MAPPING, MONITORING AND MANAGING SEAGRASS RESOURCES IN THE BINTAN ISLAND, INDONESIA USING REMOTE SENSING

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Seagrasses are submerged flowering plants (angiosperms) that can form dense beds in shallow subtidal, mostly clear and sheltered, softbottomed marine and estuarine environments. The function of seagrass:

- **Habitat for various marine biota**: Provide shelter, spawning and nursery ground.
- **Primer producer**: Productivity in the seagrass ecosystem is high.
- **Recycling nutrients**: Effective in recycling nutrients.
- **As sediment trap**: Effective in trapping sediment and make the water clear and this important to other ecosystem such as corals.
- **Effective to trap CO2**: Effective in trapping CO2 more than rainforest.
Why Bintan Island?

• Bintan is the outer Island, faced to Singapore and Malaysia, bordered by Singgapore and Malacca Straits → the most busy sea transportation lane in the world
  → Established data base on coastal zone resources, in case of tanker accident

• Bintan has highest seagrass biodiversity in Indonesia.

Cr  Cs  Ea  Hd  Hm  Ho  Hu  Hs
Hp  Si  Th  Tc

X Not found
↓ rare in Indonesia
Why Bintan Island

- Home for endangered species such as Dugong, sea turtles
Seagrass Ecosystem in Bintan are threatened by various human activity.

Nowadays is OK 5, 10, 20 years ahead.....?

- Unfriendly land used
- Buried searss
- Hotel, Resort & Restaurant
- Eutrophication

- Sumberdaya hayati hilang
- Kunjungan wisatawan rendah
- Pendapatan daerah berkurang
- Kesejahteraan menurun
- Pengangguran meningkat
- Kriminalitas meningkat
The objective of this study

• To collect bio-ecology data of seagrass
• To Map the seagrass in Bintan Island
• To monitor and to propose good management of seagrass resources in Bintan
STEPS ON PREPARATION OF ZONATION PLAN

1. Field Survey: - Species distribution, diversity, % coverage, Biomass of seagrass, - Environment condition (temperature, salinity, depth, substrat), - Socio-economic-culture of the community.
Species diversity of seagrasses in the coastal zone of east Bintan Island
Association between seagrass and corals
Association between seagrass and various flora and fauna which having commercial values or not.
Mengapa Bintan?

- Commercial fisheries products provided by seagrass.
STEPS ON PREPARATION OF ZONATION PLAN

2. Mapping seagrass using multi-temporal satellite data: → isocluster analysis

- Dense seagrass
- Lmedium
- Seagrass mix with send
- Coral reefs
- Rock
- Land Laut
- Laut
1. Sungai Kawal

Landsat-7 TM, 3 Mar 2003
Luas: 2600.1 ha

Landsat-7 ETM, 22 Feb. 2008
Luas: 2599.8 ha

ALOS- AVNIR-2, 14 2009
Luas: 2596.9 ha
Vegetation Indek of near the coastal areas

Luas 1973: 0.72 ha → 1989: 1.98 ha → 2000: 437.5 ha → 2008: 1066.7 ha, → 2009: 538.2 ha
TAHAPAN PERSIAPAN RENCANA ZONASI

3. Simple GIS Analysis

- Species diversity of seagrass
- Sea grass % Cover
- Sea grass biomass
Seagrass condition map

Tourism development along the east coast of Bintan
Draft for possibility zoning for sea grass management

- Conservation zone
- Restricted sed zone
- Full used zone
4. Focus Group Discussion (FGD):

FGD 1 → Bio ecology of Seagrass
FGD 2 → Government act / decree on sea grass
FGD 3 → Desimination of research results
6. Detail Mapping:
 Mapping the good habitat of sea grass in each village
Detail Sampling
Zonation in the coastal zone of east Bintan

- **Seagrass sanctuary zone**
- Restricted utilization zone
- Zone for ferry boat
- Community Tourism Zone
- Eco-Tourism zone
- General Tourism Zone
- Commercial Tourism Zone
- Catch Fisheriez Zone
- Sub Zone or diving
7. Final FGD: to discuss the candidates of seagrass sanctuary in for villages Pengudang, Berakit, Malang-Rapat dan Teluk Bakau villages. The head of village and their community agree to build the seagrass sanctuary.

8. Kegiatan Lainnya:
- Kesadaran Masyarakat
- Pembentukan Pondok Informasi
8. Seagrass sanctuary development in 5-7 October 2009

Teluk Bakau sanctuary
- Dominance: Thalasiodendron
- Association: Coral
- Not exposed during low tide
- Thread: none

Malang Rapat sanctuary
- Dominance: Enhalus
- Association: None
- Exposed during low tide
- Thread: other village community

Sanctuary
- Dominance: *Enhalus acroides*
- Association: Mangrove
- Exposed during low tide
- Thread: none
PERATURAN DESA
DESA TELUK BAKAU
KECAMATAN GUNUNG KIJANG
KABUPATEN BINTAN
NOMOR : 21 TAHUN 2009

BUPATI BINTAN
KEPUTUSAN BUPATI BINTAN
NOMOR : 267/VI/2010

TENTANG
PENETAPAN KAWASAN KONSERVASI PADANG LAMUN
KABUPATEN BINTAN

BUPATI BINTAN,
The head of Bintan district won coastal award during the national Symposium on the coastal zone and small island in Amnon in 2010.

There are five categories for the Coastal Award 2010. The winners and the categories are as follows:

1. Eliza Kissva: Personal Category
2. Wahana Anak Pantai: Community Group Category
3. District of Bintan: Local Government Category
4. Pertamina Refinery Unit IV Cilacap: Corporate Category
5. Heru Pamuji: News Category

The Coastal Award 2010 for Local Government Category was received by Bupati Bintan, Anshar Ahmad. (Source: KKP & Antara)
THANK YOU
TERIMA KASIH
Conclusion
- This research give good lesson learnt, from basic research to seagrass management

- Need to monitor periodically the effectiveness of seagrass sanctuary in the east coast of Bintan

- Become good? Not change? or Worsen?