talking about today, that is concentration of GHG and global warming

Scientists have estimated that seagrass beds sequester and store around 15% of CO2

This means that reduction in the area of seagrass beds will also mean greater concentration of GHG in the atmosphere

One other benefit is filtering pollutants such as nutrients, chemicals and sediments.

Not clear

Clear

Very clear

When we talk about water clarity, this is what we mean

The benefits of clear coastal water are:

1.The sun can shine to greater sea depths; seagrass, like plants on land, need sunlight

2.The more pollutants that sea grass can filter, the less pollutant that can spread to the coral reefs

The 3 marine ecosystems, mangroves, sea grass and corals are interdependent

Sea grass

Coral reefs

Mangroves

This survey is being conducted because, similar to many other areas around the world, the sea grass beds of Trang province is gradually declining

Every hour each day,sea grass beds around the world is disappearing equivalent to an area of around 2 football fields.



A standard football field is 106 x 68 meter or 7,140 square meters

I would like to take just a few moments to explain the reasons why this is happening

One of the reason for the deterioration of coastal water quality is the increasing concentration nutrient and pollutants from land-based activities (from communities, factories and chemical residues from fertilizer and pesticides which is drained into the sea.



These pollutants (nutrients) speeds the growth of planktons compete for the necessary nutrients for the growth of sea grass. Increasing concentration of certain chemical pollutants can also be harmful for marine life living in the sea grass beds.

The increasing concentration of planktons, sediment and other suspended particles will reduce the clarity of the coastal waters, blocking the sunlight which negatively affect the growth of the sea grass.

Other reasons why sea grass are disappearing

Anchoring boats



Fishing and harvesting sea urchins, shrimps, etc. in the seagrass beds

Increasing sediments which block the sunlight necessary for seagrass growth
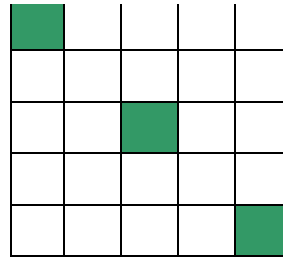


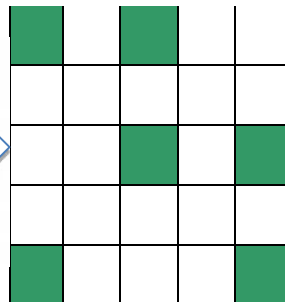Dredging to facilitate navigation

# Why these measures are necessary

## Measure 1: Restoring and replanting seagrass beds

❖ Presently, there are on-going local efforts to replant sea grass

❖ In Trang, replanting will be done 3 times a year. Each time, an area of 25 square meters of sea grass will be planted.
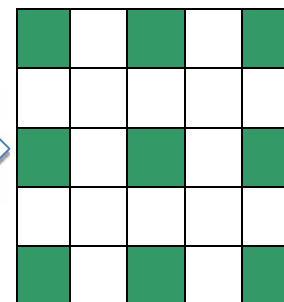
❖ Every year, area replanted is 75 square meters

This is how sea grass is planted, in 5 x 5 meters parcel. The parcels don't have to be continuous but separated
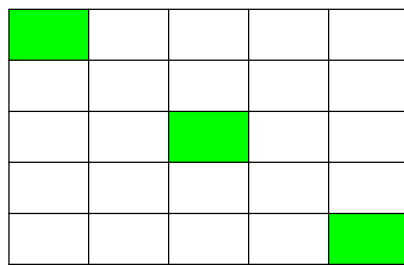
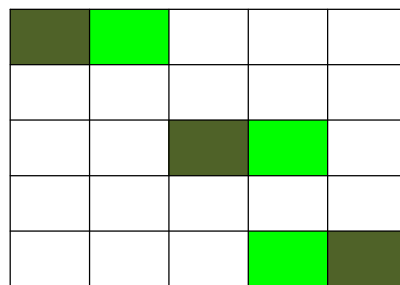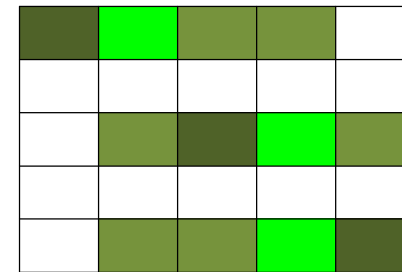With more budget, more parcels can be replanted, like this

or like this

- Why is it being replanted in patches?
- That's because, left undisturbed, the seagrass will spread twice the area originally planted without having to plant the whole area.
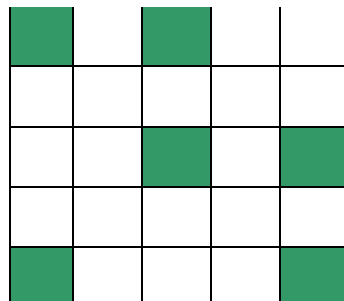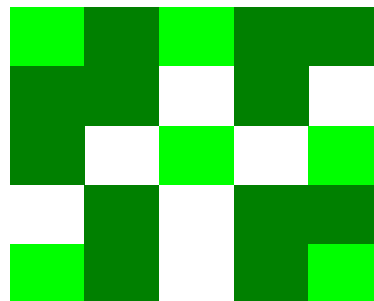
Year planted

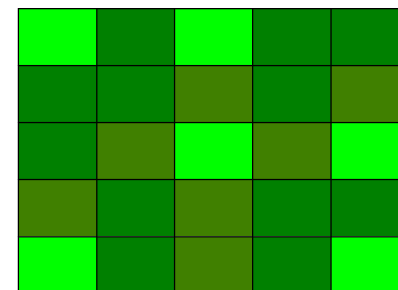1 year afterwards

2 years afterwards

If we plant more patches to begin with, the whole areawill be covered with sea grass in a faster time
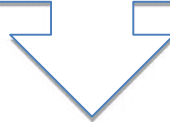
Year planted

1 year afterwards

2 years afterwards

# Measure 2: Controlling and reducing pollution at source

If we can reduce pollution and the sediment at sources (normally land-based), coastal waters can be improved and will be more suitable for sea grass growth

If seagrass beds are in better condition, they can better filter sediments, nutrients and other pollutants before they reach the coral reefs

And the water will be clearer

# Measure 3: Dugong Conservation

Dugong is an endangered specie.
In Trang, there are only 130
dugongs

If the population reduces futher,
there is a high risk that they will
become extinct in these waters

Since survival of the dugongs
depend on abundance of sea
grass.. Conservation of sea grass
beds is therefore an important
measure to reduce the risk of
dugong extinction



But to preserve the
sea grass beds alone
may not  be sufficient

# Because the dugongs face a number of other threats….

Dugongs are mammals. So if the get caught in fishing nets, or if they are injured by boat propellors and are unable to surface to breathe, they will drown

One way to provide protection is to declare certain areas that are habitat or feeding grounds as sanctuaries

But to do this, we need to know.
- ❖ where they roam
- ❖ where they sleep
- ❖ and where they feed

We can do this by tagging them. Signals from these tags will be picked up by satellite
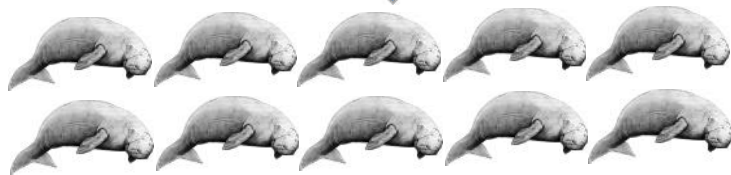
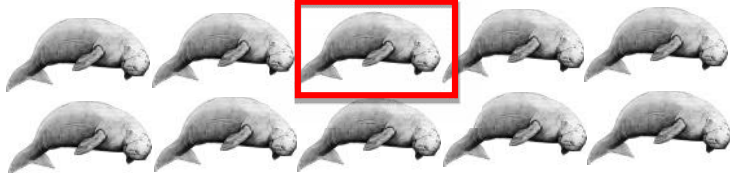We will then have information about where they go

These red dots will provide information about the areas that should be their sanctuaries

Dugongs move in groups (normally about 10 per group)

So we don't tag all of them but just one and we will know where the group move

| Type of value | Million USD |
|---|---|
| Use value from Fisheries | 1.2 |
| Use value from Tourism | 5.5 |
| Indirect use value from carbon sequestration | 65 |
| Non-use value | 275 |



**Replacement cost?**

**=1,168 USD/Hectare**

# There is a distance ahead to turn this cut diamond

Adjustments of assumptions and data refinements required for  it can becomes a fine jewel…….



However the preliminary estimates serve as an indication of the economic value of seagrass ecosystems.   It also highlights  a potential to mobilize support from the general public to support protection and conservation efforts.