FROM COASTAL MANAGEMENT TO INTEGRATED URBAN COASTAL MANAGEMENT – THE SINGAPORE STORY

L.M. Chou
Dept of Biological Sciences
National University of Singapore

9TH ICRI EAST ASIA REGIONAL WORKSHOP / MPA MANAGEMENT EFFECTIVENESS CAPACITY BUILDING WORKSHOP, 9th – 12th SEP. 2013, SINGAPORE
ICM initiatives in Southeast Asia

- ASEAN/USAID Coastal Resources Management Project.
- GEF/UNDP/IMO Partnerships in Environmental Management of the Seas of East Asia (PEMSEA).
- USAID/URI Thailand Coastal Resources Management Project.
- USAID/Indonesia Coastal Resources Management Project.
- ASEAN/Australia Coastal Living Resources Project.
WHAT IS INTEGRATED COASTAL MANAGEMENT?

Management framework based on the simple concept of getting people to work together in managing the coastal environment.
WHY IS ICM NEEDED?

• Resolve / reduce multiple use conflicts.
• Improve interagency coordination in planning and management.
• Promote policy and functional integration.
• Ensure sustainable use and environmental protection.
• Avoid/reduce risks to public and ecosystem health.
• Create environmental investment.
INCREASING PRESSURES

Expanding coastal population

Growing demand for marine resources

Diverse economic activities

small coastal community

subsistence fishing

coastal megacity
SOUTHEAST ASIA

Total coastline length – 120,000km (7% of world’s total).

Coastal population (within 100km of coast) - 401m (85% of total population). World’s average coastal population 40%.

Sea area – 2.5% of world’s ocean surface.
MARINE BIODIVERSITY GLOBAL HOTSPOT

- Many species endemic to the region.
- Global extinction potential high.

- 75% of world’s coral spp.
- 40% of world's reef fish spp.
- 6 of world’s 7 marine turtle spp.
- 51 of world’s 70 mangrove spp.
- 23 of world’s 50 seagrass spp.
COASTAL DEVELOPMENT

Coastal aquaculture

Mariculture

Dredging

Dumping of spoils
COASTAL TOURISM
COASTAL CONSTRUCTION

Coastal road built close to shoreline (Cha-am, Thailand)
oil-contaminated mangrove habitat (Brunei Darussalam)
1992 RIO SUMMIT
“to safeguard the health and integrity of the world’s ecosystems”

ECOSYSTEM HEALTH
ECOSYSTEM INTEGRITY

2002 WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT
Integrated coastal management

Sustainable Development

Sectoral approach in management. (Different agencies and sectors with individual agendas.)

Open access of coastal and marine environment. (Tragedy of the commons.)

Total land area: 715.8 km²
Territorial sea: 750 km² (82% port waters)
Human population: 5.31m
Population density: 7,422 per km²

60 small offshore islands.
>98% of mangroves lost
>60% of coral reefs lost
Land reclaimed before 1959

Land reclaimed in the 1960s

Land reclaimed in the 1970s

Land reclaimed in the 1980s.

Land reclaimed today (and future).
One of world’s busiest ports

2012
- vessel arrivals - 2.25 billion gross tons (130,422 vessels)
- cargo tonnage - 538 million tons
- container throughput - 31.6m TEUs

- Ships arrive and depart every 2 to 3 minutes.
COASTAL RECLAMATION AND MODIFICATION

- artificial lagoon
- east coast reclamation
- dredging
- dumping
POLLUTION MANAGEMENT

Water quality monitoring by National Environment Agency and Maritime and Port Authority.

All sewage treated before discharge – coliform bacteria and harmful pathogens reduced.

Industrial effluent treated before discharge.

Strong measures to control ship-based oil discharge.

These measures improve carrying capacity of the marine environment.
Traditional fishing trap - “kelong”

Floating fish farm (Changi)

Floating fish cages (St. John’s)
**WHY IS ICM NEEDED?**

Improved management efficiency to meet sustainable development goals.
- reduce conflicts
- address management gaps
- minimize environmental degradation.
- greater appreciation of ecosystems as resource systems.

**WHO OWNS THE SEA?**
**WHO OWNS THE COAST?**

Grey ownership.
Sector-centered responsibility.
Accountability?
Personal observation (1995)

No agency claimed responsibility over marine habitat protection.

Regulations on removal of corals and reef-associated organisms outdated or non-existent.

Which agency gives approval for reef surveys?

Personal experience (1995)

Pulau Sakra reef survey

Jurong Town Corporation  Port of Singapore Authority
Before mid 1990s - management response to marine biodiversity protection nil.

No integrated coastal management framework. Management largely sectoral.

All marine related agencies avoided responsibility over marine habitat protection.

2004 - National Parks Board given custodian role of marine biodiversity.

2007 - Establishment of inter-agency Technical Committee on Coastal & Marine Environment under umbrella of the Inter-Ministerial Committee on Sustainable Development.
INFORMATION TO SUPPORT DECISION-MAKING

Robust information required.

Sectoral management promotes information defense.
CAN ICM WORK IN SINGAPORE?

2. Semakau landfill (1996)
CLEANING OF SINGAPORE RIVER AND KALLANG BASIN

10 year program commencing 1977

US$ 150m
TRIGGERING FACTORS

• GROSS POLLUTION
• BIOLOGICALLY-DEAD RIVERS
• STENCH
• HEALTH RISK
• OPEN SEWER AND GARBAGE DUMP
## GOVERNMENT AGENCIES INVOLVED

<table>
<thead>
<tr>
<th>MINISTRY</th>
<th>AGENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Sewerage Dept., Drainage Dept., Environmental Health Dept., Hawkers Dept.</td>
</tr>
<tr>
<td>National Development</td>
<td>Parks and Recreation Dept., Housing Development Board, Urban Redevelopment Authority</td>
</tr>
<tr>
<td>Trade &amp; Industry</td>
<td>Jurong Town Corporation</td>
</tr>
<tr>
<td>Communications</td>
<td>Port of Singapore Authority</td>
</tr>
<tr>
<td>Law</td>
<td>Land Office</td>
</tr>
</tbody>
</table>
SUCCESS FACTORS

• Integrated area management approach
• Strong political commitment
• Integration of programme with nation’s long-term development strategy
• Provision of alternatives
• Investment in infrastructure
“It should be a way of life to keep the water clean, to keep every stream, every culvert, every rivulet, free from unnecessary pollution.

The Ministry of the Environment should make a target: in ten years, let us have fishing in the Singapore River and fishing in the Kallang River.

It can be done.”

SEMAKAU LANDFILL

Pre-development considerations.

- Protection of coral reefs and mangroves.
- Restoration of mangroves.
Mangrove rehabilitation at Semakau.

*Rhizophora* zone of the mangrove. Northern nursery visible on the right of picture.

The southern nursery with monoculture of *Rhizophora* sp. at about 4 years old.
Semakau landfill opens for nature-based activities

Launch welcomes back 40 former resident families from Pulau Sakeng

News Release No: 30/2005
Date of issue: 16 July 2005

For 40 families, returning together to the island of Pulau Sakeng where they once lived was something they had often talked about.

It was a wish come true for them this morning as they set foot on the island - now joined by a bund and road to Pulau Semakau to form Semakau Landfill - as special guests of Dr Yaacob Ibrahim, the Minister for the Environment and Water Resources. The Minister was there to officiate the launch of Semakau Landfill for recreational activities.

Semakau Landfill was developed to meet Singapore’s need for landfill when the last one on the mainland at Lorong Halus closed in 1999. It is also the world’s first manmade offshore landfill.
SINGAPORE’S CORAL REEFS

No problem with ecotourism
No problem with poison or blast fishing

Some problems with unregulated harvesting for

1. aquarium trade (anemones)
2. food (sea cucumbers, giant clams)
3. ornamental trade (collection of corals by Korean construction workers in 1970s)
Can we get clear waters again? A test for ICM.
Can ICM make Singapore a strong model for sustainable development?
World’s busiest harbour + good water quality + rich biodiversity.

IUCM